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# **RADC 2.0**









# SERVICE NOTES

- Please read these assembly instructions completely before starting assembly.
- These installation instructions are intended for workshops and attachment manufacturers Appropriate background knowledge is therefore assumed in these assembly instructions. It should be noted that some work may only be carried out by appropriately qualified personnel in order to avoid the risk of injury and to achieve the quality required for construction work.
- When making product improvements, we reserve the right to make technical and optical changes.
- If you have any questions or installation problems, call Aspöck customer service, the dealer or contact your authorized workshop.

# LIABILITY PROVISIONS

#### General information:

- National mounting, installation and operating regulations must be observed.
- The product may only be used in accordance with the enclosed instructions and safety notes. Instructions can be found online at *www.aspoeck.com*.
- No modifications may be made to the product unless only the original spare parts intended for this purpose or spare parts approved by Aspöck are used and installed by professionally qualified personnel.

#### Exclusion of warranty:

- Warranty for any product damage is excluded in the event of non-compliance with the instructions, with the product data sheet or in the event of use outside of the intended purpose or operating conditions.
- The warranty also does not cover products that have been damaged or are in poor operating condition due to hazards (including environmental hazards, road traffic hazards, hazards caused by third parties or circumstances beyond the control of Aspöck).
- Repair or replacement of a defective product does not result in the start of a new warranty period.
- Other warranty provisions can be found in item 10 of the Terms of Sales and Delivery (TSD) *www.aspoeck.com*.

#### Exclusion of liability:

- Aspöck Systems accepts no liability for indirect damage, consequential damage and financial losses.
- Other (limiting) liability provisions can be found in item 11 of the Terms of Sales and Delivery (TSD) *www.aspoeck.com*.
- Limiting product liability provisions are laid down in item 12 of the Terms of Sales and Delivery (TSD) *www.aspoeck.com*.











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# **1. LIST OF SHORTCUTS**

SHORTCUT	EXPLANATION	
EMC	Electro-magnetic compatibility	
ESD	Electrostatic discharge	
PCB(A)	Printed circuit board (assembled)	
OEM	Original equipment manufacturer	
EOL	End of Line Test	
CAN	Controller area network	
EOM	End outline marker	
ECU	Electronic control unit	
OBD	On board diagnoses	
RADC	Radar distance control	
RLF	Road layer function	
EBS	Electronic brake system	

# 2. GENERAL INFORMATION

# 2.1 TARGET GROUP

This document is intended for qualified specialists from vehicle manufacturers and workshops.

# 2.2 SAFETY

# 2.2.1 INTENDED USE

The system may only be used to monitor the area behind the trailer when reversing commercial vehicles (class O3/O4). Any other use is considered improper. The manufacturer shall not be held liable for any damage resulting from improper use. The risk of such damage shall be borne by the driver of the vehicle. Proper use also includes compliance with the operating, maintenance and servicing instructions prescribed by the manufacturer. Use of the system is subject without exception to the country-specific traffic regulations in which the vehicle is operated. The manufacturer shall not be held liable for any damage resulting from unauthorised modifications to the system.





# 2.2.2 USED PICTOGRAM

These instructions contain information that must be observed for personal safety and to prevent personal injury and damage to property. These are highlighted by warning triangles and shown below depending on the degree of danger.

#### **A DANGER**

The signal word indicates a hazard with a **high** level of risk which, if not avoided, could result in death or serious injury.

#### 

The signal word indicates a hazard with a **medium** level of risk which, if not avoided, could result in death or serious injury.

#### 

The signal word indicates a hazard with a **low** level of risk which, if not avoided, could result in a minor or moderate injury.

#### NOTE

A note in the context of these instructions is important information, a technical note, about the product or the relevant part of the instructions to which particular attention is to be paid.

# **3. SYSTEM DESCRIPTION**

The RADC 2.0 supports the driver when reversing a towing vehicle with a trailer, in particular when docking with a loading ramp. For large vehicles with trailers, a large, non-visible area is created at the rear, which is monitored by the RADC 2.0. If there are any obstacles, the trailer brake is automatically activated (target braking).

For the assisted docking process at a loading ramp, the attached rear position lamps (EOM) signal the remaining distance to the obstacle or loading ramp by means of different flashing frequencies. In addition, the driver can be warned acoustically.

The RADC 2.0 can also be installed without modifying the vehicle's EBS. In this case, the function is limited to the visual warning by the EOMs and an optional acoustic warning by the beeper. In this variant, the HDSCS plug connection on the ECU must be sealed. (6.2  $(\kappa)$ )



#### The RADC 2.0 fulfils the following regulations:

- ISO 26262 Functional safety for road vehicles
- ECE R10 Electromagnetic compatibility

#### RADC 2.0 | OPERATING MANUAL





# **3.1 SUPPORTED FUNCTIONS**



#### Flashing EOM (Superpoint)

• visualisation of the ramp spacing



#### **Beeper Alarm**

• Warnings when crossing traffic is detected (optional: signalling of different detection zones)



#### No EBS configuration required (Wabco/ZF, Haldex)

- 'Plug and play' through CAN data interface between RADC 2.0 and EBS (Wabco/ZF, Haldex compatibility with current EBS versions)
- Knorr on the analogue "RLF" brake



#### Manual deactivation of the system

• Option for the driver to completely deactivate it (9.2)



#### Different brake pressure values transmitted to the EBS

- Low pressure (haptic information for the driver)
- High pressure (last distance to ramp)
- Emergency braking pressure (cross-traffic)



#### **Cross-traffic detection**

• Emergency brake implementation, beeper warning



#### System based on UN ECE R158 regulation



#### Selbstdiagnose / Zustandsüberwachung

- Sensor, ECU, EBS brake readiness, power supply, open or overcurrent detection at outputs
- HARA, FMEA analysis



#### Customisable with RADC 2.0 configuration software

• Adjustment of sensor position, detection zones, brake pressures,...



#### RADC 2.0 ECU

• High-quality HDSCS and Superseal connectors.





# 3.2 REQUIREMENTS ON THE TRAILER

#### **Electrical requirements**

A prerequisite for the mounting of the RADC 2.0 is the power supply via the lighting functions of an existing ISO12098 connection from the truck to the trailer. The minimum requirement for activating the rear area monitoring function is the active supply wired in parallel to the reverse lamp. To ensure that the EOM lamps are switched on in forward gear, it is also necessary to connect the inputs to the ECU for the right and left parking lights to the ISO12098.

#### Further electrical/wiring information:

The supply voltage of the components can be between 9V and 32V. To read control signals correctly, voltage values above 11V are necessary. When operating on a 12V electrical system, care should be taken to use neither over-long cables nor cables with insufficient cross-section. Furthermore, flawless plug contacts must be ensured to prevent voltage drops.

#### **Trailer EBS requirement**

To control the automatic brake request, the RADC 2.0 is connected to the trailer EBS via CAN bus. For this purpose, appropriate cables are provided for the different brake system manufacturers.

- RADC 2.0 Wabco EBS TEBS-E (Subsystem oder GIO5)
- RADC 2.0 Haldex EBS Gen 4
- RADC 2.0 Wabco EBS TEBS-F (Subsystem)

If several devices are connected to the EBS CAN subsystem, the wiring in a line structure must be observed. The use of Aspöck AMP-CAN cabling is recommended for this purpose.

• AMP end device HDSCS 6pin and RADC 2.0 K1.2 - 6pin HDSCS 55° female

With Knorr-Bremse Trailer EBS, the brake request is controlled via a ground-free single-wire signal line.

• RADC 2.0 Knorr EBS G2 (9.5.1)

If possible, the SENS\_SUP (IN-OUT connector pin 6) should be used for this on the TEBS G2.2 Premium. To do this, further configuration of the trailer EBS is necessary in order to store a brake pressure as a 'Road Layer Function (RLF)' at the input used.

#### **Technical requirement**

In order to properly mount all components of the RADC 2.0 on the trailer, it is necessary to observe all mounting dimensions and tolerances. Before starting the mounting, make sure that the required space is available on the trailer. This is essential to ensure the proper functioning of the RADC 2.0. The mounting dimensions, tolerances and hole patterns are described in the following chapters.

# OPERATING MANUAL



# 4. SYSTEM OVERVIEW





# **5. COMPONENT OVERVIEW**



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# **5.1 COMPONENTS**

# **5.1.2 BASIC COMPONENTS**

	ORDER NB. OEM	ORDER NB. AM	VERSION	ADDITION	
	75-0600-017	75-0600-011		RADC 2.0 ECU	Set
			[A]	RADC 2.0 ECU - Config 00 (Standard)	1 pcs.
				Screw EJOT Delta PT 40x14	4 pcs.
			[B]	RADC 2.0 - Sticker	1 pcs.
				Leaflet ECU	1 pcs.
				Leaflet Sensor	1 pcs.
	10-0350-977			Operating Manual	1 pcs.
S	75-0213-127	75-0213-121	[C]	RADC 2.0 Sensor	1 pcs.
DNENT	78-7023-407	78-7023-404	[D]	RADC 2.0 Sensorcable	1 m
COMPG	78-7023-417	78-7023-414	[E]	RADC 2.0 Sensorcable	3 m
ASIC O		15-7411-004		RADC 2.0 Sensorcover	Set
			[F]	RADC 2.0 Sensorcover	1 pcs.
				Screw EJOT Delta PT 45x20	4 pcs.
		15-7412-004		Aspöck ECU protection cap	Set
			[G]	Aspöck ECU protection cap	1 pcs.
				Screw EJOT Delta PT 40x14	4 pcs.
	31-3103-487	31-3103-484	[H]	SP IV R/W/O 2m 2p S.Seal RH	2 m
	31-3102-477	31-3102-474	[1]	SP IV R/W/O 2m 2p S.Seal LH	2 m
	75-0001-037	75-0001-034	[J]	RADC 2.0 Beeper 2p S.Seal	4 m

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# **5.1.3 SPECIFIC COMPONENTS**

	ORDER NB. OEM	ORDER NB. AM	VERSION	ADDITION	
	78-7023-207	78-7023-204	[K]	RADC 2.0 power supply cable ASS3 17p.	0,3 / 5m
	78-7023-217	78-7023-214	[L]	RADC 2.0 power supply cable o. e.	5 m
	78-7023-037	78-7023-034	[M]	RADC 2.0 Wabco EBS3 - ECU	6 m
	78-7023-077	78-7023-074	[N]	RADC 2.0 Haldex EBS4 - ECU	6 m
SPECIFIC COMPONENTS	78-7023-007	78-7023-004	[O]	RADC 2.0 Knorr EBS3 RLF - ECU	6 m
	78-7023-707		[P]	RADC 2.0 K1.2 - ECU	6 m
	78-7023-717		[Q]	K1.2 CAN Splitter 1m/2m	1 / 2 m
	69-0048-087		[R]	Extension cable 2p S.Seal	3 m
	69-0048-007		[S]	Extension cable 2p S.Seal	1,5 m
	69-0354-007	69-0354-004	[T]	PCAN Adapter	
	69-0470-007	69-0470-004	[U]	Aspöck ECU programming cable	0,4 / 4m
	75-9012-027			Aspöck USB Dongle	

# 5.1.4 SPARE PARTS

	ORDER NB. OEM	ORDER NB. AM	VERSION	ADDITION	
(0	14-0414-034			Screw EJOT Delta PT 40x14	4 Stk.
PARTS	14-2045-014			Screw EJOT Delta PT 45x20	4 Stk.
SPARE	10-0211-397	10-0211-397	[B]	RADC 2.0 - Sticker	
0)					









# 6. COMPONENTS AND ASSEMBLY

Careful assembly of the RADC 2.0 components takes time and requires familiarisation with the operating instructions. To ensure proper installation, it is necessary to follow all the information and instructions in this document.

#### Overview of components and cables







#### **A DANGER**

All components and cables must not be routed or installed along heat sources or through areas that may be subject to impact or dirt abrasion.

# 6.1 SENSOR

The reversing sensor of the RADC 2 offers a detection angle of 180° with a detection range of 10m x 4m (maximum) and complies with the UN ECE R10 directive. The single radar is easy to install and can be user-friendly integrated into most vehicle systems to activate active braking and audible warnings when reversing.



TECHNICAL DATA	
DETECTION RANGE	10 m x 4 m (maximal)
ANGLE OF DETECTION HORIZ.	180° (No blind spots)
DISTANCE ACCURACY	±0,2 m
DISTANCE RESOLUTION	0,5 m
MEASUREMENT (W/H/D)	115 x 95 x 43 mm
COMMUNICATION INTERFACE	CAN
OPERATING VOLTAGE	24 V
OPERATING TEMPERATURE	-40 °C - +80 °C
APPROVAL	UN ECE R10
PROTECTION CLASS	IP69K







# 6.1.1 SENSOR COVER

To protect the sensor from dirt and mechanical damage, the RADC 2.0 includes a cover for the sensor. The cover is screwed to the sensor during assembly in the same hole pattern.



TECHNICAL DATA		
MEASUREMENT (W/H/D)	99.9 x 155.9 x 44.5 mm	
MATERIAL	ABS	
WEIGHT	55 g	
COLOR	black	









#### **Mounting position**

When mounting the sensor, it is important to ensure compliance with the vertical and horizontal deviation tolerances. If the sensor is mounted outside the tolerances, the performance of the sensor must be tested. The effective range of the sensor must not be covered or shielded by any attached parts at the rear or sides, as this may affect its function. (Malfunction of the sensor due to radar reflections) In the standard Aspöck mounting, the sensor is mounted on the left of the bumper next to the licence plate or, if possible, in the centre of the vehicle. The specified installation heights and installation depths must be observed.



Radar reflections due to excessive depth



#### **A** CAUTION

Since the actual installation situation can vary greatly in practice, radar reflections may occur even if the installation dimensions and tolerances are adhered to. To ensure that the RADC 2.0 works properly, the performance of the reversing system must be tested before final operation.

#### Example of an Aspöck bumper





#### Example add-on element





### Preparation for assembly



#### Hole pattern sensor/sensor cover





#### Mounting the sensor

Guide the sensor-side plug through the large lower drill hole. Insert the sensor plug into the sensor and lock it. Place the cover over the sensor and position both parts over the drill holes for the screws. The sensor is now screwed together with the cover from the inside.







# 6.2 RADC 2.0 ECU

The RADC 2.0 ECU is the central unit of the RADC 2.0. On the one hand, it provides the connection to the EBS of various manufacturers and, on the other, to sensors, beepers and signal lamps.



TECNICAL DATA	
HOUSING	PBT (GF20), back side moulded
MEASUREMENT (W/H/D)	132 x 152 x 52 mm
WEIGHT	350 g
OPERATING TEMPERATURE	-40 °C - +80 °C
PROTECTION CLASS (ISO20653)	IP6K9K
QUIESCENT CURRENT (BEI 24V)	65 mA
FUSE	5A (T)
VOLTAGE RANGE	9V - 32V
REVERSE POLARITY PROTECTION	Yes
INITIAL VOLTAGE	>6V
OVERVOLTAGE PROTECTION	>33V
EMC APPROVAL AND TESTING	ECE R10 ISO 7637-2, ISO 16750 RoHS, REACH-SVHC ADR ISO13766
CONFIGURATION	Can be configured using Aspöck RADC 2.0 configuration software

#### Pin assignment













#### **Mounting position**

The RADC 2.0 ECU is installed in the centre of the inside of the trailer in the standard Aspöck construction. This keeps the cable lengths short and also makes any theft or damage more difficult. Other installation points for the RADC 2.0 ECU are possible, but the customer must then take into account the required cable lengths. The mounting orientation of the RADC 2.0 ECU must be vertical to prevent the ingress of water and dirt. The Aspöck RADC 2.0 optionally offers a protective cover for the RADC 2.0 ECU.

#### NOTE

Protected mounting required: The RADC 2.0 ECU must not extend beyond the vehicle's outline or beyond its delimitation. Installation in a protected area in the underrun protection or in frame parts is necessary. Mounting in the wheel splash zone is prohibited. (risk of stone chipping)







### Preparation for assembly



Hole pattern RADC 2.0 ECU





# Mounting the RADC 2.0 ECU







# 6.3 BEEPER

A beeper with up to 90 dB is installed for acoustic warning when reversing.



TECHNICAL DATA		
SOUND PRESSURE LEVEL	~90 dB	
AUDIO FREQUENCY	2.400 Hz	
CONNECTOR	2p S.Seal	
OPERATING VOLTAGE	24 V	
OPERATING TEMPERATURE	-20 °C - 60 °C	
CURRENT CONSUMPTION	20 mA	
PROTECTION CLASS	IP68	













#### **Mounting position**

In the standard Aspöck construction, the beeper is mounted in the rear area of the trailer frame. Care must be taken to ensure that the sound outlet of the beeper is directed towards the road. This also protects the beeper from standing or entering water. To ensure vertical mounting, an additional bracket may need to be attached to the trailer (max. thickness 5 mm). The beeper must be installed in a bracket pointing downwards at 90°.

#### NOTE

Protected mounting required: The component must not delimit the vehicle's outer perimeter (e.g. installation in the underrun protection or protected by a lamp plate). No mounting is permitted in the wheel spray area (stone impact), for example.





### Preparation for assembly







#### Mounting the beeper

Unscrew the mounting nut and insert the beeper from above into the hole. Place the washer from below and then tighten the beeper with the mounting nut.





# 6.4 SUPERPOINT IV

In order to guarantee the visual warning of the RADC 2.0 when reversing the trailer, end outline marker lamps must be mounted on the rear of the trailer. These are controlled directly by the RADC 2.0 ECU of the RADC 2.0 and support the driver when reversing by means of different flashing frequencies. The ECE R48 mounting guidelines must be adhered to. If Aspöck Superpoint IV end outline marker lamps are already in use, these can be connected to the ECU of the RADC 2.0 by means of extension cables. Otherwise, these must be mounted at a suitable point on the trailer.









#### Preparation for assembly



## Hole pattern Superpoint IV







# 7. CABLING







## Übersicht Kabel / RADC 2.0 ECU







#### 

Components and cables must not be routed or installed along heat sources or through areas that may be subject to impact or dirt abrasion.

Once all components of the RADC 2.0 have been securely mounted on the trailer, the components can be wired up. When routing the cables, care should be taken to ensure that they are not routed through heat sources or areas that could cause damage. All cables must be firmly attached to the trailer, unnecessarily small bending radii must be avoided and strain relief must be provided at the connectors.

# 8. CAN-TERMINATION

A CAN connection should always consist of a single line with a maximum of two defined ends. Each end must be terminated by a terminal resistor. Usually, the terminal resistor is located in the connected CAN device.

A CAN network with more than two end resistors does not allow for reliable communication. For this reason, it is necessary that additional devices are only operated with the resistor switched off. Undermined devices must be connected at the short end of a path (max. 1 m).

# CAN termination for the RADC 2.0 is activated via a setting in the RADC 2.0 configuration software. (9.4)



#### **CAN Termination Examples**

CAN0 is always terminated





# 9. RADC 2.0 CONFIGURATION SOFTWARE

The RADC 2.0 offers the possibility to adjust the trailer width, the sensor position, the individual detection zones and the different brake pressures within the limits of predefined threshold values. This is done with the help of the provided RADC 2.0 configuration software. Before operating the RADC 2.0, it is necessary to download the RADC 2.0 configuration software and configure the required parameters according to the trailer used. These settings are then transferred to the RADC 2.0 ECU by connecting the laptop to the ECU using an optional cable (9.4) via a USB port on the laptop. The RADC 2.0 configuration software also offers the option of saving multiple parameter setups so that they can be reloaded at a later date and imported into the RADC 2.0 ECU.

#### **HINWEIS**

To use the Aspoeck RADC 2.0 configuration software, a special USB stick called "Aspoeck RADC Software Dongle" is required. Before use, the "Aspoeck Dongle Driver" must be installed, which is the driver for the USB stick. Without this installation and the connected USB stick, the Aspoeck RADC 2.0 configuration software cannot be used. The driver can be downloaded from Aspöck Connect platform (https://connect.aspoeck.com).

If you have any further questions or encounter any problems, please contact Aspöck's technical support team directly: **radc.support@aspoeck.com** 

# 9.1 ASPOECK RADC SOFTWARE DONGLE

The Aspoeck software dongle must be plugged in to transfer configured parameters or parameter setups to the ECU or to read them (9.4.1, 9.4.2). A reminder message is displayed in the bottom left corner.



Status: Please install DESkey driver and insert DESkey security dongle into local USB port to activate. Status: Please insert DESkey security dongle into local USB port to activate.



# 9.2 REGISTER AND DOWNLOAD THE RADC 2.0 CONFIGURATION SOFTWARE

#### System requirements for the computer:

- Operating system: Windows 11 (x64/ARM64), Windows 10 (x64) or Linux
- One available USB port (USB 1.1, USB 2.0 or USB 3.0) or one available port on an active, connected USB hub.


#### Step 1: Registration and software download

 Register on Aspöck Connect (https://connect.aspoeck.com) and download the Aspöck RADC 2.0 configuration software. (two-factor authentication)

#### Step 2: Save file

• Save the downloaded file on your laptop/PC.

### 9.3 STARTING THE RADC 2.0 CONFIGURATION SOFTWARE

- Open the folder in which the file is stored
- Double-click on the RADCConfigTool.exe file to start the RADC 2.0 configuration software

### 9.3.1 RADC 2.0 CONFIGURATION SOFTWARE OVERVIEW



#### **Device status**

\*The device status indicates whether a laptop is currently connected to the vehicle's RADC 2.0 ECU. It is not necessary to be connected to the vehicle to configure the parameters. The laptop only needs to be connected to the ECU if parameter setup files that have already been saved are to be transferred to the ECU or the configuration parameters are to be changed directly. (9.5)







#### Diagnosis

The diagnostic mode of the RADC 2.0 configuration software provides an overview of the status of the RADC 2.0 system. Any system malfunctions are displayed and simplify the search for possible causes.

The laptop must be correctly connected to the RADC 2.0 ECU. (9.5)

#### File transfer

In file transfer mode, the RADC 2.0 ECU can be updated to a new firmware version. In the event of damage to the ECU, a stored parameter setup file can be reloaded. The laptop must be correctly connected to the RADC 2.0 ECU. (9.5)



RADC Configuration Tool		19	00 0
ANAGE Solved: 519 Select: Flagsmeder File	Aspöck Flasher Updating Firmware Firmware Updater / Parameter Updater Dev Pow	ice status: -USB ownrectier: configuration comm rate: 259 kBR vare serial namber 462486 Jename: RADC_2	Connected action: Connected Version: V2.2 : 1069 © Application
DATE	Firmware Update Select a Firmware file first	Start	NO MODULE
hijudana Firmiwana	0	Run	
) Update Parametere	Browse	OK	
		NOK	
	Parameter Update	Start	
	0	Run	
	Browse\uappaek.lokal/tlases(AT\ansasesc);0ccumerzs(RADC2.0);1409.2 param	OK	
	Status	NOK	







## 9.4 CONFIGURE RADC 2.0

The RADC 2.0 can now be configured step by step. Presets are defined for each value, which can be adopted if necessary. If values are entered that are outside the

parameters, this is indicated by an error message in red text. These must be corrected. Press the Next button at the bottom of each page to apply the selected parameters. All parameters can be corrected, saved and adjusted at any time. Parameter setup files that have already been saved can be loaded.

#### HINWEIS

To use the Aspoeck RADC 2.0 configuration software, a special USB stick called "Aspoeck RADC Software Dongle" is required (9.1).

#### **Explanation Overview**

RADC Configuration Tool		·~ 0
ASPÕCK	Basic Parameters Basic configuration of the ECU tool	Device status: PCAN-USE connection: Commented
PARAMETERS		East outs: 250 GB: Variation U2.2
🕃 Basic Parametera 💦 🕴	Time For Brake Pressure Release @	Hardwate partial number: 1069
He Sensor Width Offset	20	Part: 402436
Hier Sensor Static Offset	Range Osec - 12.75sec	Modulename: RADC_2_0 Application
II Ramp Detection Warning Zones		1
≓ Sensor Dynamic Offaet		1 espock
1 Occupitatic Detection Assist	Beeper Alert (3)	A DESCRIPTION OF THE OWNER.
.B. Lane Marker Projection Lights >	aleri crosstraffic detection •	
\$1 Parameter Overview		-
MANAGE	CAN Termination	lake .
🚊 Load Parameter Setup	CANI (Service Part) (CANI (ERS Part) Termination *	No. of the second se
E Save Parameter Setup		
C. Donat Parameter		(EBS)
-		e
E PDP Report	EBS Identify (1)	
UPDATE	ZF/Wabeo TEBS-E *	
🛅 Read Parameter ECU		
2 Write Parameter ECU		
	, 	
		Next





#### **Basic parameters**

RADC Configuration	Tool		-
		Basic Parameters Basic configuration of the ECU tool	After half of defined time, during remaining time the brake pressure get released until Obar; Osec result in constant brak pressure without release
PARAMETERS			Baud rate: 259 kBit Venion: V2.2
🚯 Basic Patamatera		Time For Brake Pressure Release 🚯	Configuration of the beeper function mode
🛏 Sensor Width Offset	`	4	птолиститити: консоди, с неросанова
Hi Sensor Static Offset	`		
II] Ramp Detection Warning Zones	2		CAN Termination (120R) on CAN0 and CAN1 - please check
Sensor Dynamic Offset		Beeper Alert ③	bus-system harness to correctly setup the termination for st
Lane Marker Projection Lights	<u>_</u>	alert crosstraffic detection -	ble BLIS communication
31 Parameter Overview	<u>,</u>	//	
MANAGE Load Parameter Setup     Save Parameter Setup		CAN Termination  CAND (Sensor Port) +CAN1 (EBS Port) Termination. *	
G Reset Parameter			define connected Trailer EBS_ATTENTION! On Yard-Tractor
E FDF Report		EBS Identify (0)	Mode(s) no diagnostic on the EBSI
		ZF/Wabco TEBS-E	If you use a Knorr broking overam, make ours that any addition
UPDATE			If you use a knort braking system, make sure that any additio-
C New Parameter ECU			nal settings (speed, brake pressure, system input) are made
Write Perameter ECU			using the dedicated Knorr software. (9.5.1)
			Next
La Back to Overseev			

#### NOTE

The RADC 2.0 can also be installed without interfering with the vehicle's EBS. In this case, the function is limited to the visual warning by the EOMs or an optional audible warning by the beeper. In this variant, the HDSCS plug connection on the ECU must be sealed. (6.2 (K))

#### Sensor Width Offset





#### Sensor Static Offset (Length)



#### **Ramp Detection Warning Zones**





# Sensor Dynamic Offset (Length)



#### **Crosstraffic Detection Assist**

RADC Configuration Tool	EBS Device status: PCAN-USD connective: Connected CXR extribution connection: Connected
ARAMETERS	Baud rete: 229 kBz Version: V2.2 Hardvære senal number: 1059 Part: 462485 Modulename: RADO,2,6 Application
Drake, Deeper Warming, Dy Ork Dutton     Sanar Synam Offaet     Sanar Synam Offaet     Cross Traffic Detection Assist     Parameter Overview	Emergency Brake pressure while an lateral moving object is detected, it is falling to release the brake after configured Release Time (Preset value: 4sec)
MARAGE Crossbuffic Detection Zone   Load Parameter Setup Save Parameter Setup Preset Value: 200 cm Preset Value: 200 cm Preset Value: 200 cm	Energency B. e Pressure @ 5 bar Preset Value: 5 bar
UPDATE  Road Parameter ECU  Write Parameter ECU	Latitude Object Velocity Mils
Define (longitude) Detection Zone behind the trailer	Back Nex
(+ Back to Ownreaw	define minimum lateral velocity of the object, on which to trigger the emergency brake

#### 

When Cross Traffic Assist is deactivated, the driver will no longer receive an audible warning and the emergency braking maneuver will no longer be carried out. This can result in serious damage when reversing.



#### Lane Marker Projection Lights







#### Parameter setup overview

All configured values can be checked and, if necessary, corrected in the overview.

	Parameters Overvie Review all the parameters value	êW es		Device status: PCAN-USB connection: Connected
ARAMETERS				CAN configuration connection: Connected Baudinate: 250 kBit Version: V2.2
Basic Parameters				Hardware serial number: 1069
if Concer Welth Officed	Basic Parameters			Part: 402436
- Sensor State / March	CAN Termination (3)	EBS identify ()	Beeper Alert ()	Modulename: RADC_2_0 Application
Osma Patentina Missina Tanas	CANE (Sensor Port) +CAN1 (EBS Pn +	ZE/Wabon TEBS-E +	alert crosstraffic detection *	
Disemploavection marning zones				
= Sensur Dynamic Ortaat >	Time For Brake Pressure Release @			
Crosstratic Detection Assist >	4			
<ol> <li>Lane Marker Projection Lights</li> </ol>	1			
Parameter Overview				
ANAGE	Sensor Width Offset (Latitude)			
Lowd Parameter Setup	Trailer Width @	Sensor Alignment		
Save Parameter Setun	280 cm.	140 im		
a new contraction of the				
], Reset Parameter				
FDF Report	Sensor Static Offset (Longitude)			
ALLER.	Static Offset 🕲			
PDATE	20 cm			
C Read Paratienal ECU				
g Write Parameter ECU				
	Ramp Detection Warning Zones	2010/02/02/02/02/02	and a sugar	
	Warning Zone Green (max. 10m) ()	Warning Zone Yellow (2)	Warning Zone Red (2)	
	700	800 cm	150 27	
		10 - 10 - 10 - 10 - 10 - 10 - 10 - 10 -	1012012	
		Low Brake Pressure ()	High Brake Pressure (3)	
		0.8 tor	3.5 UW	
	Sensor Dynamic Offset (Longitude	e)		
	Dynamic Offset ()	Linear Measurement 🚯		
	0	e on/V		
	Crosstraffic Detection Assist			
	Crosstraffic Detection Zone	Emergency Brake Pressure @	Latitude Object Velocity Min @	
	70.0	5 har	1.5 m/s	
		<u>(</u>		
	Lane Marker Projection Lights			
	Projection Lights ④			

### 9.4.1 PARAMETER SETUP READ OUT/WRITE

#### NOTE

Before creating new parameter setups, it makes sense to read out and save the parameter setup initially stored on your ECU. This enables you to restore the original parameter setup at a later point in time, for example, if the ECU is damaged.

To transfer the configured parameters to the ECU or to read parameter setups from the ECU, a connection between the laptop and the ECU must be established. (9.5)





#### Read parameter setup

If the parameter setup of the RADC 2.0 ECU is read out, the currently configured parameters on your laptop/PC will be overwritten.

RADC Configuration Tool		
	Parameters Overview Review all the parameters values	Device status: PGAN-USD connection: Cannected CAN configuration connection: Cannected
RAMETERS		Baud rote: 250 kBit Version: V2.2
Basic Parameters	Baula Bantanatan	Hardware sental number: 1069
Sensor Width Offeet	Basic Parameters	Part: 432486
Sensor Static Offset	CAN Termination () EBS Identify () Beeper Alert ()	Modulemente: RADC_2_0 Application
Ramp Detection Warring Zones	CAND (Sensor Part) +CAN1 (EBS Pa + ZF/Waboo TEBS-E + alert crossinalfic detection *	
Sensor Denamer Officer		
Oneninale Entertion Analat	Time For Brake Pressure Release 🕥	
Los Madar Distation Faith		
Cane manto Propositin Ogno	/ If you want to read the parameterization of the	ne ECU, press
Parameter Overview	/ "Read Parameter ECU".	
LAGE	5 / dr 1	
.oed Peremeter Setup	ailer Width () Sensor Alignment ()	
iave Parameter Setup	230 úm 140 úm	
Conset Darameter		
PD# Report	Sensor Static Offset (Longitude)	
ATE .	Static Offset (2)	
Read Parameter ECU	29 09	
Note: Descendent PAUL		
finite Parameter ECU	Prove Distortion Wanter Town	
	Hamp Detection Warring Zones	
	Warning Zone Green (max. 10m)         Warning Zone Yellow         Warning Zone Red         O           700          500          150	
	Warning Zone Green (max. 10m) () Warning Zone Yellaw () Warning Zone Red ()	
	Warning Zone Green (max. 10m)         Warning Zone Yellow         Warning Zone Red           Tran          6m            Reset parameters         Load parameters         Save parameters to file         Export as POF         Read	Parameter ECU Update Parameter to ECU
Back to Overview	Warning Zone Green (max. 10m)         Warning Zone Yellow         Warning Zone Red         main           7010	Parameter ECU Upfate Parameter to ECU
Back to Opervise	Warning Zone Green (max. 10m)     Warning Zone Yellow     Warning Zone Red       Tran      Kon        Reset parameters     Load parameters     Save parameters to file     Export as POF	Parametar ECU Upfathe Parametar to ECU
RADC Configuration Tool	Warning Zone Green (max. 10m)         Warning Zone Yellow         Warning Zone Red	Parameter ECU
RADC Configuration Tool	Warning Zone Green (max. 10m)       Warning Zone Vellow       Warning Zone Red ©         Ynn	Parameter ECU Upfate Parameter to ECU Parameter to ECU
RADC Configuration Tool	Warning Zone Green (max. 10m)       Warning Zone Vellow       Warning Zone Red         This	Persmeter ECU Update Parameter to ECU  Persmeter ECU  Dervice status: PCAN-USE connected CAR configuration connected CAR configuration connected CAR configuration connected
RADC Configuration Tool	Warning Zone Green (max. 10m)       Warning Zone Vellow       Warning Zone Red ©         Two       warning Zone Red ©       tso         Read parameters       Load parameters       Sare parameters to file       Export as ROF       Red         Parameters       Overview       Review all the parameters values       Review all the parameters values       Review all the parameters values	Persente ECU Update Persentator to ECU
Back to Greeview RADC Configuration Tool REPORT MARTINE Back Proceedings	Warning Zone Green (max. 10m)       Warning Zone Vellow       Warning Zone Red ©         Tran	Purameter ECU Upfeite Parameter to ECU Device status: PCAN-USS connected: Connected CAN configuration contaction: Connected Issues to a 22 MAR Version: VS.3 Teachers entit inartion: 1509
Aach to Owerview RADC Configuration Tool	Warning Zone Green (max. 10m)       Warning Zone Vellow       Warning Zone Red ©         Tran       ann       tran       tran         Read parameters       Load parameters       Save parameters to file       Export as POF       Read         Parameters Overview       Review all the parameters values       Basic Parameters       Basic Parameters       Basic Parameters	Perameter ECU Update Parameter to ECU Device status: PCAN-USE connector: Connected CAR configuration connection: Connected thand rate 79.23 Nardware serial martier: 1609 Far: 402465 Medvhares: 8206.2.0 Sachtratis:
Act to Ownrew RADC Configuration Tool	Warning Zone Green (max. 10m)       Warning Zone Vellow       Warning Zone Red ©         Ynn	Parameter ECU Update Parameter to ECU Parameter ECU Device status: PCAN-USE connected: CAR configuration connected: Card confi
Act to Configuration Tool  RADC Configuration Tool  Ketter  Ketter Ketter  Ketter  Ketter Ketter  Ketter  Ketter  Ketter  Ketter  Ketter  Ketter Ketter Ketter  Ketter  Ketter Ketter Ketter Ketter Ketter Ketter Kett	Warning Zone Green (max. 10m)       Warning Zone Vellow       Warning Zone Red ©         Ynn	Persmetter ECU Update Parameter to ECU Device status: PCAN-USE connection: Connected CAR configuration connection: Connected thard cate: 220 MB Venser, V0.3 Rectivere sental mattheware sental mattheware to 230 Rective Status: Device status: Devic
Institution Configuration Tool	Warning Zone Green (max. 10m)       Warning Zone Kellow       Warning Zone Red ©         Two       son       son       son         Read parameters       Load parameters       Sare parameters to file       Export as ROF       Read         Parameters       Overview       Review all the parameters values       Sare parameters       Export as ROF       Read         Basic Parameters       CAN1 (EBS Ps. +)       EBB Identify ©       Besper Alert ©       ser consumption detection       *	Personette ECU Update Personetar to ECU — Device status: PCAN-USE-corrected CAR conference Corrected CAR conference Corrected Care of the Corrected Care o
Aack to Orevvew RADC Configuration Tool	Warning Zone Green (max. 10m)       Warning Zone Vellow       Warning Zone Red ©         Two       son       son       son         Read parameters       Load parameters       Sone parameters to file       Export as ROF       Red         Parameters       Overview       Review all the parameters values       Basic Parameters       EBS identify ©       Benjer Alert ©       event construints detection       e         CMM Termination       EBS identify ©       EVEN interfees to the son of the so	Parameter ECU Update Parameter to ECU Device status: PCAN-USE connection: Corrected CAR configuration connection: Corrected thad not: 230 Mart Vensor V/J Tardware settal number: 1009 Part: 402406 Nodulename: RADC_2.0 Application
Aact to Overview  RADC Configuration Tool  Second S	Warning Zone Green (max. 10m)       Warning Zone Vellow       Warning Zone Red ©         Tran       ann       ann       ann         Read parameters       Load parameters       Export as POF       Read         Parameters Overview       Review all the parameters values       Basic Parameters       EDS Identify ©       Beeper Alist ©         CMM Termination ©       EDS Identify ©       Beeper Alist ©       aur coessinglife detection •         Terms for Brake Prior       ####################################	Parameter ECU Update Parameter to ECU Device status PCAN-USB connector: Connected CAR configuration connector: Connected Carl configuration connector: VC3 Hardware serial martion: 1609 Fart: 402486 Medulename: RADC_2.6 Application
Inde to Overview  RADIC Configuration Tool  KETTES  Index Presenters  Index Official  Index Official Index Official Index Official Index Official Index Official Index Official Index Official Index Official Index Official Index Official Index Official Index Official Index Official Index Official Index Official Index Official Index Official Index Official Index Official Index Offic	Warning Zeine Green (max. 10m)       Warning Zeine Kell (000 (000 (000 (000 (000 (000 (000 (	Parameter ECU Update Parameter to ECU Device status: PCAN-USS connector: Connected CAR configuration connection: Connected Unar care 2014 With Water Hardware senial martice: Today Part: 402406 Macubaname: RADC 2, 0 Application
Institutionary Configuration Tool	Warning Zone Green (max. 10m)       Warning Zone Kellow       Warning Zone Red ©         Two       warning Zone Red ©       ton       ton         Read parameters       Load parameters       Sare parameters to file       Export as ROF       Read         Parameters       Overview       Review all the parameters values       Basic Parameters       EDS Identify ©       Beeper Alert ©         CMMI (Sensor Port) = CMMI (EBS Pc -)       If //Wabes TEBS E       Sare you sure you want to read out the parameterization?	Personettor ECU Update Parameter to ECU Device status: PCAN-UBI connection: Corrected CAR: coffiguration connection: Corrected taud cate: 230 May Version: V0.3 mathware sent immos: 1000 Par: 40.406 Medulement: RADC.2,0 Application
Aack to Greeverse RADC Configuration Tool Configuration Tool Configuration Tool Configuration Tool Configuration Tool Configuration Tool Configuration Tool Configuration Tool Configuration Configuratio	Warning Zone Green (max. 10m)       Warning Zone Kellow       Warning Zone Red ©         Two       warning Zone Red ©       ton       ton         Read parameters       Load parameters       Sare parameters to file       Export as RCF       Read         Parameters       Overview       Review all the parameters values       Edd Identify ©       Exepter Alert ©       introduction (max. 10m)       introduction (max. 10m)         CAMI Termination ©       Edd Identify ©       Exepter Alert ©       introduction (max. 10m)       introduction (max. 10m)         CAMI Termination @       Edd Identify ©       Exepter Alert ©       introduction (max. 10m)       introduction (max. 10m)         CAMI Termination @       Edd Identify ©       Exepter Alert ©       introduction (max. 10m)       introduction (max. 10m)         CAMI Termination @       Edd Identify ©       Exepter Alert ©       introduction (max. 10m)       introduction (max. 10m)         CAMI Termination @       Edd Identify ©       Exercover to the parameter identify (max. 10m)       introduction (max. 10m)       introduction (max. 10m)         CAMI Termination @       Edd Identify ©       Exercover to the parameter identify (max. 10m)       introduction (max. 10m)       introduction (max. 10m)         Bespect Midth: Offse       Exercover you want to read out the parameter identice identify identify (max. 10m) <td< td=""><td>Persenter ECU Update Parameter to ECU — — — — — — — — — — — — — — — — — — —</td></td<>	Persenter ECU Update Parameter to ECU — — — — — — — — — — — — — — — — — — —
Aack to Overvree RADC Configuration Tool RADC Configuration Tool MAETER Description Server State Server Stat	Warning Zone Green (max. 10m)       Warning Zone Kellow       Warning Zone Red ©         Tran       an       an       an         Read parameters       Load parameters       Sare parameters to file       Export as ROF       Read         Parameters Overview       Review all the parameters values       Sare parameters       Review all the parameters values         Basic Parameters       CAMI Termination ©       EBS identify ©       Beeper Alert ©       arc overstraffic defacition *         Tema For Steale Prior       CAMI Termination ?       arc you Sure you want to read out the parameterization?       Your current parameterization?         Your current parameterization will be overwritten       Your current parameterization will be overwritten       Your current parameterization	Parameter ECU Update Parameter to ECU — Device status: PCAN-USB connection: Corrected CAR configuration convertion: Corrected tand rate: 230 Matt. Version: V2.3 Tandware senial number: 1009 Part: 402409 Moduleneme: PADC.2,0 Application
hack to Greenwee RADIC Configuration Tool Configuration Tool AME THE Description Configuration 1 Server Vidah, Office Server V	Warning Zone Green (max. 10m)       Warning Zone Kellow       Warning Zone Kell ©         Two       win       win       win         Read parameters       Load parameters       Save parameters to 56       Export as POF       Read         Parameters       Overview       Review all the parameters values       Besic Parameters       Besic Parameters         CMM Termination @       EBS Identify @       Besper Allet @       #         Time For Strake Privation Control (EBS Privation TEBS #       #       #       #         Sensor Width Offs       Free you sure you want to read out the parameterization?       Your current parameterization will be overwritten       Your current parameterization will be overwritten	Persente ECU Update Parameter to ECU — — — — — — — — — — — — — — — — — — —
And to Cherrywywiae RADC Configuration Tool Configuration Tool Configuration Tool Configuration Tool Configuration Cherry Configuration Cherry Cherry Configuration Cherry Chery Cherry Cherry Cherry Cherry Chery Cherry	Warning Zeine Green (max. 10m)       Warning Zeine Kell ©       Warning Zeine Kell ©         Tran       ann       ann       ann         Reast parameters       Load parameters       Save parameters to file       Export as POF       Read         Parameters       Load parameters       Save parameters to file       Export as POF       Read         Basic Parameters       CAM termination ©       EXE Monthly ©       Beeper Alerit ©       Save consuming detection       *         Cold (Sensor Port) = CAM1 (EBS Pr. +)       EXE Monthly ©       Beeper Alerit ©       *       *         Time For Braine Press       #       Are you sure you want to read out the parameterization?       *       Your current parameterization will be overwritten       *         20:       No       Yes       Yes       Yes       Yes	Personettor ECU Update Parameter to ECU Device status: PCAN-USE connected CAR configuration connected CAR configuration connected taud rate: 220 kBr Venson V0.3 Part 40.408 Medulename: RADC.2.0 Application
Anak to Cherrorerov RADC Configuration Tool Configuration Tool Configuration Tool Configuration Tool Configuration Tool Configuration Tool Configuration Con	Warning Zeine Green (max. 10m)       Warning Zone Ned O       Warning Zone Ned O         The       isin       isin       isin         Read parameters       Load parameters       Sare parameters to file       Export as ROF       Read         Parameters Overview       Review all the parameters values       Basic Parameters       EDS identify O       Berger Alert O       isin       *         Cobit (Sensor Port) = CAM1 (EBS PL = )       EDS identify O       Berger Alert O       isin to essaralize detection       *         Time For Braile Press       ####################################	Personettor ECU Update Parameter (5) ECU — — — — — — — — — — — — — — — — — — —
RADC Configuration Tool ADD Configuration Too	Warning Zone Green (max. 10m)       Warning Zone Kellow       Warning Zone Red ©         The       isin       isin       isin         Read parameters       Load parameters       Sare parameters to file       Export as RCF       Red         Parameters       Overview       Sare parameters to file       Export as RCF       Red         Basic Parameters       CAM I the parameters values       Sare parameters       Sare constraints       Image: Sare parameters         CAM Termination @       EtB Identify @       Server Alert @       Sare constraints detection *       *         Time For Brake Press       Image: Sare you want to read out the parameterization?       Sare you sure you want to read out the parameterization?       Yes         Sensor Static Off-ett (Longitude)       No       Yes	Persenter ECU Update Persenter to ECU — — — — — — — — — — — — — — — — — — —
RADC Configuration Tool  ACC Configuration	Warning Zone Green (max. 10m)       Warning Zone Kellow       Warning Zone Red ©         Tran       an       an       an         Read parameters       Load parameters       Sare parameters to file       Export as ROF       Read         Basic Parameters       CAM Termination ©       EBS identify ©       Beeper Alert ©       arc you sure you want to read out the parameterization?       arc you sure you want to read out the parameterization?         Traine For Static Offset (Longitude)       No       Yes       Sensor Static Offset (Longitude)         Static Offset ©       No       Yes       Sensor Static Offset (Longitude)	Perameter ECU Update Parameter to ECU — — — — — — — — — — — — — — — — — — —
hask to disevery RADIC Configuration Tool Configuration Tool Co	Warning Zone Green (max. 10m)       Warning Zone Kellow       Warning Zone Kell ©         Two       win       win       win         Read parameters       Load parameters       Export as POF       Read         Bablic Parameters       Bablic Parameters       Beeper Alint ©       Beeper Alint ©         CMM Termination ©       EBS Identify ©       Beeper Alint ©       automation ************************************	Perameter ECU Update Parameter 19 ECU
hack to Greewwww  RADC Configuration Tool  RAD	Warning Zeine Green (max. 10th)       Warning Zone Net@       Warning Zeine Net@         Two       warning Zeine Net@       too         Reset parameters       Load parameters       Sare parameters to file       Export as RCF       Reset         Parameters       Overview       Basic Parameters       Beeper Aleri @       Item Too Sare parameters       Reset         Basic Parameters       Ets Identify @       Beeper Aleri @       Item Too Sare Parameters       Item Too Sare Parameters         CMM (Beener Part) = CMM1 (BBS Pr =)       Ets Identify @       Beeper Aleri @       Item Too Sare Parameters       Item Too Sare Parameters         CMMI (Beener Part) = CMM1 (BBS Pr =)       Ets Identify @       Beeper Aleri @       Item Too Sare Parameter P	Personettor ECU Update Parameter to SCU Device status: PCAN-ISB connection: Connected CAR configuration connected CAR configuration connected thard care 22h Mat Werson V0.3 Instructor

#### NOTE

This action cannot be undone. To make the entered parameters available at a later point in time, they can be saved on the laptop beforehand. -> "Save Parameter Setup" or "Save Parameter to file" (9.4.2)

arning Zone Yellow 🕲

Reset parameters Load parameters Save parameters to file Export as POF

Warning Zone Red

Read Parameter ECU

ng Zone Green (max. 10m) 🔘



#### Write parameter setup.

The currently configured parameter setup is written to the RADC 2.0 ECU.

RADC Configuration Tool				- D X
	Parameters Overvie Review all the parameters value	<b>ew</b> Jes		Device status: PCAH USD connection: Connected CAN configuration connection: Connected
RAMETERS				Baud rate: 250 kBit Version: V2.2
Basic Parameters >	Basic Parameters			Hardware sental number: 1069
Sensor Width Offset	CAN Termination (D)	EDS Identify @	Beeper Alert @	Moduleneme: RADC 2 0 Application
Sensor Static Offset >	CAND (Prover Bank) (CAN) (EDF Dr	TEORIA TERE E	- alart crosstraffe detection *	
Ramp Detection Warning Zones 🔹 🕨	CANAL (SEEBOL HEAL) +CANAL (EDS NE. +	2F/Wabco (EBS-E		
Sensor Dynamic Offset 🔹 👂				
Orceativation Assist	Time For Brake Processes Balance (D)			
and Marker Disjustice Liette	If you want	t to transfer tr	ie configured param	eter setup to the ECC
Caroli manifer a collar data				
Parameter Overview	Z press "Upd	ate Parameter	to ECU" or "Write	Parameter ECU".
Parameter Overview	press "Upd	ate Parameter	to ECU" or "Write	Parameter ECU".
Pasamater Overview	press "Upd	ate Parameter	to ECU" or "Write	Parameter ECU".
AGE Cold Parameter Setup	press "Upd nsor Width Offset (Latitude) Trailar Width @	sensor Alignment @	to ECU" or "Write	Parameter ECU".
Anamater Overview	press "Upd. hor Width Offset (Latitude) frailer Width @ 280 or	Sersor Alignment @	to ECU" or "Write	Parameter ECU".
Anameter Dvarview	hor Width Offset (Latitude) Trailer Width @ 280 @u	Serisor Alignment @	to ECU" or "Write	Parameter ECU".
Another Angele Ang	press "Upd. nor Width Offset (Latitude) Trailer Width @ 280 error Sensor Static Offset (Londitude)	Sensor Algoment ()	to ECU" or "Write	Parameter ECU".
Alas menter Dvarview () AGE Local Parameter Setup Save Parameter PEP Report	press "Upd. nor Width Offset (Latitude) Trainer Width @ 220 or Sensor Static Offset (Longitude) Static Offset @	Sensor Alignment @	to ECU" or "Write	Parameter ECU".
MAGE Lood Parameter DearNeek Lood Parameter Betuip Seve Parameter Setuip Reset Parameter PEP Report ATE	press "Upd. hor Width Offset (Latitude) Trainer Width @ 200 ov Sensor Static Offset (Longitude) Static Offset @ 20 ov	Sensor Alignment @	to ECU" or "Write	Parameter ECU".
An internetier Overview   KKGE Lood Parameter Setap Save Parameter Setap Read Parameter PDP Report  KTE Read Parameter ECU	press "Upd. hor Width Offset (Latitude) frailer Width @ 230 ov Sensor Static Offset (Longitude) Static Offset @ 20 ov	Senaar Alignment @	to ECU" or "Write	Parameter ECU".
Parameter Overview  AAGE Lood Parameter Setup  Resol Parameter  PDT Report  ATE Resol Parameter ECU  With Parameter ECU	press "Upd. Incor Width Offset (Latitude) Trailer Width @ 299 ov Sensor Static Offset (Longitude) Static Offset @ 20 ov	Sensor Alignment @	to ECU" or "Write	Parameter ECU".
Annumeter Overview Parameter Overview Parameter Overview Parameter Setup Save Farameter Setup Reset Parameter PEP Report ATE Road Parameter ECU Write Parameter ECU	press "Upd. hor Width Offset (Latitude) frailer Width @ 200 ent Sensor Static Offset (Longitude) Static Offset @ 200 ent Bamp Detection Warning Zones	Sensor Alignment @	to ECU" or "Write	Parameter ECU".
Automation register ognitis i i Perameter Deandeer Load Parameter Setup Save Parameter PEP Report ATE Read Parameter ECU Write Parameter ECU	press "Upd. nor Width Offset (Latitude) Trailer Width @ 220 ov Sensor Static Offset (Longitude) Static Offset @ 27 ov Ramp Detection Warning Zones Warning Zone Ween (max. 10m) @	Senar Algament @	to ECU" or "Write	Parameter ECU".
MAGE Used Parameter Dearless MAGE Load Parameter Setup Save Parameter FEP Report ATE Read Parameter ECU Write Parameter ECU	Press "Upd. hor Width Offset (Latitude) Trainer Width @ 220 000 Sensor Static Offset (Longitude) Static Offset @ 23 000 Ramp Detection Warning Zones Warning Zone Green (max. 10m) @ Traine	Sensor Alignment @	to ECU" or "Write	Parameter ECU".
Parameter Dvankees	Press "Upd. hor Width Offset (Latitude) Trainer Width @ 200 ov Sensor Static Offset (Longitude) Static Offset @ 200 ov Ramp Detection Warning Zones: Warning Zone Green (max. 10m) @ 700 ov 700 ov	Sensor Alignment @	em Warning Zone Red @	Parameter ECU".

RADC Configuration Tool				÷. 0	×
ASPOCK	Parameters Overvie Review all the parameters value	2W es		Device status: PCAN-USB connection: Connected CAN configuration connected: Connected	
PARAMETERS				tisud rate: 250 kBit Version V2.2	
🕀 Beau Parameters 🔰 🗦	Basic Parameters			Fart 462485	
Init Sensor Width Offset.	CAN Termination (3)	EBS Identify (0)	Beeper Alert ()	Modulement: RADC_2_0 Application	
He Servor Static Officet 3	CAND (Senator Part) +CAN1 (EBS Pa. +	2F/Wabon TEBS-E +	alert crosstraffic detection		
I Ramp Detection Vierning Zones					
# Server Dynamic Offset >	Time For Brake Diese Philipping				
🔛 Occessivatic Detection Assetst 🔹 🗧	4				
.B. Lans Marker Projection Lights >			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
22 Parameter Overview	Al	e you sure you want to e parametrisation?	overwrite		
MANAGE	Sensor Width Offs	e parametrisation:			
🚊 Loed Parameter Betup	Trailer Width @	ar current parameterization will be ov	erwritten		
B Save Parameter Setup	280				
C. Devet Oceanneter		No	Yes		
E FDF Report	Sensor Static Offset (congitude)				
LIPDATE	20				
🖑 Read Parameter ECU	100 CO				
2 Write Pararoster ECU					
	Ramp Detection Warning Zones				
	Warning Zone Green (max. 10m) ④	Warning Zone Yellow 🕲	Warning Zone Red 🕲		
	- ]	Ans	350	A CONTRACTOR OF	
	Repet parameters Load param	noters Save parameters to file	Export as POF	Read Parameter ECU Update Parameter to ECI	
[+ Hack to Overview					-

#### NOTE

This action cannot be undone. To make the entered parameters available at a later point in time, they can be saved on the laptop beforehand. -> "Save Parameter Setup" or "Save Parameter to file" (9.4.2)



### 9.4.2 PARAMETER SETUP SAVE/LOAD/RESET

#### Save parameter setup

To optimize the parameter setup and to be able to reuse it at a later time, it makes sense to save it. To do this, it is not necessary to establish a direct connection to the RADC 2.0 ECU.

RADC Configuration Tool		
	Parameters Overview Review all the parameters values	Device status: PCAN USD connection: Connected CAN configuration connection: Connected Baud none: 200 Marx Versier: V3.2
Basic Parameters	Baolo Desemption	Hardware sental number: 1069
# Sensor Width Offset	Basic Parameters	Part: 402486
	If you want to save the parameter setup	on your laptop,
Ramp Detection Warning Zones	Apress "Save Parameter Setup" or "Save u	parameter to file"
Sensor Dynamic Offaat >	piece care rarameter cetap er care p	
Orceativatic Detection Assist	Ime For Brake Pressure Release @	
Lane Marker Projection Lights >/	4	
Parameter Overview		
	Sensor Width Offset (Latitude)	
	Trailer Width D Sensor Alignment D	
Const Parameter George	280 on 140 on	
save Parameter Setup		
Reset Parameter		
FDf Report	Sensor Static Offset (Longitude)	
DATE	Static Offset ()	
Read Parameter ECU	40 00	
Billing Descenter D/11		
- VILLO PARACIMINE DOM	Ramp Detection Warning Zones	
1 WIN PANING DOD		
2. THE PARAMETER DUST	Warning Zone Green (max. 10m) () Warning Zone Yellow () Warning Zone Red ()	
, million Presentation Down	Warning Zone Green (max. 10m) ③ Warning Zone Yellow ③ Vinning Zone Red ③	
C. MILW PARAMINE CO.V.	Warning Zone Green (max. 10m) () Warning Zone Vellow () // ming Zone Red () // 154	Read Parameter ECU Update Parameter to TCU

Multiple parameter setups can be stored on the laptop/PC. These can be loaded at any time to adjust them if necessary.

Speichern unter					
	Dieser PC > Dokumente > R	ADC_2.0		v O RADC_2.0 dure	hsuchen
Organisieren *	Neuer Ordner				E • (
<ul> <li>Dieser PC</li> <li>3D-Objekte</li> <li>Bilder</li> <li>Desktop</li> <li>Downloads</li> <li>Musik</li> <li>Videos</li> </ul>	15000 (P)	^	Name LKW_1.param LKW_2.param	Änderungsdatum 21.01.2025 10.13 21.01.2025 10.13	Typ PARAM-Date PARAM-Date
Dateiname:	Parameter.param	~	٢		_
Datetyp.	Parameter tiles ("param)				
				and a second second	A Discourse in the second





#### Load parameter setup

Stored parameter setups can be loaded and, if necessary, reconfigured at any time. This does not require a direct connection to the RADC 2.0 ECU.

RADC Configuration Tool		-	×
	Parameters Overview Review all the parameters values	Device status: *CAN USD connection: Connected XM configuration connection: Centected Datal adde: 220 MBt: Vension: V2.2 Androws avail analysis: 105	
Her Sensor Width Offset	Basic Pf If you want to load a parameter setup on your	laptop, ters".	
I∏ Ramp Detection Warring Zones → ≓ Sensor Dynamic Offset →	Time For Brake Pressure Roberts ()		
D Lane Marker Projection Lights	*		
# Parameter Overview			
MANAGE	Sensor Width Offset (Latitude) Trailer Width   Sensor Alignment		
Save Parameter Setup	230 (m) 140 (m)		
G Reset Parameter			
E FDF Report	Sensor Static Offset (Longitude)		
PDATE	Static Offset () 20 ev		
Read Parameter ECU			
Write Parameter ECU	Ramp Detertion Warring Topes		
	Warning Zone Green (max. 10m) Warning Zone Area (Construction of the Vellow (Construct		
	Reset parameters Load parameters Sare parameters to file Expert as POF Read Param	update Parameter to ECU	
+ Back to Overview			-

Öffnen			>
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<ul> <li>Dieser PC</li> <li>3D-Objekte</li> <li>Bilder</li> <li>Desktop</li> <li>Downloads</li> <li>Musik</li> <li>Videos</li> <li>Lokaler Datenträger (C.)</li> </ul>	Name	Anderungsdatum 21.01.2025 10:13 21.01.2025 10:13	Typ PARAM-Datei PARAM-Datei
Dateiname:		~ Paramet	er files (*.param) 👋
		Öffne	Abbrechen





#### Reset parameter setup

All parameters that have already been entered can be reseted to their original values.

RADC Configuration Tool		- 0 X
RADAMETERS BASIC Programmers 2	Parameters Overview Review all the parameters values Basic Parameters	Device status: PGAN-USD connection: Gameoted CAN configuration connection: Generated Baudi nois: 2016/84 Vension: V3.2 Handware settial cumber: 1069 Perit: 402466
Her Sensor Width Offset	If you want to reset the parameters you have	ve already entered, press
I Ramp Detection Warning Zones	"Reset Parameter" or "Reset Parameters"	
≓ Sensor Dynamic Offaat >		
Dissemble Detection Assist	ne For Brane Pressure Release ()	
.D. Lane Marker Projection Lights >		
# Parameter Overview		
MANAGE	Sensor Width Offset (Latitude)	
* Load Parameter Setuin	Trailer Width () Sensor Alignment ()	
	280 on 140 on	
C Reset Parameter		
EC/ Destort	Sensor Static Officet (Longitude)	
	Static Officer (D	
UPDATE	20 00	
Read Parameter ECU		
🖉 Write Parameter ECU		
	Ramp Detection Warning Zones	
	Warning Zone Green (max. 10m) 💋 Warning Zone Yellow 🏵 Warning Zone Red 🔘	2
	700 ····· 150 ····· 150	al #
	Reset parameters Load parameters Save parameters to file Export as POF	Read Parameter ECU Update Parameter to ECU
[+ Back to Overview		

RADC Configuration Tool				- 0 X
	Parameters Overview Review all the parameters values	r		Device status. PCAN-USE convector: Disconnected
PARAMETERS	Basic Parameters CAN Termination @ El	BS Identify ()	Beeper Alert ()	Staad rate. Version Hardware softel number: Part Modulessame
Element Exerction Warring Zones     Second Optimized Offset     Second Optimized Offset     Second Optimized Optimized     Laser Marker Proprietion Lights     Second Optimized Optimized     Laser Parameter Detage     Second Optimized Optimized     Second Optimized Optimized     Second Optimized Optimized     Second Optimized Optimized     Second Optimized Optimized	Time For Brake Press 4 Sensor Width Offs Trailer Width Offs 285 285	re you want to reset para Jes? I change to preset values	meter values to	
C meter-resonance EPONTE M Read Parameter ECU White Parameter ECU	Sensor Static Offset (Longitude) Static Offset () 20 (m) Ramp Detection Warning Zones Warning Zone Green (max. 10m) () W ma ()	Parning Zone Vellow @	Warning Zone Red 🔘	
(+ flack to Guerriew	Reset parameters Load parameter	rs Save parameters to file	Export as POF	Read Parameter ECU IIpdate Parameter to ECU





### 9.4.3 SAVE PARAMETER SETUP AS PDF

#### Create parameter setup PDF

The parameter setup can be exported as a PDF file for storage on the ECU for documentation purposes or for keeping as evidence in the vehicle. The PDF can also be used as a basis for a new configuration in the event of damage to the ECU.

RADC Configuration Tool		
	Parameters Overview Review all the parameters values CAN cont Build new Can cont Build ne	status: Deconsection: Connected guardich connection: Cennected 210 kBit: Versier: V2.2
Basic Parenters     Santor Width Offset     Santor Width Offset     Santor Static Offset	Basic V If you want to save the parameter setup as a PDF A laptop, press "PDF Report" or "Export as PDF". I (Besser Part) -CANT (BES Ps - 27/Walson TEES E	on your
Pasameter Ovensien      MADAGE      Loed Parameter Setup      Save Parameter Setup      Reset Parameter	Sensor Width Offset (Latitude) Trailer Width    Sensor Alignment	
FDF Report	Sensor Static Offset (Longitude) Static Offset (D 20 00	
	Ramp Detection Warning Zones       Warning Zone Green (max. 10m)       Ynn       Ynn       Reset parameters       Load parameters       Save parameters to file   Export as POE Reset parameters	Update Parameter to ECU

RADC Configuration Tool			
ASPOCK	Parameters Overview Review all the parameter Vehicle ID (e.g. V	VIN number)	Device status. PCAN-USE connection: Disconnected CAR-configurative connection: Disconnected
PARAMETERS	Basic Parameters CAN Termination @ EBS Identify @	Vehicle brand	Staaf rate Version: Herboure portal Inandes: Part Modulerane
I∏ Ramp Descrition Warning Zonos → = Server Dyname Offset → ∏ Description Derection Anster → II: Linet Marker Popyretien Uights → II: Persmetter Description	CAND (Senar Port) +CAN1 (EBS Pc - Time For Brake Press 4 Yellstrick	- awt creatraite detection *	ehicle type
MMMAGE ± Load Parameter Setup Seve Parameter Setup G Reaut Parameter PDP Report	Sensor Width Offs Traise Width @ 289 Show Hardware Information (Needs Connected Sensor Static Offse Static Offse	(Module) Di Generate PDF (MVE	splays additional hardware specifi- ations of the vehicle in PDF format. IODULE NAME, SERIAL NUMBER, ERSION)
UPDATE	20 05 Ramp Detection Warning Zones Warning Zone Green (max. 10m) Trans - 400 Emotionements for the second sec	Click "Ger your lapto	nerate PDF" to save the PDF on
La Back In Overslaw	Comparations Comparations Comparations to	Constant of the second se	Contraction of the second



Multiple parameter setup PDFs can be stored on the laptop.

Speichern unter				×
e -> 🛧 🖡 >	Dieser PC > Dokumente > RADC_2.0		∽ O RADC_2.0 durch	suchen 🔎
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### 9.5 CONNECT RADC 2.0 ECU TO PC

To transfer new configuration parameters to the RADC 2.0 ECU or to perform a fault diagnosis, the laptop must be connected to the ECU, vehicle and laptop as follows. The parking light on the vehicle must be switched on. Optionally, an external power supply can also be connected to the ECU if no vehicle power supply is available.







If possible, the SENS\_SUP (IN-OUT connector pin 6) should be used for this on the TEBS G2.2 Premium. This requires further configuration of the trailer EBS in order to store a brake pressure as a "Road Layer Function (RLF)" at the input used.

<b>((K))</b>	Starter for	Knorr-Brems systems	e diagnostic	
ECU TEBS G2/G2×	Connection line CAN	Protocol UDS	Diagnostic Control	ECU 5 <u>m</u> ode CU
Application	Description	1	Tools	nload
n case of active W Anen a TRM is fitte Road Train Diagn	arning Lamp without related d, click on 'Notepad' Icon o ostics".	error in diagnostics, and a the right to activate	20	G
To check your so	tware is up to date, visit 🛛 🚾	wv.knorr-bremsecvs.com		



# 10. HANDLING

# **10.1 ACTIVATION OF THE SYSTEM**

RADC 2.0 is activated when the driver engages reverse gear. The driver is informed of this by an activation sequence:

- EOM lamps light up for 1 second
- Beeper sounds for 1 second
- Brake pressure is activated for 1 second











### **10.2 DEACTIVATING THE SYSTEM**



In certain driving situations (e.g. active brake pressure in winter road conditions or very confined maneuvering spaces), it sometimes makes sense to switch off the system to prevent an annoying brake intervention. To deliberately deactivate the RADC 2.0 reversing system, proceed as follows:

With reverse gear engaged (active reverse lamp), the rear fog lamp (Fog) must be switched on for at least 0.5 seconds. The RADC 2.0 is now deactivated.

- The deactivated system is indicated visually by the EOM double flash.
- The beeper signals the deactivation of the system with two short tones.
- Any requested brake pressure is reduced to 0 bar.



#### 

When reversing with the RADC 2.0 system switched off, no objects can be detected behind the vehicle. To avoid damage, make sure that there are no objects or obstacles in the area behind the vehicle.

#### NOTE

Deactivating the RADC 2.0 by the driver is canceled by re-engaging reverse gear and the system is automatically reactivated.





### **11. WARNING FUNCTIONS**

### **11.1 AUDIBLE/VISUAL WARNING FUNCTIONS**

To alert the driver to objects when reversing or approaching a ramp to avoid damage, the RADC 2.0 is equipped with audible (beeper), visual (EOM) and haptic (EBS brake intervention) warning functions. In addition, the system also warns of moving objects entering the danger zone (cross-traffic zone warning). The driver is warned of the presence of moving objects in these defined danger zones by means of different flashing frequencies of the EOMs and acoustic signals from the beeper. If a hazard is detected, the system automatically engages the trailer's braking system. To ensure proper functioning, the speed when reversing must not exceed 6 km/h.

### **11.2 DETECTION ZONES / RAMP TYPES**

When reversing a towing vehicle with a trailer, the RADC 2.0 helps the driver to monitor the area behind the vehicle, especially when docking at a loading ramp. However, different types of ramps can affect the detection accuracy of the sensor and must be taken into account by the driver. For example, the sensor cannot detect roof overhangs on the building or obstacles caused by sloping ramp approaches.

#### Example of ramp types



#### 

The RADC 2.0 supports the driver when reversing a towing vehicle with a trailer, in particular during the difficult docking process at the loading ramp. Since sensor detection cannot account for all types of ramps, it is the driver's responsibility to evaluate the situation and react accordingly to avoid damage.



When the system is activated (reverse gear engaged/max. 6 km/h), the RADC 2.0 detects the following zones and automatically activates the respective mode, which is indicated acoustically and visually.



No object in detection zone Object in detection zone (gray)



2

Object in detection zone (green)







#### **A DANGER**

Despite the automated intervention of the RADC 2.0 in the braking system when reversing, the system must be actively supported. If an object is detected in the yellow detection range (brake pressure is automatically increased slightly), the engine speed must be reduced.



Basic configuration - can be customized in the RADC 2.0 configuration software (9.4).

#### 

Despite the automated intervention of the RADC 2.0 in the braking system when reversing, the system must be actively supported. If an object is already in the red detection area (brake pressure is automatically increased), the brake must also be actively applied by the driver. The brake pressure applied by the detected red braking zone (P HIGH) is reduced in a controlled manner to 0 bar after a configured dwell time (basic configuration 2 s) by means of a falling ramp. This allows the docking process to be completed in a controlled manner over the last short distance on the ramp without any disruptive braking resistance.





Moving object in cross-traffic zone (blue)



Basic configuration - can be customized in the RADC 2.0 configuration software (9.4).

#### **A DANGER**

Despite the automated intervention of the RADC 2.0 in the braking system when reversing, the system must be actively supported. If an object (> 1.5 m/s) moves into the blue detection area (brake pressure is automatically increased), the speed of the motor must be reduced. The brake pressure (P EMERGE) applied by the detected blue braking zone is reduced in a controlled manner to 0 bar after a configured dwell time (basic configuration 4 s) by means of a falling ramp.



# **11.3 DETECTION ZONE OVERVIEW**



\*Settings can be customized in the RADC 2.0 Configuration Software (9.4).

	Beeper	EOM	Brake pressure
		*	
		EOM continous light on parking light on no EOM continous light on parking light off	
	warning signal (trill)	EOM continous light	Emergency brake pressure*
		EOM 1Hz	
((R))		EOM 2Hz	
		EOM 4Hz	low*
		EOM continous light	high*

PERATING MANUAL



### **12. INITIAL START-UP AND TEST**

#### NOTE

The accuracy (response behavior) of the RADC 2.0 can vary due to the different reflection properties of the materials to be detected. Furthermore, the height and width of the object to be detected are also crucial for the detection accuracy of the RADC 2.0.

There are three different ways to test the functionality of the RADC 2.0:

- 12.2 Initial operation and test/shutdown
- 12.3 Initial operation and test/operation
- 12.4 Initial operation and test/computer-assisted

One of these tests must be carried out to ensure the functionality of the RADC 2.0.

### **12.1 INITIAL START-UP AND TEST/STANDSTILL**

Prerequisites for checking the RADC 2.0 for correct function while stationary:

- Free area in the detection range behind the trailer (at least 6 m to 11 m)
- Mounted (6.) and configured (9.4) RADC 2.0 system
- Trailer brake readiness, i.e. active ISO7638 connection (coupled towing vehicle or through an existing test stand)
- Aspöck ECU programming cable available
- Supply with external power source 14 V-33 V (9.5 Option 2)

When starting up at a standstill, the supply and activation (reverse gear) of the RADC 2.0 is simulated via an external power source.

The activation sequence (10.1) is carried out immediately after the connector of the power source for the system's self-diagnosis. The following functions are activated for a period of one second:

- Both EOMs continuously lit
- One-time beeper signal (low) brake pressure request to the EBS and subsequent release of the brake pressure

If the activation sequence differs from the function, possible causes should be sought in the malfunction section (14.).

If the system goes into operation after the activation sequence (constant flashing of the EOMs), the detection zones can be checked:

- Test object made of metal (height >=1 meter / width >=25 mm)
- Place the test object in the green detection zone
   -> faster flashing of the EOMs (11.2 2)
- Fast movement of the test object across the rear area -> triggering of the cross-traffic detection (11.2 5) -> EOMs light up continuously + high braking pressure with subsequent lowering, acoustic warning signal (trilling)





- Placing the test object in the yellow detection zone -> EOMs flash quickly + low braking pressure (11.2 3)
- Placing the test object in the red detection zone -> EOMs light continuously + high brake pressure with subsequent lowering (11.2 (4))
- Manual deactivation by switching on the rear fog light -> double flash of the EOMs (10.2)
- (Re-)activation of the system by disconnecting and reconnecting the external power source -> Restart with activation sequence (10.1)

### 12.2 INITIAL START-UP AND TEST/DRIVING MODE

The requirements for checking the RADC 2.0 for correct function while driving are:

- Free area in the detection range behind the trailer (at least 6 m to 11 m)
- Mounted (6.) and configured (9.3) RADC 2.0 system
- Operational readiness of the trailer brake, i.e. active ISO7638 connection (coupled towing vehicle)

When starting up in driving mode, the RADC 2.0 is activated by engaging reverse gear. The activation sequence (10.1) for self-diagnostics is carried out immediately. The following functions are activated for a period of one second:

- Both EOMs are continuously lit
- The beeper emits a single audible signal
- (Low) brake pressure request to the EBS and subsequent release of the brake pressure

If the activation sequence differs from the function, possible causes should be sought in the malfunctions section (14.).

If the system goes into operation after the activation sequence (constant flashing of the EOMs), the detection zones can be checked.

The test object is placed at a sufficient distance (> 10 m) behind the trailer. When reversing, the test object is now approached (< 6 km/h)

#### 1. Static object:

- Test object made of metal (height >=1 meter / width >=25 mm)
- When the test object is reached in the green detection zone -> the EOMs flash faster (11.2 (2))
- When the test object is reached in the yellow detection zone -> rapid flashing of the EOMs + low braking pressure (11.2 (3))

#### \Lambda Danger

During the test, it must be ensured that there are no other objects in the test area behind the vehicle.





- Test object reaches the red detection zone -> EOMs light up continuously + high braking pressure with subsequent reduction (11.2 (4))
- Manual deactivation by switching on the rear fog light -> double flash of the EOMs (10.2)
- (Re-)activation of the system by engaging reverse gear again -> restart with activation sequence (10.1)

#### 2. Cross traffic

To check the cross-traffic warning, the vehicle must be stationary with the engine running and secured. (Handbrake must be active!) Now an object is moved at least 1.5 m/s into the cross-traffic zone (11.3) behind the trailer. It must be ensured that all acoustic, optical and haptic warning functions of the RADC 2.0 work properly. (11.1)

- Test object made of metal (height >=1 meter / width >=25 mm)
- Fast movement (>1.5 m/s) of the test object transversely into the rear area of the trailer
   -> triggering of the cross-traffic detection (11.2 5) -> continuous illumination of the EOMs + high brake pressure with subsequent lowering + audible warning signal (trilling)

### 12.3 INITIAL START-UP AND TEST/ COMPUTER-ASSISTED



If the initial operation according to point 12.1 or 12.2 is not possible because the test environment cannot be created as part of the production line, for example, a test for the full range of functions of the RADC 2.0 must be carried out in diagnostic mode with the help of the configuration software.

Download and registration of the RADC 2.0 configuration software (9.2)





#### Start RADC 2.0 configuration software



#### Start diagnosis mode

The diagnostic mode of the RADC 2.0 configuration software provides an overview of the status of the RADC 2.0 system. Any system malfunctions are displayed and simplify the search for possible causes.



The laptop must be connected correctly to the RADC 2.0 ECU. (9.5)







### **13. WORKSHOP INSTRUCTIONS**

### **13.1 MAINTENANCE**

The Aspöck RADC 2.0 is basically maintenance-free. However, it is important to regularly ensure that the sensor is not dirty and that all the cable plug-in connections and the cabling itself are in good order.

### 13.2 REPAIR

If a malfunction is indicated, a diagnosis must be carried out to identify the fault (see 14.1 Diagnosis). If an error message continues to appear after the diagnosis has been carried out and all system components have been checked, a specialist workshop must be contacted immediately to repair the fault.

### **14. MALFUNCTIONS**

If the RADC 2.0 is not working properly, this can have various causes.

- Malfunction of sensor
- Malfunction due to defective wiring
- EBS error
- ECU error
- Speed >11 km/h
- System is switched off by Fog

The error can possibly be localized or found using a diagnostic matrix in section 14.1.





### **14.1 DIAGNOSIS MATRIX**

To rectify a problem as quickly as possible, proceed as follows.





### 14.2 MANUAL DIAGNOSIS / PC

To perform a manual diagnosis of the RADC 2.0 ECU, a laptop can be connected to the ECU, vehicle and laptop as follows. The parking lights on the vehicle must be switched on. Optionally, an external power supply can be connected to the ECU if the vehicle power supply is not available.





#### Start RADC 2.0 configuration software (9.2, 9.3)



#### Start diagnosis mode

The diagnostic mode of the RADC 2.0 configuration software provides an overview of the status of the RADC 2.0 system. Any system malfunctions are displayed and simplify the search for possible causes. (14.1)



The laptop must be connected correctly to the vehicle or RADC 2.0 ECU. (14.2)



#### RADC 2.0 | OPERATING MANUAL

# 14.4 SELF DIAGNOSIS

Before the RADC 2.0 is activated by engaging reverse gear, the system performs a self-diagnosis of voltage, overcurrent, open outputs and temperature. The error diagnosis (ECU, EBS and sensor) is also carried out during detection mode and constantly monitored.

# 14.4.1 GENERAL SYSTEM SELF DIAGNOSIS

ING

- Supply voltage in the range between 11V-32V
- EOM 1 open output or overcurrent
- EOM 2 open output or overcurrent
- Beeper open output or overcurrent
- Excessive temperature RADC 2.0 ECU

If an excessive temperature or excessive/low voltage of the power supply is diagnosed, the system goes into error mode and visualizes this with the EOM lamps flashing twice.

If the vehicle is reversing (reverse signal) and the RADC is not operating due to a lack of power supply (tail lights OFF) or if the EOMs are not able to operate (cable break, defective EOM lamps), this is indicated by the EOMs not lighting up.

### 14.4.2 SENSOR SELF-DIAGNOSIS

A malfunction of the sensor can be caused by dirt, a lack of power supply or a general malfunction. If a fault is diagnosed, the system goes into error mode and visualizes this by the EOM lamps flashing twice. However, if there is a problem with the EOM lamps, the error mode can also be indicated by non-illuminated EOMs.

### 14.4.3 BRAKE SELF-DIAGNOSIS

A brake malfunction can be caused by an EBS error, the unavailability of the brake interface or a general malfunction of the brake. If an error is diagnosed, the system goes into error mode and visualizes this by the EOM lamps flashing twice. However, if there is a problem with the EOM lamps, the error mode can also be indicated by unlit EOMs.

For a precise analysis, it is necessary to examine and rectify the malfunction using the software of the respective brake manufacturer.









## **15. CIRCUIT DIAGRAMS AND PIN ASSIGNMENTS.**

# **15.1 PIN ASSIGNMENT RADC 2.0 ECU**

						HDSCS 8	CONN-I Bpol code black(A)
C	ONN-A						8765
	erseal 2pol						4321
PIN Number	Input / Output			/		PIN Number	Input / Output
1	Ground				. [	1	Reverse light
2	Power Supply EOM 2	$\setminus$			F	2	Ground
		$\backslash$				3	Position light R
			6		F	4	Position light L or Power+
C	ONN-C		h			5	Power Supply output ECU
Supe	erseal 2pol					6	Fog light or switch input
	Contraction of the second seco					7	CAN0 High
				NC		8	CAN0 Low
1 2	Ground Power Supply EOM 1			K		HDSCS	CONN-K 6pol code black(A) 654
Supe	ONN-E erseal 2pol	_					113
			HDSCS	CONN-J 6pol code grev(B)			
(2) (1)				123		PIN Number	Input / Output
				2 2 2		1	Power Supply output EBS
PIN Number	Input / Output				Γ	2	Ground
1	Ground			456		3	CAN1 High
2	Power Supply Beeper			lagent / Outget		4	CAN1 Low
			Pin number	input / Output		5	EBS AUX+
			1	Power Supply output Sensor		6	EBS AUX-
			2	Ground			
			3	CAN0 High			
			4	CAN0 Low			
			5	Analog Input			

LIN

6

ASF



## **15.2 PIN ASSIGNMENT CONNECTOR/CABLE**

#### RADC 2.0 Sensor Cable 1m - Directional Sensor

PIN NO	INPUT /OUTPUT	PIN COLOR
1	VCC	
2	-	
3	-	
4	Ground	
5	-	
6	-	
7	CAN High	
8	CAN Low	

Molex

### RADC 2.0 Sensor Cable 1m Direction - ECU

PIN NO	INPUT /OUTPUT	PIN COLOR
1	VCC	
2	Ground	
3	CAN High	
4	CAN Low	
5	-	
6	-	
7	-	
8	-	

6p. HDSCS female





#### RADC 2.0 Knorr EBS3 RLF - ECU 6m - Direction EBS



#### RADC 2.0 Knorr EBS3 RLF - ECU 6m - direction ECU

PIN NO	INPUT /OUTPUT	PIN COLOR	PIN COLOR BRIDGE
1	+VDC Bat		
2			
3			
4			
5	EBS AUX +		
6	EBS AUX -	$\bigcirc$	

6p. HDSCS female




#### RADC 2.0 Wabco EBS3 - ECU 6m - Richtung EBS

PIN NO	INPUT /OUTPUT	PIN COLOR
1	+VDC Bat	
2	CAN2 High	
3	CAN2 Low	
4	Ground	
5	-	
6	-	
7	-	
8	ABS rotational speed	

WABCO 449 437 060 0



# RADC 2.0 Wabco EBS3 - ECU 6m - Richtung ECU

PIN NO	INPUT /OUTPUT	PIN COLOR
1	-	-
2	-	-
3	CAN2 Low	
4	CAN2 High	
5	-	-
6	-	-

6p. HDSCS female





# RADC 2.0 Haldex EBS4 - ECU 6m - Richtung EBS

PIN NO	INPUT /OUTPUT	PIN COLOR
1	+VDC Bat	
2	CAN High	
3	CAN Low	
4	Ground	

4p. Haldex CAN for EB+ Gen4



# RADC 2.0 Haldex EBS4 - ECU 6m - Richtung RADC 2.0 ECU

PIN NO	INPUT /OUTPUT	PIN COLOR
1	-	-
2	-	-
3	CAN2 Low	
4	CAN2 High	
5	-	-
6	-	-

HDSCS 6pin Female





#### RADC 2.0 power supply cable ASS3 17p.



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CONNECTOR		3
PIN NO	INPUT /OUTPUT	PIN COLOR
1	Reverse lamp	
2	Ground	$\bigcirc$
3	Tail light RH	
4	Tail light LH	
5	-	-
6	Fog light	
7	N/A	-
8	N/A	-

HDSCS 8pin Female 3





# RADC 2.0 power supply cable o. e.

PIN NUMMER	EINGABE / AUSGABE	PIN FARBE
1	Reverse lamp	
2	Ground	$\bigcirc$
3	Tail light RH	
4	Tail light LH	
5	-	-
6	Fog light	
7	N/A	-
8	N/A	-

HDSCS 8pin Female









PIN NO	INPUT /OUTPUT	PIN COLOR
1	-	-
2	-	-
3	CAN High	
4	CAN Low	
5	-	-
6	-	-

PIN NO	INPUT /OUTPUT	PIN COLOR
1	-	-
2	+VDC Bat	
3	-	-
4	-	-
5	Ground	
6	CAN Low	
7	CAN High	

HDSCS 6pin Female



ASPÖCH

7p.AMP male



# SP IV R/W/O 2m 2p S.Seal RH

PIN NO	INPUT /OUTPUT	PIN COLOR
1	Ground	$\bigcirc$
2	+VDC	

2p.S.Seal female





#### RADC 2.0 Beeper 0,6m 2p S.Seal

PIN NO	INPUT /OUTPUT	PIN COLOR	2p.S.Seal female
1	Ground	$\bigcirc$	
2	+VDC		

#### Aspöck ECU programming cable



2

OPERATING MANUAL



PIN NO	INPUT /OUTPUT	PIN COLOR
1	-	-
2	CAN0 Low	
3	-	-
4	-	-
5	-	-
6	-	-
7	CAN0 High	
8	_	_
9	-	-

PIN NO	INPUT /OUTPUT	PIN COLOR
1	Reverse lamp	
2	Ground	

# **PCAN Adapter**

PIN NO	INPUT /OUTPUT	PIN COLOR
1	-	-
2	CAN0 Low	
3	Ground	$\bigcirc$
4	-	-
5	-	-
6	Ground	$\bigcirc$
7	CAN0 High	
8	-	-
9	-	-

9pin D-Sub female



male S.Seal





USB 1.1, USB 2.0 and USB 3.0







# 16. DISPOSAL

- **Decommissioning and disposal:** Please observe the applicable legal requirements for decommissioning and disposing of this product. In particular, observe the regulations for disposing of batteries, equipment and electrical systems.
- **Electrical appliances:** Collect electrical appliances separately from household or commercial waste. These can be recycled or disposed of properly. If possible, pass the old appliance on for internal disposal or contact the manufacturer for specific instructions.
- **Environmental protection:** Electrical and electronic equipment must be collected separately from unsorted municipal waste and disposed of or recycled properly. Improper disposal can harm health and the environment. Contact a specialized company or the relevant authorities for detailed information.
- **Packaging:** Packaging must be disposed of separately. Paper, cardboard and plastics can be recycled.

# THE ART OF LIGHTS

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