Vehicle conversion for persons with limited mobility

Steering Wheel - Remote Control

Installation Instructions

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handicap mobil

Steering wheel remote control "CAN-Relais-Box 16“

Installation instructions

Content:

A. Introduction

To provide persons with limited mobility access to driving in their own car, a system was developed to permit these persons a complete control of all important function elements of a vehicle despite the limited mobility.
These persons often operate gas and brake with one hand and steer the vehicle with the other. To permit steering without changing the grip, a control knob is attached to the steering wheel, which must also include the remaining control elements for the control of turn signal, windshield wiper, etc.

Safety information

The installation must only be performed by trained expert personnel.
The electronics must only be opened by persons authorized for this purpose, otherwise the warranty expires.
The battery remains connected to be able to perform a functional test during the installation. Adherence to the appropriate safety regulations is therefore mandatory.
When drilling holes, it must be ensured that vehicle parts (battery, cable) are not damaged. Please install safe, protected cabling.
The terminal connection diagrams attached in the appendix were generated on the basis of the available original circuit diagrams of different vehicle manufacturers available to handicap mobil GmbH.
We do not automatically receive changes of the circuit diagrams from the manufacturers and therefore, deviations between the terminal connection diagrams and the original condition are possible.

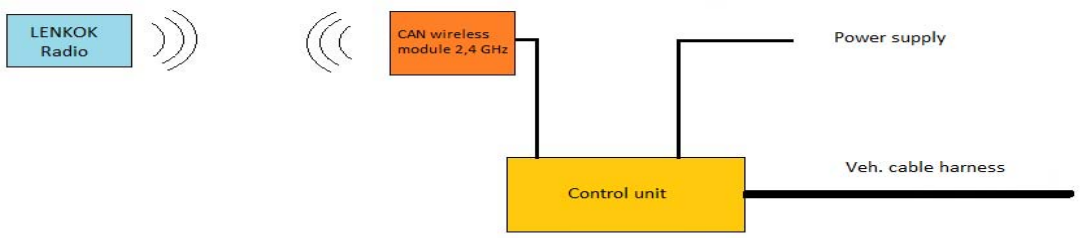


Figure 1: Block diagram total system

A radio signal will initially be transmitted per keystroke through the sender at the steering wheel to the CAN wireless module, which is connected to the control unit through a CAN bus. This is where the received signal will be analyzed and allocated to its appropriate function. The control unit switches appropriate relays, which bypass the original switching and relay contacts in the vehicle. This means that the vehicle continuous to be operational through its own control units.

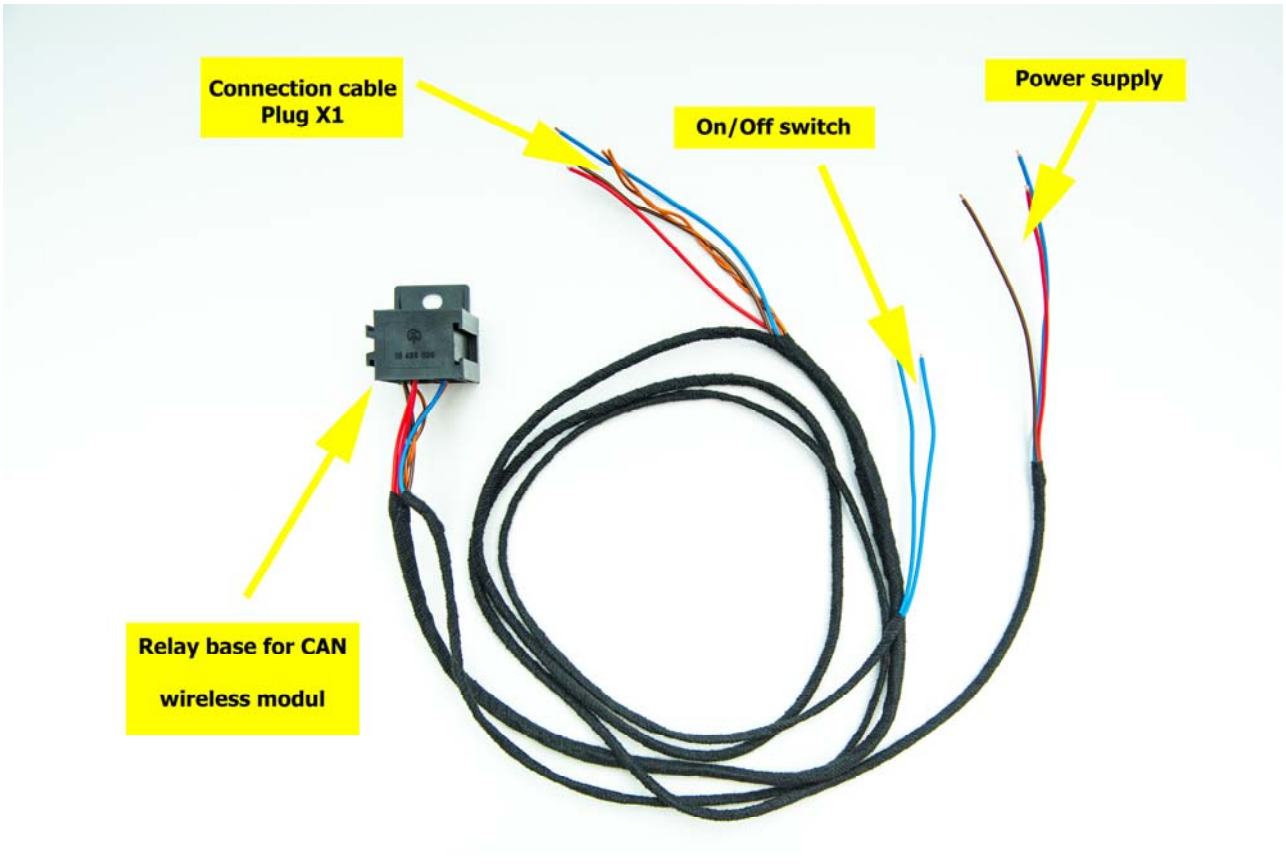
B. Installation

Installation of the electronics
The electronics will be installed at a suitable point behind the dashboard or in the foot space. Depending on the car type, the connection wires will be routed in accordance with the terminal connection diagrams (appendix) and the general circuit diagram (appendix). The terminal strips are designed as a plug connection.
During the assembly, place the plug on a solid underground and insert the cables. Now plug it into the electronics and lock it. Please install safe, protected cabling.

Power supply of the electronics
On the side of the electronics, the connections are made at the plug X1
(Pin 27 Kl.30 red; pin 28 Kl. 15 blue; pin 12 GND brown), for this purpose, use the provided cable harness. In the vehicle, the connections Kl 30 red and Kl 15 blue will be secured through a 1 amp fuse. GND brown is connected at a suitable point to the vehicle ground. The provided switch will be installed in the dashboard to switch the electronics on and off, the switch will be connected to the two blue wires off the provided cable harness.

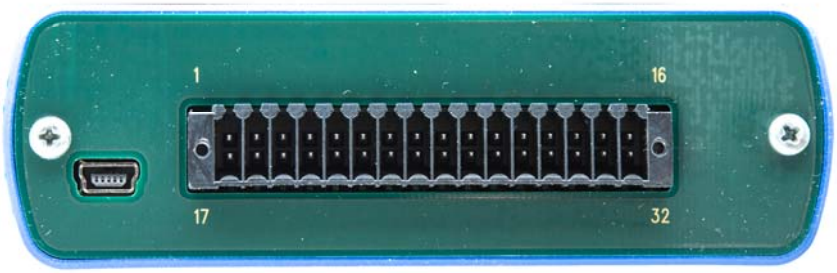
Connection electronic -> CAN wireless module
The electronics and the CAN wireless module will be connected to each other through CAN bus. For this purpose, connect the two twisted wires of the provided cable harness as follows to the plug X1:

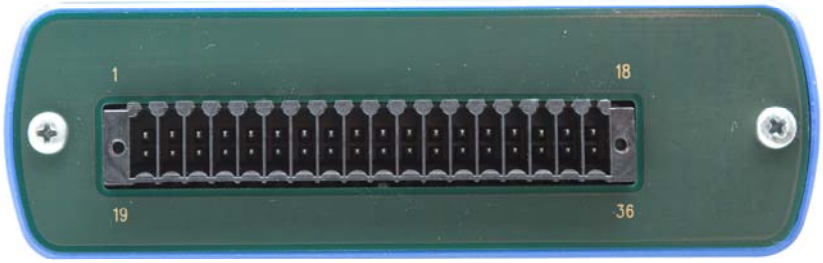
Orange / brown = CAN high Pin 20
Orange / black = CAN low Pin 4



I. Terminal assignments

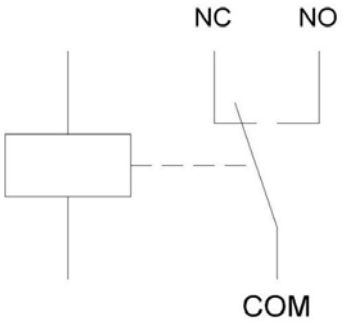
The device includes 2 large terminal strips and a USB connection.
Terminal strip assignment:



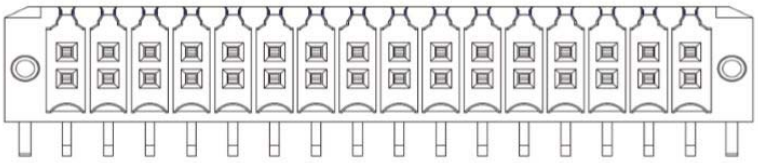


Relay contacts
16 relays are installed in the electronics, they are designed as changeover relays.
The relays can be assigned to a function through configuration.
Each relay has 3 connections:

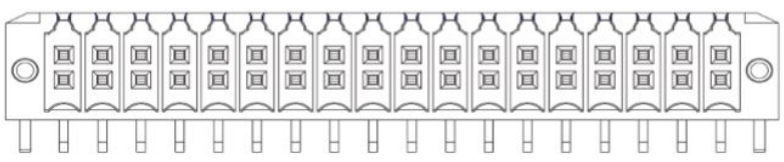
COM = Changeover contact (30)
NO = Normally open contact (87)
NC = Normally closed contact (87a)



X1 (106)			
PIN	Desciption	PIN	Desciption
1	REL 15 COM	17	REL 16 COM
2	REL 16 NO	18	REL 16 NC
3	REL 15 NO	19	REL 15 NC
4	CAN L	20	CAN H
5	AIN 13	21	AIN 12
6	AIN 10	22	AIN11
7	AIN 08	23	AIN 09
8	AIN 06	24	AIN 07
9	AIN 05	25	AIN 04
10	AIN 03	26	AIN 02
11	AIN 01	27	KL 30
12	GND	28	KL 15
13	DIN 01	29	DIN 02
14	REL 13 NC	30	REL 13 NO
15	REL 14 NO	31	REL 14 NC
16	REL 14 COM	32	REL 13 COM



X2 (105)			
PIN	Desciption	PIN	Desciption
1	REL 12 COM	19	REL 12 NC
2	REL 12 NO	20	REL 11 NC
3	REL 11 NO	21	REL 11 COM
4	REL 10 NC	22	REL 10 COM
5	REL 10 NO	23	REL 09 NC
6	REL 09 NO	24	REL 09 COM
7	REL 08 NC	25	REL 08 COM
8	REL 08 NO	26	REL 07 NC
9	REL 07 NO	27	REL 07 COM
10	REL 06 NC	28	REL 06 COM
11	REL 06 NO	29	REL 05 NC
12	REL 05 NO	30	REL 05 COM
13	REL 04 NC	31	REL 04 COM
14	REL 04 NO	32	REL 03 NC
15	REL 03 NO	33	REL 03 COM
16	REL 02 NC	34	REL 02 COM
17	REL 02 NO	35	REL 01 NC
18	REL 01 NO	36	REL 01 COM



II. Windshield wiper actuation

Traditionally most vehicles have 3 wiper stages (interval, stage 1, stage 2).
One relay will be closed to actuate these 3 stages.

The interval mode is traditionally actuated through a wiper relay, which lets the wiper wipe once every 5 seconds. For this purpose, a contact will be closed briefly and released immediately. The wiper now must complete the wipe cycle independently and must return to its resting position. This is guaranteed by the relay wiper 0 position (wiper return). This contact is always closed, except during the wiping operation with stage 1 or 2. In this case it is opened, because the motor in these two wiper stages is always supplied with electricity and therefore, the return to the resting position is guaranteed.

a. Process controlled interval wiping

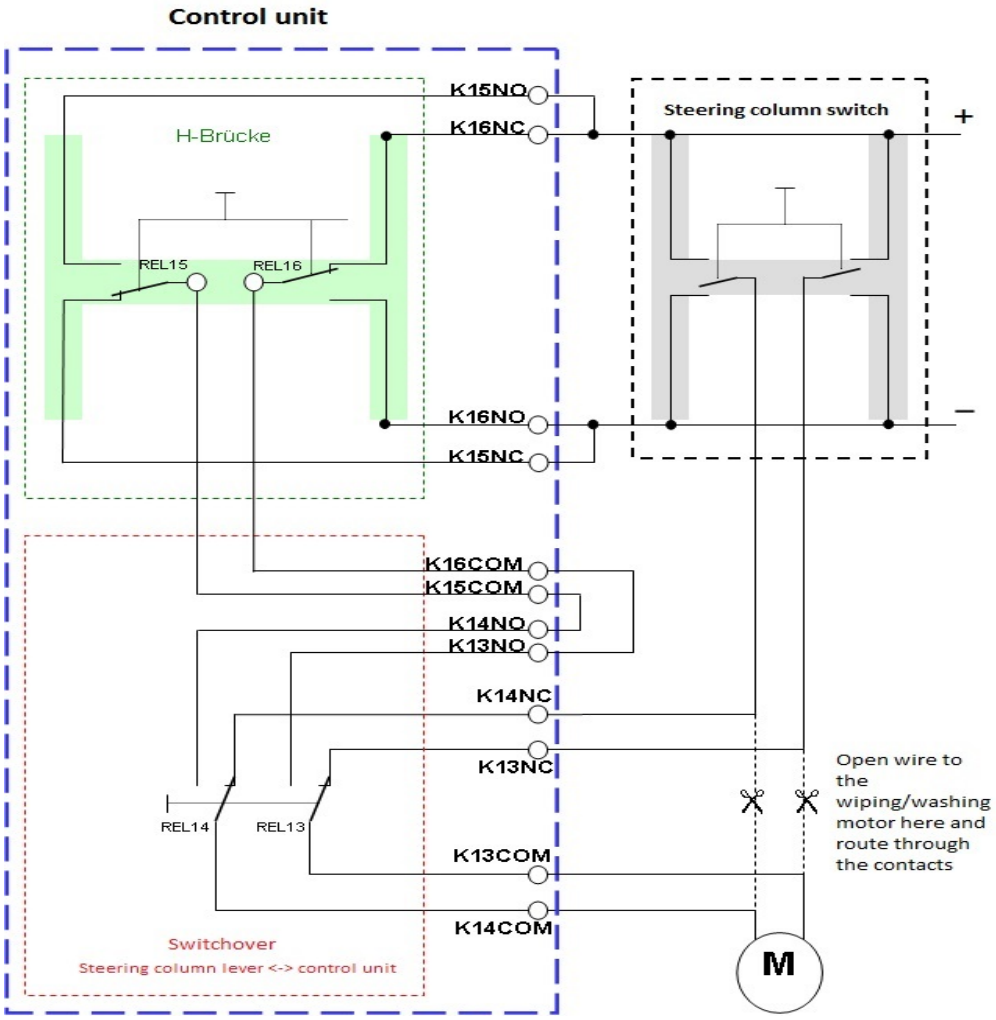
In some vehicles, the interval wiping through a single closed relay (interval) contact represent a problem. In these cases, the electronics can assume the interval control.
The wiper interval relay will be closed here every 5 seconds (the time can be adjusted in configuration) for 1 second and therefore triggers a single wiping cycle.

b. Switch the wiping functions through a button command

In some vehicles (e.g. BMW), the wiping function is a no longer assigned through fixed contacts. Instead, from an electronics standpoint only *faster* and *slower* buttons are available.
The control unit can now be configured in such a way that a relay will be closed briefly when the wiper should run faster while another relay will be closed briefly when the wiper should run slower. The wiping/washing function is not affected.

III. Connection variants for wiping/washing

a. Vehicle has only one wiping/washing pump



For vehicles with only one wiping/washing pump, the switchover between wiping/washing front and wiping/washing rear will be resolved in such a way that the pump runs forward for one process and backwards for the other one. Valves in the washing agent tubes guide the washing agent in one case to the front windshield in the other case to the rear window.
Therefore, the steering column switch in the vehicle is designed as an H-bridge. This permits the polarity reversal of the wiping/washing pump.

The relays K13 - K16 can be combined to an H-bridge to permit both wiping/washing function through the remote control. Its supply voltage will be obtained from the steering column switch (K15NC, K16NO and K15NO, K16NC).
The contacts K13NO must be connected with K16COM and K14NO with K15COM to connect the relays to an H-bridge.
The wiping/washing pump must be connected through K13COM, K14COM, K13NC and K14NC. For this purpose, the two wires to the pump must be separated and guided through the device.
The electronics in the configuration must be set to a joint washing pump.

b. Vehicle has two wiping/washing pumps

This variant offers up to 2 relays for wiping/washing for the front and 2 relays for wiping/washing for the rear.
The control unit must be reset to 2 wiping washing pumps in vehicles that include 2 wiping/washing pumps.

IV. Wiper coasting

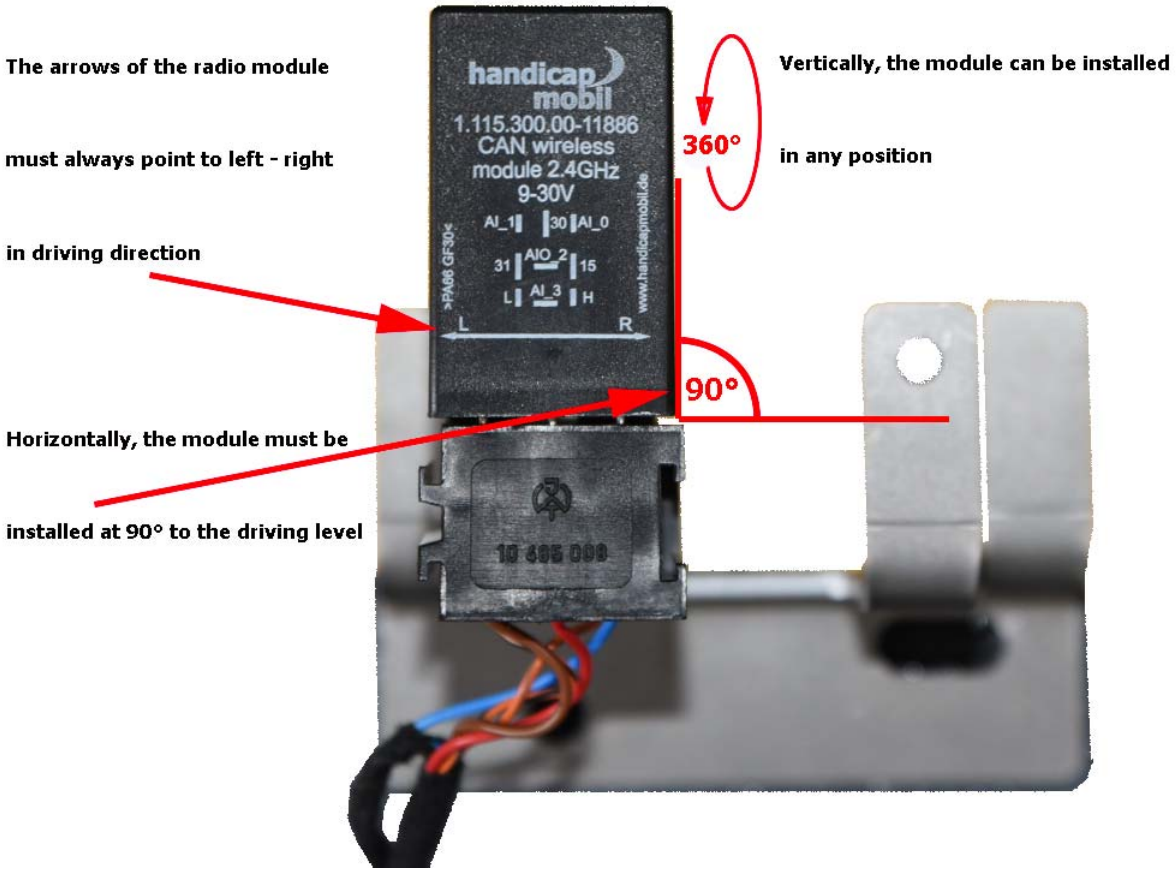
After actuating the front wiping/washing pump, this function can be used to actuate the windshield wiper for a defined time if this is not automatically provided by the vehicle.

V. Turn signal retraction

This function will be assumed because the automatic turn signal retraction in the steering column switch cannot work when using the remote control.

Turn signal retraction through acceleration sensor
The turn signal is retracted by an acceleration sensor, which is integrated in the CAN wireless module. This sensor attempts to derive the steering motion through the cross acceleration of the vehicle and in doing so retract the turn signal at the right time. The installation of the CAN wireless module in a defined position is the prerequisite for the correct function of the acceleration sensor.

a. Installation position of the CAN wireless module when using the acceleration sensor



VI. Turn signal

One relay each is available for the turn signals left and right and they can either be used as a switch or a button.

VII. Hazard flasher

The actuation of the hazard flasher depends on the vehicle. Therefore, several options exist to actuate it.

1. **As switching function**
   If the hazard flasher is set, then 1 relay closes and stays closed until the hazard flasher is switched off again.
   Disadvantage: If the ignition is switched off, then the hazard flasher is also off.

2. **As button function**
   A contact will be closed briefly if the hazard flasher is set and this signals to the vehicle electronics that the hazard flasher must be switched on.
   If the contact is closed again, then the hazard flasher is switched off.

In addition, 2 options exist to connect the hazard flasher.

1. **Through the two turn signal relays**
   If the hazard flasher is set, then both turn signal relays will be closed simultaneously.

2. **Through a dedicated relay**
   If the hazard flasher is set, then a relay will be closed or switched.

VIII. High beam/headlight flasher

The high beam and/or the headlight flasher can be jointly or separately controlled through a relay, which means that one relay each is responsible for the high beam while the other is responsible for the headlight flasher.
The high beam function can either be implemented as a switch or a button.

IX. Light

Up to 4 relays are possible for the control of the light, and a differentiation is made between a dimmed headlight and a parking light.
For vehicles with H4 expanding pipes it is required that the dimmed headlights are switched off if the high beam is switched on.
The function must be set separately in configuration. If this function is not active, then all selected relays for the dimmed headlights and the parking light will be switched jointly and will be switched off only if the light function is switched off.
For the relays of the light function it is also possible to chose between a switch and a button function.

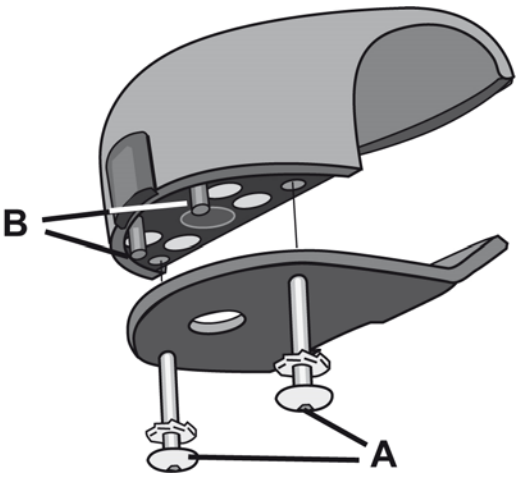
Dimmed headlight status (optional)
The electronics use this connection to determine whether the dimmed headlight is switched on. For this purpose, voltage must be delivered to this connection as soon as the light is switched on.

X. Horn

A relay is provided for the horn and this is always designed as a button function.

XI. Installation of the LENKOK

The bracket of the LENKOK can be positioned on the steering wheel if this is requested. In this case it must be ensured that the adapter does not impair any switches or rocker switches located on the steering wheel. The adapter must be attached in such a way that the triggering knob points to the center of the steering wheel. For persons who use a hand control for gas and brakes, a favorable placing would be at the left of the steering wheel in vehicles that have a left steering wheel. (app. 8:00 o'clock)
The following steps are required for the installation.



Remove the holding plate of the adapter by loosening the two screws (A).

Check whether the adapter fits the steering wheel.
If gaps exists, use rubber materials for compensation and adaptation.

Adjust the two spacer screws (B) in such a way that they represent a counter force against the holding plate.

Fasten the holding plate by using the two screws (A) and the spring washers.
Ensure that the screws insert themselves correctly into the threads of the holes.

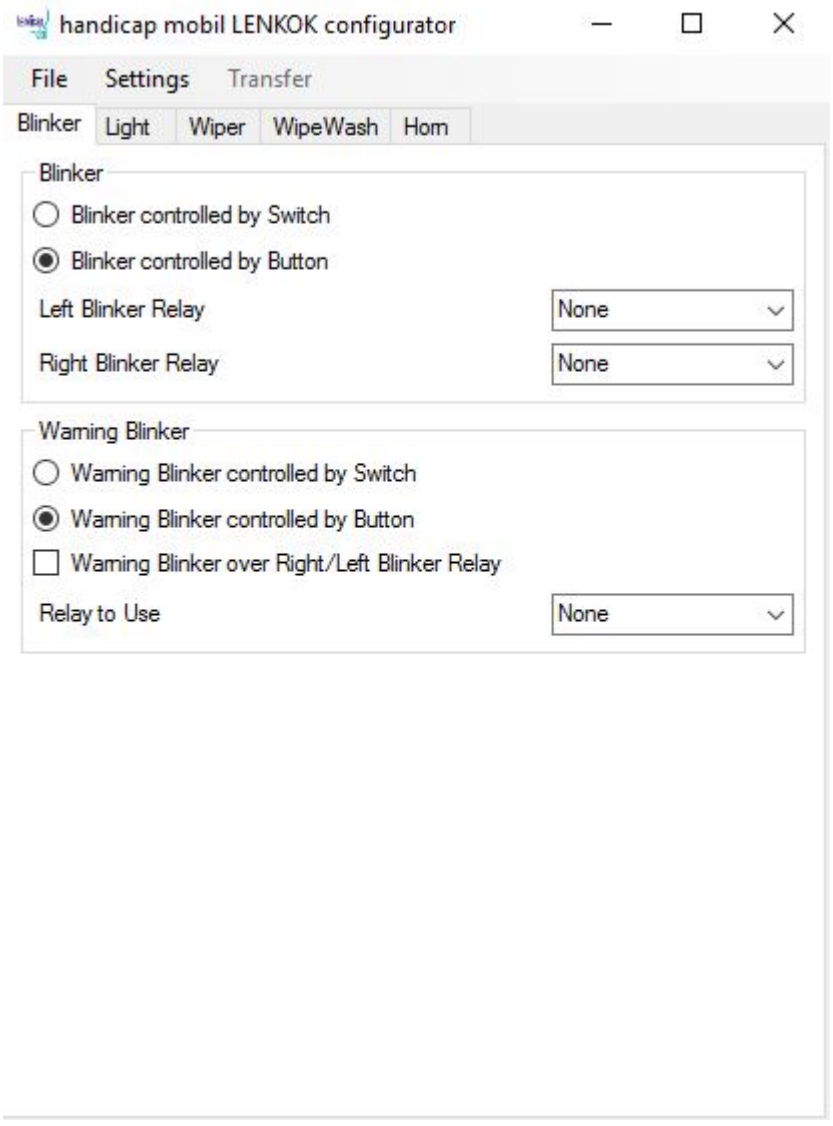
1. The triggering knob must be pressed and the axles must be inserted until it latches in to plug the knob on.

2. Press the trigger knob (at the side of the bracket) and simultaneously pull the knob out of the clamp to remove the knob.

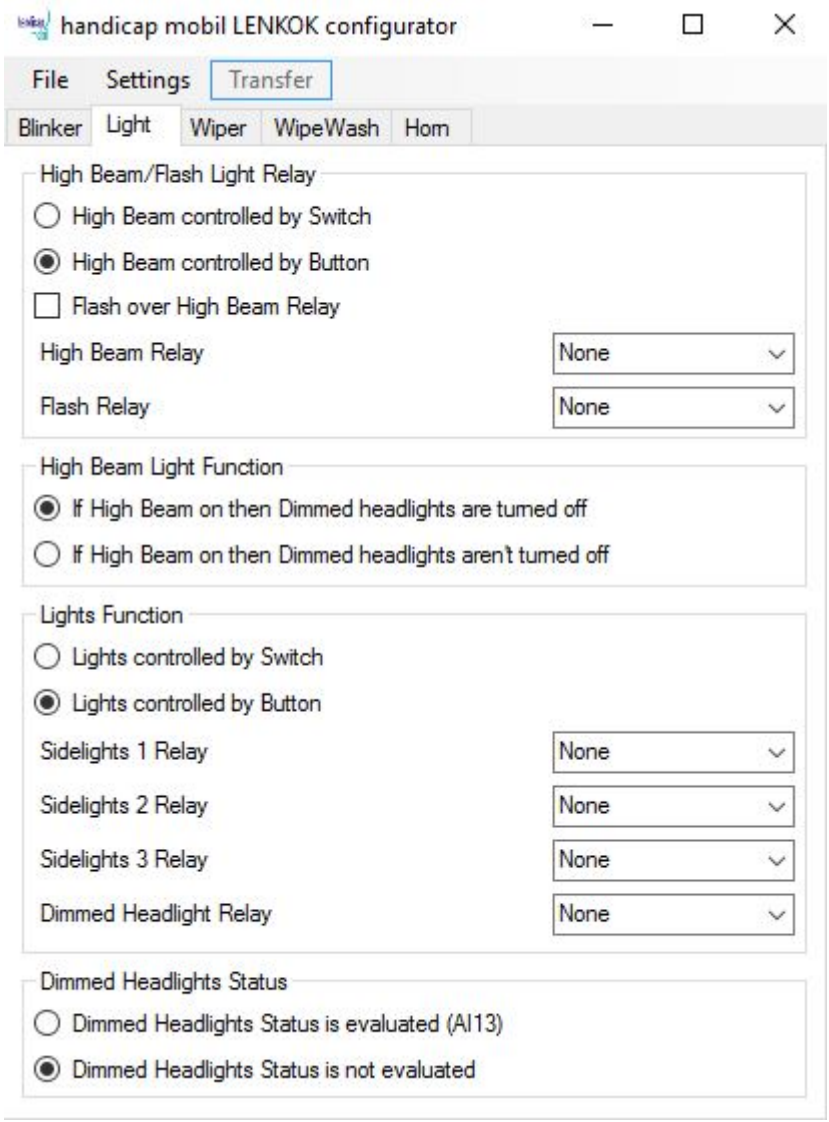
C. Software configuration (optional)

The electronics will be completely setup and delivered specifically for the vehicle type. However, if no plans are available or if software changes should be required based on changes to the vehicle electronics, then the software can be reprogrammed with a software delivered by us by using a USB cable.

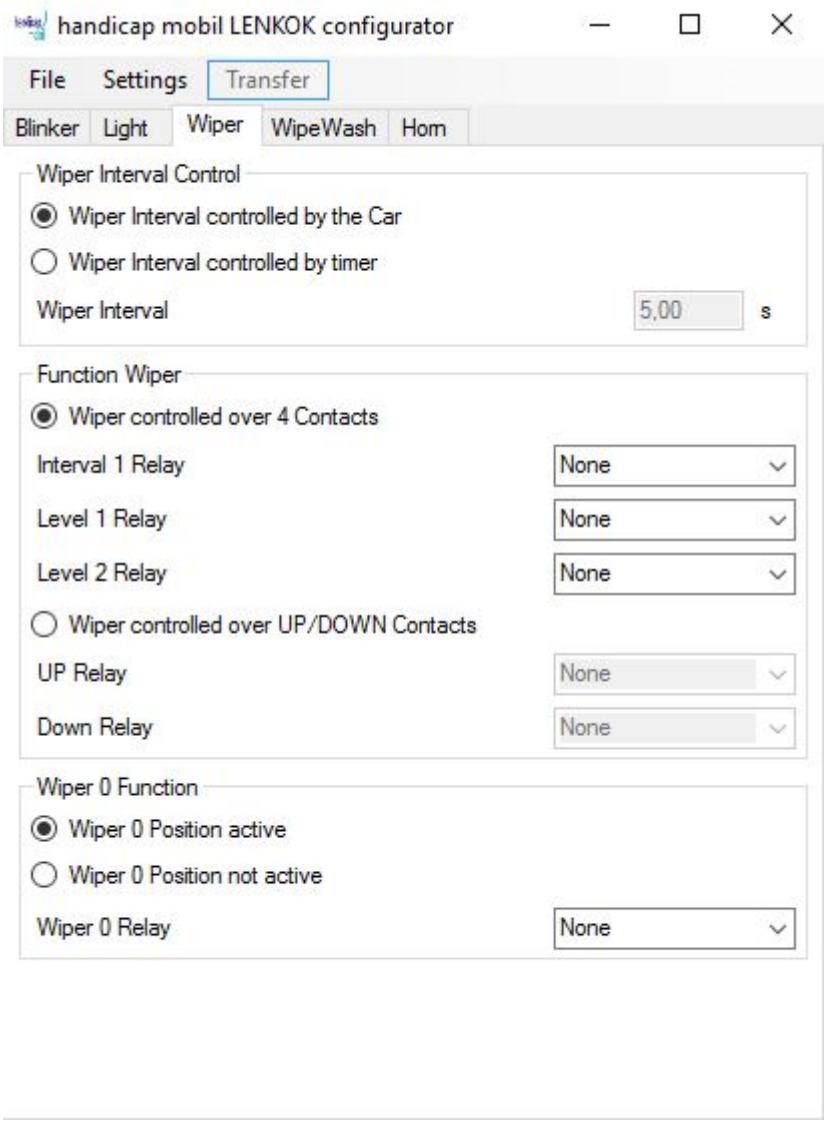
Settings turn signal/hazard flasher



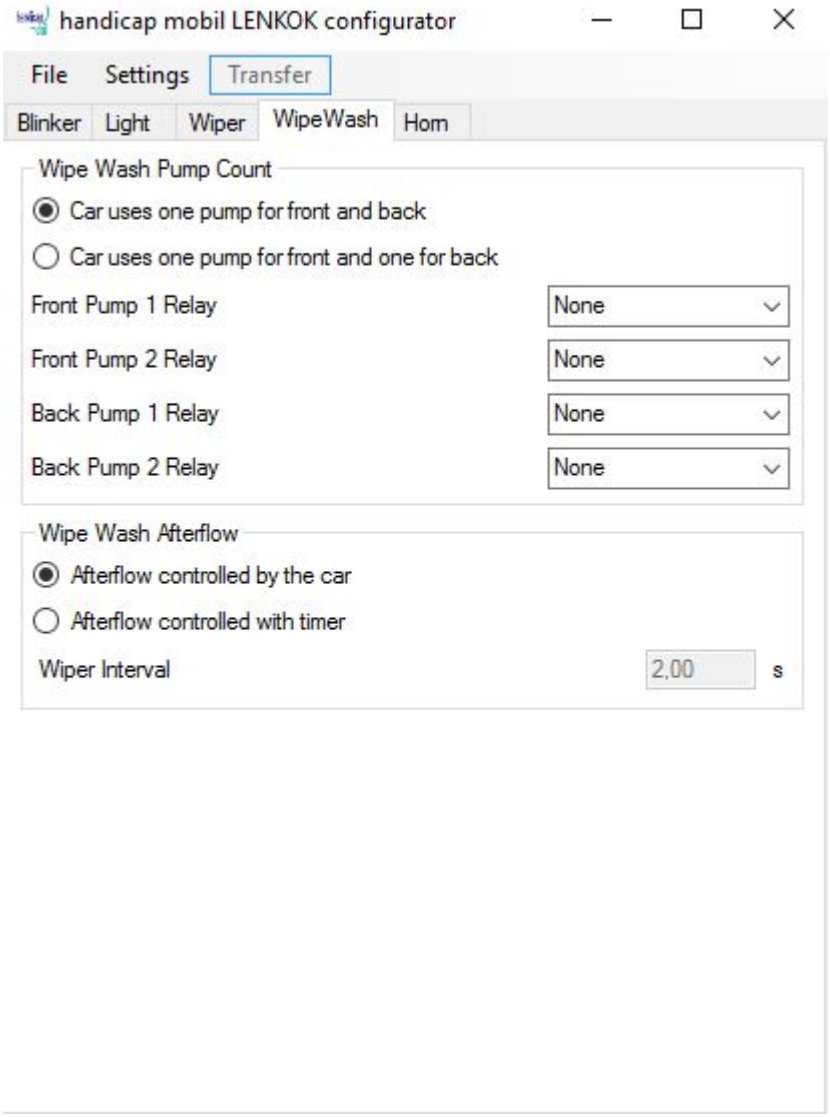
Settings light



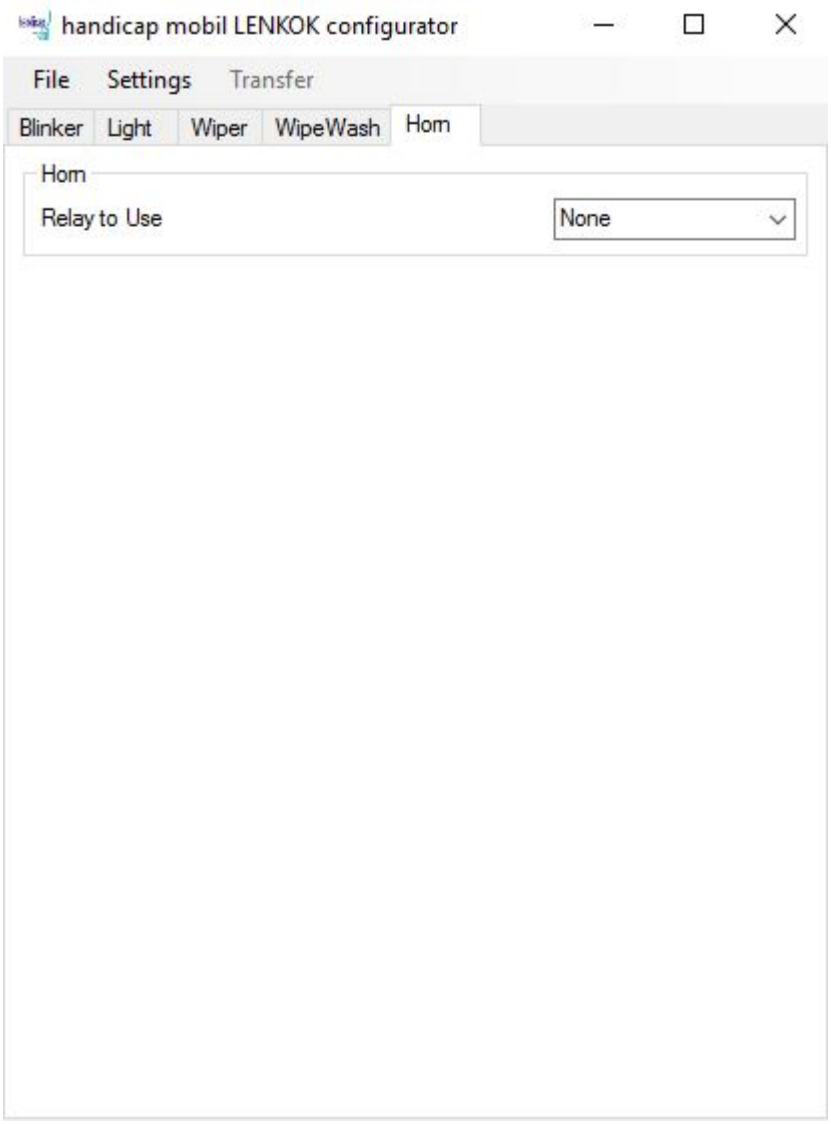
Settings windshield wipers



Settings wiping/washing



Settings horn



D. Operation

(see operating instructions).

Kraftfahrt-Bundesamt

DE-24932 Flensburg

E 1

MITTEILUNG

ausgestellt von:
Kraftfahrt-Bundesamt

über die Genehmigung
eines Typs eines elektrischen/elektronischen Bauteiles nach der Regelung Nr. 10

COMMUNICATION

issued by:
Kraftfahrt-Bundesamt

concerning approval granted
of a type of electrical/electronic sub-assembly with regard to Regulation No. 10

Nummer der Genehmigung**: 057899**
Approval No.:

Erweiterung Nr.: **--**
Extension No.:

1. Fabrikmarke (Handelsname des Herstellers):
Make (trade name of manufacturer):
MRS Electronic GmbH

2. Typ:
Type:
1.060

Handelsbezeichnung(en):
General commercial description(s):
CAN Relais Box 16

3. Merkmale zur Typidentifizierung, sofern am Bauteil vorhanden:
Means of identification of type, if marked on the component:
112882C

3.1 Anbringungsstelle dieser Merkmale:
Location of that marking:
auf dem Gehäuse
on the housing

Nummer der Genehmigung: 057899
Approval No.:

4. Klasse der Fahrzeuge:
Category of vehicle:
entfällt
not applicable

5. Name und Anschrift des Herstellers:
Name and address of manufacturer:
MRS Electronic GmbH
DE-78628 Rottweil

6. Bei Bauteilen und selbständigen technischen Einheiten, Lage und Anbringungsart des ECE-Genehmigungszeichens:
In the case of components and separate technical units, location and method of affixing of the ECE approval-mark:
Aufdruck auf dem Gehäuse
imprint on the housing

7. Anschrift(en) der Fertigungsstätte(n):
Address(es) of assembly plant(s):
MRS Electronic GmbH
DE-78628 Rottweil

8. Zusätzliche Angaben (erforderlichenfalls):
Additional information (where applicable):
siehe Anlage
see appendix

9. Für die Durchführung der Prüfungen zuständiger technischer Dienst:
Technical service responsible for carrying out the tests:
CSA Group Bayern GmbH
DE-94342 Strasskirchen

10. Datum des Prüfprotokolls:
Date of test report:
03.05.2016

11. Nummer des Prüfprotokolls:
Number of test report:
A40928-00-00AW

12. Gegebenenfalls Bemerkungen:
Remarks (if any):
siehe Anlage
see appendix

Nummer der Genehmigung: 057899
Approval No.:

13. Ort: **DE-24932 Flensburg**
Place:

14. Datum: **13.05.2016**
Date:

15. Unterschrift: **Im Auftrag**
Signature:

(Jörg Burgkhardt)

KRAFTFAHRT-BUNDESAMT 527

16. Das Inhaltsverzeichnis der bei den zuständigen Behörden hinterlegten Typgenehmigungsunterlagen, die auf Antrag erhältlich sind, liegt bei.
The index to the information package lodged with the approval authority, which may be obtained on request is attached.

1. Anlage zur ECE-Typgenehmigungs-Mitteilung
Appendix to the ECE type-approval communication

2. Inhaltsverzeichnis zu den Beschreibungsunterlagen
Index to the information package

3. Beschreibungsunterlagen
Information package

17. Grund oder Gründe für die Erweiterung der Genehmigung:
Reason(s) of extension of approval:
entfällt
not applicable

Nummer der Genehmigung: 057899
Approval No.:

Anlage
Appendix

zur ECE-Typgenehmigungs-Mitteilung Nr. **057899** betreffend die Typgenehmigung einer elektrischen/elektronischen Unterbaugruppe nach der Regelung Nr. 10
to ECE type-approval certificate No. **057899** concerning the type-approval of an electric/electronic sub-assembly under Regulation No. 10

1. Ergänzende Angaben:
Additional information:

1.1. Nennspannung des elektrischen Systems:
Electric system rated voltage:
12 V bzw. - resp. 24 V

1.2. Diese EUB kann für jeden Fahrzeugtyp mit folgenden Einschränkungen verwendet werden:
This ESA can be used on any vehicle type with the following restrictions:
alle Fahrzeugtypen mit einem 12 V bzw. 24 V - Bordnetz und Batterie(-) an der Karosserie
all vehicle types with a 12 V resp. 24 V - electrical wiring and battery(-) at the body

1.2.1. Einbauvorschriften (gegebenenfalls):
Installation conditions, if any:
die Einbauvorschriften sind der Einbauanleitung zu entnehmen
the installation conditions have to be gathered from the installation instructions

1.3. Diese EUB kann nur für die folgenden Fahrzeugtypen verwendet werden:
This ESA can only be used on the following vehicle types:
entfällt
not applicable

1.4. Angewandte(s) spezielle(s) Prüfverfahren und Frequenzbereiche zur Ermittlung der Störfestigkeit:
The specific test method(s) used and the frequency ranges covered to determine immunity were:
siehe Prüfbericht Nr.: A40928-00-00AW vom 03.05.2016
see technical report

Kraftfahrt-Bundesamt

DE-24932 Flensburg

E1

MITTEILUNG

ausgestellt von:
Kraftfahrt-Bundesamt

über die Genehmigung
eines Typs eines elektrischen/elektronischen Bauteiles nach der Regelung Nr. 10

COMMUNICATION

issued by:
Kraftfahrt-Bundesamt

concerning approval granted
of a type of electrical/electronic sub-assembly with regard to Regulation No. 10

Nummer der Genehmigung**: 047510**
Approval No.:

Erweiterung Nr.: **--**
Extension No.:

1. Fabrikmarke (Handelsname des Herstellers):
Make (trade name of manufacturer):
MRS Electronic GmbH

2. Typ:
Type:
1.115

Handelsbezeichnung(en):
General commercial description(s):
entfällt
not applicable

3. Merkmale zur Typidentifizierung, sofern am Bauteil vorhanden:
Means of identification of type, if marked on the component:
112029B

3.1 Anbringungsstelle dieser Merkmale:
Location of that marking:
auf der Gehäuseseite
on the side of the housing

Nummer der Genehmigung: 047510
Approval No.:

4. Klasse der Fahrzeuge:
Category of vehicle:
entfällt
not applicable

5. Name und Anschrift des Herstellers:
Name and address of manufacturer:
MRS Electronic GmbH
DE-78628 Rottweil

6. Bei Bauteilen und selbständigen technischen Einheiten, Lage und Anbringungsart des ECE-Genehmigungszeichens:
In the case of components and separate technical units, location and method of affixing of the ECE approval-mark:
Aufdruck auf der Gehäuseseite
imprint on the side of the housing

7. Anschrift(en) der Fertigungsstätte(n):
Address(es) of assembly plant(s):
MRS Electronic GmbH
DE-78628 Rottweil

8. Zusätzliche Angaben (erforderlichenfalls):
Additional information (where applicable):
siehe Anlage
see appendix

9. Für die Durchführung der Prüfungen zuständiger technischer Dienst:
Technical service responsible for carrying out the tests:
PHOENIX TESTLAB GMBH
DE-32825 Blomberg

10. Datum des Prüfprotokolls:
Date of test report:
27.10.2014

11. Nummer des Prüfprotokolls:
Number of test report:
145210

12. Gegebenenfalls Bemerkungen:
Remarks (if any):
siehe Anlage
see appendix

Nummer der Genehmigung: 047510
Approval No.:

13. Ort: **DE-24932 Flensburg**
Place:

14. Datum: **13.01.2015**
Date:

15. Unterschrift: **Im Auftrag**
Signature:

16. Das Inhaltsverzeichnis der bei den zuständigen Behörden hinterlegten Typgenehmigungsunterlagen, die auf Antrag erhältlich sind, liegt bei.
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entfällt
not applicable