

# OptiTire™

## TIRE PRESSURE MONITORING SYSTEM

### INSTALLATION MANUAL



**WABCO**



**OptiTire™**

**TIRE PRESSURE MONITORING  
SYSTEM**

**INSTALLATION MANUAL**

**Edition 1**

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<http://www.wabco.info/i/511>



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## 1 General information

### Purpose of the document

This publication describes the installation of the tire pressure monitoring system OptiTire™.

### Copyright and trademark notice

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### Symbols used

#### CAUTION

#### Specifies possible material damage

Not observing the safety instruction can lead to material damage.

- *Follow the instructions in this warning note to avoid any material damage.*

 Important information, instructions and/or tips that you must always observe without fail.



Reference to information on the internet

- Action step
  - ⇒ Consequence of an action
- List

### Technical documents



- Open the WABCO INFORM online product catalogue:  
<http://inform.wabco-auto.com>
- Search for documents by entering the document number.

The WABCO online product catalogue INFORM provides you with convenient access to the complete technical documentation.

All documents are available in PDF format. Please contact your WABCO partner for printed versions.

## General information

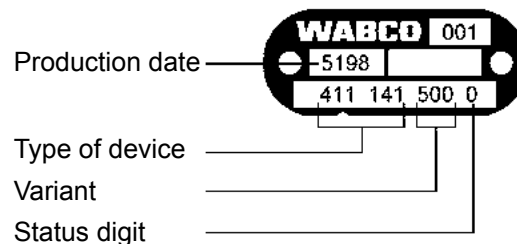
Please note that the publications are not always available in all language versions.

| Document Title                  | Document Number |
|---------------------------------|-----------------|
| OptiTire™ – Installation Manual | 815 XX0 230 3   |
| OptiTire™ – System Description  | 815 XX0 229 3   |
| Diagnosis – Product Overview    | 815 XX0 037 3   |
| SmartBoard – User Manual        | 815 XX0 138 3   |
| TEBS E System Description       | 815 XX0 093 3   |
| TEBS C/D System Description     | 815 XX0 020 3   |

\*Language code XX: 01 = English, 02 = German, 03 = French, 04 = Spanish, 05 = Italian, 06 = Dutch, 07 = Swedish, 08 = Russian, 09 = Polish, 10 = Croatian, 11 = Romanian, 12 = Hungarian, 13 = Portuguese (Portugal), 14 = Turkish, 15 = Czech, 16 = Chinese, 17 = Korean, 18 = Japanese, 19 = Hebrew, 20 = Greek, 21 = Arabic, 24 = Danish, 25 = Lithuanian, 26 = Norwegian, 27 = Slovenian, 28 = Finnish, 29 = Estonian, 30 = Latvian, 31 = Bulgarian, 32 = Slovakian, 34 = Portuguese (Brazil), 35 = Macedonian, 36 = Albanian, 97 = German/English 98 = = multilingual, 99 = non-verbal

## Structure of the WABCO product number

WABCO product numbers consist of 10 digits.



- 0 = New device (complete device)
- 1 = New device (subassembly)
- 2 = Repair set or subassembly
- 4 = Individual part
- 7 = Replacement part
- R = Reman

## Choose genuine WABCO parts

Genuine WABCO parts are made of high quality materials and are rigorously tested before they leave our factories. You also have the assurance that the quality of every WABCO product is supported by a powerful customer service network.

As a leading supplier to the industry, WABCO collaborates with the world's leading original equipment manufacturers and disposes of the experience and capacitive capability required to also satisfy the most stringent production standards. The quality of every genuine WABCO part is supported by:

- Tooling made for serial production
- Regular sub-supplier audits
- Exhaustive end-of-line tests
- Quality standards < 50 PPM

**Installing replica parts can cost lives – genuine WABCO parts protect your business.**

# General information

## WABCO additional services

The package you will get with a genuine WABCO part:

- 24-month product warranty
- Overnight delivery
- Technical support from WABCO
- Professional training solutions from the WABCO Academy
- Access to diagnostics tools and support from the WABCO Service Partner network
- Straightforward claims handling
- Plus, of course, the confidence that the Original Equipment Manufacturers' rigorous quality standards are met.

## WABCO Service Partner



WABCO Service Partners – the network you can rely on. You can access 2000 high quality workshops with more than 6000 specialist mechanics, all trained to WABCO's exacting standards and equipped with our most up-to-the-minute systems diagnostic and support technology.

## Your direct contact to WABCO

In addition to our online services, trained members of staff are there to help you at our WABCO Service Partners to directly answer any technical or business-related questions you may have.

Contact us if you need assistance:

- Find the right product
- Diagnosis support
- Training
- System support
- Order management



You can find your WABCO partner here:  
<http://www.wabco-auto.com/en/how-to-find-us/contact/>

## 2 Safety information

### Observe all required provisions and instructions:

- Read this publication carefully.  
Adhere to all instructions, information and safety information to prevent injury to persons and damage to property.  
WABCO will only guarantee the security, reliability and performance of their products and systems if all information in this publication is adhered to.
- Always follow the specifications and instructions of the vehicle manufacturer.
- Observe all accident regulations of the respective company as well as regional and national regulations.

### Make provisions for a safe work environment:

- Only trained and qualified technicians are allowed to perform work on the vehicle.
- Use personal protective equipment if required (protective goggles, respiratory protection, ear protectors, etc.).
- Pedal actuations can lead to severe injuries if persons are in the vicinity of the vehicle. Make sure that pedals cannot be actuated as follows:
  - Switch the transmission to "neutral" and actuate the park brake.
  - Secure the vehicle with chocks.
  - Fasten a visible note to the steering wheel indicating that work is being performed on the vehicle and that the pedals are not to be actuated.



## 3 OptiTire™ RF Declaration of Conformity

### OptiTire™ FCC Declaration for FCC ID: SA4-OPTITIRE and SA4-WM731

"This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation"

### OptiTire™ IC Declaration for model: IC: 6970A-OPTITIRE and 6970A-WM731

"This device complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:

- (1) This device may not cause interference; and
- (2) This device must accept any interference, including interference that may cause undesired operation of the device."

"Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

- 1) l'appareil ne doit pas produire de brouillage;
- 2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement."

---

**!** CAUTION TO USERS: "Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment."

---

## 4 Components

| FIGURE  | NAME OF COMPONENT                 |
|---|-----------------------------------|
|    | ECU                               |
|    | External wheel sensor (WM2)       |
|    | ECU bracket                       |
|  | WABCO Display                     |
|  | Balancing plate                   |
|  | PA tube                           |
|  | Adapter                           |
|  | Wiring harness, truck             |
|  | Wiring harness, trailer (example) |

## 5 Installation

### 5.1 Safety information

- Observe the occupational health and safety regulations of the respective country, the workshop as well as the vehicle manufacturer's instructions.

#### Risk of accident due to loose wheel nuts

- Loose wheel nuts may lead to accidents when driving on roads.
  - Wheel nuts must be tightened with torque specified by vehicle manufacturer.
  - Check the tightness of the wheel nuts after 500 km.

#### Risk of accident due to unsecured vehicle

- Vehicles not secured may roll away during the assembly. This might lead to severe injuries or even death.
  - Secure the vehicle with chocks before carrying out work on the vehicle.

#### Danger to health due to dust

- Dusts that are dangerous to health are generated when the rim is cleaned using compressed air.
  - Do not clean the rims using compressed air.

### 5.2 Pre-installation checklist

- Check if the latest diagnostic software version is installed (requirements: PC running Windows XP or higher, 100 MB free hard disk space).
- A vehicle wiring diagram or knowledge of the vehicle electrical system will be helpful to complete the installation.

## 5.3 ECU

### 5.3.1 Trailer

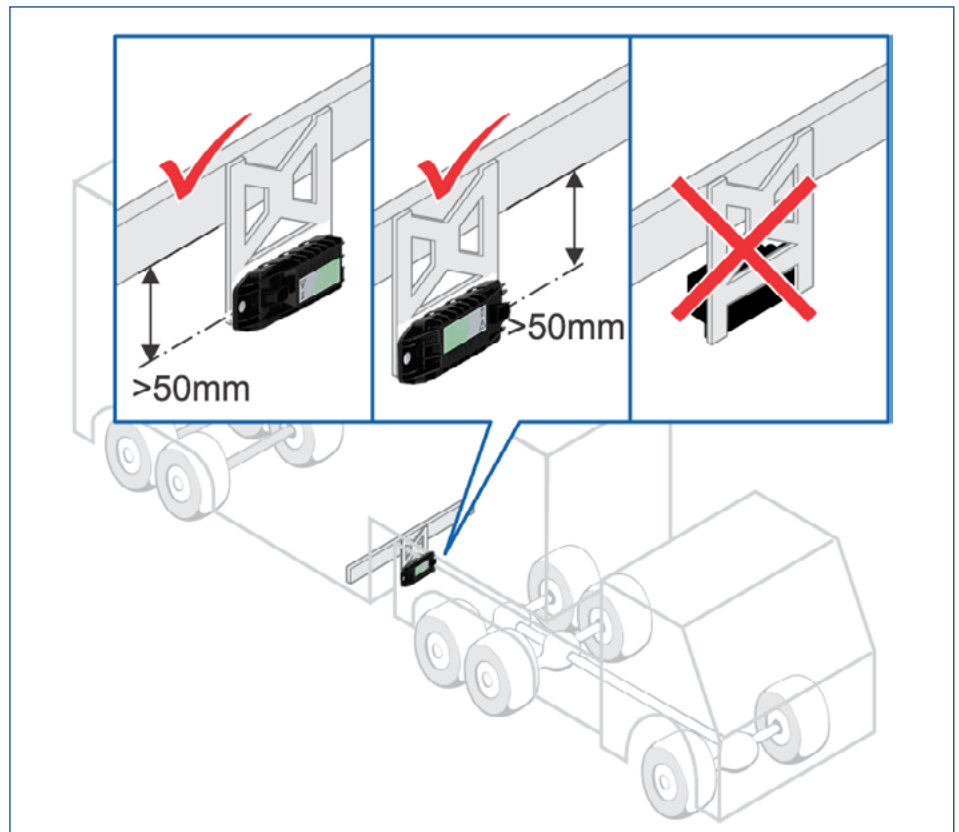
- Determine the best possible installation position, depending on the type of the trailer:
  - Drawbar trailer: Install the ECU between the first axle and the middle of the trailer.
  - Semitrailer/Central axle: Mount the ECU next to the first axle of the trailer.

The ECU plug must point to the side (to the right or left) but not up or down.

The ECU should be parallel to the main frame, in line with the driving direction.

The housing of the ECU must have clearance at the front and back surfaces to ensure the proper reception of signals from the wheel modules.

#### Semitrailer: Assembly on cross member

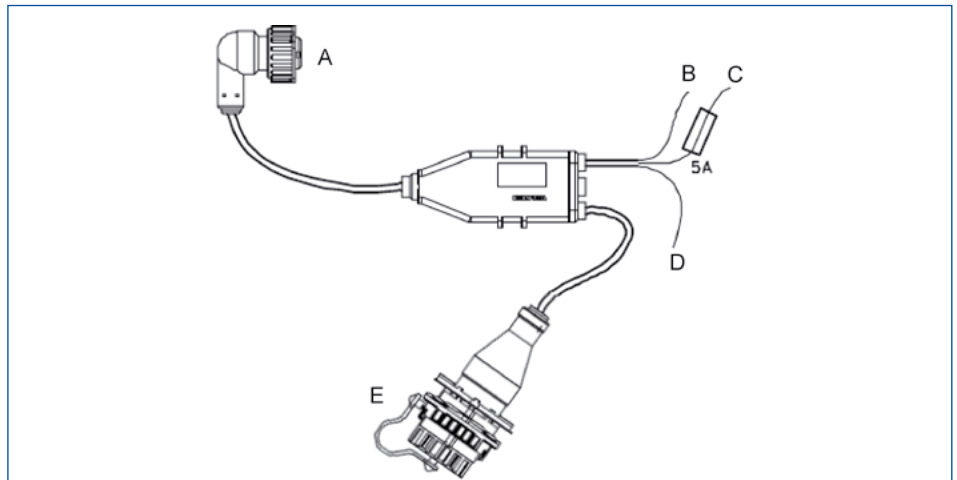


- Mount the ECU on the bracket.
- Tighten ECU to bracket using torque of  $15 \pm 1.5$  Nm.
- Mount the bracket + ECU on the chassis.
- Connect the ECU with the WABCO Trailer EBS modulator using the provided cable and the adapter.

The provided cable may be routed along the same path as the current trailer cables.

# Installation

## Trailer wiring



### LEGEND

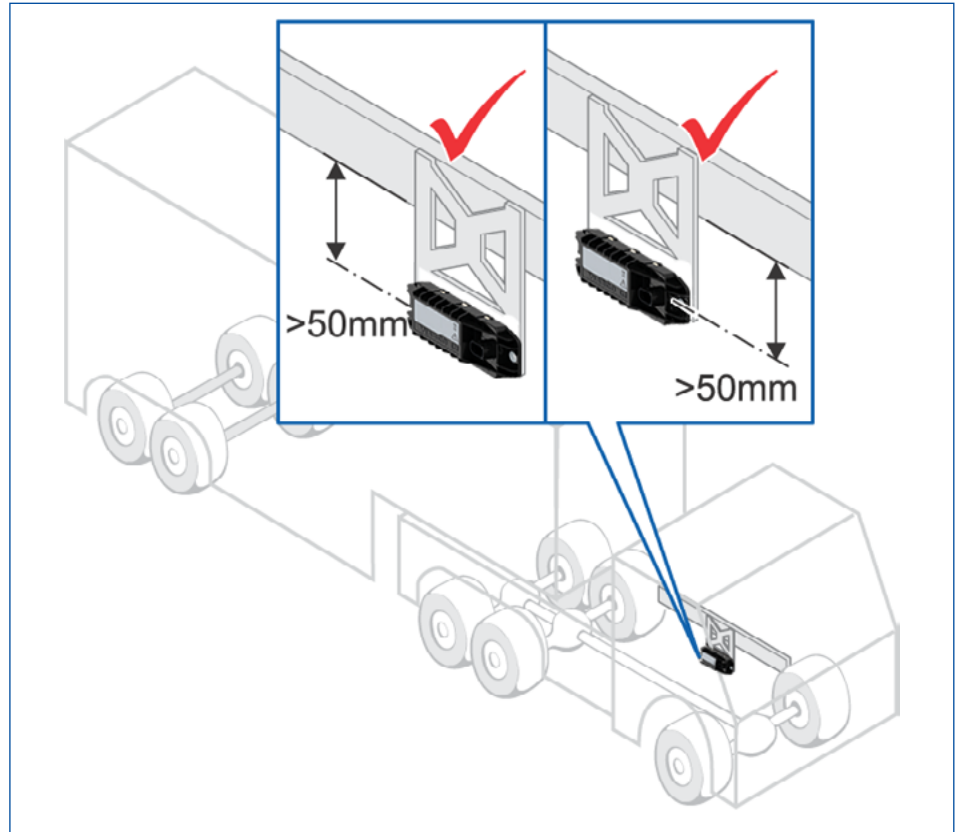
|          |   |
|----------|---|
| <b>A</b> | ECU (via adapter cable with WABCO part number: 894 600 001 2) |
| <b>B</b> | Brown: Ground   |
| <b>C</b> | Red: +12 V/24 V   |
| <b>D</b> | White: Stop light   |
| <b>E</b> | Diagnosis   |

## 5.3.2 Truck

The ECU should be mounted on the chassis in the middle of the vehicle so that the distance to the wheel modules is as equal as possible.

The ECU plug must point to the side (to the right or left) but not up or down.

### Assembly on the longitudinal beam



If the vehicle is equipped with a low lying coupling for central axle trailer, install the ECU on the right side of the vehicle so that the wireless connection to the trailer is not shielded off by the coupling.

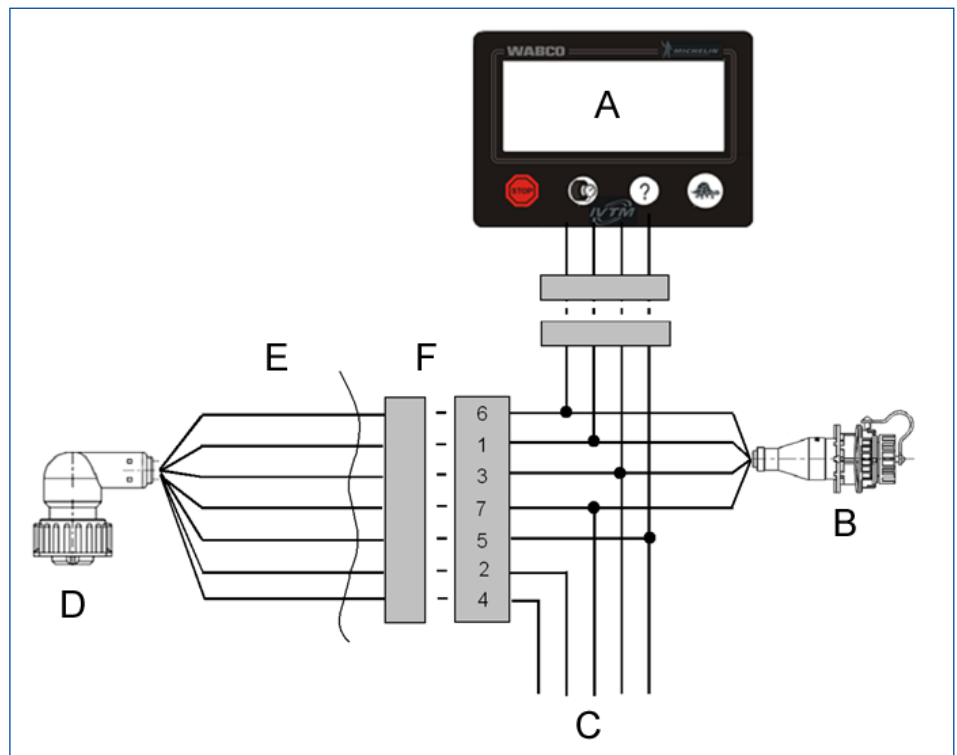
The housing of the ECU must have clearance at the front and back surfaces to ensure the proper reception of signals from the wheel modules.

- Mount the ECU on the bracket.
- Tighten ECU to bracket applying torque of  $15 \pm 1.5$  Nm.
- Mount the bracket and ECU on the chassis.
- Connect the ECU to the vehicle using the provided cable and the adapter.
- Fit the diagnostic socket to a suitable attachment location and label it with "Diagnostic OptiTire".
- Install cables according to the wiring diagram using cable ties in parallel with already existing wiring harnesses.

# Installation

## Wiring of towing vehicle

! It is mandatory to use the additional adapter cable (not displayed in the illustration).



### LEGEND

|          |   |
|----------|---|
| <b>A</b> | Display   |
| <b>B</b> | Diagnosis   |
| <b>C</b> | Vehicle electrical system                                     |
| <b>D</b> | ECU (via adapter cable with WABCO part number: 894 600 001 2) |
| <b>E</b> | external  |
| <b>F</b> | internal  |

## Cable set assignment

| PIN NO. | CONNECTOR PIN ASSIGNMENT    | CABLE COLOUR 5-PIN | CABLE COLOUR 7-PIN |
|---------|-----------------------------|--------------------|--------------------|
| 2       | CAN High                    |                    |                    |
| 1       | CAN Low                     |                    |                    |
| 8       | GND                         | blue               | blue               |
| 7       | +24 V or 12 V               | red                | red                |
| 6       | Ignition                    | yellow & grey      | grey               |
| 4       | Stop light / warning lamp 2 |                    | yellow             |
| 3       | Warning lamp 1              |                    | green              |

## 5.4 External module & balancing plate

Maintaining a list of the wheel module numbers and location on the vehicle is required for proper ECU programming:

- Assign each wheel module to the designated wheel.
- Enter each wheel module ID on the paper form (form can be found in the appendix of this manual).

Wheel modules are always mounted on the outside wheels.

- Check which position of the wheel module is suitable for connecting the PA tube to the wheel module and the valve ▶ see chapter „5.5 PA tubes“ on page 16.

The wheel module should be positioned as close as possible to the tire valve. The minimum length of the PA tube from valve to external wheel module should be 10 cm.

The PA tube should be guided to the tire valve without stretching, deformation or twisting.

- Remove the wheel nuts on which the external modules and balancing plates are to be mounted. The vehicle does not need to be jacked up when only four wheel nuts are removed.
- If necessary, also remove the rim protecting ring.
- Position the wheel module and the balancing plate on the wheel bolts.

The wheel modules should be located directly opposite the balancing plates, except on twin tires where no balancing plates are required.

Twin tires: Both wheel modules should be mounted on the outer wheel. The wheel modules should be located directly opposite each other.

- Screw the wheel nuts back on.
- Tighten the wheel nuts with the torque specified by the vehicle manufacturer.
- Inflate tires to proper air pressure according to manufacturer or fleet recommendations.

## 5.5 PA tubes

### CAUTION

#### Increased wear due to incorrect installation

With tubes that rest on the edge of enclosures there is increased wear due to vibrations. This might lead to leakages.

- *PA tubes need to be installed such that they neither exert tensile or compressive stress on connections nor rest on the rim.*
- *Avoid excess lengths to prevent undesired vibrations.*
- *Avoid moisture in the PA tube or at the pressure port of the external sensor.*

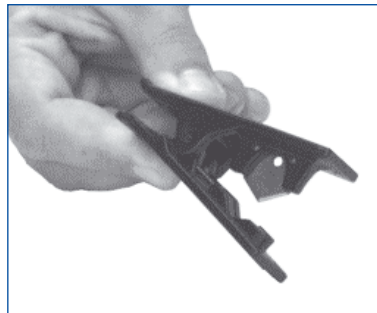
- Hold the PA tube with the connection to the tire valve.
- Hold the other end of the PA tube to the wheel module.



- Stick the PA tube onto the tire valve without tightening it to avoid loss of pressure.
- Mark the position on the tube where the PA tube meets with the edge of the wheel module (e.g. using adhesive tape).
- Adjust the length of the PA tube (PA tube should be long enough so it is not under tension).
- Also note that the PA tube reaches 20 mm into the connection. For this reason the PA tube should be cut 20 mm after the marking. Use a suitable right-angled cutting tool, such as those used for shortening plastic brake lines.

**!** Do not use valve extensions made of plastic. They are not designed to be constantly pressurised.

**Tube cutting tool for  
ø 4 to ø 12**



**Tube cutting tool for  
ø 4 to ø 22**



- Mount the connecting tube to the wheel module by inserting the end of the PA tube into the wheel module opening. After pressing with force, the PA tube is locked in position and can then only be removed again after unscrewing the brass screw connection (V203).
- Using the marking, check if the PA tube has been pushed up to the stop.
- Pull on the PA tube to check if the PA tube has been inserted and connected with sufficient tightness.
- Connect the other side of the PA tube to the tire valve.
- Tighten union nuts on the tire valve hand tight.
- Check that the connection is tight using a leakage indicating spray.

## 5.6 Display

**!** Comply with all safety and vehicle manufacture guidelines.

- Determine where to install the WABCO display unit. The display housing is mounted with screws and the display is snapped into the housing. Modifications may be necessary to install this unit.
- Follow the instruction to install the cabling of the Truck ECU.
- Locate the diagnostic connector near the fuse panel for accessibility. This is required for programming of functions and system diagnostics.

## 6 ECU programming

### 6.1 Required tools

- Check if the latest OptiTire™ diagnostic software version is installed (requirements: PC running Windows XP or higher, 100 MB free hard disk space).

Diagnostic interface (e.g. 446 301 030 0) is supplied separately.

Diagnostic cable (446 300 348 0) is supplied separately.

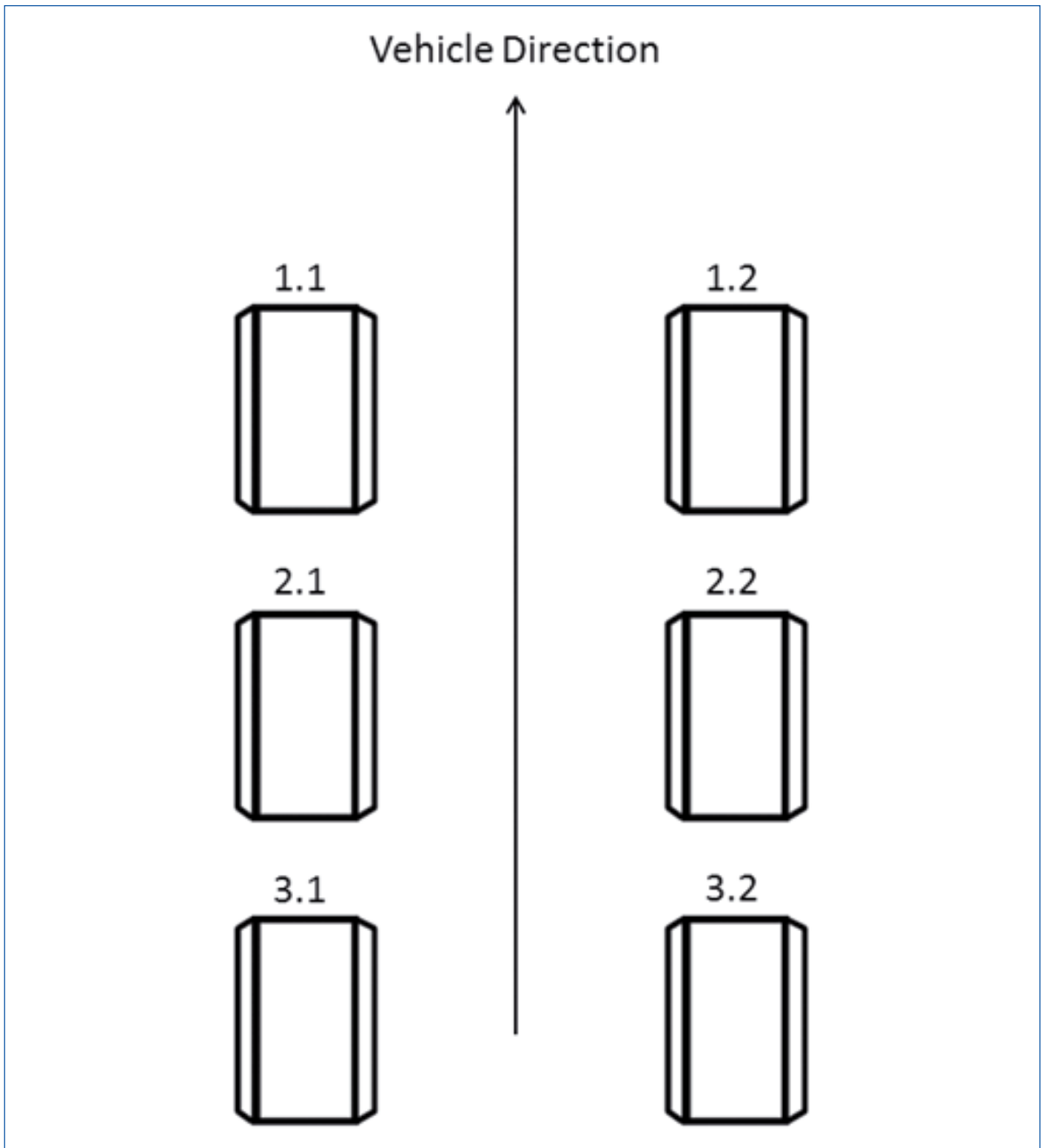
### 6.2 OptiTire™ ECU installation

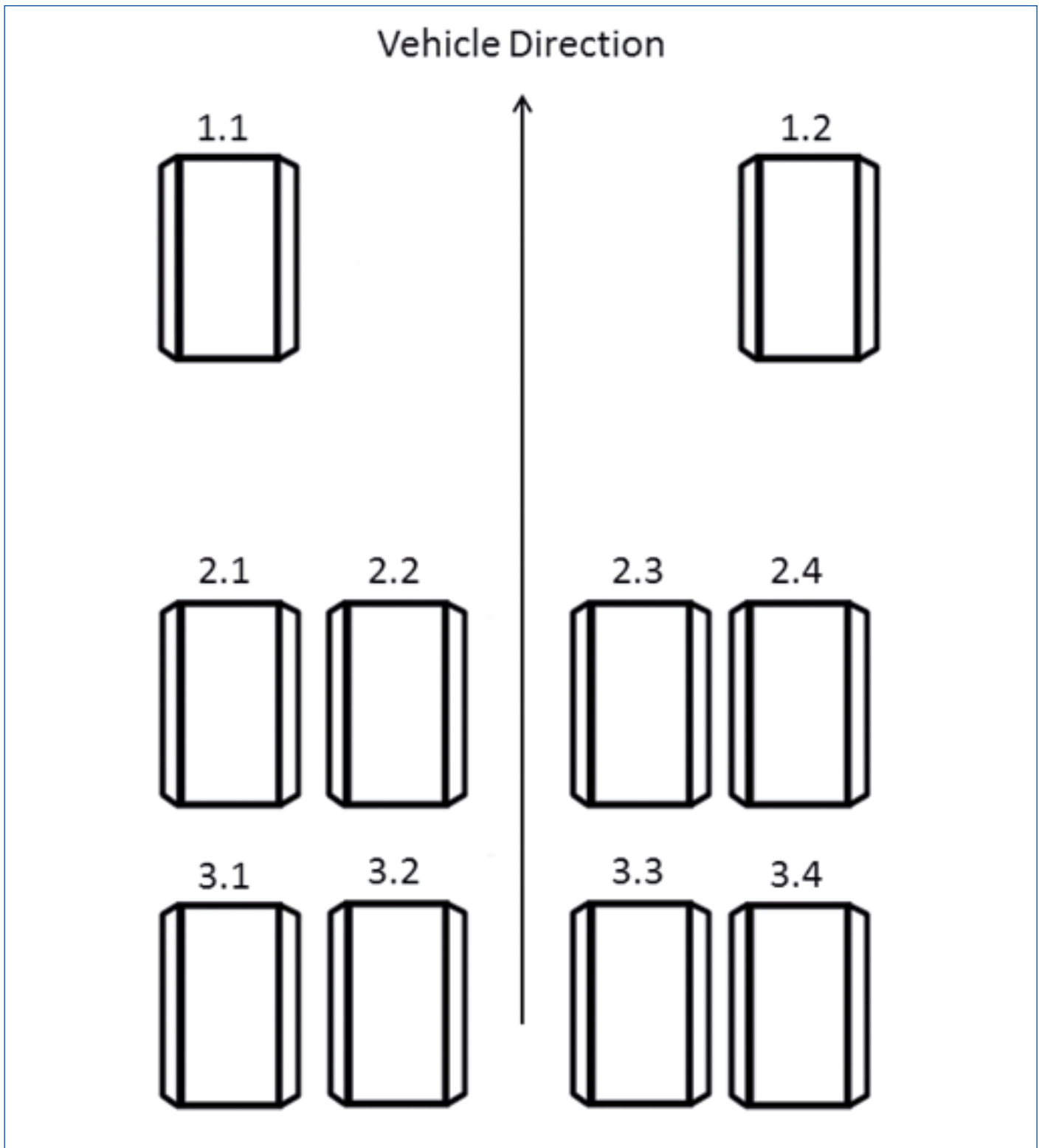
- If OptiTire™ is installed in both the truck and the trailer, remember that both ECUs need to be programmed.
- Turn on the vehicle ignition.
- Connect the external diagnostic plug to the WABCO diagnostic interface using the diagnostic cable.
- Select the vehicle type and type of diagnostic connection. It is also possible to automatically search for all connected ECUs (more time-consuming than the manual procedure).
- Select system check. Click on *Start*.
- Enter the vehicle data. Click *OK* and save.
- Select the vehicle configuration and sensor type (WM2 for external modules). Click *Continue*.
- Enter the wheel module IDs and recommended tire pressure.
- Click *Continue* after module IDs and tire pressures have been entered.
- Click *Continue* if no additional warning lamp should be activated.
- Click *Continue* if no changes to country-specific entries are required (only valid for USA).
- Click on *Write to ECU*.
- If required, enter the provided PIN into the "PIN2" field and click *OK*.
- Click *OK* again.
- Wheel module reception will appear in the module table.
- Click *OK* after the reception column indicates at least one bar for each module. Module stimulation can reduce installation time.
  - ⇒ Assignment test of module allocation will be started.
- Stimulate the wheel modules with a bar magnet according to the prescribed sequence in the diagnosis. The magnet must be hold minimum 5 seconds to the OptiTire™ logo of the wheel module.
- Click on *OK*.
- If faults occur, they will be displayed and should be repaired.
- Click *OK*.
- Click on *System Check Label* to print out the protocol. Store it with other vehicle-related information.
- Click on *System Label* to print out the system sticker. Attach accordingly.

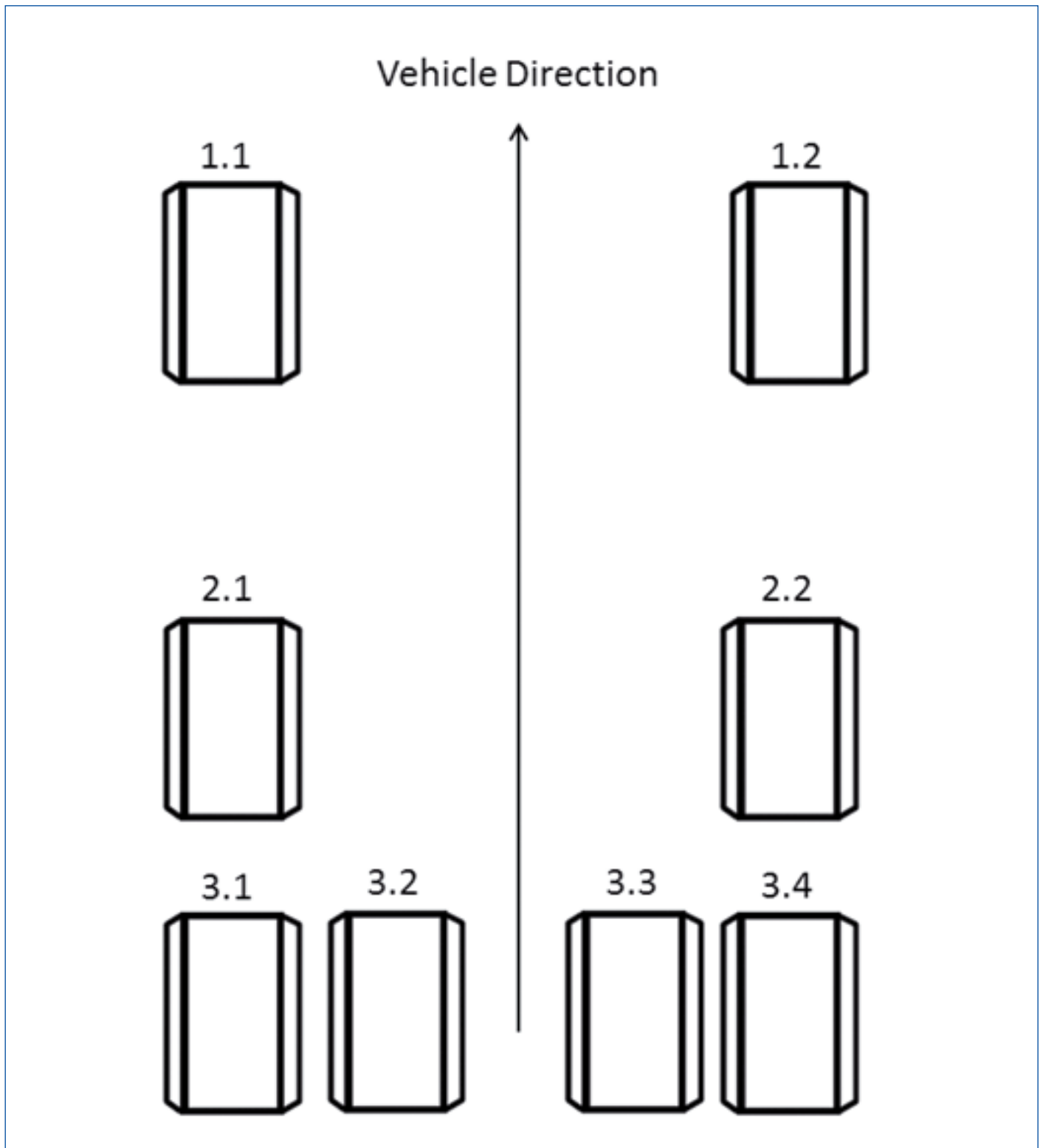
## 7 Appendix

### 7.1 Wheel module ID numbers

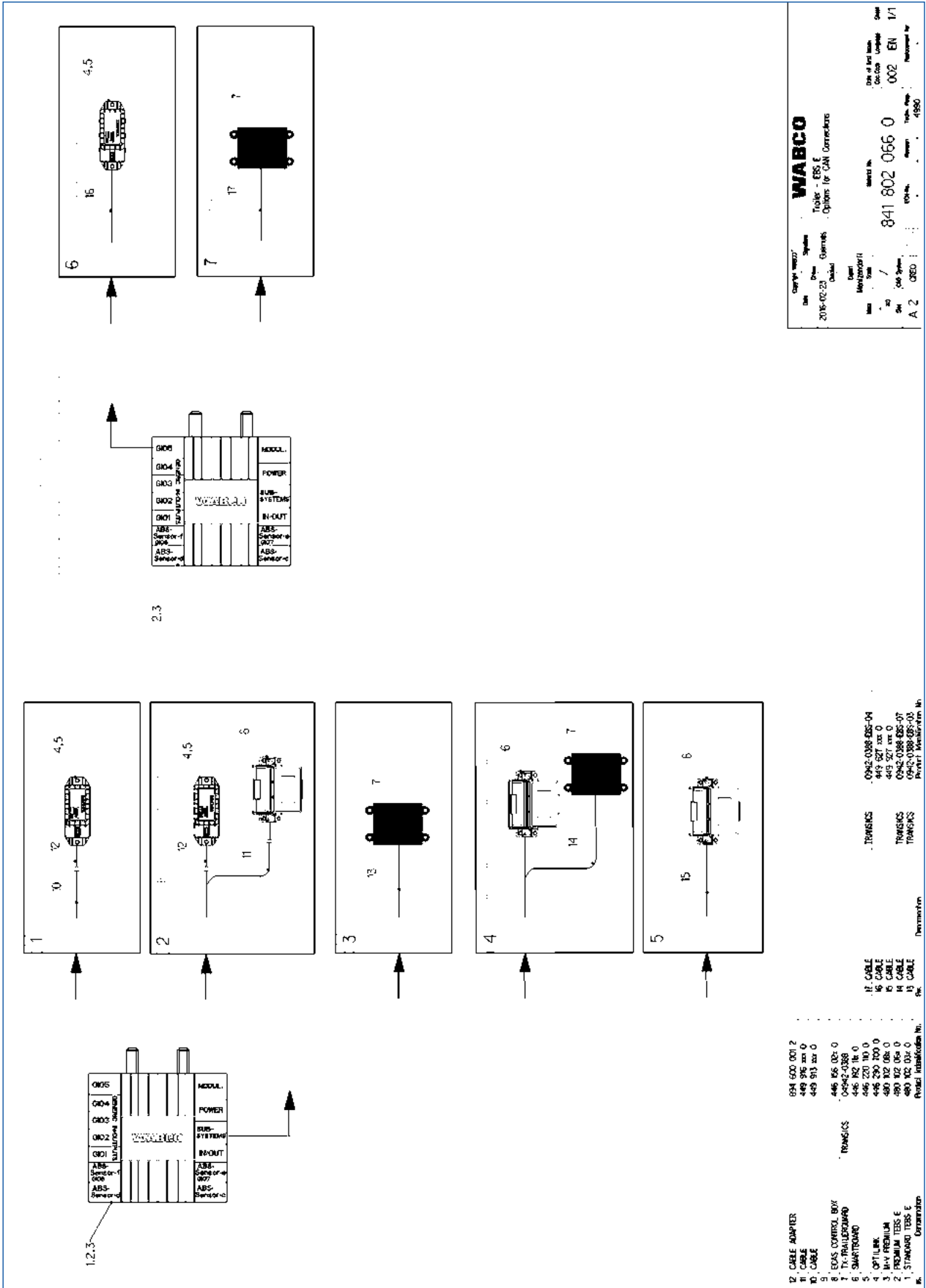
Make a record of wheel module ID numbers by noting the IDs and/or attaching ID stickers at each wheel location:







## 7.2 Circuit diagram



**WABCO**  
 Technische Zeichnung  
 Teil: 841 802 066 0  
 Option für CAN Connectors

2018-02-23  
 Datum  
 2018-02-23  
 Datum  
 2018-02-23  
 Datum

841 802 066 0  
 Teil-Nr.  
 841 802 066 0  
 Teil-Nr.

1/1  
 Blatt  
 1/1  
 Blatt

4980  
 4980  
 4980





**WABCO**  
a **WORLD** of  
**DIFFERENCE**

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