CAN Router
CAN Repeater
System Description

1st Edition

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WABCO
Vehicle Control Systems

Changes are subject to change without notice
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1 Safety information

This document describes the system structure, functions and components of the CAN Router and CAN Repeater.

Read this publication thoroughly. 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.

- Only trained and qualified technicians are to perform any work on the vehicle.
- Make sure to follow the specifications and instructions of the vehicle manufacturer.
- Maintain all accident regulations of the business as well as regional and national regulations.
- Wear suitable protective clothing when necessary.
- Your workspace must be dry as well as sufficiently illuminated and ventilated.

Risk of injury!

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 hand brake.
– Secure the vehicle against rolling with chocks.
– Fasten a visible note to the steering wheel indicating the work is being performed on the vehicle and that the pedals are not to be actuated.
– Do not wear a tie, loose clothing, open hair, arm bands, etc. when working on the vehicle, especially with the engine running. Keep your hands and hair away from the moving parts.

Fire hazard!

– Use only ground lights.
– Keep flammable material (cloths, paper, etc.) away from the exhaust system.
– Do not smoke in the workplace.
– Check electrical lines for proper insulation and fastening.

1.1 Avoiding electro-static charge and uncontrolled discharging (ESD)

Note during construction and building the vehicle:

- Prevent potential differences between components (e. g. axles) and the vehicle frame (Chassis).

  Make sure that the resistance between metallic parts of the components to the vehicle frame is lower than 10 Ohm (< 10 Ohm).

  Connect moving or insulated vehicle parts such as axles electrically conductive with the frame.
- Prevent potential differences between the towing vehicle and the trailer.

  Make sure that an electrically conductive connection is made via the coupling (king pin, fifth wheel, claws with pins), even with no cable connection.
- Use electrically conductive bolted connections when fastening the ECUs to the vehicle frame.
- Use only cable conforming to WABCO specifications or WABCO original cable.
- Run the cable in metallic casing if at all possible (e. g. inside the U-beam) or behind metallic and grounded protective plating, to minimize the influence of electro-magnetic fields.
- Avoid the use of plastic materials if they can cause electrostatic charging.

Note during repair and welding work on the vehicle:

- Disconnect the battery - if installed in the vehicle.
- Disconnect cable connections to devices and components and protect the plug-ins and connections from contamination and humidity.
- Always connect the grounding electrode directly with the metal next to the welding position when welding, to prevent magnetic fields and current flow via the cable or components.

  Make sure that current is well conducted by removing paint or rust.
- Prevent heat influences on devices and cabling when welding.

2 System

2.1 CAN Router

With special vehicle concepts such as e.g. Eurocombis or Roadtrains, the utilisation of multiple Trailer EBS systems on different axle units or trailer modules is required.

To supply the brake modulators with CAN signals in accordance with ISO 11992 and supply voltage, an additional device is required. WABCO provides a solution in the CAN Router, with which up to four CAN routers in series can supply up to five Trailer EBS modulators.

The CAN brake signal of the towing vehicle is received by the CAN Router and distributed to the Trailer EBS modulators.

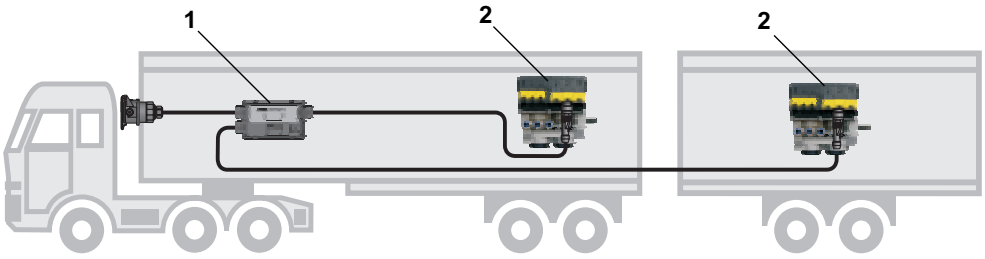


Fig. Using a CAN router (1) in a "Eurocombi" tractor-trailer combination with two Trailer EBS modulators (2)

CAN router with pressure sensor

If the CAN signal of the towing vehicle is not available, a pressure sensor that can be connected as an option generates the control pressure for the yellow hose coupling as a CAN signal and sends it through the CAN router to the Trailer EBS E1 modulator connected to the "Power OUT1" output to optimise timing.

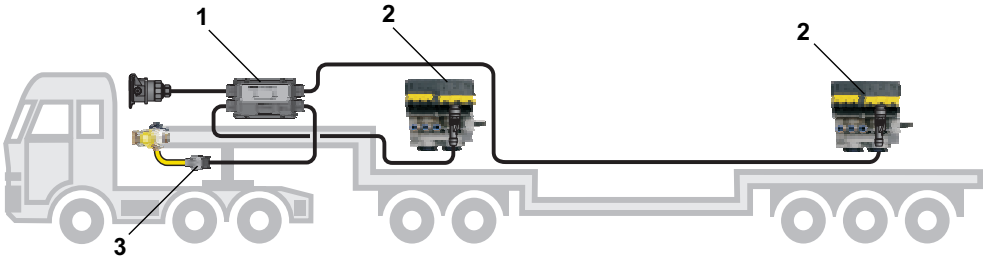


Fig. Using a CAN router (1) with optional external pressure sensor (3) in a Flat Bed Trailer with two Trailer EBS E1 modulators (2)

2.2 CAN Repeater

The CAN repeater is designed for the CAN signal transfer in overlength vehicles, such as telescoping trailers. Its task is to amplify the CAN signal to ensure the supply for the connected Trailer EBS over greater distances.

This is required technically as well as for legal reasons, since based on ECE R 13, the CAN line in the trailer vehicle is only allowed to be a maximum of 18 m on trailer vehicles without using a CAN repeater. With a CAN repeater connected, the cable length can be extended by up to 80 meters after the CAN repeater.

The CAN repeater is equipped with a connection for an external pressure sensor. This pressure sensor generates the brake pressure set value as a CAN signal and sends it to the downstream Trailer EBS E1 modulator to guarantee the required timing in accordance with ECE R 13.

This way, the trailer can be used with towing vehicles with no CAN brake signalling as well.

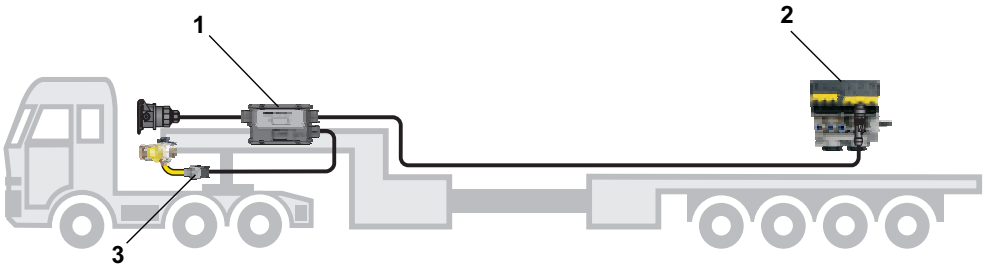


Fig. Operation of a CAN repeater (1) with optional external pressure sensor (3) in an overlength trailer with Trailer EBS E1 (2)

2.3 System prerequisites, Configuration

The CAN router / -repeater is used with the WABCO electronic braking system (T-EBS) of generations E and D.

Using trailers with CAN routers/-repeaters is permitted on towing vehicles with CAN interfaces, with at least a pneumatic control line.

On trailers with Trailer EBS E1, an external pressure sensor can be connected to the CAN router/-repeater. This pressure sensor generates the brake pressure set value as a CAN signal to optimise the timing in accordance with ECE R 13 behind the towing vehicle without CAN brake signalling.

! The use of the external pressure sensor with CAN router/-repeater is only possible in combination with Trailer EBS E1 (software version as of TE001418).

Trailers with 2× trailer EBS E1

The CAN brake signal of the towing vehicle is received by the CAN Router and distributed to both T-EBS E1 modulators. If the CAN signal is not available from the towing vehicle, the front T-EBS E1 modulator brakes via the yellow control line while the rear T-EBS E1 modulator brakes via the CAN signal, which the external pressure generates.

Overlength trailers

The CAN repeater amplifies the CAN signal for overlength trailers. If T-EBS E1 is installed, the same external pressure sensor is used for optimising the timing when there is no CAN signal from the towing vehicle.

The CAN router/-repeater in

- EuroCombis or Roadtrains,

- Trailers with two modulators T-EBS E0 / D,
- Overlength trailers with T-EBS E0 / D

only functions if the towing vehicle is equipped with CAN.

CAN router/-repeater in combination with WABCO Trailer EBS

Type Trailer	Trailer EBS	Variants CAN router/-repeater	Connection external pressure sensor	Connecting a CAN router/-repeater
EuroCombi or Roadtrain	T-EBS E1 T-EBS E0 T-EBS D	CAN Router 446 122 050 / 052 0	–	1st Trailer on connection Power OUT1, 2nd Trailer on connection Power OUT2
Trailer vehicle with 2× T-EBS (e.g. Flat Bed Trailer)	T-EBS E1	CAN Router 446 122 054 0	on CAN router	Rear T-EBS modulator on connection Power OUT1, Front T-EBS modulator on connection Power OUT2
	T-EBS E0 T-EBS D	CAN Router 446 122 054 0	on T-EBS modulator	
Overlength trailer (e.g. timber trailers)	T-EBS E1	CAN Repeater 446 122 051 / 053 0	on CAN Repeater	T-EBS modulator on connection Power OUT1
	T-EBS E0 T-EBS D	CAN Repeater 446 122 051 / 053 0	on T-EBS modulator	

2.4 Certificates

Certificates for CAN router and CAN repeater

– Open the WABCO website www.wabco-auto.com
– Click on the INFORM product catalogue in the quick-access area and then on Index
– Enter the words CAN router or CAN repeater in the search field.

CAN Router

Using the CAN router in vehicle combinations with a trailer and more than one Trailer EBS E1 modulator is approved with the TÜV certificate **EB124.5E** (with KBA release).

To use the CAN router in vehicle combinations with multiple trailers, there is no certificate based on ECE R 13. WABCO does provide the TÜV certificate **EB124_CanRou_0E** however (no KBA release) indicating the full functionality of the unit. This informal certificate serves as proof for individual acceptance, that all respective requirements of the towing vehicle (disconnected supply line to second trailer, etc.) are met by the system.

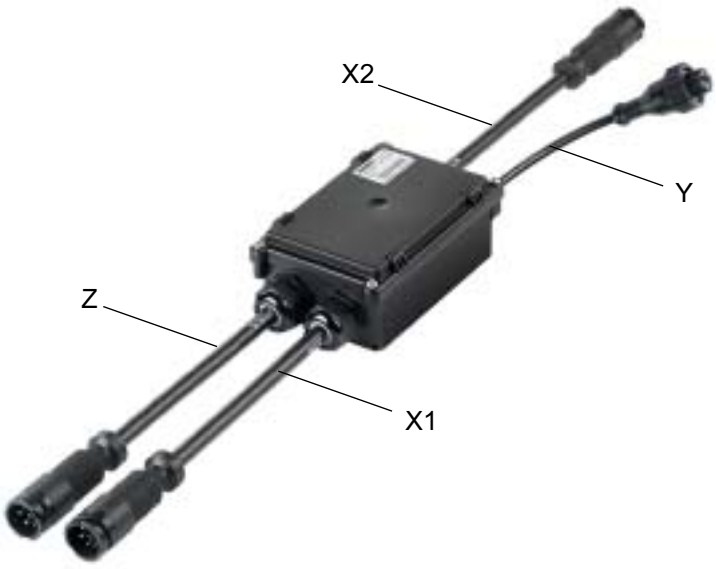
! When using the CAN router for vehicle combinations with more than one trailer, an individual acceptance must be performed for the vehicle.

CAN Repeater

For using the CAN repeater in combination with the T-EBS E modulator, the certificate **EB124.5E** conforming to ECE R 13 is available.

3 Components

3.1 CAN Router



The CAN router (446 122 050 0 / 052 0) mainly consists of the ECU and three connecting cables (Z, X1, X2) with 7-pin DIN bayonet plugs. With version 446 122 054 0, there is another connecting cable (Y) to an external nominal pressure sensor.

Electrical connections

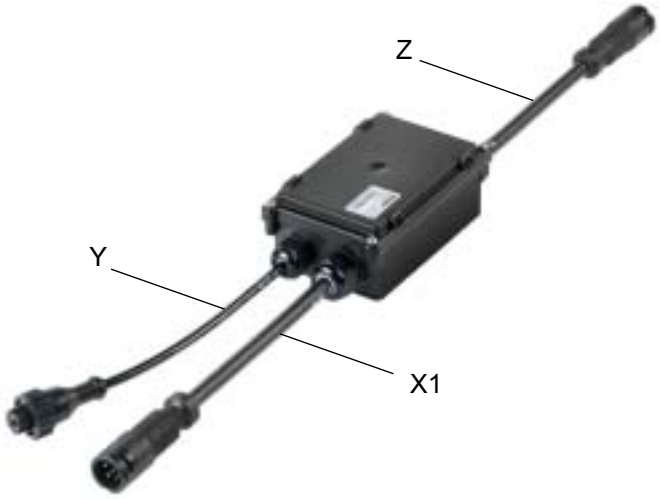
To identify the connections, the connection designations are shown on a sticker on the housing cover and on small tags on the connectors.

Pos.	Connection designation	Function	Connection cable
Z	Power IN	Power supply (ISO 7638) from tow vehicle	449 133 … 0 / 449 135 … 0 (for semitrailer) 449 231 … 0 / 449 233 … 0 (for drawbar trailer)
X1	Power OUT1	Connection T-EBS modulator	449 347 … 0 (for T-EBS E) 449 333 … 0 (for T-EBS D)
X2	Power OUT2	Connection T-EBS modulator	
		Connection for next trailer	449 135 … 0
Y	Pressure sensor	Connection of the external nominal pressure sensor (only as of T-EBS E1)	449 425 … 0

3.1.1 Variants of the CAN router

WABCO number	Housing symbol	Electrical connections (DIN bayonet)		
		Z - Power IN	X1 - Power OUT1 X2 - Power OUT2	Y - Pressure sensor
446 122 050 0		Socket	Connector	–
446 122 052 0		Connector	Connector	–
446 122 054 0		Connector	Connector	Socket

3.2 CAN Repeater



The CAN repeater (446 122 051 0 / 053 0) mainly consists of the ECU with two connecting cables (Z, X1) with 7-pin DIN bayonet plug-in connectors and the connecting cable (Y) for the external nominal pressure sensor.

Electrical connections

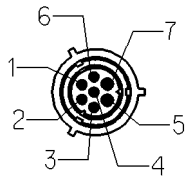
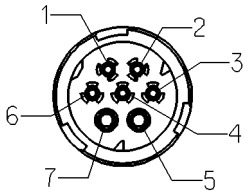
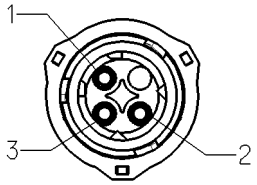
To identify the connections, the connection designations are shown on a sticker on the housing cover and on small tags on the connectors.

Pos.	Connection designation	Function	Connection cable
Z	Power IN	Power supply (ISO 7638) from tow vehicle	449 133 … 0 / 449 135 … 0 (for semitrailer) 449 231 … 0 / 449 233 … 0 (for drawbar trailer)
X1	Power OUT1	Connection T-EBS modulator	449 347 … 0 (for T-EBS E) 449 333 … 0 (for T-EBS D)
Y	Pressure sensor	Connection of the external nominal pressure sensor (only as of T-EBS E1)	449 425 … 0

3.2.1 Variants of the CAN repeater

WABCO number	Housing symbol	Electrical connections (DIN bayonet)		
		Z - Power IN	X1 - Power OUT1	Y - Pressure sensor
446 122 051 0		Socket	Connector	Socket
446 122 053 0		Connector	Connector	Socket

3.3 Pin assignments

Pos.	Connection designation	Connector	PIN	Application
Z	Power IN		1	CAN Low
			2	CAN High
			3	WALA
			4	GND (Term. 15)
			5	GND
			6	Pin 15
			7	Pin 30
X1 / X2	Power OUT1 / Power OUT2		1	CAN Low
			2	CAN High
			3	WALA
			4	GND (Term. 15)
			5	GND
			6	Pin 15
			7	Pin 30
Y	Pressure sensor		1	Sensor SUPPLY
			2	GND
			3	Sensor IN

3.4 Pressure sensor 441 044 101 0 / 102 0

The pressure sensor generates the nominal brake pressure value as a CAN signal on towing vehicles with no CAN line or on overlength trailers in order to meet the necessary timing requirements in accordance with ECE R 13.

In connection with the Trailer EBS E1, the external pressure sensor is connected to the yellow hose fitting and to connection Y "Pressure sensor" of the CAN router/-repeater. With a Trailer EBS of the D generation, the pressure sensor is connected to the "IN/OUT 2" connector of the T-EBS modulator.

! As of version 1.5 of the Trailer EBS E (production date from CW 49/2009), in the diagnostic software "Trailer EBS E" with connected external pressure sensor on the CAN router/-repeater, select setting: "Nominal pressure sensor on R/R" to improve the communication between the devices.

3.5 Cable

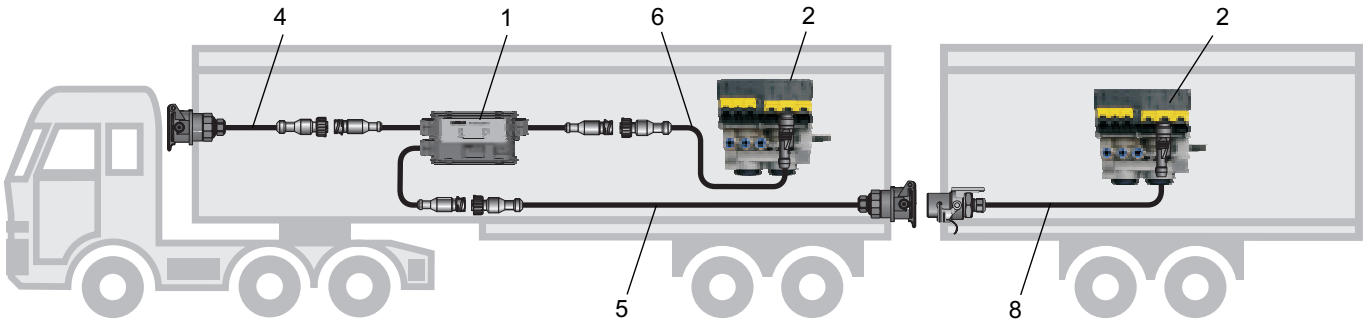


Fig. Cabling a CAN router (1) in a "Eurocombi" tractor-trailer combination with two Trailer EBS modulators (2)

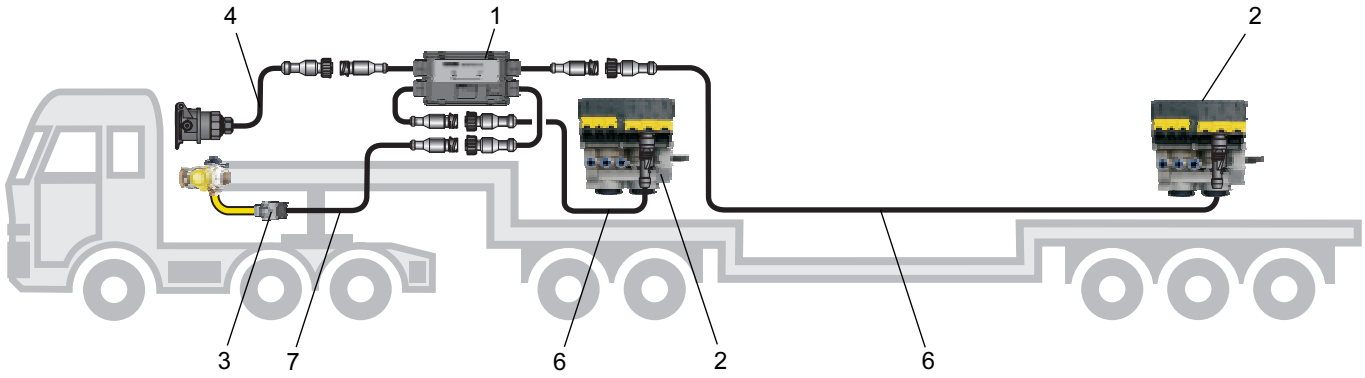
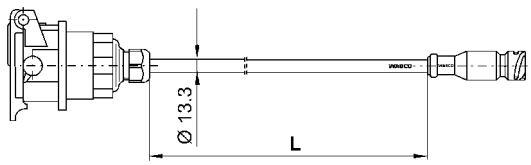


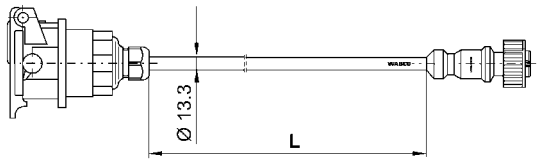
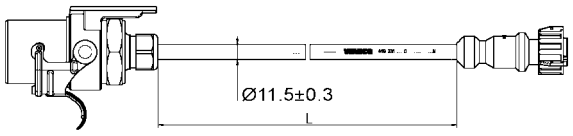
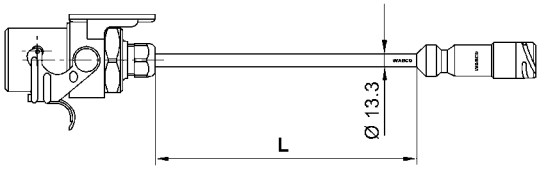
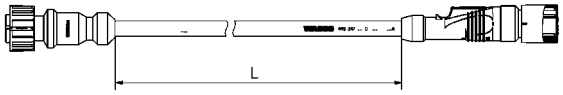
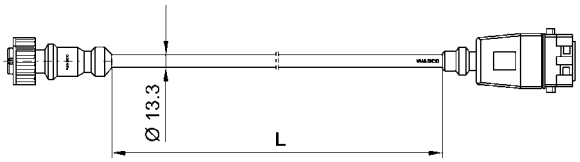
Fig. Cabling a CAN router (1) with optional external pressure sensor (3) in a Flat Bed Trailer with two Trailer EBS E1 modulators (2)

Pos.	Component
1	CAN Router
2	Trailer EBS E Modulator
3	Pressure sensor

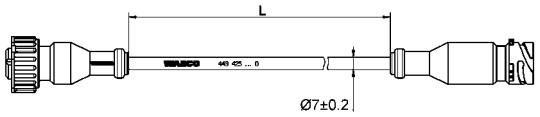
Pos.	Cable family
4	449 133 … 0 / 449 135 … 0 (for semitrailer) 449 231 … 0 / 449 233 … 0 (for drawbar trailer)
5	449 135 … 0 449 231 … 0
6	449 347 … 0 (for T-EBS E) 449 333 … 0 (for T-EBS D)
7	449 425 … 0
8	449 173 … 0 (for semitrailers with T-EBS E) 449 273 … 0 (for drawbar trailers with T-EBS E) 449 172 … 0 (for semitrailers with T-EBS D) 449 272 … 0 (for drawbar trailers with T-EBS D)

3.5.1 Power supply cable

Cable	WABCO no.	L in m	Cable ends - Design	
	**Power IN semitrailer** (permitted total length max. 18 m)			
	449 133 003 0	0,3	Socket ISO 7638	Connector DIN bayonet 7-pin
	449 133 030 0	3,0		
	449 133 120 0	12,0		
	449 133 150 0	15,0		

Cable	WABCO no.	L in m	Cable ends - Design	
	**Power IN semitrailer** (permitted total length max. 18 m) **Power OUT2** (permitted total length max. 15 m)			
	449 135 005 0	0,5	Socket ISO 7638	Socket DIN bayonet 7-pin
	449 135 025 0	2,5		
	449 135 060 0	6,0		
	**Power IN drawbar trailer** (permitted total length max. 18 m)			
	449 231 060 0	6,0	Connector ISO 7638	Socket DIN bayonet 7-pin
	449 231 120 0	12,0		
	**Power IN drawbar trailer** (permitted total length max. 18 m)			
	449 233 030 0	3,0	Connector ISO 7638	Connector DIN bayonet 7-pin
	449 233 100 0	10,0		
	449 233 140 0	14,0		
	449 233 180 0	18,0		
	**Power OUT1** (with connection, permitted total length max. 80 m)			
	449 347 003 0	0,3	Socket DIN bayonet 7-pin	T-EBS E 8-pin Cod. B
	449 347 025 0	2,5		
	449 347 080 0	8,0		
	**Power OUT1** (permitted total length max. 80 m)			
	449 333 003 0	0,3	Socket DIN bayonet 7-pin	T-EBS D "Power"
	449 333 025 0	2,5		
	449 333 055 0	5,5		
	449 333 120 0	12,0		

3.5.2 Sensor cable

Cable	WABCO no.	L in m	Cable ends - Design	
	**Connecting cable Pressure sensor**			
	449 425 030 0	3,0	Socket DIN bayonet	Connector DIN bayonet
	449 425 060 0	6,0		

4 Workshop instructions

Prior to installation, retrofitting, or repair of the CAN router/repeater, ensure the following instructions are observed:

- Only trained and qualified personnel may perform this work.
- Make sure to follow the specifications and instructions of the vehicle manufacturer.
- Always comply with the company and national accident prevention guidelines and Health and Safety regulations.
- When working on the brake system, the vehicle must be secured against rolling away.
- Wear suitable protective clothing when necessary.
- The workplace has to be dry, as well as sufficiently lit and ventilated.
- Observe the notes for avoiding electro-static charge (see chapter 1.1 „Avoiding electro-static charge and uncontrolled discharging (ESD)“, page 4).

4.1 Mounting and Installation

4.1.1 Installation concept

Installation diagrams for CAN routers/repeaters in the various vehicle types are located in the appendix (see chapter 6.3 „Diagram“, page 23).

- Chose the respective installation diagram for your vehicle type.
- Identify the device and the device variant on the type plate and the designation on the device cover label.
- Make sure that the device is suitable for the desired concept and vehicle combination (see chapter 2.3 „System prerequisites, Configuration“, page 6).
- Choose the suitable cable and pay attention to the maximum permitted total length of the cable for the respective connection (see chapter 3.5 „Cable“, page 11).

connection	Maximum permitted total cable length
Z - Power IN	<18 m
X1 - Power OUT1	<80 m
X2 - Power OUT2	<15 m

CAN router in combination with Trailer EBS

If the CAN router is used in Eurocombis or Roadtrains, make sure that the sequence for connected T-EBS modulators is identical with the sequence of trailers.

- Power OUT1 (X1): Connection of the 1st T-EBS modulator / 1st trailer (2.1)
- Power OUT2 (X2): Connection of the 2nd T-EBS modulator / 2nd trailer (2.2)

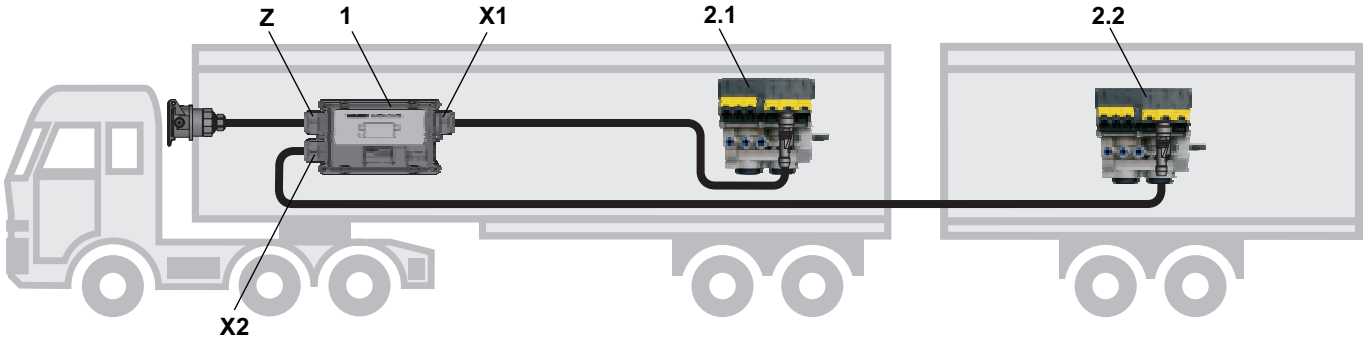


Fig. Using the CAN router (1) in a "Eurocombi" tractor-trailer combination with two Trailer EBS modulators (2.1, 2.2)

The CAN signal that is generated by the external pressure sensor is only passed on via the Power OUT1 (X1) connection of the CAN router:

- Power OUT1 (X1): Passing on the CAN signal from external pressure sensor
- Power OUT2 (X2): Not passing on the CAN signal from external pressure sensor

Therefore, when using the CAN router in a trailer with two T-EBS E1 modulators, the rear modulator (2.1) is always to be connected to the Power OUT1 (X1) connection of the CAN router (1) to achieve optimal timing.

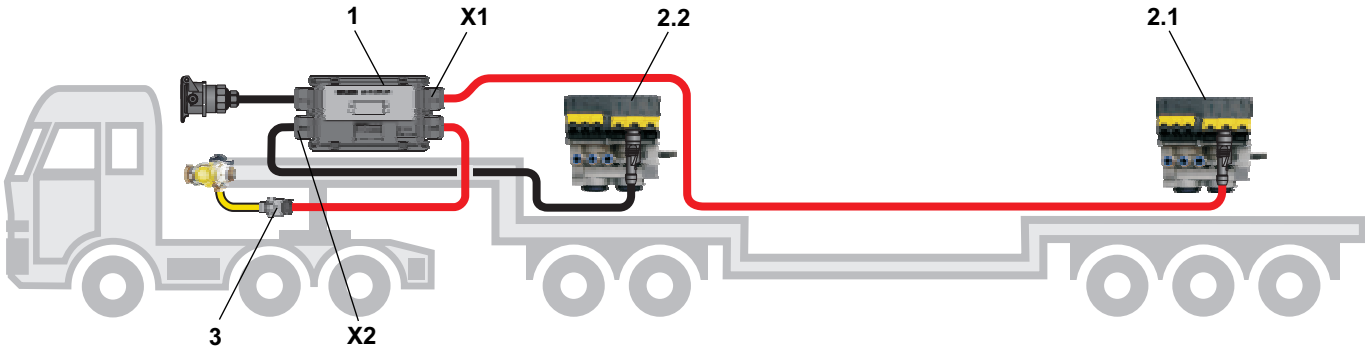


Fig. Using the CAN router (1) with external pressure sensor (3) in a Flat Bed Trailer with two Trailer EBS E1 modulators (2.1, 2.2)

4.1.2 Mounting the CAN Router / Repeater

! Remove the POWER plug of the Trailer EBS modulator for welding work. Position the ground connection of the welder directly next to the welding location. Always position the ground connection for the welder directly in the vicinity of the welding location, to prevent magnetic fields and current flow via cables or components of the Trailer EBS.

– Disconnect the power supply to the towing vehicle. Consider any short-circuit hazards from batteries in the towing vehicle.

– Position the device to be accessible on the vehicle frame so that changing a fuse is possible. The installation location of the device should be parallel to the cable route to prevent unnecessary bending radii in the connecting cable. The CAN repeater should be mounted in the front or on the side of the trailer.

– Use the drilling template for performing any drilling (see chapter 6.2 „Drilling template“, page 22).

– Fasten the device on vehicle frames with two suitable screws and tighten the screws securely.

4.1.3 Mounting the cable

– Identify the connections on the CAN router/repeater via the designations on the labels on the housing cover and the tags on the connections.

– Remove the protective cap on the cable and connect the cable to the respective connections.

– Press the cable into the slot applying a little initial force. All connections must be assigned a cable or have a closing cap. A cap is provided in the delivery of the CAN router/repeater for connection Y (external pressure sensor), in case it will not be connected.

– Fasten the cable only on solid elements that are connected with the components, e.g. the vehicle frame. Fastening to flexible elements can cause cable breaks and the seal can be broken.

– Fasten the cable and plug so that no tension or lateral forces affect the plug-in connections.

– Be sure not to route cables over sharp edges or in the vicinity of aggressive media (e.g. acids).

– Fasten the cable a maximum of 30 cm after the device, e.g. with a cable tie. Fix the cable ties in such a way that the cables are not damaged (if you are using tools, please observe the instructions of the manufacturer of the cable tie).

4.1.4 Functional test

– Use the diagnostic software to test for fault-free communication between the CAN router/repeater and the connected T-EBS modulators.

No further steps are required for starting up the CAN router/repeater.

– Check the cables for damages and make sure that the plug and the cable are correctly connected on the device connections during general maintenance.

4.2 Fuses

The power supply lines (PIN 1 and PIN 3) between the towing vehicle and the Trailer EBS in accordance with ISO 7638 are protected from overvoltage and short-circuits with 4 fuses inside the CAN router/repeater.

Defective fuses are indicated in the towing vehicle with the yellow warning light and in the diagnostic software.

! Defective fuses must be replaced.

On the housing cover label, the connection designations, fuse allocations and bolt tightening torques are shown in case fuses have to be replaced.

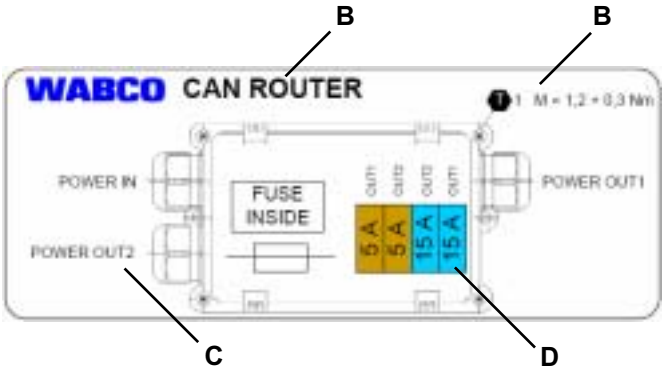


Fig. Label on the housing cover of the CAN router

A Device designation
B Tightening torque for the bolts on the housing cover
C Connection designation
D Fuse allocation

Changing a fuse

– Use the diagnostic software to determine the position of the defective fuse. The position can be located in the diagnostic memory.
– Mark the cover and the housing of the ECU if necessary, so that the alignment is not wrong when the cover is replaced later.
– Unscrew the housing of the ECU.
– Carefully remove the defective fuse and replace with a new fuse. The "little fuse" fuses can be purchased at most retail outlets.
– Close the housing with the housing cover and make sure that it is aligned properly with your markings.
– Tighten the bolts alternating across from one another. The maximum tightening torque is shown in position B on the housing cover.

5 Diagnostics

The diagnostic software for the CAN router/repeater enables fault analysis and status monitoring for the devices.

For the diagnosis, you require

- a PC or laptop,
- a diagnostic interface
- a connection cable to the vehicle
- The diagnostic Software "Trailer CAN Router-Repeater"

5.1 Diagnostic port

5.1.1 ISO7638 towing vehicle/trailer interface

The connection of the diagnostic software to the CAN router/repeater can be made via the towing vehicle-/trailer interface with an ISO 7638 connection adapter.

! On vehicle combinations with multiple CAN routers in sequence, the CAN router that is connected directly with the ISO 7638 interface is always diagnosed.

Diagnostic Interface	Diagnostic cable	Connection adapter
446 301 021 0 (serial) 	CAN-Converter 446 300 470 0 	446 300 360 0 
446 301 022 / 030 0 (USB) 	446 300 361 0 or 446 301 362 0 	446 300 360 0 

5.2 Hardware

PC / Laptop

WABCO offers you a workshop-suitable, impact- and contamination-resistant laptop. This "Toughbook" with preinstalled Diagnostic Software can be obtained from WABCO.

The Diagnostic Software will run on all standard PCs with an operating system Microsoft Windows 2000 or higher.

There are no other special requirements of the hardware. The PC should however have a free USB connector or a free serial connector (COM interface 9-pin) to connect the diagnostic interface.

Diagnostic Interface Set
To set up the diagnosis, the WABCO Diagnostic Interface Set with order number 446 301 030 0 (USB connection) is required. The set contains the Diagnostic Interface and a USB connecting cable to the PC or laptop.

The old Diagnostic Interfaces with serial connection (446 301 021 0) and with USB connection (446 301 022 0) can still be used.

5.3 Diagnostic Software

There are three ways to obtain the "Trailer CAN Router-Repeater" diagnostic software:

- Offline as a USB stick version
- Online as a single download
- As a part of a WABCO system diagnostics subscription

For the diagnosis of multiple WABCO systems, WABCO offers you four different Diagnostic Software subscriptions via the Internet. These contain numerous diagnostic programs at one very low price.

On the Internet, on Web page www.wabco-auto.com in the quick access area, click on "Diagnosis" and then on "WABCO System Diagnostics". There, you will find further information and can order the Diagnostic Software in your language and to load onto your PC.

5.3.1 Diagnostic Software "Trailer CAN Router-Repeater"

If a diagnostics connection exists, the diagnostic software recognises, when starting, which system – whether CAN Router or -Repeater – is connected and adapts the display of the diagnostic software accordingly.

The following important tasks are covered by the diagnosis:

Diagnostic memory

Under menu point "Messages/Diagnostic memory“, current and aged system errors and notes are shown (see chapter 6.1 „Diagnostic messages“, page 20).

The diagnostic memory can be deleted with the respective button.

Status monitoring

- Monitoring the CAN communication between the CAN router/repeater and the T-EBS modulator

If a fault is reported in the CAN communication, the cable connection must be checked.

If multiple CAN routers are connected in series, each device must be checked individually. Always choose the interface directly before the CAN router for checking the communication status to the downstream T-EBS modulator or attached router.

- Monitoring the status of the warning lights

Faults in CAN communication and warning light messages are shown as follows:

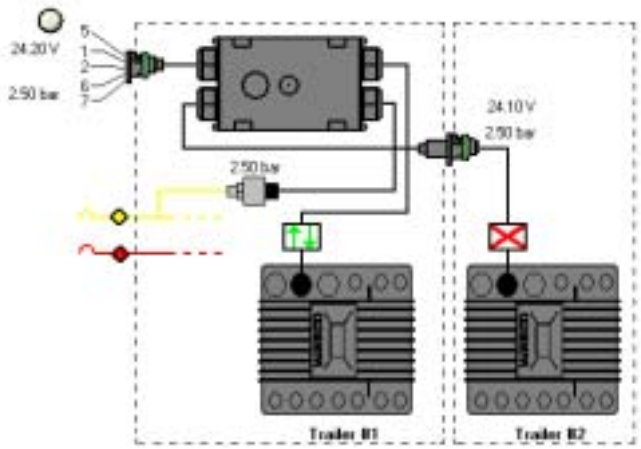


Fig. Screenshot Diagnostic Software: Faulty CAN communication to Trailer #2

Monitoring the external nominal pressure sensor

In menu "System / Deactivate fault monitoring of pressure sensor", the fault monitoring for the external nominal pressure sensor can be deactivated.

When delivered, the fault monitoring of the external nominal pressure sensor is deactivated on the CAN router/repeater. The fault monitoring is activated when the sensor is connected for the first time.

If it is connected again after replacing the sensor, the monitoring is activated again automatically. In this case, the fault monitoring must be deactivated again.

! As of version 1.5 of the Trailer EBS E (production date from CW 49/2009), in the diagnostic software "Trailer EBS E" with connected external pressure sensor on the CAN router/-repeater, select setting: "Nominal pressure sensor on R/R" to improve the communication between the devices.

ECU Software Update

In the "System / ECU Update" menu, the software for the CAN router/repeater can be updated. Updates for the ECU software are provided in file format and can be loaded into the ECU with the diagnostic software.

– Pay attention to the messages and follow the instructions of the diagnostic software during the ECU software update.

! Only software that has been officially released by WABCO is to be loaded into the ECU of the CAN router/repeater.

6 Appendix

6.1 Diagnostic messages

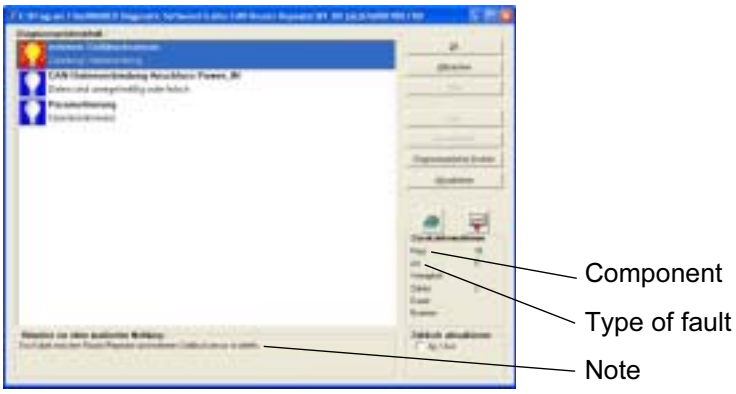


Fig. Screenshot Diagnostic Software: "Diagnostics memory"

Component

Code	Message
78	External desired-pressure sensor
220	CAN data link connection Power_IN
183	CAN data link connection Power_OUT1
184	CAN data link connection Power_OUT2
251	Power supply connection Power_IN
181	Power supply connection Power_OUT1
182	Power supply connection Power_OUT2
253	Parameter setting
254	Control unit
255	Internal operating software

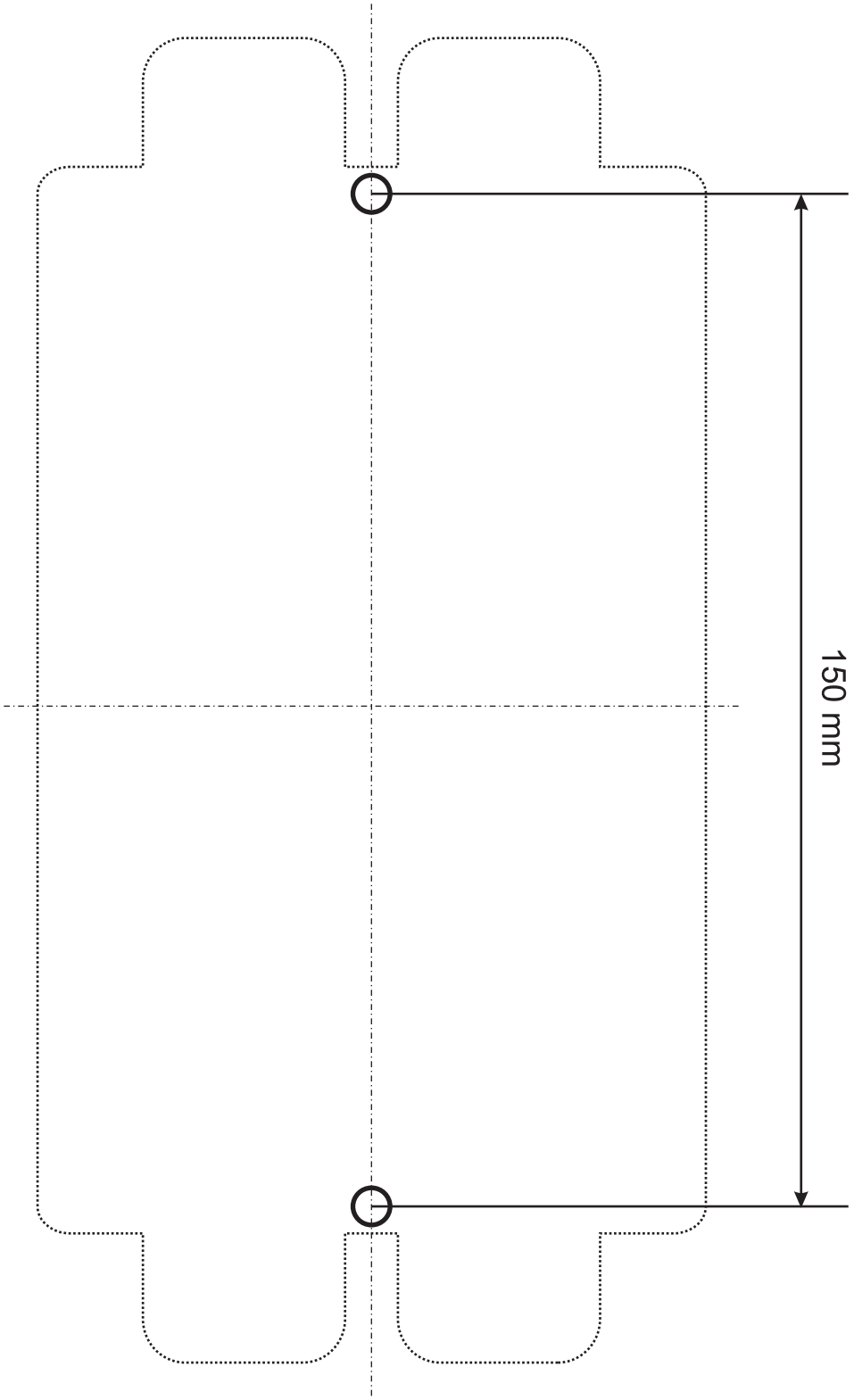
Type of fault

Code	Message
0	Value too high
1	Value too low
2	Data is irregular or incorrect
3	Overvoltage/Short circuit to 24 V
4	Undervoltage/ Short circuit to ground
5	Permanent current consumption
6	Current too high or circuit grounded
7	Air gap too big
8	Slip
9	Signal failure
10	Jump up / Jump down
11	see note
12	see note
13	Characteristic curve information
14	Special message/ see message info
15	see note

Note

Code	Message
25412	Internal ECU message. Switch off ignition for 5 seconds. If message still exists, replace device.
25512	Internal operating system message: Switch off ignition for 5 seconds. If message still exists, replace device.
25103	Connection between Router/Repeater and towing vehicle (Power_IN): Voltage on pin 1 or 2 from towing vehicle is too high.
25104	Connection between Router/Repeater and towing vehicle (Power_IN): The voltage from the towing vehicle is below 8 V or the connection at PIN 1 or 2 of the trailer coupling is broken. Message can also exist in towing vehicle.
18103	Connection between Router/Repeater and trailer modulator (Power_OUT1): Supply voltage too high. This message occurs if the voltage supplied from the towing vehicle is too high.
18104	Connection between Router/Repeater and trailer modulator (Power_OUT1): Interruption in the supply voltage. The internal fuses F1 or F4 can be defective in the Router/Repeater. Check fuses.
18203	Connection between Router/Repeater and towed vehicle (Power_OUT2): Voltage on pin 1 or 2 from towing vehicle is too high. This message occurs if the voltage supplied from the towing vehicle is too high.
18204	Connection between Router/Repeater and towed vehicle (Power_OUT2): The connection via pin 1 or 2 of the trailer plug-in connection is interrupted. The internal fuses F2 or F3 can be defective in the Router/Repeater. Check fuses.
25313	Internal parameter message. Switch off ignition for 5 seconds. If message still exists, replace device.
25314	Parameter message. Switch off ignition for 5 seconds. If message still exists, replace device.
18413	CAN data received from a 6th vehicle. A maximum of 5 vehicles are supported in a road train. 6th vehicle must be disconnected. Then switch ignition off and on again.
22005	Connection between Router/Repeater and towing vehicle (Power_IN): Interruption on pin 6 or 7 (CAN H or CAN L) of the trailer plug-in connection between the trailer and the towing vehicle. Check plug-in connection. Message can also exist in the towing vehicle.
18305	Connection between Router/Repeater and trailer modulator (Power_OUT1): Interruption on pin 2 or 1 (CAN H or CAN L) of the connection between the Router/Repeater and trailer modulator. Check connection between devices. Is the bayonet connection plugged in?
18312	Expected CAN data was not received from the trailer modulator. Is the trailer modulator connected with the connection Power_OUT1? Has the connection with the towing vehicle or the towed vehicle been swapped?
18405	Connection between Router/Repeater and towed vehicle (Power_OUT2): Interruption on pin 6 or 7 (CAN H or CAN L) of the trailer plug-in connection between the trailer and the towed vehicle. Check plug-in connection. Message can also exist in the towed vehicle.
7803	The cable between the Router/Repeater and the external desired-pressure sensor is defective.
7804	The cable between the Router/Repeater and the external desired-pressure sensor is defective.
7805	The cable between the Router/Repeater and the external desired-pressure sensor is defective.
7813	Measured pressure is implausible. Check the pneumatic connection of the pressure sensor in the control line.

6.2 Drilling template

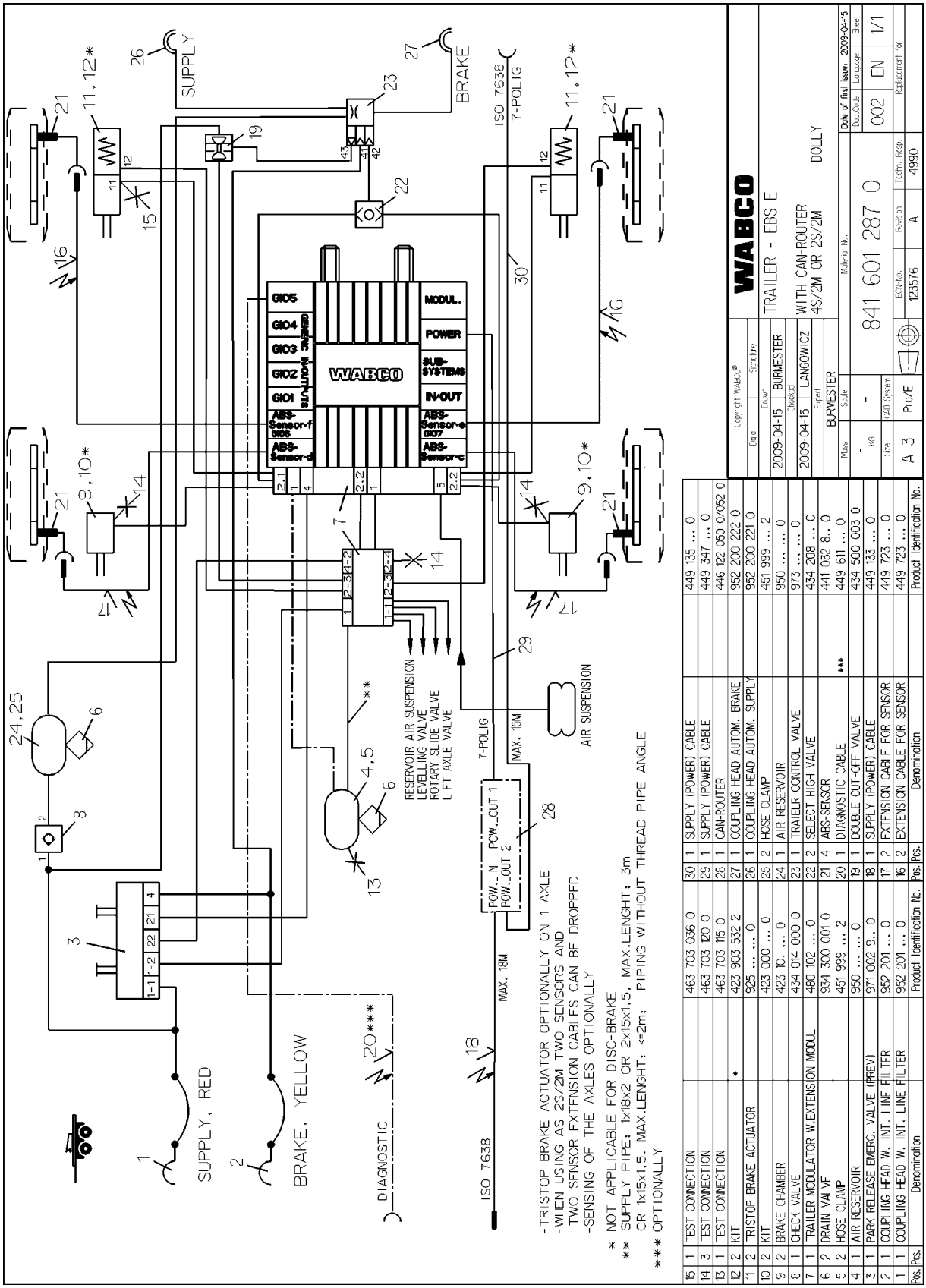


6.3 Diagram

Configuration / Components	Diagram					
	841 601 287 0	841 701 228 0	841 601 245 0	841 701 055 0	841 701 057 0	841 701 058 0
CAN Router	X	X	X			
CAN repeater with pressure sensor				X	X	X
Select High for RSS in Eurocombi / Roadtrain	X	X				
Select Low for trailing steering axle					X	
3. Modulator / EBS relay valve for last axle / trailing steering axle				X		X
PREV	X	X			X	X
Trailer release valve			X	X		

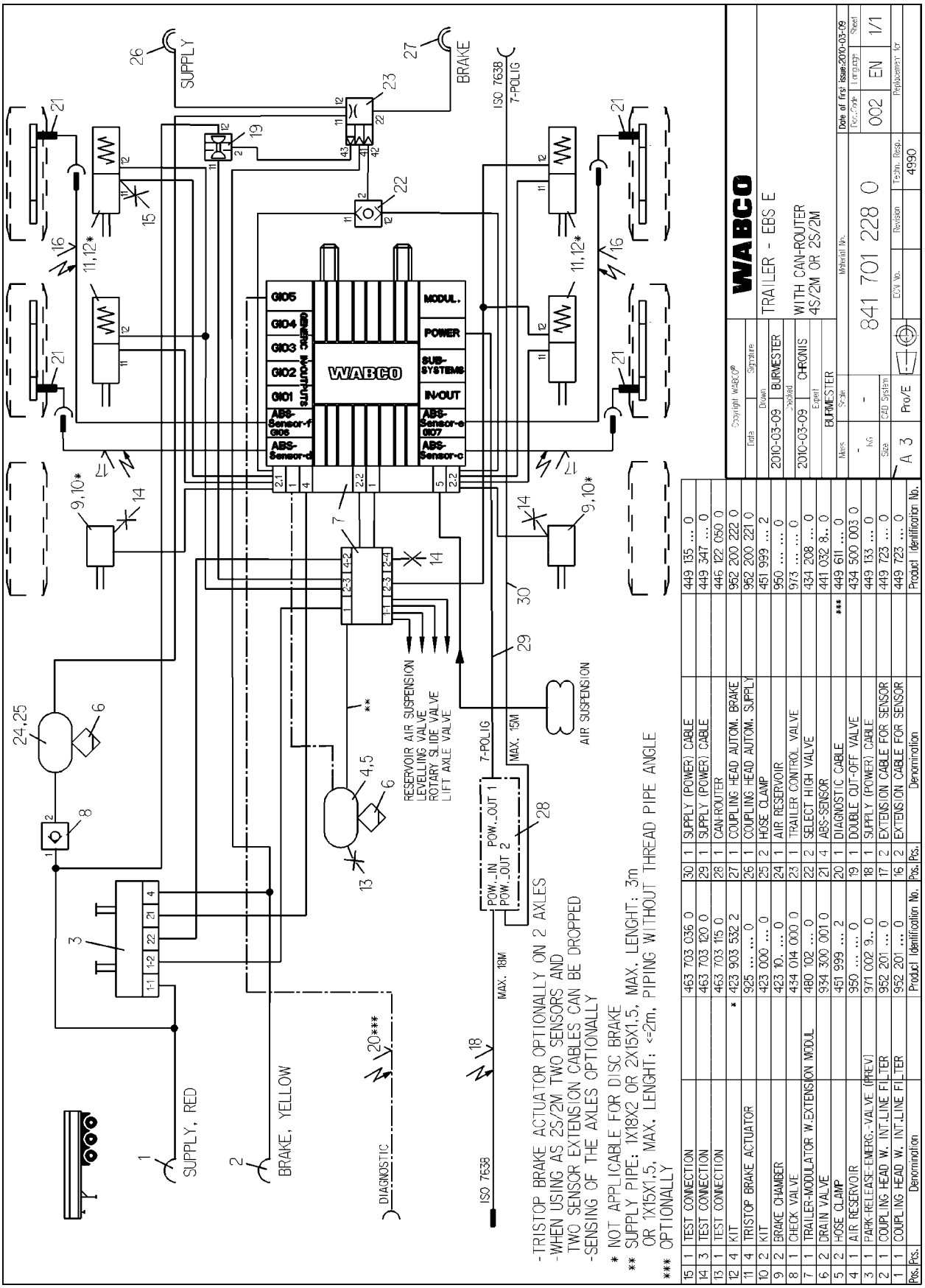
6.3.1 CAN Router

841 601 287 0 Trailer EBS E with CAN router, 4S/2m or 2S/2M in dolly for Eurocombis or Roadtrains with Select High valve for improved RSS control in entire vehicle



Pos.	Pcs.	Denomination	Product Identification No.	Pos.	Pcs.	Denomination	Product Identification No.
15	1	TEST CONNECTION	463 703 036 0	30	1	SUPPLY (POWER) CABLE	449 135 ... 0
14	3	TEST CONNECTION	463 703 120 0	29	1	SUPPLY (POWER) CABLE	449 347 ... 0
13	1	TEST CONNECTION	463 703 115 0	28	1	CAN-ROUTER	446 122 050 0/052 0
12	2	KIT *	423 903 532 2	27	1	COUPLING HEAD AUTOM. BRAKE	952 200 222 0
11	2	TRISTOP BRAKE ACTUATOR *	925 0	26	1	COUPLING HEAD AUTOM. SUPPLY	952 200 221 0
10	2	KIT	423 000 ... 0	25	2	HOSE CLAMP	451 999 ... 2
9	2	BRAKE CHAMBER	423 10. ... 0	24	1	AIR RESERVOIR	950 0
8	1	CHECK VALVE	434 014 000 0	23	1	TRAILER CONTROL VALVE	973 0
7	1	TRAILER-MODULATOR W.EXTENSION MODUL	480 102 ... 0	22	2	SELECT HIGH VALVE	434 208 ... 0
6	2	DRAIN VALVE	934 300 001 0	21	4	ABS-SENSOR	441 032 8.. 0
5	2	HOSE CLAMP	451 999 ... 2	20	1	DIAGNOSTIC CABLE ***	449 611 ... 0
4	1	AIR RESERVOIR	950 0	19	1	DOUBLE CUT-OFF VALVE	434 500 003 0
3	1	PARK-RELEASE-EMERG.-VALVE (PREV)	971 002 9.. 0	18	1	SUPPLY (POWER) CABLE	449 133 ... 0
2	1	COUPLING HEAD W. INT. LINE FILTER	952 201 ... 0	17	2	EXTENSION CABLE FOR SENSOR	449 723 ... 0
1	1	COUPLING HEAD W. INT. LINE FILTER	952 201 ... 0	16	2	EXTENSION CABLE FOR SENSOR	449 723 ... 0

841 701 228 0 Trailer EBS E with CAN router, 4S/2M or 2S/2M in dolly for flatdecks / semitrailers with Select High valve for improved RSS control in entire vehicle



Pos.	Pcs.	Denomination	Product Identification No.	Pos.	Pcs.	Denomination	Product Identification No.
1	1	COUPLING HEAD W. INT.LINE FILTER	952 201 ... 0	16	2	EXTENSION CABLE FOR SENSOR	449 723 ... 0
2	1	COUPLING HEAD W. INT.LINE FILTER	952 201 ... 0	17	2	EXTENSION CABLE FOR SENSOR	449 723 ... 0
3	1	PARK-RELEASE-EMERG.-VALVE (PREV)	971 002 9.. 0	18	1	SUPPLY (POWER) CABLE	449 133 ... 0
4	1	AIR RESERVOIR	950 0	19	1	DOUBLE CUT-OFF VALVE	434 500 003 0
5	2	HOSE CLAMP	451 999 ... 2	20	1	DIAGNOSTIC CABLE	*** 449 611 ... 0
6	2	DRAIN VALVE	934 300 001 0	21	4	ABS-SENSOR	441 032 8.. 0
7	1	TRAILER-MODULATOR W.EXTENSION MODUL	480 102 ... 0	22	2	SELECT HIGH VALVE	434 208 ... 0
8	1	CHECK VALVE	434 014 000 0	23	1	TRAILER CONTROL VALVE	973 0
9	2	BRAKE CHAMBER	423 10. ... 0	24	1	AIR RESERVOIR	950 0
10	2	KIT	423 000 ... 0	25	2	HOSE CLAMP	451 999 ... 2
11	4	TRISTOP BRAKE ACTUATOR	925 0	26	1	COUPLING HEAD AUTOM. SUPPLY	952 200 221 0
12	4	KIT	* 423 903 532 2	27	1	COUPLING HEAD AUTOM. BRAKE	952 200 222 0
13	1	TEST CONNECTION	463 703 115 0	28	1	CAN-ROUTER	446 122 050 0
14	3	TEST CONNECTION	463 703 120 0	29	1	SUPPLY (POWER) CABLE	449 347 ... 0
15	1	TEST CONNECTION	463 703 036 0	30	1	SUPPLY (POWER) CABLE	449 135 ... 0

Date	Signature
Drawn	
2010-03-09	BURMESTER
Checked	
2010-03-09	CHRONIS
Export	
BURMESTER	

WABCO

TRAILER - EBS E

WITH CAN-ROUTER
4S/2M OR 2S/2M

Material No.	ECN No.	Revision	Techn. Resp.
841 701 228 0			4990

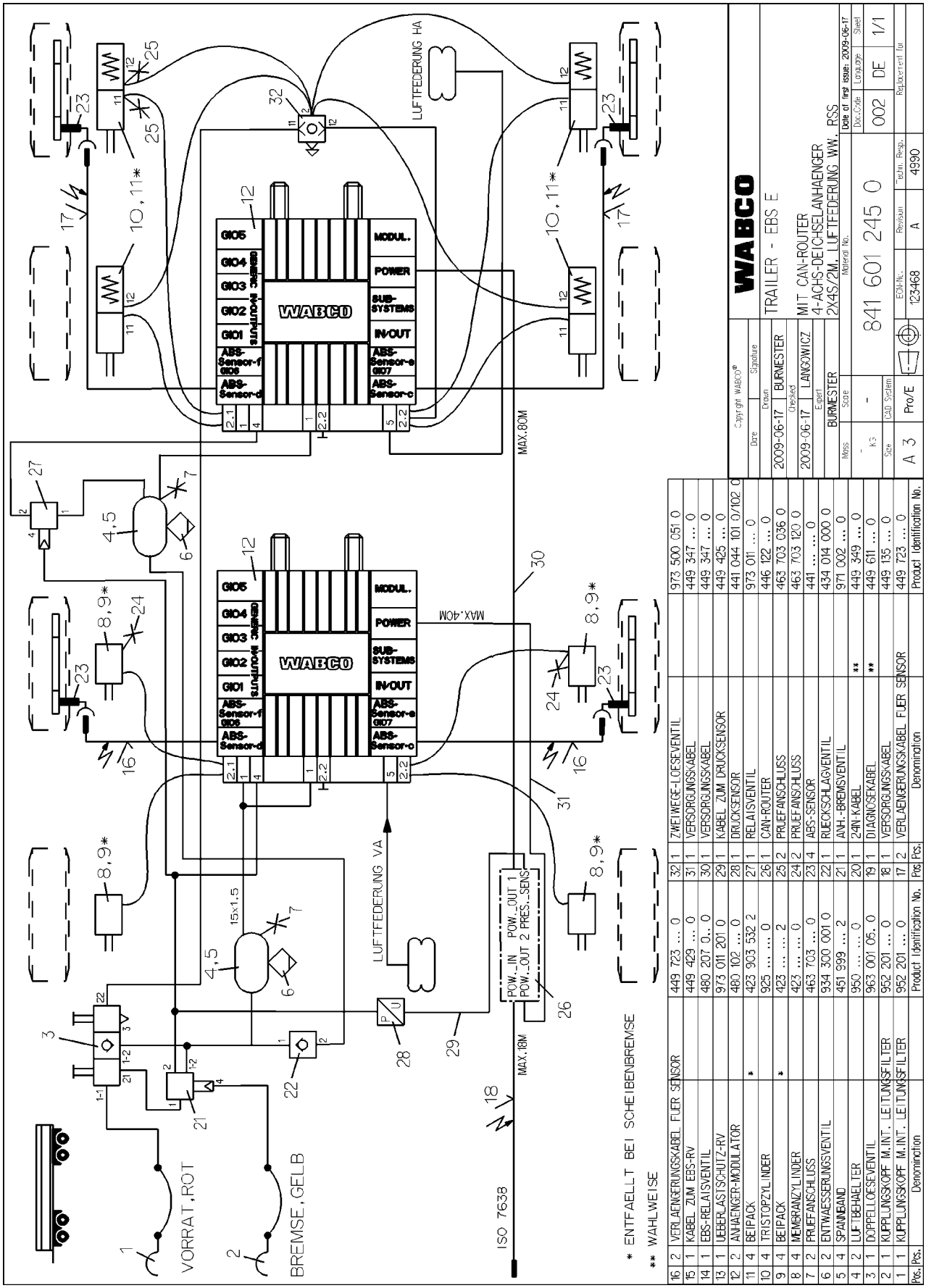
Scale	CAD System	Size	Pro/E
-		A 3	

Date of first issue: 2010-03-09

Doc. Code	Language	Sheet
002	EN	1/1

Replacement for

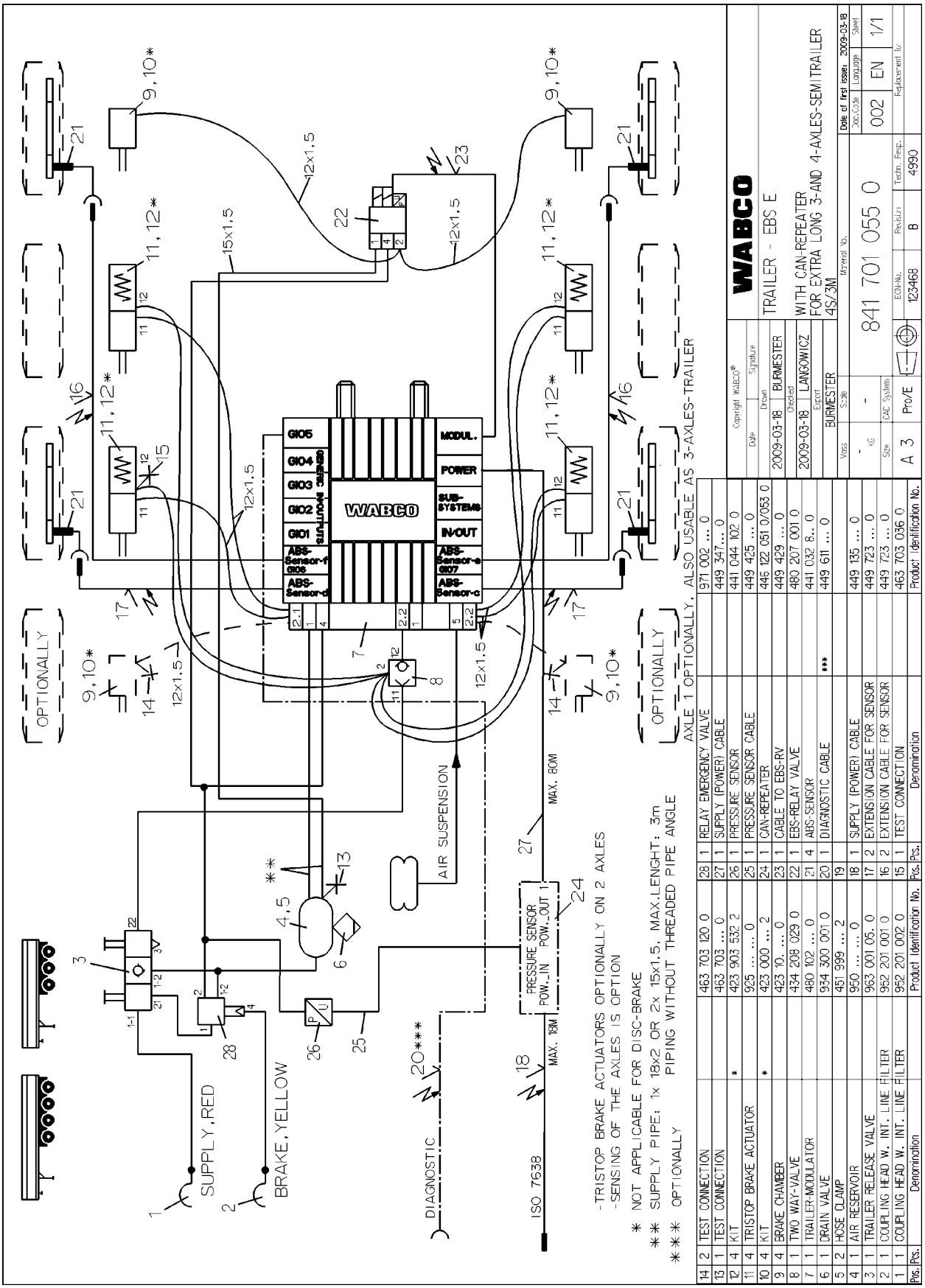
841 601 245 0 Trailer EBS E with CAN router, 2 x 2S/2M in a vehicle



Pos.	Pcs.	Denomination	Product Identification No.
16	2	VERLAENGERUNGSKABEL FUER SENSOR	449 723 ... 0
15	1	KABEL ZUM EBS-RV	449 429 ... 0
14	1	EBS-RELAISVENTIL	480 207 0.. 0
13	1	UEBERLASTSCHUTZ-RV	973 011 201 0
12	2	ANHAENGER-MODULATOR	480 102 ... 0
11	4	BEIPACK	423 903 532 2
10	4	TRISTOPZYLINDER	925 0
9	4	BEIPACK	423 2
8	4	MEMBRANZYLINDER	423 0
7	2	PRUEFANSCHLUSS	463 703 ... 0
6	2	ENTWAESSERUNGSVENTIL	934 300 001 0
5	4	SPANNBAND	451 999 ... 2
4	2	LUFTBEHAELTER	950 0
3	1	DOPPELLOESEVENTIL	963 001 05. 0
2	1	KUPPLUNGSKOPF M.INT. LEITUNGSFILTER	952 201 ... 0
1	1	KUPPLUNGSKOPF M.INT. LEITUNGSFILTER	952 201 ... 0
32	1	ZWEIWEGE-LOESEVENTIL	973 500 051 0
31	1	VERSORGUNGSKABEL	449 347 ... 0
30	1	VERSORGUNGSKABEL	449 347 ... 0
29	1	KABEL ZUM DRUCKSENSOR	449 425 ... 0
28	1	DRUCKSENSOR	441 044 101 0/102 0
27	1	RELAISVENTIL	973 011 ... 0
26	1	CAN-ROUTER	446 122 ... 0
25	2	PRUEFANSCHLUSS	463 703 036 0
24	2	PRUEFANSCHLUSS	463 703 120 0
23	4	ABS-SENSOR	441 0
22	1	RUECKSCHLAGVENTIL	434 014 000 0
21	1	ANH.-BREMSVENTIL	971 002 ... 0
20	1	24N-KABEL	449 349 ... 0
19	1	DIAGNOSEKABEL	449 611 ... 0
18	1	VERSORGUNGSKABEL	449 135 ... 0
17	2	VERLAENGERUNGSKABEL FUER SENSOR	449 723 ... 0

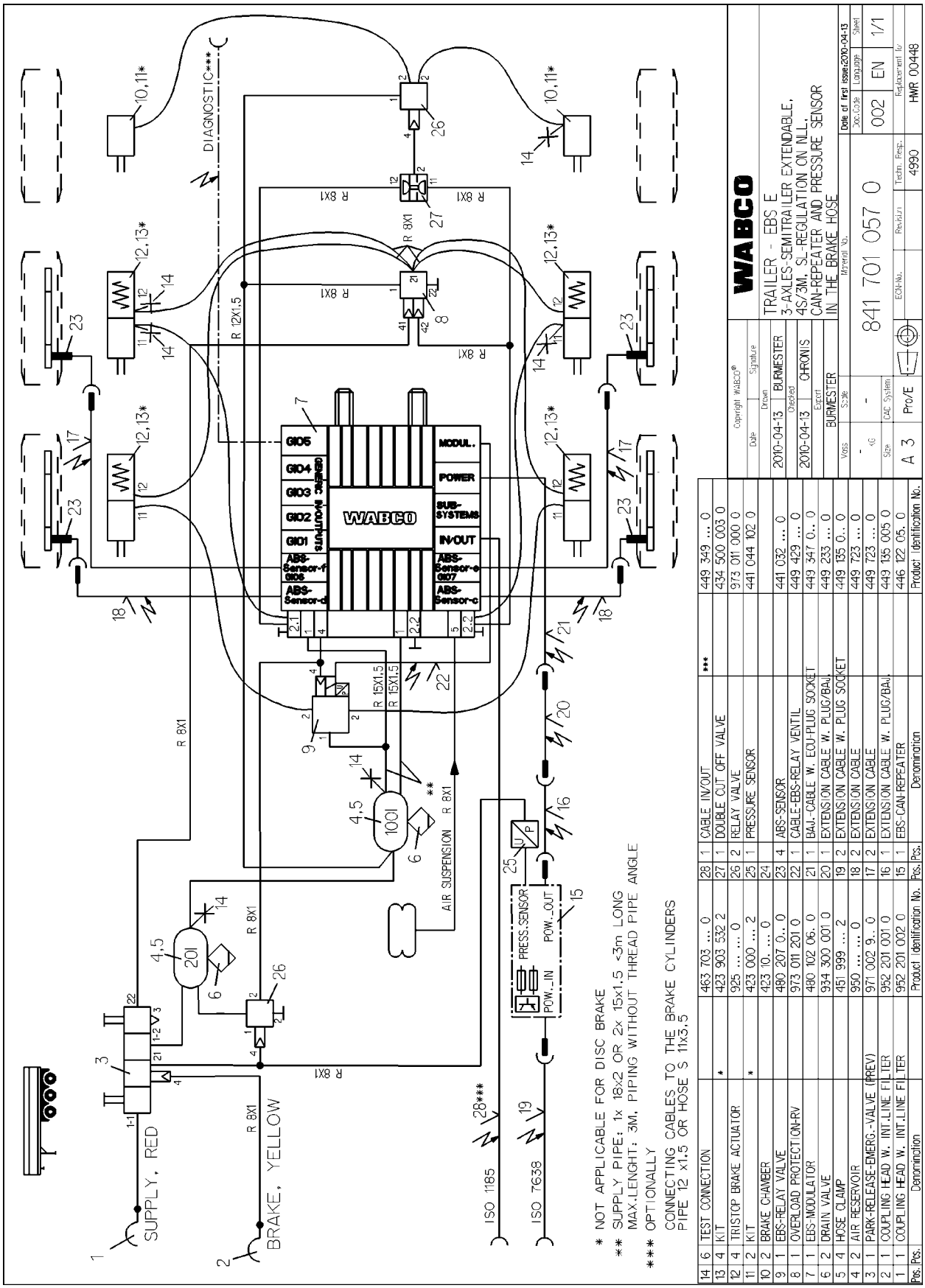
6.3.2 CAN Repeater

841 701 055 0 Trailer EBS E with CAN repeater for overlength trailers 4S/3M with trailer release valve and PEM



Pos.	Pcs.	Denomination	Product Identification No.
14	2	TEST CONNECTION	463 703 120 0
13	1	TEST CONNECTION	463 703 ... 0
12	4	KIT	423 903 532 2
11	4	TRISTOP BRAKE ACTUATOR	925 0
10	4	KIT	423 000 ... 2
9	4	BRAKE CHAMBER	423 10. ... 0
8	1	TWO WAY-VALVE	434 208 029 0
7	1	TRAILER-MODULATOR	480 102 ... 0
6	1	DRAIN VALVE	934 300 001 0
5	2	HOSE CLAMP	451 999 ... 2
4	1	AIR RESERVOIR	950 0
3	1	TRAILER RELEASE VALVE	963 001 05. 0
2	1	COUPLING HEAD W. INT. LINE FILTER	952 201 001 0
1	1	COUPLING HEAD W. INT. LINE FILTER	952 201 002 0
28	1	RELAY EMERGENCY VALVE	971 002 ... 0
27	1	SUPPLY (POWER) CABLE	449 347 ... 0
26	1	PRESSURE SENSOR	441 044 102 0
25	1	PRESSURE SENSOR CABLE	449 425 ... 0
24	1	CAN-REPEATER	446 122 051 0/053 0
23	1	CABLE TO EBS-RV	449 429 ... 0
22	1	EBS-RELAY VALVE	480 207 001 0
21	4	ABS-SENSOR	441 032 8.. 0
20	1	DIAGNOSTIC CABLE	449 611 ... 0
19			
18	1	SUPPLY (POWER) CABLE	449 135 ... 0
17	2	EXTENSION CABLE FOR SENSOR	449 723 ... 0
16	2	EXTENSION CABLE FOR SENSOR	449 723 ... 0
15	1	TEST CONNECTION	463 703 036 0

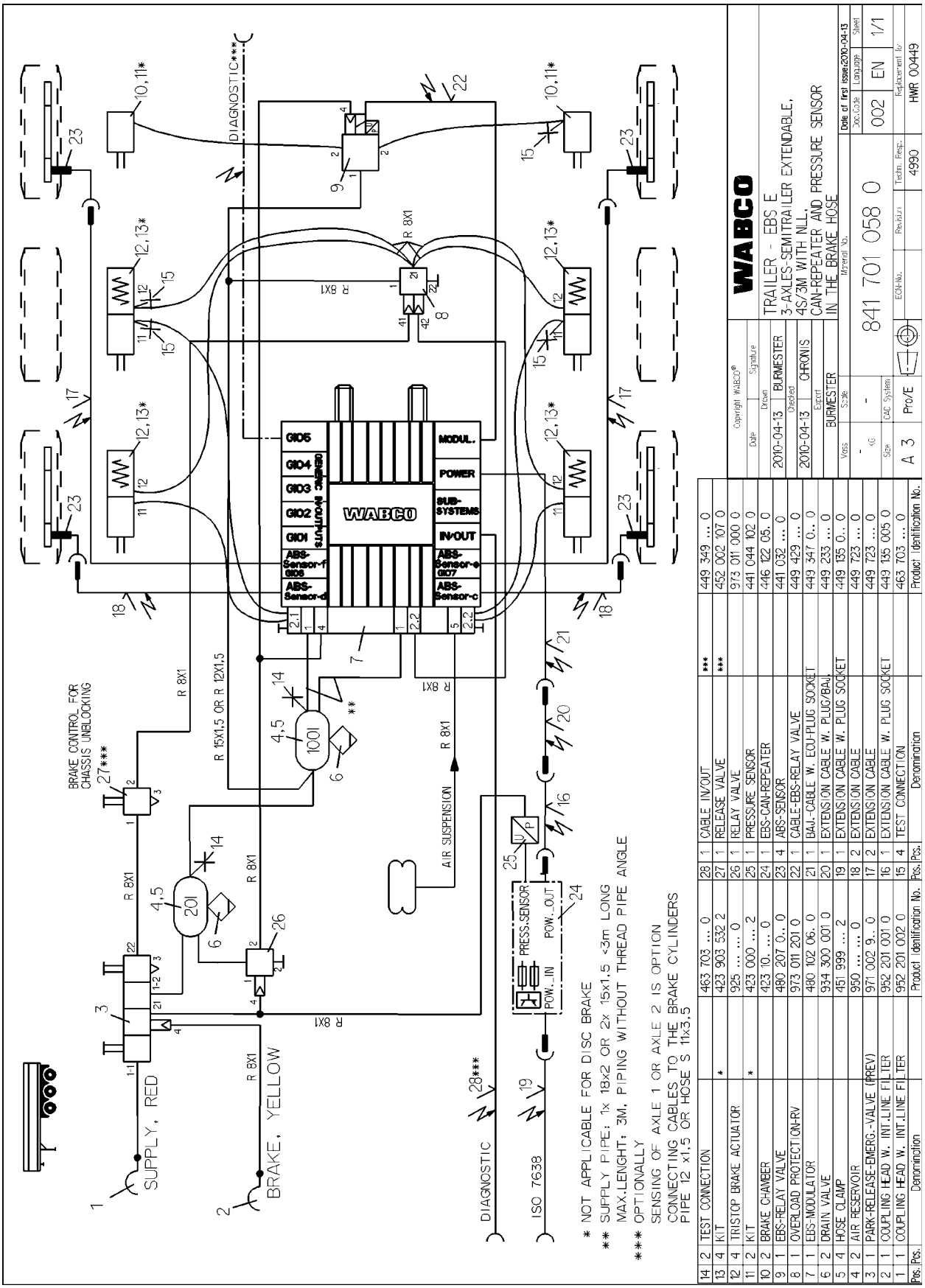
841 701 057 0 Trailer EBS E with CAN repeater for overlength trailer 4S/3M with PREV and Select Low for trailing steering axle



Pos.	Pcs.	Denomination	Product Identification No.	Pos.	Pcs.	Denomination	***	Product Identification No.
14	6	TEST CONNECTION	463 703 ... 0	28	1	CABLE IN/OUT		449 349 ... 0
13	4	KIT	423 903 332 2	27	1	DOUBLE CUT OFF VALVE		434 500 003 0
12	4	TRISTOP BRAKE ACTUATOR	925 0	26	2	RELAY VALVE		973 011 000 0
11	2	KIT	423 000 ... 2	25	1	PRESSURE SENSOR		441 044 102 0
10	2	BRAKE CHAMBER	423 10. ... 0	24				
9	1	EBS-RELAY VALVE	480 207 0.. 0	23	4	ABS-SENSOR		441 032 ... 0
8	1	OVERLOAD PROTECTION-RV	973 011 201 0	22	1	CABLE-EBS-RELAY VENTIL		449 429 ... 0
7	1	EBS-MODULATOR	480 102 06. 0	21	1	BAJ.-CABLE W. ECU-PLUG SOCKET		449 347 0.. 0
6	2	DRAIN VALVE	934 300 001 0	20	1	EXTENSION CABLE W. PLUG/BAJ.		449 233 ... 0
5	4	HOSE CLAMP	451 999 ... 2	19	2	EXTENSION CABLE W. PLUG SOCKET		449 135 0.. 0
4	2	AIR RESERVOIR	950 0	18	2	EXTENSION CABLE		449 723 ... 0
3	1	PARK-RELEASE-EMERG.-VALVE (PREV)	971 002 9.. 0	17	2	EXTENSION CABLE		449 723 ... 0
2	1	COUPLING HEAD W. INT.LINE FILTER	952 201 001 0	16	1	EXTENSION CABLE W. PLUG/BAJ.		449 135 005 0
1	1	COUPLING HEAD W. INT.LINE FILTER	952 201 002 0	15	1	EBS-CAN-REPEATER		446 122 05. 0

Copyright WABCO®		Material No.	Date of first issue:2010-04-13
Date	Drawn	Voss	Scale
2010-04-13	BURMESTER	-	-
Checked		±G	
2010-04-13	CHRONIS	Size	CAD System
Export		A 3	Pro/E
BURMESTER		ECN-No.	Revision
IN THE BRAKE HOSE		Techn. Resp.	Replacement for
		4990	HWR 00448
		Doc.Code	Language
		002	EN
			Sheet 1/1

841 701 058 0 Trailer EBS E with CAN repeater for overlength trailers 4S/3M with EBS relay valve and trailing steering axle



Pos.	Pcs.	Denomination	Product Identification No.	Pcs.	Pos.
14	2	TEST CONNECTION	463 703 ... 0	28	1
13	4	KIT	423 903 532 2	27	1
12	4	TRISTOP BRAKE ACTUATOR	925 0	26	1
11	2	KIT	423 000 ... 2	25	1
10	2	BRAKE CHAMBER	423 10. ... 0	24	1
9	1	EBS-RELAY VALVE	480 207 0.. 0	23	4
8	1	OVERLOAD PROTECTION-RV	973 011 201 0	22	1
7	1	EBS-MODULATOR	480 102 06. 0	21	1
6	2	DRAIN VALVE	934 300 001 0	20	1
5	4	HOSE CLAMP	451 999 ... 2	19	1
4	2	AIR RESERVOIR	950 0	18	2
3	1	PARK-RELEASE-EMERG.-VALVE (PREV)	971 002 9.. 0	17	2
2	1	COUPLING HEAD W. INT.LINE FILTER	952 201 001 0	16	1
1	1	COUPLING HEAD W. INT.LINE FILTER	952 201 002 0	15	4
Pos.	Pcs.	Denomination	Product Identification No.	Pcs.	Pos.
14	2	CABLE IN/OUT	449 349 ... 0	***	
13	4	RELEASE VALVE	452 002 107 0	***	
12	1	RELAY VALVE	973 011 000 0		
11	1	PRESSURE SENSOR	441 044 102 0		
10	1	EBS-CAN-REPEATER	446 122 05. 0		
9	4	ABS-SENSOR	441 032 ... 0		
8	1	CABLE-EBS-RELAY VALVE	449 429 ... 0		
7	1	BAU.-CABLE W. ECU-PLUG SOCKET	449 347 0.. 0		
6	1	EXTENSION CABLE W. PLUG/BAU.	449 233 ... 0		
5	1	EXTENSION CABLE W. PLUG SOCKET	449 135 0.. 0		
4	2	EXTENSION CABLE	449 723 ... 0		
3	2	EXTENSION CABLE	449 723 ... 0		
2	1	EXTENSION CABLE W. PLUG SOCKET	449 135 005 0		
1	4	TEST CONNECTION	463 703 ... 0		
Pos.	Pcs.	Denomination	Product Identification No.		