



# Installation Guide

## SCALAR EVO Pulse





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## Before the Installation

This installation guide provides you with installation directives and procedures for the correct installation of SCALAR EVO Pulse.

### Liability

The installation of SCALAR EVO Pulse can be carried out either by a Certified TEBS Service Partner or by the customer himself (after a ZF-Transics training / demo installation). Contact your service partner in case the TEBS data still need to be activated.

A lot of customers prefer to do the installation themselves: the building-in of the device can then be combined with regular trailer maintenance services, which allows for a more efficient use of time. To this purpose, we provide trainings for the technical engineers of the (installation) company. The training consists of a theoretical part which can be illustrated with a demo installation, and further monitoring. Afterwards, the trainees will be qualified to autonomously assemble the other devices in the trailers.

The illustrations and specific data of non- ZF-Transics products have been checked thoroughly and have been found correct at the time this manual was composed. However, ZF-Transics cannot accept any responsibility for possible adaptations by the manufacturer concerned. ZF-Transics aims for a continuous improvement of its products. For the purpose of technical progress, we reserve the right to implement changes at any time, without prior notice.

### Approvals

#### CE Approval

See the [SCALAR EVO Pulse EC Declaration of Conformity](#).

#### Mobile Phone Radiance

Frequency	RF output power
LTE-FDD B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B26/B28	23 dBm $\pm$ 2 dB (class 3)
LTE-TDD B39 (for category M1 only)	23 dBm $\pm$ 2 dB (class 3)
GSM850 / EGSM900	33 dBm $\pm$ 2 dB
DCS1800 / PCS1900	30 dBm $\pm$ 2 dB

#### EEC Type Approval

E/ECE/324 Addendum 9: Regulation No. 10-05 – E6-10R05 1210

## Best Practices in Installation



During the entire connection procedure, the voltage must be turned off.

### ASSEMBLY

The assembly of the parts must be done using the accessories provided. ZF-Transics cannot be held responsible for any errors resulting from the use of other materials. ZF-Transics wishes to point out that activities which require welding to the trailer, can cause damage to the electronics of the device. It is imperative that the device is disconnected when carrying out such activities.

### WIRE MANAGEMENT

All the wire ways shall be smooth and free from sharp edges. Wires shall be protected, so they do not come into contact with burrs, cooling fins, moving parts, etc., which could cause damage to the insulation of the conductors.

### OPERATING CONDITIONS

- Input voltage range: 10 - 32 V
- Maximum current: 1.5 A
- Operating temperature range – Externally powered: -40°C ~ +75°C
- Operating temperature range – Battery powered: -20°C ~ +60°C
- Battery charging temperature range: 0°C ~ +45°C
- Storage temperature range: -20°C ~ +60°C
- Nominal power consumption – Battery fully charged: 0.6 W
- Maximum power consumption – Battery charging: 7.5 W
- Ingress Protection: IP6K6K / IP6K9K
- Compliance with: ISO 16750 – D/E – L – E – D – D – IP6K6 / IP6K9K

### DISPOSAL



Batteries are hazardous waste.

Dispose of hazardous waste in an environmentally friendly manner and in compliance with relevant national regulations.

As with other old devices, all components can be returned to ZF-Transics.

### IMPROPER USE

**USE THE DEVICE ONLY FOR ITS INTENDED PURPOSE!**

**DO NOT OPEN THE SCALAR EVO PULSE UNIT.**

**IT IS NOT ALLOWED TO DRILL IN THE DEVICE HOUSING!**

In case of damage of any kind, which could affect the Ingress Protection / waterproofness of the device, the device must be immediately taken out of service.

The device safety may be endangered in case:



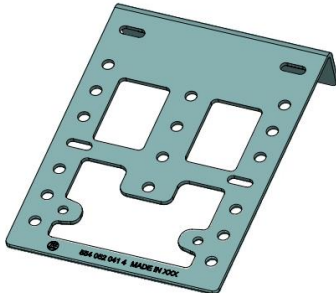
- The device is not firmly fastened to the trailer.
- The device has suffered from transportation damages.
- The temperature limits are exceeded.
- The device is visibly damaged.

**IF THE DEVICE IS VISIBLY DAMAGED, IT MUST BE IMMEDIATELY REPLACED AND SENT BACK TO ZF-TRANSICS.**

All other instructions, notes and regulations in this operation manual must be closely followed.

## Step 1 - Hardware Components

SCALAR EVO Pulse is a trailer tracer unit with an embedded SIM card, GSM antenna, GPS antenna and RF antenna for tire pressure monitoring. It is designed for outside use. It consists of an ECU which can be **connected** to a trailer's **TEBS** system.

Dimensions (L x W x H)	HW Component
<p>Including fixing points: 154 x 132 x 50 mm</p> <p>Excluding fixing points: 105 x 132 x 50 mm</p>	 <p>SCALAR EVO Pulse (Part number 346 292 001 0)</p>
<p>In case the installation includes a TPMS system (with internal sensors cf. <a href="#">Connecting to the Internal Sensors</a> p.38), an installation bracket <b>MUST</b> be used to fix the SCALAR EVO Pulse.</p> <p>If no TPMS system is used, the installation brackets are not required.</p> <p>Bracket dimensions: 251.8 x 195 x 4 mm</p>	 <p>Installation bracket Advanced I-bracket (Part number 554 052 051 4)</p>
<p>The Advanced I bracket is the default bracket in case of TPMS.</p> <p>Do <b>NOT</b> make adjustments to the advanced I bracket, as this will have a negative effect on TPMS performance.</p> <p>In case installation with the Advanced I-bracket is not possible, we offer an alternative with the L-bracket.</p> <p>Bracket dimensions: 280 x 205 x 4 mm</p>	 <p>L-bracket (Part number 554 052 041 4)</p>

# Hardware Description

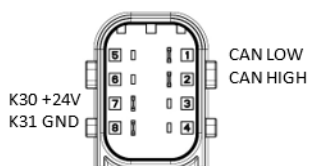
Front view



Back view



## PIN ASSIGNMENT



**NOTE:** Make sure that the air vent of the SCALAR EVO Pulse unit is always accessible to air. Make sure that nothing can block the air access of the air vent (Do NOT apply glue/tape/silicone along the edges of the unit). Mounting the unit on the bracket will not block the air vent.

Device serial number:  
TPB1-XXXXXXXXXXXXXXXXX  
or  
TPB2-XXXXXXXXXXXXXXXXX  
(SCALAR EVO Pulse with load dump protection)

Side view



**TPB1-123456789123456**  
TX-TRAILERPULSE with battery  
346 292 000 0

01

CE FC XMR201707BG96

**E6 10R-05 1210**

Designed in BELGIUM  
Made in EUROPE (Romania)

WABCO Europe BVBA Chaussée de la Hulpe 166 1170 Brussels, Belgium	Voltage range: 10-32V Maximum current: 1,5A T°: -40°C to +75°C	IP6K6K IP6K9K
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## Step 2 - SCALAR EVO Pulse Position

### General Recommendations

- SCALAR EVO Pulse must be installed and activated within 1 year and 3 months after assembly to ensure the product warranty.
- Verify the installation with an external power source connected to the SCALAR EVO Pulse unit.
- To obtain a full battery capacity, connect the SCALAR EVO Pulse unit to an external power source for 4 hours.
- Make sure that the unit will not be continuously exposed to direct sunlight.
- Make sure that the label of the unit is always visible.
- The installation technician remains responsible at all times for the correct installation and connection of the hardware unit.
- As we cannot document all different trailer configurations, we recommend validating the installation of the unit with a ZF-Transics technician before deploying it on a large scale.



In case the installation includes a TPMS system (with internal sensors cf. p. 38), an installation bracket **MUST** be used to fix the SCALAR EVO Pulse. If no TPMS system is used, the installation brackets are not required.

### Installation without Bracket (Standard Trailer with a Fixed Trailer Bed)

- The unit must be installed below the trailer bed with the front of the SCALAR EVO Pulse unit directed to the bottom.
- Make sure that the front of the unit has a clear view to the bottom (not obstructed by other components).
- Keep the sides of the unit at a minimum distance of 20 cm from obstacles.
- **Always verify that sufficient GPS coverage is guaranteed** and a good GPS position has been received via <https://install.new.wabco-fleet.com/> (cf. "Step 4 - Checking the Installation" p. 40).

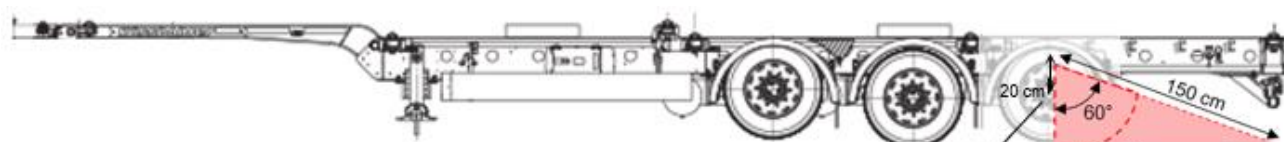
Always observe all above-mentioned [General recommendations!](#)



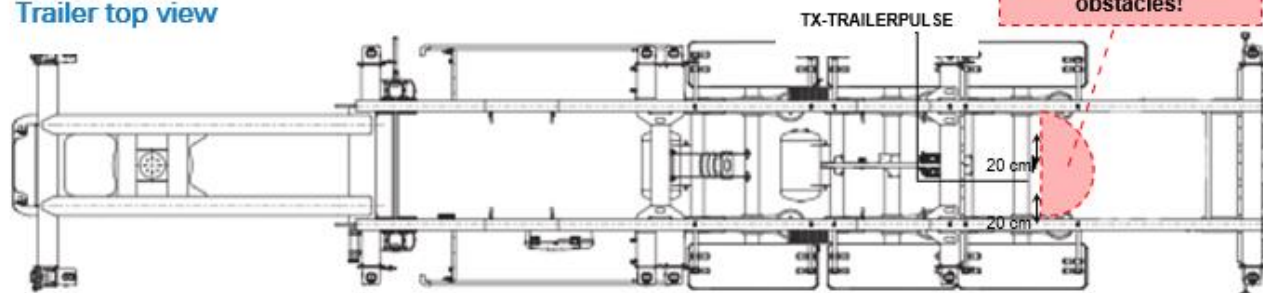
## Alternative Installation without Bracket (Trailer without Fixed Trailer Bed)

- If no fixed trailer bed is available (e.g. container chassis, tilt chassis ...), the hardware unit can also be installed in a vertical position with the front of the unit directed to the back or side of the trailer.
- Find a suitable location and make sure that the front of the unit has a **clear view** as much as possible (min. 150 cm).
- Keep the sides of the unit at a minimum distance of 20 cm from obstacles (also keep a minimum distance of 20 cm above the unit).
- **Always verify that sufficient GPS coverage is guaranteed** and a good GPS position has been received via <https://install.new.wabco-fleet.com/> (cf. "Step 4 - Checking the Installation" p. 40).
- Always observe all abovementioned [General Recommendations!](#)

### Trailer side view



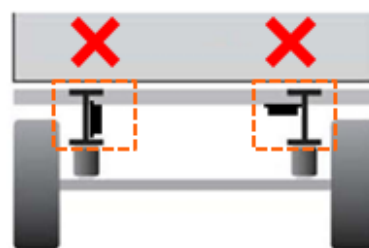
### Trailer top view



### Incorrect Installation

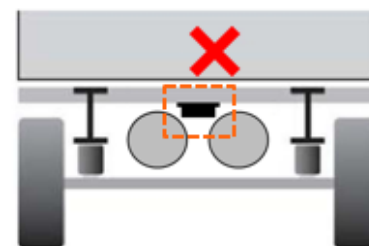
#### *INCORRECT:*

Do NOT install the unit on or inside the trailer beams.



#### *INCORRECT:*

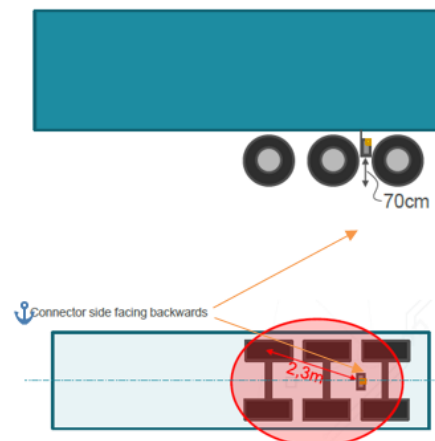
Do NOT install the unit above other components (e.g. air tanks ...). The unit requires a clear view to the bottom.





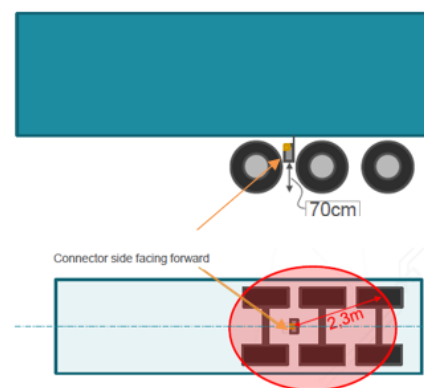
## Installation with Bracket: Between Axle 2 And 3, Connector Upwards and to the Back of the Trailer

- In case the installation includes a TPMS system (cf. Connecting to the Internal Sensors p. 38), an installation bracket MUST be used to fix the SCALAR EVO Pulse (cf. “Fastening SCALAR EVO Pulse” p.9).
- Install the unit between axle 2 and 3, **with the connector facing towards the back of the trailer.**
- Make sure that the unit is placed with the connector on the upper side.
- Install the unit at around 70 cm from the ground.
- Install the unit centered between the wheels (in the middle of the axle).
- Install the unit at a max. distance of 2.3 m from the center of any of the wheels.
- **Make sure that the unit has a clear view to all wheel sensors (not obstructed by other components).**



## Alternative Installation with Bracket: Between Axle 1 and 2, Connector Upwards and to the Front of the Trailer

- In case the installation includes a TPMS system (Connecting to the Internal Sensors p. 38), an installation bracket MUST be used to fix the SCALAR EVO Pulse (cf. “Fastening SCALAR EVO Pulse” p. 9).
- Install the unit between axle 1 and 2, **with the connector facing towards the front of the trailer.**
- Make sure that the unit is placed with the connector on the **upper** side.
- Install the unit at around 70 cm from the ground.
- Install the unit centered between the wheels (in the middle of the axle).
- Install the unit at a max. distance of 2.3 m from the center of any of the wheels.
- **Make sure that the unit has a clear view to all wheel sensors (not obstructed by other components).**



### Installation Instructions for Cables

The general installation instructions to be observed for cables and connectors can be downloaded from: <http://inform.wabco-auto.com/intl/drw/9/4490000000.pdf>.

After connecting all hardware to SCALAR EVO Pulse, ZF-Transics recommends using cable ties to relieve tension from the connectors.



## Fastening SCALAR EVO Pulse

- Install the SCALAR EVO Pulse unit in one of the recommended positions (cf. "[General Recommendations](#)" on p.6).
- Always verify that sufficient GPS coverage is guaranteed and a good GPS position has been received via <https://install.new.wabco-fleet.com/> (cf. "[Step 4 - Checking the Installation](#)" p. 40). Check this for every installation!

### PLEASE OBSERVE THE FOLLOWING RECOMMENDATIONS:

- Install the unit centered between the wheels (in the middle of the axle).
- **Make sure that the unit has a clear view to all wheel sensors (not obstructed by other components).**
- Install the unit at a max. distance of 2.3 m from the center of any of the wheels.
- Install the unit at around 70 cm from the ground.

## Fixing the Bracket to the Trailer

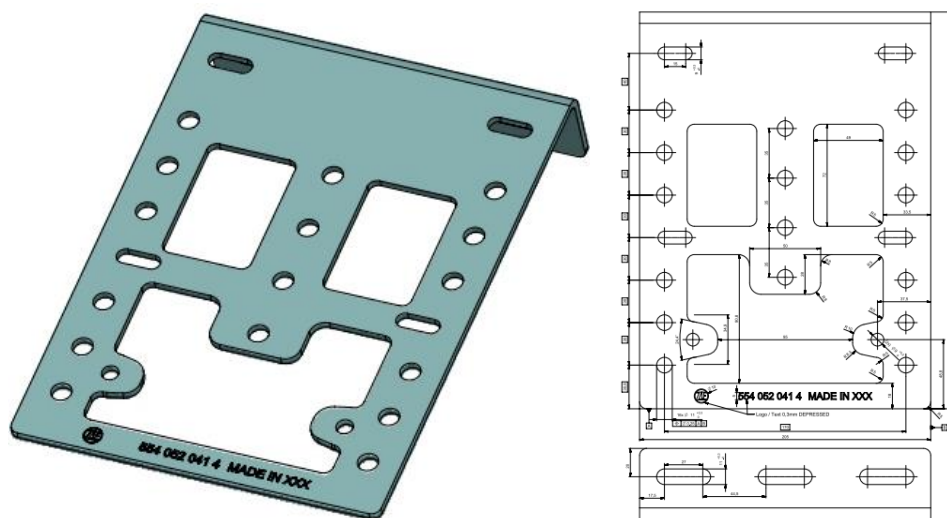
- Make sure that the bracket is placed perpendicular (90° angle) to the ground and the trailer floor.
- Screw the bracket onto the trailer.

## Fixing SCALAR EVO Pulse to the Bracket

- Use hexagon head M8 x 1.25, class 8.8 bolts, nuts and washers (not included) treated for the applicable environment to mount the SCALAR EVO Pulse unit on the bracket.
- Tighten with a maximum torque of 12.5 Nm.
- Make sure that the unit is positioned with the connector on the upper side.



Advanced I-bracket (554 052 051 4)



L-bracket (554 052 041 4)

## Step 3 - Connecting the Hardware

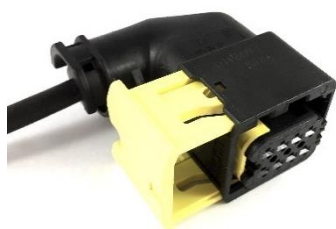
### Hardware Activation

The SCALAR EVO Pulse unit is preactivated and will start sending positions as soon as the unit is connected to an external power source.

### Connection to SCALAR EVO Pulse

All TEBS connection cables use the same type of connector. Always make sure that all connectors are correctly plugged in to ensure a waterproof connection. The SCALAR EVO Pulse unit can be powered by the TEBS system.

All TEBS connection cables use the same type of connector.

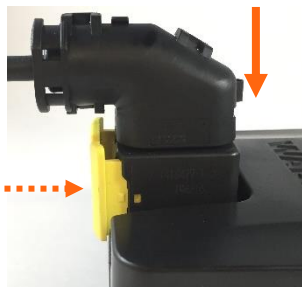


1. Plug the connector into the port.



The design of the connector will prevent you from plugging it in incorrectly.

2. Press down the connector.



By pressing down the connector, the yellow clip will automatically move down.

3. Finally, press the yellow clip to lock the connection.



A distinct "click" should be heard.

4. The connector has been plugged in correctly.



**CORRECTLY**  
plugged in

## Connecting to the TEBS System

### IMPORTANT – DIAGNOSTIC SOFTWARE

Some TEBS systems require parameter adaptation of a specific port. For the parameter adaptation, you will need a PC / laptop, a diagnostics interface, a connection cable (USB / serial) and the WABCO diagnostics software.

### Software Requirements - Ordering the Diagnostic Software

Open the website: [Diagnostic Software | WABCO Customer Centre \(wabco-customercentre.com\)](http://www.wabco.info/i/524)

Help on logging in can be obtained by pressing the Step-by-step instructions button.

After you have successfully logged in, you can order the Diagnostic Software via myWABCO.


Please contact your partner if you have any questions.

If parameters are to be changed, however, authorization with a PIN code is required. You can obtain this PIN through the relevant training course or e-learning at the Academy. More details on the diagnostics software can be obtained from your local Service Partner or via




<http://www.wabco.info/i/524>.

### Hardware Requirements

#### Option 1: Diagnosis in accordance with ISO 11992 (CAN 24 V) via the 7-pin ISO 7638 CAN connection

<p>ISO 7638 disconnecting adapter with CAN socket (446 300 360 0)</p> 	<p>Diagnostics interface (DI-2) with USB port (for PC connection) (446 301 030 0)</p> 	<p>CAN diagnostics cable (446 300 361 0 (5m) / 446 300 362 0 (20m))</p> 
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#### Option 2: Diagnosis in accordance with ISO 11898 (CAN 5 V) via an external diagnosis connection

<p>External diagnostics socket with yellow cap (449 611 xxx 0): Only TEBS E Modulators (Premium)</p> 	<p>Diagnostics interface (DI-2) with USB port (for PC connection) (446 301 030 0)</p> 	<p>CAN diagnostics cable (446 300 348 0)</p> 
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### IMPORTANT

In case another TPMS system (such as OptiTire) is connected to the EBS unit, the TPMS data / functionality will be used from that system and not the data from SCALAR EVO Pulse.

No matter which configuration (with or without TPMS) you have, ALWAYS install the SCALAR EVO Pulse unit in one of the recommended positions (cf. "[General Recommendations](#)" on p.6).

The cable overview can be found on the following page.

## Cable Overview

TEBS-D PREMIUM 480 102 010 0				
Configuration	Cable(s)	Connections	TEBS Port	
TEBS D PREMIUM SCALAR EVO Pulse	449 377 030 0 (3 m) 894 600 001 2 (0.15 m)	<p><b>NOTE:</b> Only basic EBS data (no ODR / DTC)</p>		
TEBS-E STANDARD / PREMIUM 480 102 03x 0 OR 480 102 06x 0 / 08x 0 (MultiV)				
TEBS-E PREMIUM / STANDARD SCALAR EVO Pulse	449 963 050 0 (5.0 m)		SUBSYSTEMS	
TEBS-E PREMIUM / STANDARD SCALAR EVO Pulse SMARTBOARD	4499162530 8946000012		SUBSYSTEMS	
TEBS-E PREMIUM / STANDARD SCALAR EVO Pulse SMARTBOARD II	4499162530 8946000012 8946000742		SUBSYSTEMS	
TEBS-E PREMIUM / STANDARD SCALAR EVO Pulse OPTITIRE	4499162530 8946000012 8946000012		SUBSYSTEMS	
TEBS-E PREMIUM / STANDARD SCALAR EVO Pulse ECAS REMOTE CONTROL UNIT	4499122340 8946000012		SUBSYSTEMS	



**IMPORTANT**

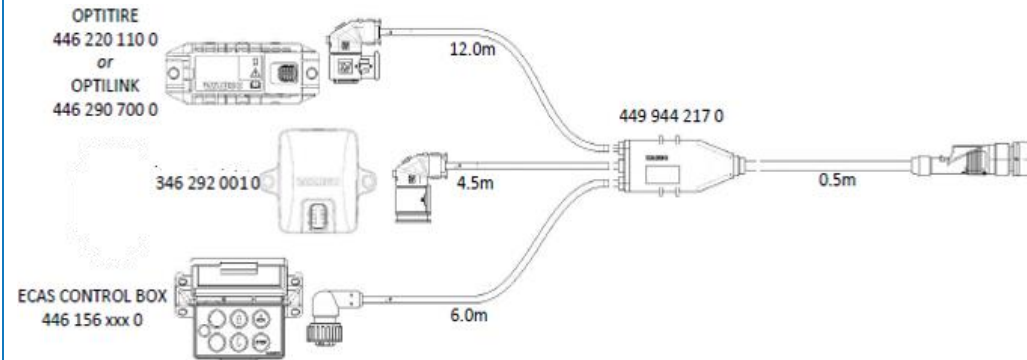
When connecting TEBS connection cable “449 916 253 0”, make sure that you connect the wire labeled as “SMARTBOARD” either to the SMARTBOARD or to the SCALAR EVO Pulse unit (see ⚠ in the images above).

**TEBS-E STANDARD / PREMIUM**  
480 102 03x 0 OR 480 102 06x 0 / 08x 0 (MultiV)

<p>TEBS-E PREMIUM / STANDARD SCALAR EVO Pulse OPTITIRE SMARTBOARD</p>	<p>449 934 330 0</p>		<p>SUBSYSTEMS</p>	
<p>TEBS-E PREMIUM / STANDARD SCALAR EVO Pulse OPTITIRE SMARTBOARD II</p>	<p>449 934 330 0 8946000742</p>		<p>SUBSYSTEMS</p>	
<p>TEBS-E PREMIUM / STANDARD SCALAR EVO Pulse OPTITIRE OPTILINK</p>	<p>449 934 330 0 894 600 001 2</p>		<p>SUBSYSTEMS</p>	

TEBS-E PREMIUM /  
STANDARD  
SCALAR EVO Pulse  
OPTITIRE or OPTILINK  
ECAS CONTROL BOX

449 944 217 0



SUBSYSTEMS

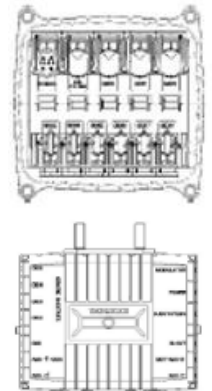
TEBS-E STANDARD / PREMIUM  
480 102 03x 0 OR 480 102 06x 0 / 08x 0 (MultiV)

Configuration	Cable(s)	Connections	TEBS Port	
TEBS-E PREMIUM SCALAR EVO Pulse	449 927 020 0 (2.0m) 449 927 050 0 (5.0m) 449 927 120 0 (12.0m)	<p>449 927 020 0 = 2.0m 449 927 050 0 = 5.0m 449 927 120 0 = 12.0m</p>	GIO5	

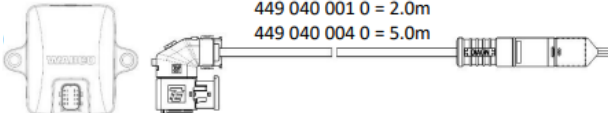


**ELEX**  
446 122 070 0

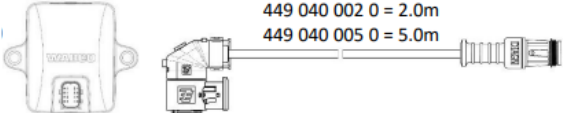
Configuration	Cable(s)	Connections	ELEX Port
ELEX SCALAR EVO Pulse	449 906 060 0 894 600 001 2		ELEX SUBSYSTEMS
ELEX SCALAR EVO Pulse SMARTBOARD	449 925 253 0 894 600 001 2		ELEX SUBSYSTEMS
ELEX SCALAR EVO Pulse SMARTBOARD II	449 925 253 0 894 600 001 2 894 600 074 2		ELEX SUBSYSTEMS
ELEX SCALAR EVO Pulse OPTITIRE	449 925 253 0 894 600 001 2 894 600 001 2		ELEX SUBSYSTEMS




HALDEX EB+  
 Gen. 1 "810 ... .."  
 Gen. 2 "820 ... .." (EBS data as from version C499)  
 Gen. 2 "950 820 ... .."

CONFIGURATION	CABLE(S)	Length	CONNECTIONS	TEBS PORT
1. HALDEX Gen.1/Gen.2 2. TX-TRAILERPULSE	449 040 001 0	2.0m	 449 040 001 0 = 2.0m 449 040 004 0 = 5.0m	DIAG
	449 040 004 0	5.0m		

HALDEX EB+  
 Gen. 3 "823 ... .."  
 Gen. 3 "950 823 ... .."

CONFIGURATION	CABLE(S)	Length	CONNECTIONS	TEBS PORT
1. HADEX Gen. 3 2. TX-TRAILERPULSE	449 040 002 0	2.0m	 449 040 002 0 = 2.0m 449 040 005 0 = 5.0m	DIAGN
	449 040 005 0	5.0m		

HALDEX EB+  
 Gen. 4 "842 ... .."  
 Gen. 4 "950 800 ... .."

Configuration	Cable(s)	Length	Connections	TEBS PORT
HALDEX Gen. 4 SCALAR EVO Pulse	554 051 011 0	5.0 m	 554 051 011 0 5.0m	T-CAN or H-CAN



KNORR G1/TEBS4 ES205x G2.0/G2.1 ES2060 G2.2 ES2090				
CONFIGURATION	CABLE(S)	Length	CONNECTIONS	TEBS PORT
1. KNORR G1/G2.0/G2.1/G2.2 2. TX-TRAILERPULSE	449 040 003 0	2.0m	<p>449 040 003 0 = 2.0m 449 040 006 0 = 5.0m</p> <p>+ 894 600 991 2</p> <p>+ 554 053 011 4</p> <p>(10x)</p>	G1: X2 G2.0/G2.1/G2.2: IN/OUT
	449 040 006 0	5.0m		
	3-way cable junction box 894 600 991 2			
	Knorr TEBS connector kit 554 053 011 4			

Only to be used on Knorr EBS or TPB2

Direct power connection – open end (only serial numbers with TPB2)														
Configuration	Cable(s)	Length	Connections											
Power source SCALAR EVO Pulse (TPB2)	449 040 006 0	5.0 m	<table border="1"> <thead> <tr> <th>Color</th> <th>Signal</th> </tr> </thead> <tbody> <tr> <td>White</td> <td>V in</td> </tr> <tr> <td>Yellow</td> <td>CAN L</td> </tr> <tr> <td>Green</td> <td>CAN H</td> </tr> <tr> <td>Brown</td> <td>GND</td> </tr> </tbody> </table>	Color	Signal	White	V in	Yellow	CAN L	Green	CAN H	Brown	GND	Power source
Color	Signal													
White	V in													
Yellow	CAN L													
Green	CAN H													
Brown	GND													

## WABCO TEBS D1 PREMIUM

449 377 030 0 (3 m)

894 600 001 2 (0.15 m)



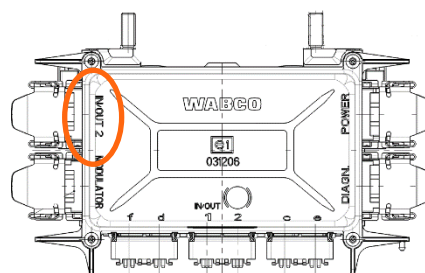
**NOTE:** Only basic EBS data (no ODR / DTC)

### Hardware Connection

Connect SCALAR EVO Pulse to the **IN/OUT port** using the TEBS connection cable. Make sure that the contact pins remain clean and dust-free.

The modulator parameters do not have to be modified. The telematics connections are automatically activated, so no parameter adaptation is required.

After connecting all hardware to the Unit, you can check the installation using <https://install.new.wabco-fleet.com/> (cf. “[Step 4 - Checking the Installation](#)” p. 40).



**Note:** Modulators of the trailer TEBS type D with a production date up to 09/2003 **do not support the power supply of the Unit.**

Verify the serial number on the modulator unit:

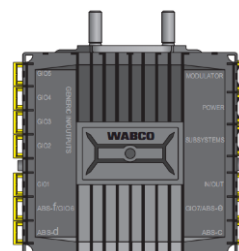
- Supported: 480 102 014 0
- Not supported: 480 102 010 0



## WABCO TEBS E Subsystem

### Hardware Connection

In case of a modulator type E (Standard (480 102 03x 0), Premium (480 102 06x 0) or Multivoltage (480 102 08x 0)), you can connect SCALAR EVO Pulse to the modulator **SUBSYSTEM** port using the TEBS connection cable.



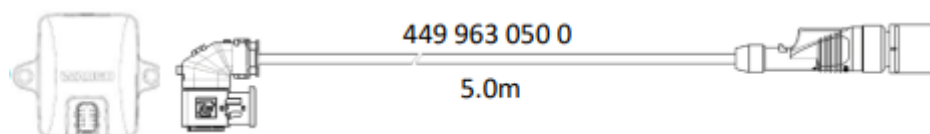
SUBSYSTEM

The required cabling depends on the existing connections. If a smartboard or OptiTire unit is occupying the subsystem port, a specific split cable is required depending on the connected devices.

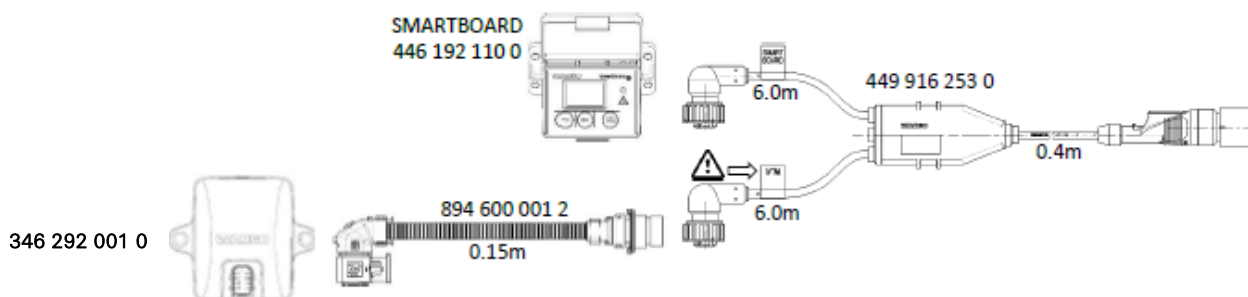
The connector on the TEBS unit remains the same for all cables.



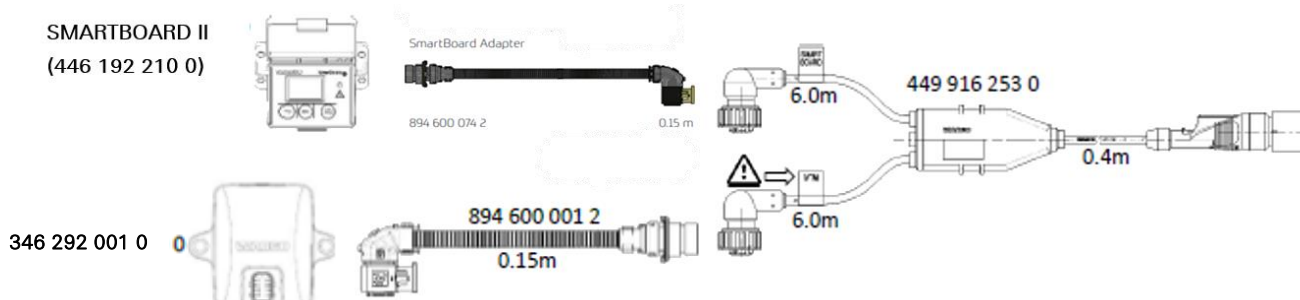
### TEBS E PREMIUM / STANDARD with SCALAR EVO Pulse



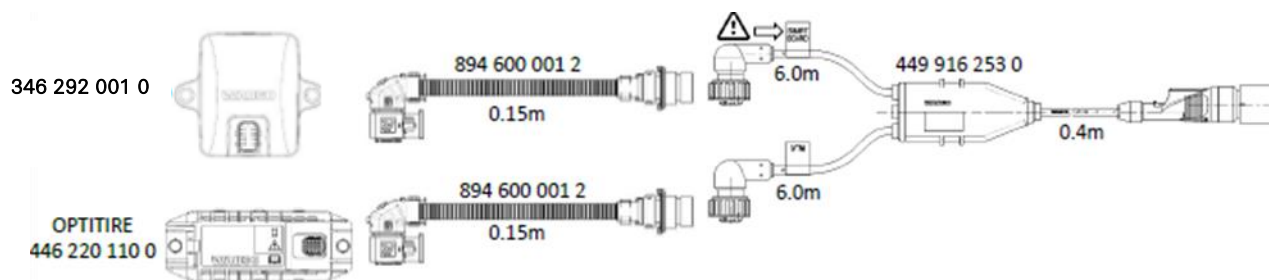
### TEBS E PREMIUM / STANDARD with SMARTBOARD I (446 192 110 0) and SCALAR EVO Pulse



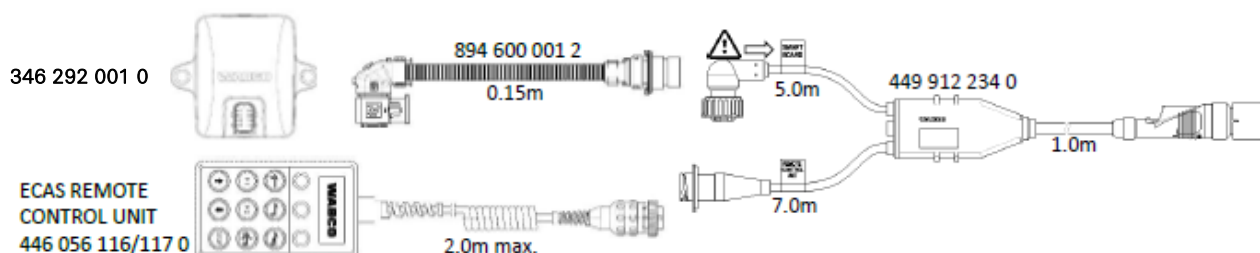
### TEBS E PREMIUM / STANDARD with SMARTBOARD II (446 192 210 0) and SCALAR EVO Pulse



**TEBS E PREMIUM / STANDARD with OPTITIRE and SCALAR EVO Pulse**



**TEBS E PREMIUM / STANDARD with ECAS REMOTE CONTROL UNIT and SCALAR EVO Pulse**

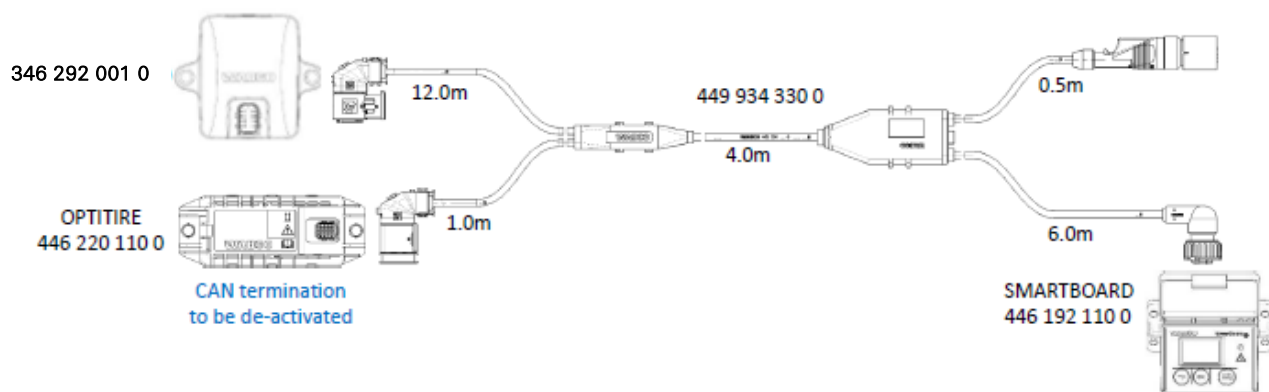


**IMPORTANT**



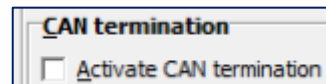
When connecting TEBS connection cable “449 916 253 0”, make sure that you connect the wire labeled as “SMARTBOARD” either to the SMARTBOARD or to the SCALAR EVO Pulse unit (see ⚠ in the images above).

**TEBS E PREMIUM / STANDARD with OPTITIRE, SMARTBOARD and SCALAR EVO Pulse**

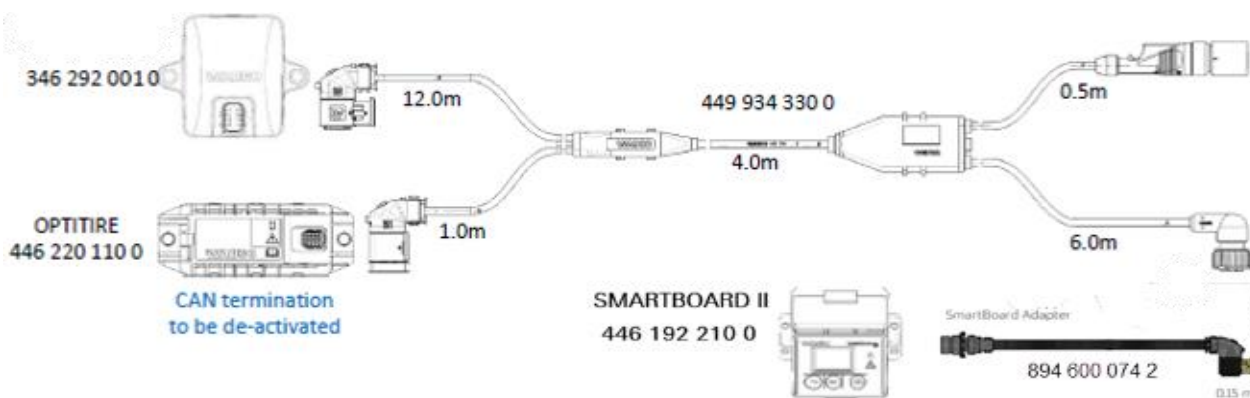


For this configuration type, the CAN bus termination of the OptiTire ECU must be set to Inactive.

Cf. “Deactivation of CAN Termination Using Optitire Diagnostics Software” on p.24.

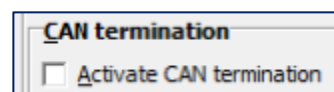


**TEBS E PREMIUM / STANDARD with OPTITIRE, SMARTBOARD II and SCALAR EVO Pulse**

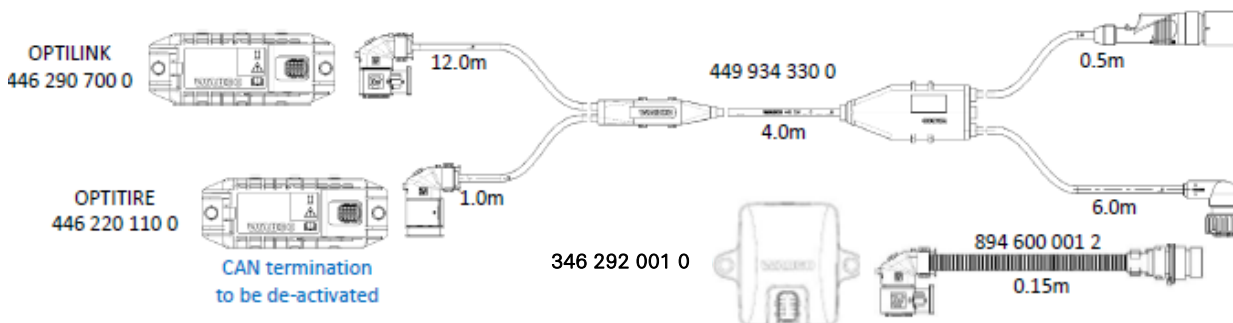


For this configuration type, the CAN bus termination of the OptiTire ECU must be set to Inactive.

Cf. [“Deactivation of CAN Termination Using Optitire Diagnostics Software”](#) on p.24.

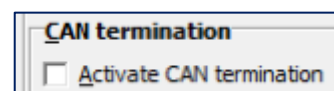


**TEBS E PREMIUM / STANDARD with OPTITIRE, OPTILINK and SCALAR EVO Pulse**

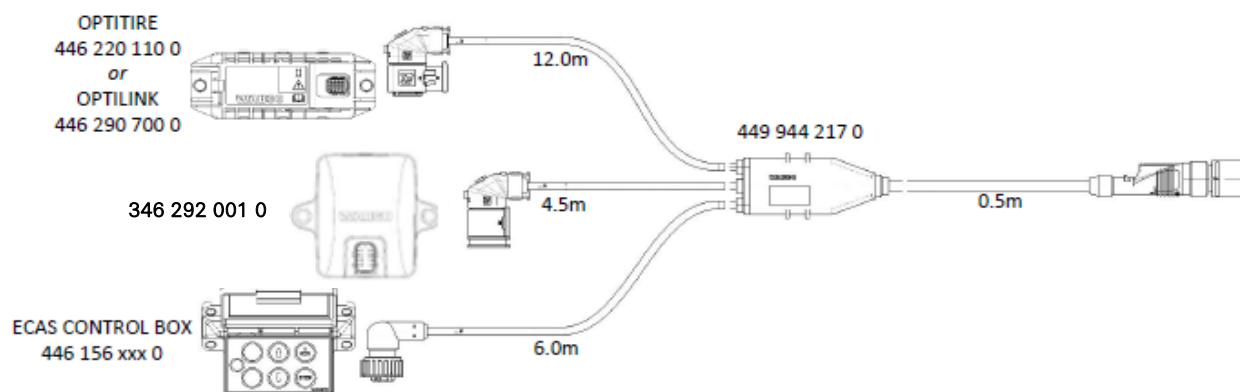


For this configuration type, the CAN bus termination of the OptiTire ECU must be set to Inactive.

Cf. [“Deactivation of CAN Termination Using Optitire Diagnostics Software”](#) on p. 24.



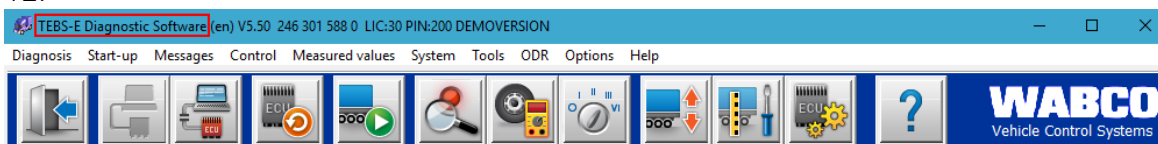
**TEBS E PREMIUM / STANDARD with OPTITIRE / OPTILINK, ECAS CONTROL BOX and SCALAR EVO Pulse**



## Parameter Adaptation Using TEBS E Diagnostics Software


### Requirements

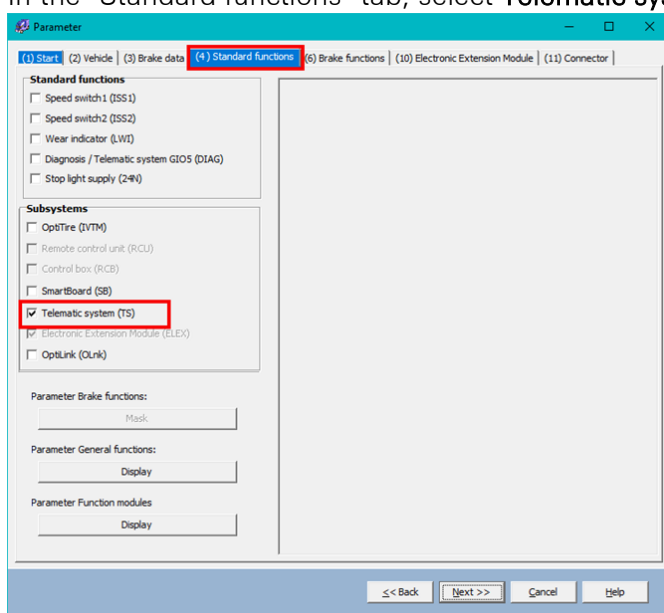
TEBS E diagnostics software: Consult [Software Requirements - Ordering the Diagnostic Software](#) p. 12.



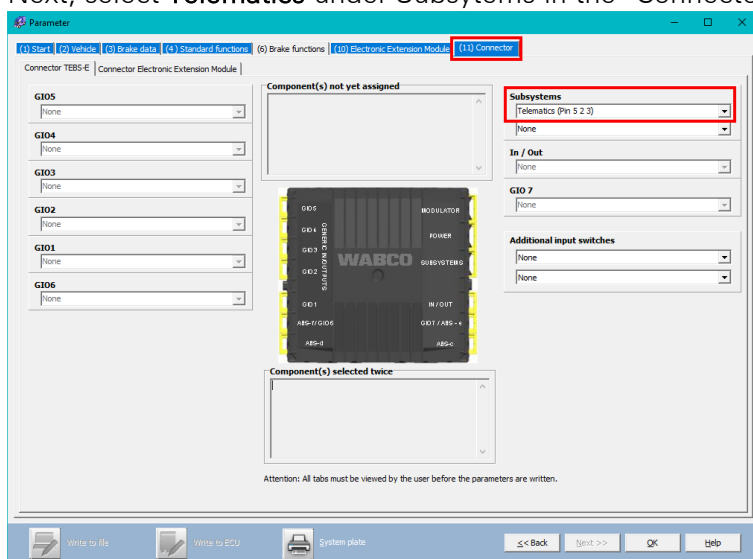
### Parameter Adaptation

If SCALAR EVO Pulse is connected to the subsystem port, telematics must be activated in the TEBS E diagnostics software as the subsystem.

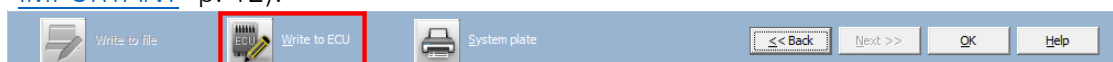
1. In the TEBS E diagnostics software, open the “EBS system parameter settings” menu: . In the “Standard functions” tab, select **Telematic system (TS)** under “Subsystems”.



2. Next, select **Telematics** under Subsystems in the “Connector” tab.



3. Press **Write to ECU** when all modifications have been performed (PIN code needed (cf. “**IMPORTANT**” p. 12)).

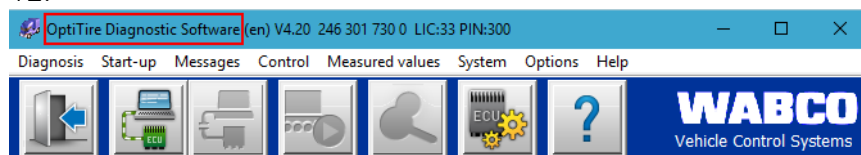




## Deactivation of CAN Termination Using Optitire Diagnostics Software

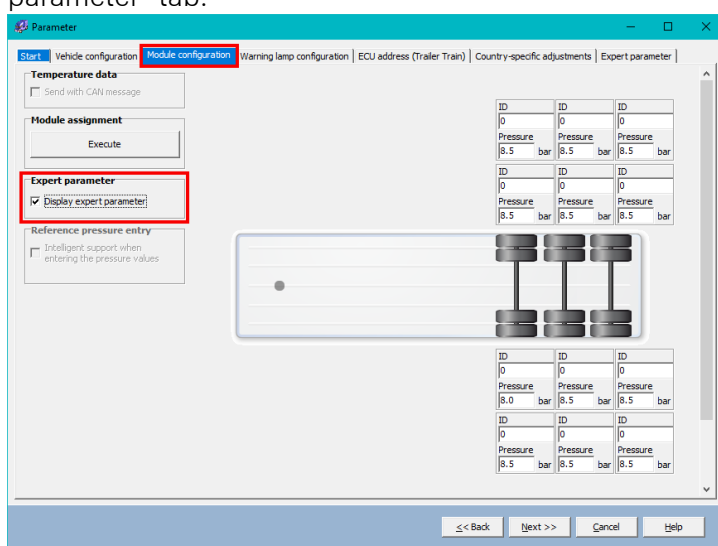
### Requirements

OptiTire diagnostics software: [Consult Software requirements - Ordering the Diagnostic Software](#) p. 12.

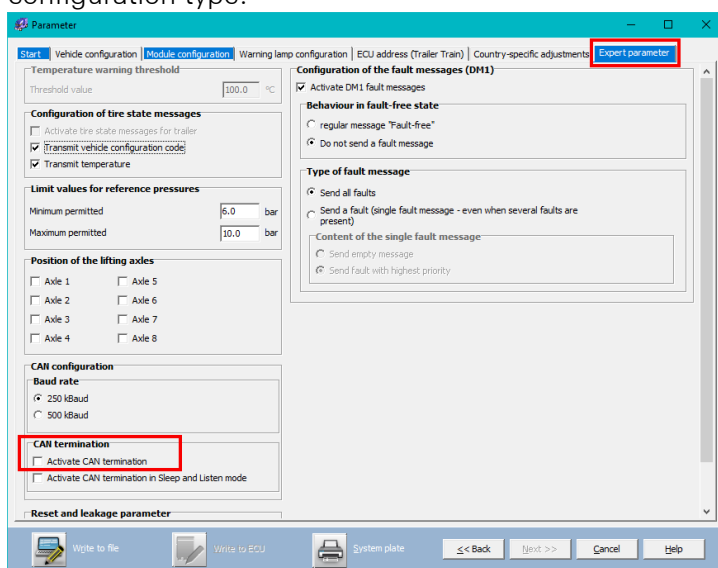


### Parameter Adaptation

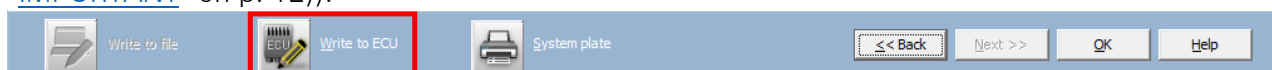
- Use the OptiTire diagnostics software to adjust the configuration of the CAN termination in the OptiTire system. Firstly, open the “EBS system parameter settings” menu: . Next, select “Display expert parameter” in the “Module configuration” tab to activate the “Expert parameter” tab.



- In the “Expert parameter” tab, adjust the setting “Activate CAN termination” according to your configuration type.



- Press **Write to ECU** when all modifications have been performed (PIN code needed (cf. “**IMPORTANT**” on p. 12)).



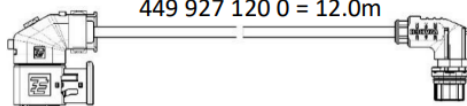
## WABCO TEBS E GIO5

### Hardware Connection

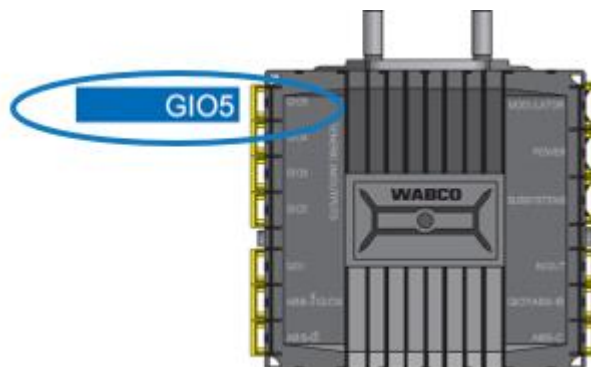
#### Required cable:

TEBS E GIO5	449 927 020 0
	449 927 050 0
	449 927 120 0

449 927 020 0 = 2.0m  
 449 927 050 0 = 5.0m  
 449 927 120 0 = 12.0m



On TEBS E Premium, you can connect SCALAR EVO Pulse to the modulator **GIO5** port via the TEBS GIO5 telematics connection cable (449 927 020 0).

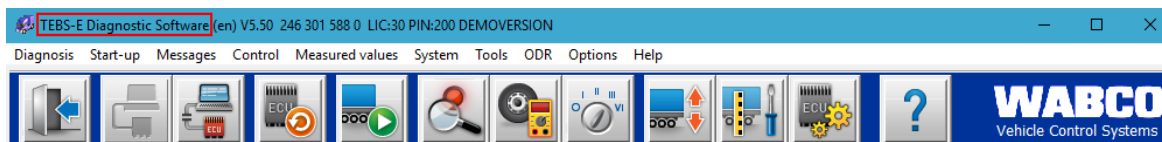


## Parameter Adaptation Using TEBS E Diagnostics Software

If SCALAR EVO Pulse is connected to the GIO5 slot, telematics must be activated in the TEBS E diagnostics software as a standard function.

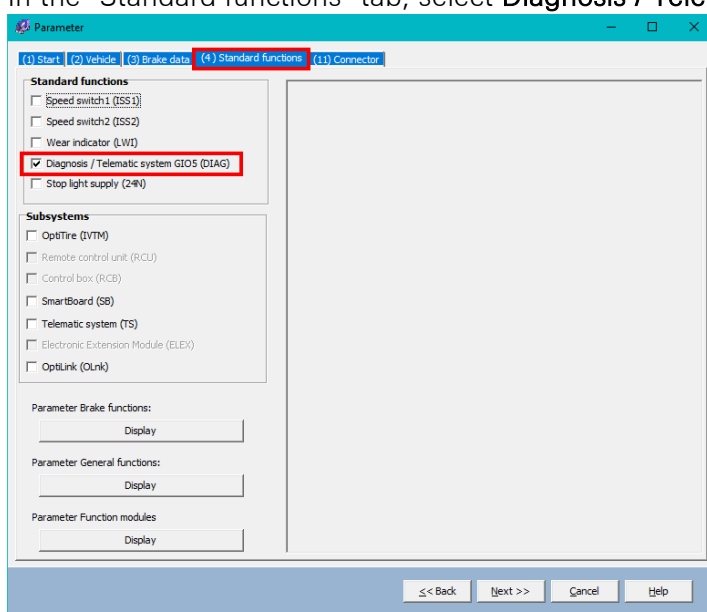
### Requirements

TEBS E diagnostics software: [Consult Software requirements - Ordering the Diagnostic Software](#) p. 12.

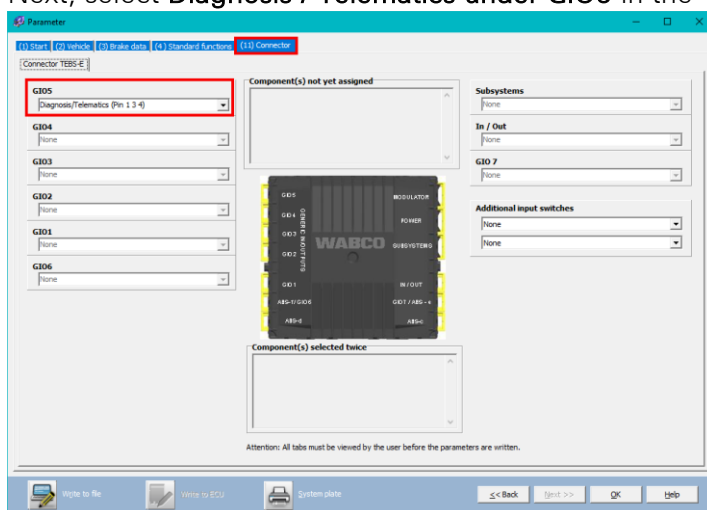


### Parameter Adaptation

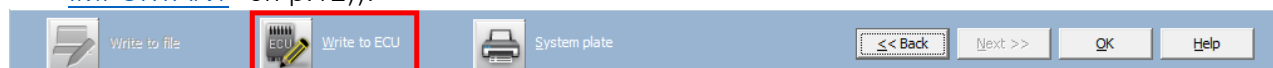
- In the TEBS E diagnostics software, open the “TEBS system parameter settings” menu: . In the “Standard functions” tab, select **Diagnosis / Telematics system GIO5 (DIAG)**.



- Next, select **Diagnosis / Telematics** under **GIO5** in the “Connector” tab.



- Press **Write to ECU** when all modifications have been performed (PIN code needed (cf. “**IMPORTANT**” on p.12)).

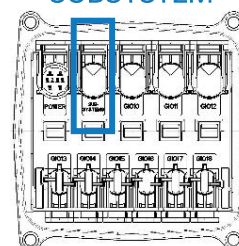


# Electronic Extension Module (ELEX)

## Hardware Connection

In case an ELEX (446 122 070 0) is used, you can connect SCALAR EVO Pulse to the SUBSYSTEM port using the ELEX connection cable. The required cabling depends on the existing connections. If a smartboard or OptiTire unit is occupying the subsystem port, a specific split cable is required.

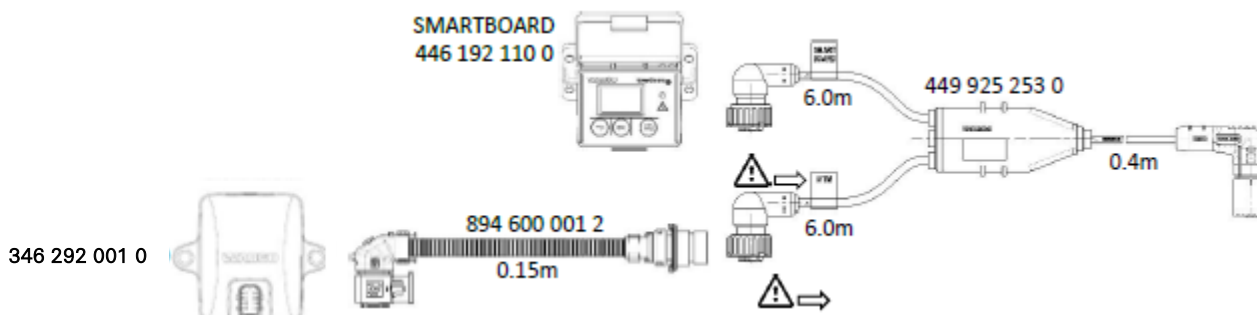
### SUBSYSTEM



### ELEX with SCALAR EVO Pulse



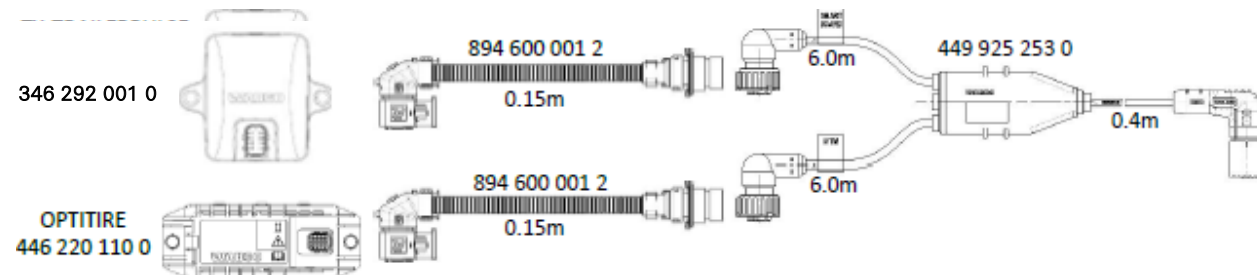
### ELEX with SMARTBOARD and SCALAR EVO Pulse



### ELEX with SMARTBOARD II and SCALAR EVO Pulse



### ELEX with SCALAR EVO Pulse and OPTITIRE



#### IMPORTANT



When connecting TEBS connection cable "449 925 253 0", make sure that you connect the wire labeled as "SMARTBOARD" either to the SMARTBOARD or to the SCALAR EVO Pulse unit (see ⚠ in the images above).

# HALDEX

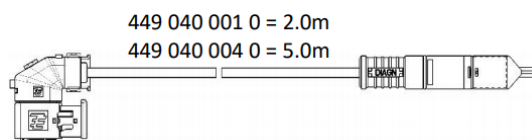
## Hardware Connection

### Gen. 1 / Gen. 2

#### Required Cable:

Haldex EB+ Gen. 1 DIAG

449 040 001 0  
449 040 004 0

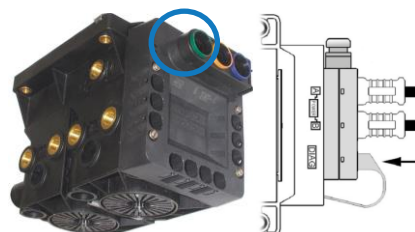


1. Remove the protection cap from the connector before plugging it into the TEBS unit. Make sure that the contact pins remain clean and dust-free.



Connect SCALAR EVO Pulse to the **DIAG port** using the TEBS connection cable. You will first need to remove the blanking plug covering the DIAG port.

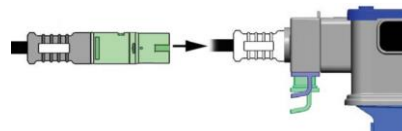
#### GEN. 1



#### GEN. 2



2. Pull down the green slide lock on the TEBS system and insert the connector.

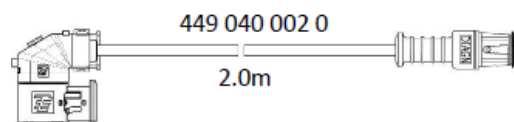


Gen. 3

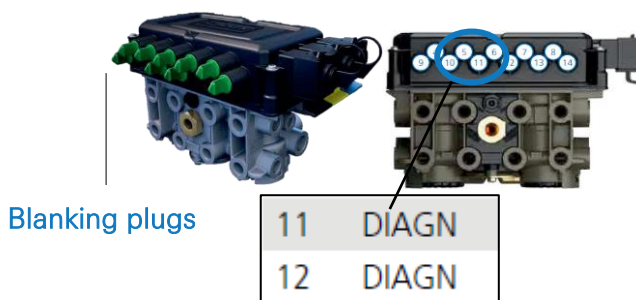
Required Cable:

Haldex EB+ Gen. 3 DIAGN

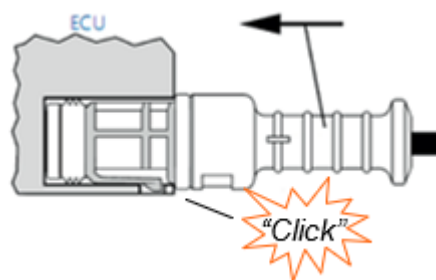
449 040 002 0



1. Connect SCALAR EVO Pulse to one of the **DIAGN ports** (cf. 11 or 12 in picture) using the TEBS connection cable. You will first need to remove the blanking plug covering the DIAGN port.



2. Make sure that the contact pins remain clean and dust-free. A distinct **“click”** should be heard.



## Gen. 4

### Required Cable:

Haldex EB+ Gen. 4 DIAGN	554 051 011 0	
-------------------------	---------------	--

Please contact your local Haldex service partner to determine the correct connection.

From a hardware perspective, there is only one version: T-CAN and H-CAN are both available.



However, from a software perspective, there are 2 versions:

- T-CAN and H-CAN active
- H-CAN only active

In case T-CAN and H-CAN are active, the telematics unit **MUST** be connected to **T-CAN**.

In case only H-CAN is active, the telematics unit must be connected to **H-CAN**. If H-CAN is already occupied, use a 'Splitter cable' 844 542 XXX (only to be purchased at Haldex).

	<b>Diagnostics splitter cable</b> 4x4x4 CAN Y-Splitter (M/F/F)	844 542 001	<b>CAN Y-Splitter</b> (M/F/F) – 1.25m
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Please contact your local Haldex service partner to determine the correct connection.

We advise to check either the **Part Number** or the **Diagnostic software** to determine the correct setup

- Check Part Number

Part Number 842 00x xxx  
=> connect telematics to **H-CAN**



Part Number 842 01x xxx & 842 02x xxx  
=> connect telematics to **T-CAN**

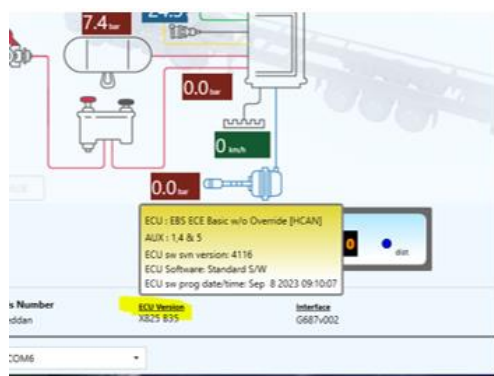


- Check DIAG++ diagnostic software

Please click on the ECU version link on the Diag++ home screen – a dialog will popup:

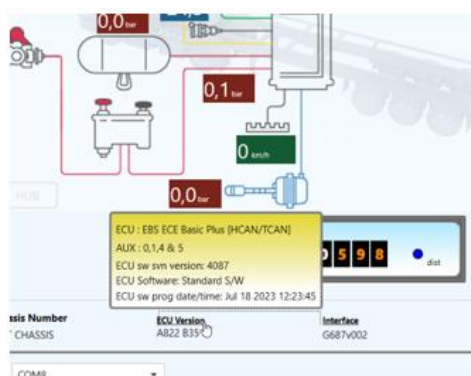
- HCAN
- HCAN/SCAN
- HCAN/HCAN
- HCAN/HCAN/SCAN

=> connect telematics to **H-CAN**



- HCAN/TCAN
- HCAN/TCAN/SCAN

=> connect telematics to **T-CAN**



Please contact your local Haldex service partner for further support.



## DIAG Ports not Available

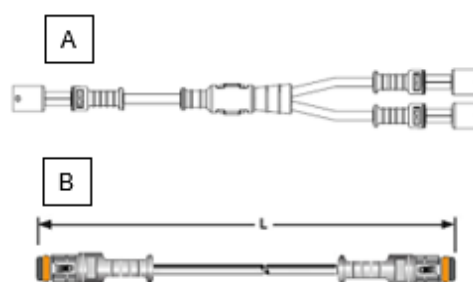
### Gen. 2

In case the DIAG port on the Haldex Generation 2 unit is already occupied by, for example, an “EB+ Soft Docking” unit or an “EB+ Info Center” module, no splitter cable is available to split the existing connection. As a result, you will need to decide which hardware you want to connect.

### Gen. 3

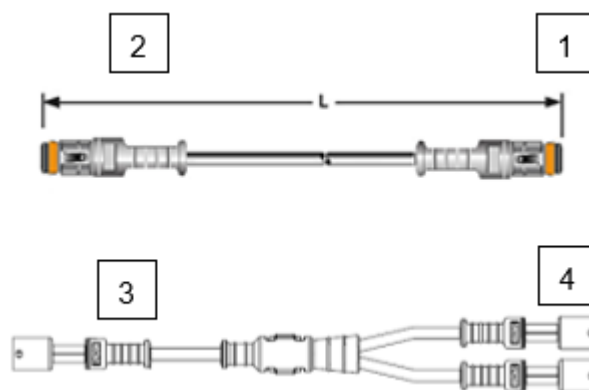
In case both DIAG ports on the Haldex Generation 3 unit are already occupied by, for example, an “EB+ Soft Docking” unit and an “EB+ Info Centre” module, an **Y-splitter cable (A)** ([814038001](#)) and an **auxiliary cable (B)** required to split the existing connection.

Auxiliary cable (B)	
814037011	0.5 m
814037051	1.0 m
814037041	2.5 m
814037001	6.5 m
814037021	8 m
814037031	14 m



Disconnect the cable from one of the occupied DIAG ports on the TEBS unit and connect one end of the auxiliary cable (1) to the DIAG port. Next, connect one end (3) of the Y-splitter cable to the other end of the auxiliary cable (2).

The 2 remaining connectors (4) of the Y-splitter cable can now be connected to the connector that was occupying the DIAG port and to the SCALAR EVO Pulse Haldex TEBS connection cable (449 040 002 0).



## Software Activation

EBS CAN data on Haldex units are only available as from software version C499. In case of older versions, please check with your local Haldex partner if a software update is available. The version of Haldex EB+ can be verified with a PC / laptop and a specific PC interface (USB dongle) connected to the diagnostic port (cf. [“Hardware Requirements”](#) below). More details on the diagnostics software can be obtained from your local Haldex service partner.

### Hardware Requirements

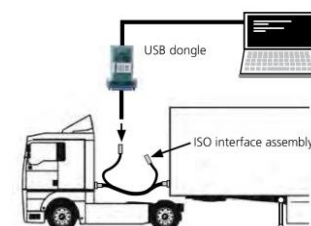
The DIAG+ interface kit consists of a USB dongle, its connection cables and a storage case. The software must be installed on the diagnostic PC before it is connected to the USB dongle.



DIAG+ interface kit      USB dongle

### Hardware Connection

Plug the USB cable into a USB port of your PC / laptop. Access the ECU by using an ISO7638 7-pin connector which uses pin 6 and 7 as a CAN data bus using ISO interface assembly (815 018 001).



### “Software Activation” Menu

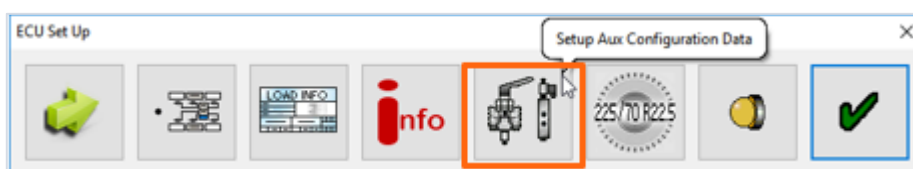
1. In the main menu, select **Configure, Read, Set up and Program The ECU**.



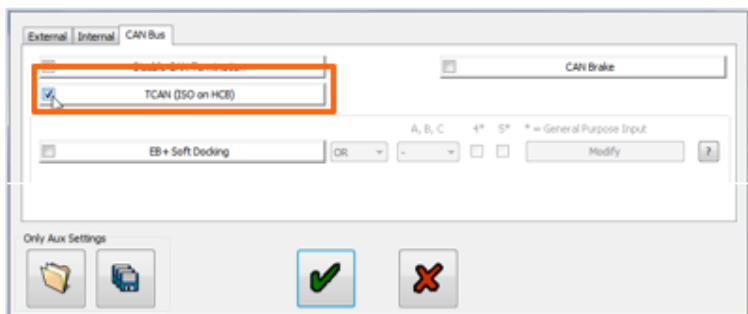
2. Next, click **Edit ECU parameters and configuration**.



3. Next, click **Set up Aux configuration data**.



4. In the **CAN Bus** tab page, activate **TCAN (ISO on HCB)**.

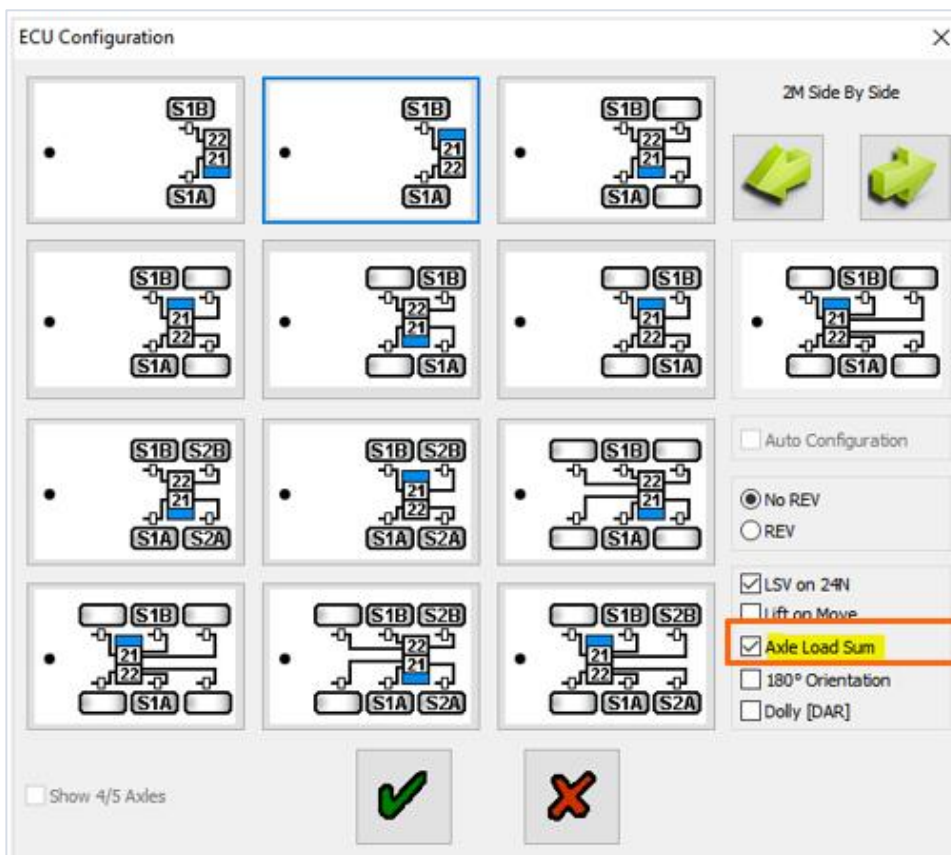


5. Confirm the modification by pressing

6. In order for the Haldex Generation 3 unit to send axle load information, a specific setting must be activated in the menu. Next, click **Set up Aux configuration and layout**.



7. Next, click the **Axle load sum** button.



8. Confirm the modification by pressing

9. Finally, press **Write configuration to the ECU**.



# KNORR

## Hardware Connection

### Required Cable:

Knorr DIAGN TIM	449 040 003 0 449 040 006 0	<p>449 040 003 0 = 2.0m 449 040 006 0 = 5.0m</p>
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### Provided Accessories:

1 x Cable junction box (3 x M16)

1x A-coding    1x B-coding    1x wedge lock    10x sealing plug



Knorr TEBS connector kit 554 053 011 4

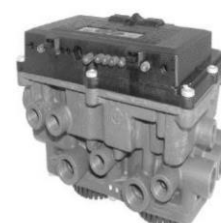
3-way cable junction box 894 600 991 2

### Knorr TEBS4 (G1) ES205x

In case of a Knorr TEBS unit G1, SCALAR EVO Pulse should be connected to the **X2 connector** on the TEBS unit.

Available signals:

- 5V CAN bus **NOT available**
- Power



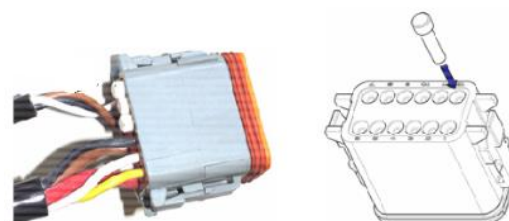
### X2 connector



A-coding

PIN assignment:

No.	Color	Function	Signal
3	White	AUX IO3	V in
12	Brown	AUX GND	GND



Unused contact locations must be fitted with seal pins.

### Knorr TEBS G2.0/G2.1 ES2060

In case of a Knorr TEBS unit G2.0/G2.1, SCALAR EVO Pulse should be connected to the **IN/OUT connector** on the TEBS unit.

Available signals:

- 5V CAN bus **available**
- Power



#### IN/OUT connector



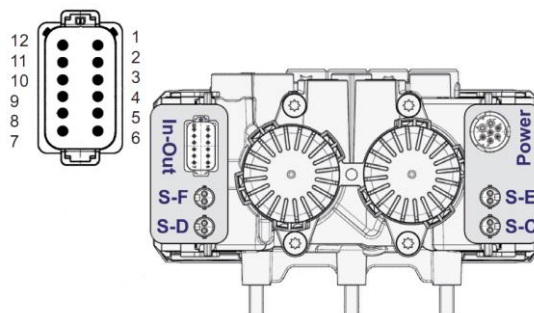
B-coding

PIN assignment:

No.	Color	Function	Signal
3	White	AUX IO3	V in
9	Yellow	5V CAN-L	CAN-L
10	Green	5V CAN-H	CAN-H
12	Brown	AUX IO3 RET	GND

Via the specific Knorr TEBS connection cable, you can split the existing connection.

Unplug the existing connector from the TEBS unit and plug in the connector from the TEBS connection cable.



### Knorr G2.2 ES2090

In case of a Knorr TEBS unit G2.2, SCALAR EVO Pulse should be connected to the **IN/OUT connector** on the TEBS unit.

Available signals:

- 5V CAN bus **available**
- Power



#### IN/OUT connector



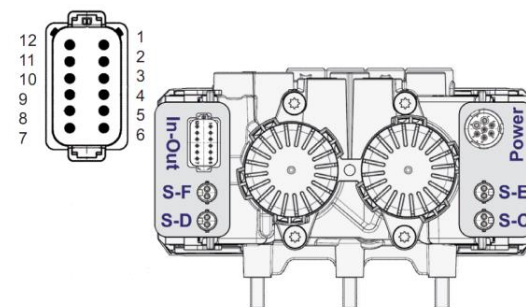
A-coding

Pin assignment:

No.	Color	Function	Signal
3	White	AUX IO3	V in
9	Yellow	5V CAN-L	CAN-L
10	Green	5V CAN-H	CAN-H
11	Brown	AUX IO3 RET	GND

Via the specific Knorr TEBS connection cable, you can split the existing connection.

Unplug the existing connector from the TEBS unit and plug in the connector from the TEBS connection cable.



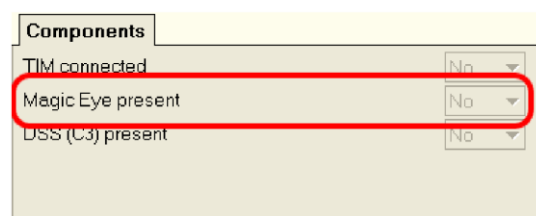
## Software Activation (Knorr G2.1 only)

Use the Knorr "ECUtalk" diagnostics software and the Knorr "UDIF" PC interface kit to establish a diagnostic connection with the modulator.

In the main menu of the diagnostics software, click the **Change configuration** or **Components** button.

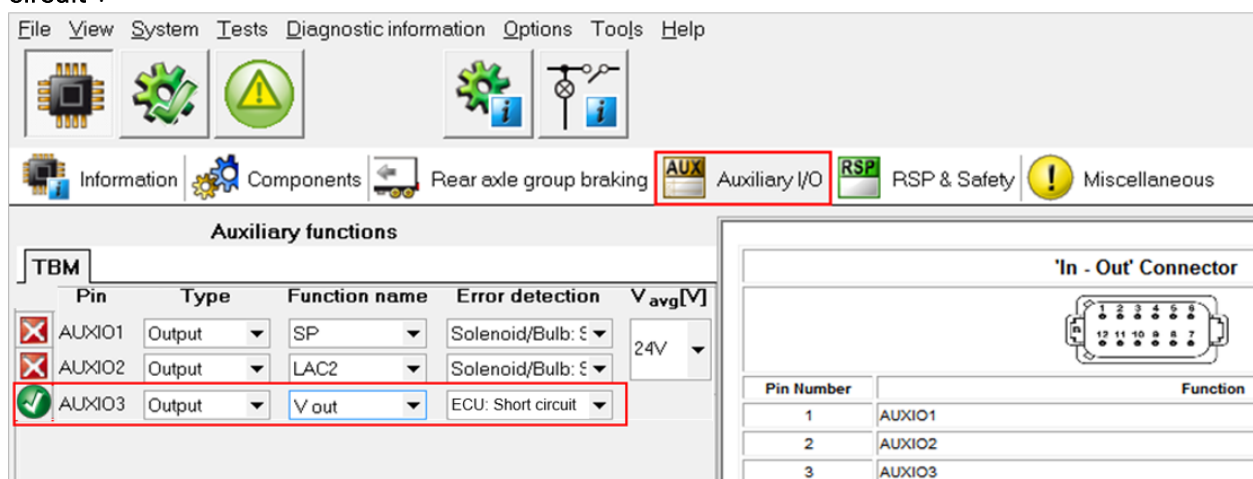


In the "Components" section, activate the **Magic Eye** function by selecting Yes from the drop-down menu. Click the **OK** button to confirm the parameter settings. In the main menu, select the **Program TEBS / Write to ECU** button.



## Software Activation (Knorr G2.1 and Knorr G2.2)

Auxiliary I/O - AUXIO3 must be enabled and set to "V out". "Error detection" must be set to "Short circuit".



## X2 or IN/OUT Connector Not Available

In case the X2 (G1) or IN/OUT (G2.0/2.1/2.2) 12-pin connectors are already occupied, a **junction box** is required to split the existing connection cable.



1 x Cable junction box (3 x M16)  
(894 600 991 2)

After connecting all hardware to the SCALAR EVO Pulse unit, you can check the installation (cf. "[Step 4 - Checking the Installation](#)" p. 40).

## Connecting to the Internal Sensors

SCALAR EVO Pulse supports the following internal tire pressure sensor type:

- OptiTire Internal Sensors (WIS): Installation on the rim by means of valve neck.
- OptiTire Strap-Mounted Sensors (SMS): Installation on the rim by means of fastening strap.

**NOTE:**

SCALAR EVO Pulse is NOT compatible with OptiTire External Sensors (WM2) or any non-WABCO TPMS solution.

## Connecting to the Internal Sensors (WIS)

For selecting the required valve set and further sensor installation instructions, we refer to the sensor installation instructions: <https://www.wabco-customercentre.com/catalog/docs/8150102293.pdf>. (See the following sections: 6.1.2 "The internal sensor (WIS)" and 7.3 "Assembly of the internal sensor (WIS)".).



**INTERNAL SENSOR (WIS)**  
(WABCO part number 960 732 000 0)



**IMPORTANT**

Remember to write down the sensor IDs with the corresponding wheel positions when installing the sensors. Use the install form below.

Sensor ID →



## Connecting to the Optitire Strap-Mounted Sensors (SMS)

For selecting the required valve set and further sensor installation instructions, we refer to the sensor installation instructions: <https://www.wabco-customercentre.com/catalog/docs/8150102293.pdf>. (See the following sections: 6.1.3 "The internal sensor (SMS)" and 7.4 "Assembly of the internal sensor (SMS)".).



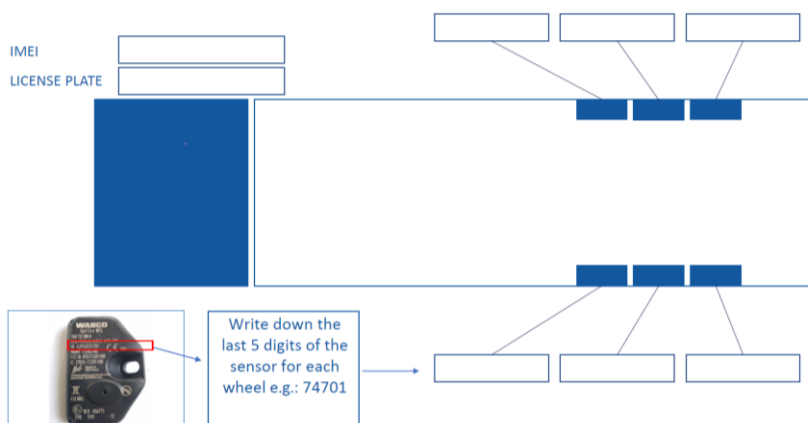
**INTERNAL SENSOR -  
SMS blue**  
(indirect via EBS)  
(part number 960 733  
000 0)



**INTERNAL  
SENSOR -SMS  
grey**  
(direct via  
SCALAR EVO  
Pulse) (part  
number  
960 733 001 0)

### IMPORTANT

Remember to write down the sensor IDs with the corresponding wheel positions when installing the sensors. Use the install form below.





## Step 4 - Checking the Installation

The SCALAR EVO Pulse installation can be verified using a smartphone.

Navigate to <https://install.new.wabco-fleet.com/> and select the correct device type.

OR

Scan the following QR code with your smartphone (a [QR code reader app](#) installed on your smartphone is required):



On the Fleet Installer page, select SCALAR EVO Pulse and scan the QR code on the SCALAR EVO Pulse device label (back / top side).



Or, enter the 15-digit device serial number (IMEI) manually in the input field and click **Connect**:

The serial number can be found on the device label:

TPB2-123456789012345



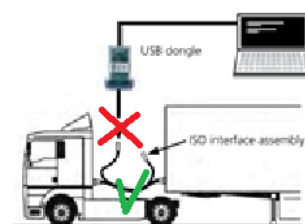
### PLEASE NOTE

This procedure requires an active Internet connection on your smartphone.



Before checking the data with Fleet Installer:

- Disconnect the diagnostics software from the ECU.
- Connect the trailer to a truck with the ISO cable.
- Turn ON the vehicle contact.





Next, select a health check method:

- [Installation Wizard](#): configure the device for the first installation using the step-by-step wizard.
- View the device health:
  - Battery status
  - GPS status
  - EBS status
  - TPMS configuration

### ← TrailerPulse with Battery

Device  
TrailerPulse with Battery

**Installation Wizard**  
Step-by-step: Install device and create report

**Battery status**

**GPS status**

**EBS status**

**TPMS configuration**  
4 sensors configured

## Installation Wizard

### Enter Vehicle Details

Identify the vehicle by entering the parameters below:

- Trailer details
  - Vehicle Identification Number (VIN)
  - EBS brand
  - Trailer utilisation
  - Trailer manufacturer
- Association
  - License plate
  - Customer
- Axles and tires
  - Number of axles
  - Tire type: Single / Twin
  - Axle brand
  - Axle model
  - Tire brand
  - Tire model

Press **Next** to continue.

✕ Install Device 86

**Installation wizard**

1 Enter Vehicle Details

<b>Trailer details</b>	Vehicle Identification Number(VIN) YAFF*  EBS brand <input type="text" value="Select from list"/>
	Trailer utilisation Not selected >
	<input type="text" value="Trailer Manufacturer"/>
<hr/>	
<b>Association</b>	License plate <input type="text"/> <small>ⓘ Recommended to fill in for office use</small>  Customer <input type="text"/>
<hr/>	
<b>Axles &amp; Tires</b>	Number of axles <input type="text" value="3"/>



## Battery status

- Voltage EBS
- Battery state
- Battery level
- History: last received valid status

Press **Next** to continue.

### × Install Device

#### Installation wizard

✓ Enter Vehicle Details

2 Battery status OK

Retry

Voltage EBS  
27.2v

TP Battery state  
Charging

Battery Level  
high

Last message received  
02/10/2023, 11:09:36

Back

Next

## EBS status

Verify the EBS connection status:

- EBS status: OK / Not OK  
In case the EBS status is not OK, verify all cable connections.
- Axle load
- Mileage / Odometer
- Speed
- EBS brand / model
- History: last received valid status

Press **Next** to continue.

### × Install Device 86t

✓ Battery status OK

3 EBS status OK

Retry

Axle load reading  
OK

Odometer reading  
OK

Speed reading  
OK

EBS brand  
wabco

EBS model  
TEBSE-5.2

Last message received  
02/10/2023, 11:14:36

Back

Next

## GPS status

Verify the GPS status:

- GPS status: OK / Not OK
- Satellites: Number of satellites covering the trailer. Min. 3 and preferably 5 satellites are necessary for a good GPS position.
- History: last received valid position

Press **Next** to continue.

### × Install Device 86

#### Installation wizard

- ✓ Enter Vehicle Details
- ✓ Battery status OK
- ✓ EBS status OK
- 4 GPS status OK

Retry

Satellite connections  
9

Last message received  
02/10/2023, 11:16:45

Back

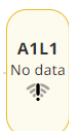
Next

## TPMS Configuration

Next, you need to configure which sensor is installed on which tire:

1. **TPMS Sensor:** Select the sensor model: WIS, SMS, Goodyear
2. **Axle and tire:**  
Set the number of axles: 1 – 6  
Set the tire type: single / twin axle
3. Add the sensor IDs per location by clicking the tire location in the image:

Example: A1L1 (Axle 1, 1<sup>st</sup> tire on the left)



#### TPMS configuration

Guided walk-through

#### TPMS Sensor

Sensor model  
WABCO OptiTire strap-mounted internal sensor (SMS) >

#### Axle & Tire

Number of axles  Tire type  Single  Twin

#### Configuration



Enter a sensor ID manually or select the detected sensor IDs from the table.

Use the **TPMS manager (300 200 001 0)** to stimulate the sensor to make it visible and/or read the sensor ID.

WABCO TPMS Manager to stimulate internal sensors



Select the correct sensor within range.

× A3L1



No sensor mapped

This wheel has not been mapped to a sensor yet. Use the TPMS Manager device to trigger the sensor, select the sensor from the list of sensors in range or type the sensor ID manually.

Trigger sensor

Choose sensor from range

Type sensor ID

Repeat these steps until a sensor has been assigned to all tires.

Press **Next** to continue.

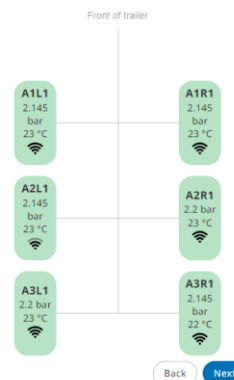
× RF sensors in range

- 2953439533  
2.145 bar
- 2953439546  
2.145 bar
- 2953439775  
2.145 bar

Configuration

Guided walk-through

Link all trailer tires to RF sensors one by one in a guided walk-through.



## Send installation report

Finally, you can send a report via email to confirm the correct installation.

Enter the required parameters:

- Email address

**NOTE:** You can send the report to multiple email addresses.

- Installer
- Workshop
- Comment

Press **Send** to complete the process.

× Install Device

Installation wizard

- ✓ Enter Vehicle Details
- ✓ Battery status OK
- ✓ EBS status OK
- ✓ GPS status OK
- ✓ TPMS configuration
- Send installation report

Report details

Email address

Separate multiple emails by commas

Installer

Workshop

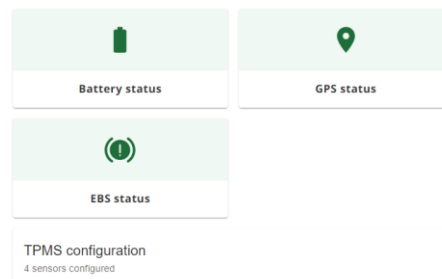
Comment

0/500

Back Finish

## Health Overview

- Battery status: OK / Not OK  
In case the battery status is not OK, verify all cable connections.
- GPS status: OK / Not OK  
In case the GPS status is not OK, make sure that the position of SCALAR EVO Pulse meets the requirements (cf. ["Step 2 - SCALAR EVO Pulse Position"](#) on p.6).
- EBS status: OK / Not OK  
In case the TEBS status is not OK, verify all cable connections. Check if the Telematics output is active in the EBS unit.
- TPMS configuration status: OK / Not OK
  - Pressure and temperature per axle
  - History: last received valid statusIn case the status is not OK, verify all sensor connections.





## Contact Information

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