

# *Steering Wheel Remote Control*

## *Installation Instructions*

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## A. Introduction

To allow persons of limited mobility to access road traffic in their own vehicle, a system has been developed which allows these people to use all the important functional elements of a vehicle despite their limited freedom of movement.

These people often operate the accelerator and brake with one hand and steer with the other. A knob is built onto the steering wheel to allow steering without moving the hand around the wheel. The other elements for operating the indicators, windscreen wipers etc must be close to this. The operating unit for this can be installed on the steering wheel or on a hand accelerator/brake system.

## Safety Notice

Installation may only be carried out by a trained specialist.

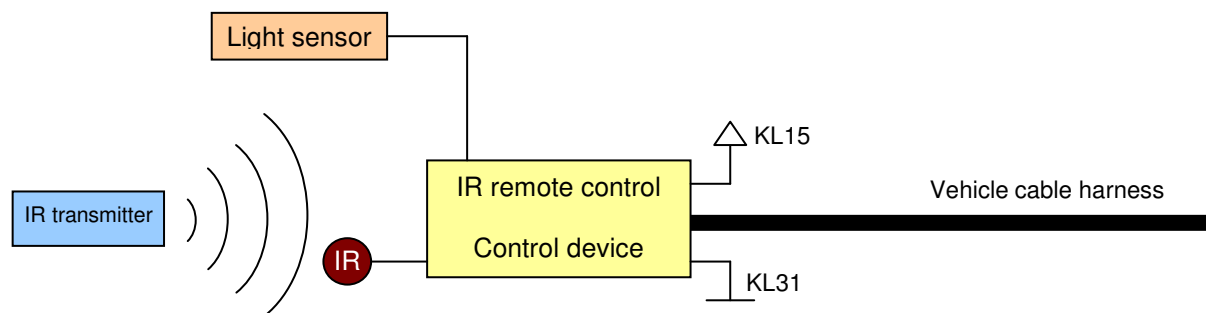
***The electronics may only be opened by persons authorised to do so, otherwise the guarantee becomes invalid.***

The battery remains in place so that the functions can be tested during installation. Attention must therefore be paid to adherence to the relevant safety provisions.

When drilling holes, it is important to ensure that no vehicle components (battery, cables, fuse box) are damaged. Attention should be paid to safe, protected cabling.

The wiring diagram included in the Appendix has been compiled based on the original circuit diagrams provided to handicap mobil GmbH by the various vehicle manufacturers.

However, since the manufacturers do not automatically inform us of changes to the circuit diagrams, deviations between the wiring diagrams and the original conditions are possible.



**Figure 1: Block diagram of entire system**

First, when a button is pushed, this information is transmitted via infrared by the transmitter on the steering wheel to the IR receiver, which is connected to the control device itself. There, the signal is interpreted and allocated to the appropriate function. The control device switches on relevant relays, which bridge the original switch and relay contacts in the vehicle. This allows the vehicle to still be operated using its own operating elements.

## **Indicator reset**

Because the automatic indicator reset in the steering column switch cannot function when the indicators are operated by remote control, this function is taken on by remote control.

### **Indicator reset via acceleration sensor**

In order to minimise the need for cabling, the optional integrated acceleration sensor can also be used to reset the indicators. This attempts to deduce the steering movement from the lateral acceleration of the vehicle and thus to reset the indicator at the correct moment. To further improve the function of this sensor, a speedometer signal from the vehicle can also be connected. The device must be installed in a specific position to allow use of the acceleration sensor.

## **B. Installation**

### **Installing the electronics**

The electronics are positioned in a suitable place behind the dashboard or in the footwell. The connecting cables are laid according to the wiring diagrams (Appendix) and general circuit diagrams (Appendix), depending on the type of vehicle. The terminal block is a plug connection.

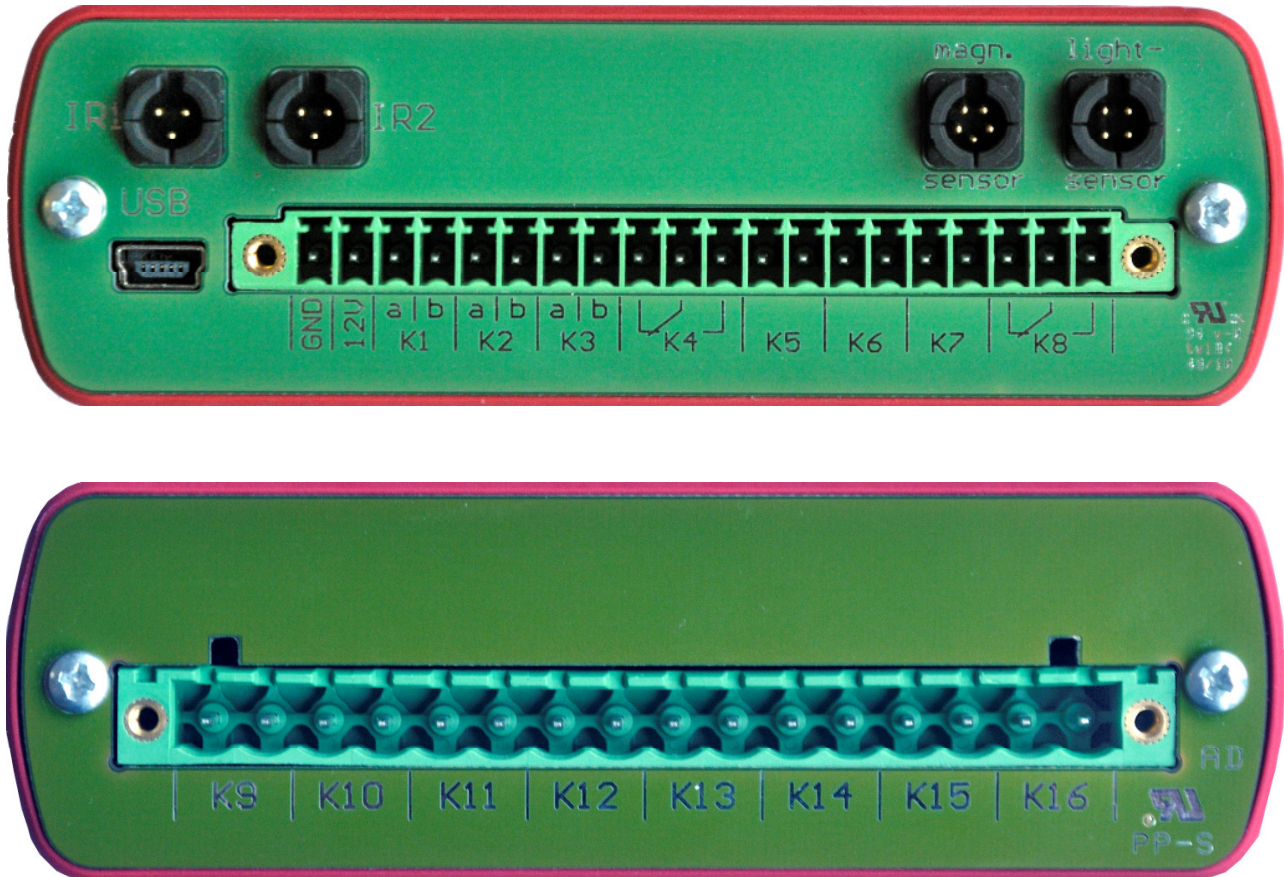
Pull the connection plug of the IF receiver component out of the electronics. Lay it on a solid surface during installation and insert the cable. Then plug into the electronics and lock. Attention should be paid to safe, protected cabling.

### **Electricity supply to the electronics**

The switch supplied is installed in the dashboard for switching the electronics on and off. The connections on the electronics side are made at 12 volts and on the vehicle side at terminal 15 (electricity after ignition + 1 Amp intermediate fuse).

## I. Terminal assignments

The device has two large terminal blocks and four additional round plug connectors.  
Assignment of terminal blocks:



### **GND:**

Connect to the vehicle mass.

### **12V:**

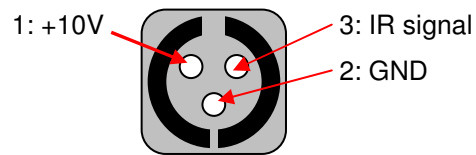
Connect to terminal 15.

All descriptions looking into the socket on the device.

### IR1 + IR2:

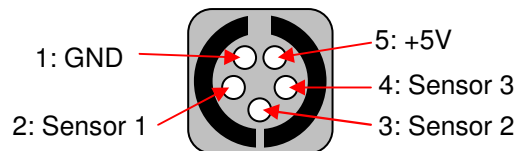
Connection for infrared receiver

Assignment:

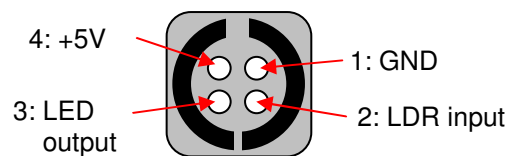


### Magnetic sensors:

Connection for the magnetic steering angle sensors



### Light sensor:



Terminal	Function	Remark
K1a	Windscreen washer	Output steering column switch
K1b	Windscreen washer	Output steering column switch
K2a	Windscreen washer	Engine -
K2b	Windscreen washer	Engine +
K3a	Windscreen washer	Supply to H bridge +
K3b	Windscreen washer	Supply to H bridge -
K4	Multi / rear washer pump / hazard light	Two-way contact
K5	Wipers level 2 / wipers slower	Closing contact
K6	Wipers level 1 / wipers faster	Closing contact
K7	Wipers intermittent	Closing contact
K8	Rear wipers / O button / hazard light	Two-way contact
K9	Horn	Closing contact
K10	Dipped beam headlights	Closing contact
K11	Full beam headlights	Closing contact
K12	Side light 1	Closing contact
K13	Side light 2	Closing contact
K14	Right indicator / hazard light	Closing contact
K15	Left indicator / hazard light	Closing contact
K16	Wipers return	Opening contact

## **II. Wiper activation**

Traditionally, most vehicles have 3 wiper levels: intermittent, level 1 and level 2. To activate level 1 and level 2, the contact is simply connected to K5 or K6.

Intermittent operation is traditionally activated via a wiper relay, which causes the wipers to move across around once every five seconds. To do this, a contact is made briefly and broken again immediately. The wiper then completes the wiping movement and returns to its rest position independently.

This is ensured by contact K16 (wiper return). This contact is always closed apart from when the wipers are operating at level 1 or 2. Then it is open because the engine is being supplied with electricity in these two wiper levels anyway and there is therefore no problem with returning to the rest position.

### **a. Processor-controlled intermittent wiper action**

In some vehicles, operating the wipers intermittently using a simple closed K7 (interval) contact is a problem. The electronics can carry out interval control in such cases.

Here, K7 is closed for one second every five seconds, thus triggering a single wiper action.

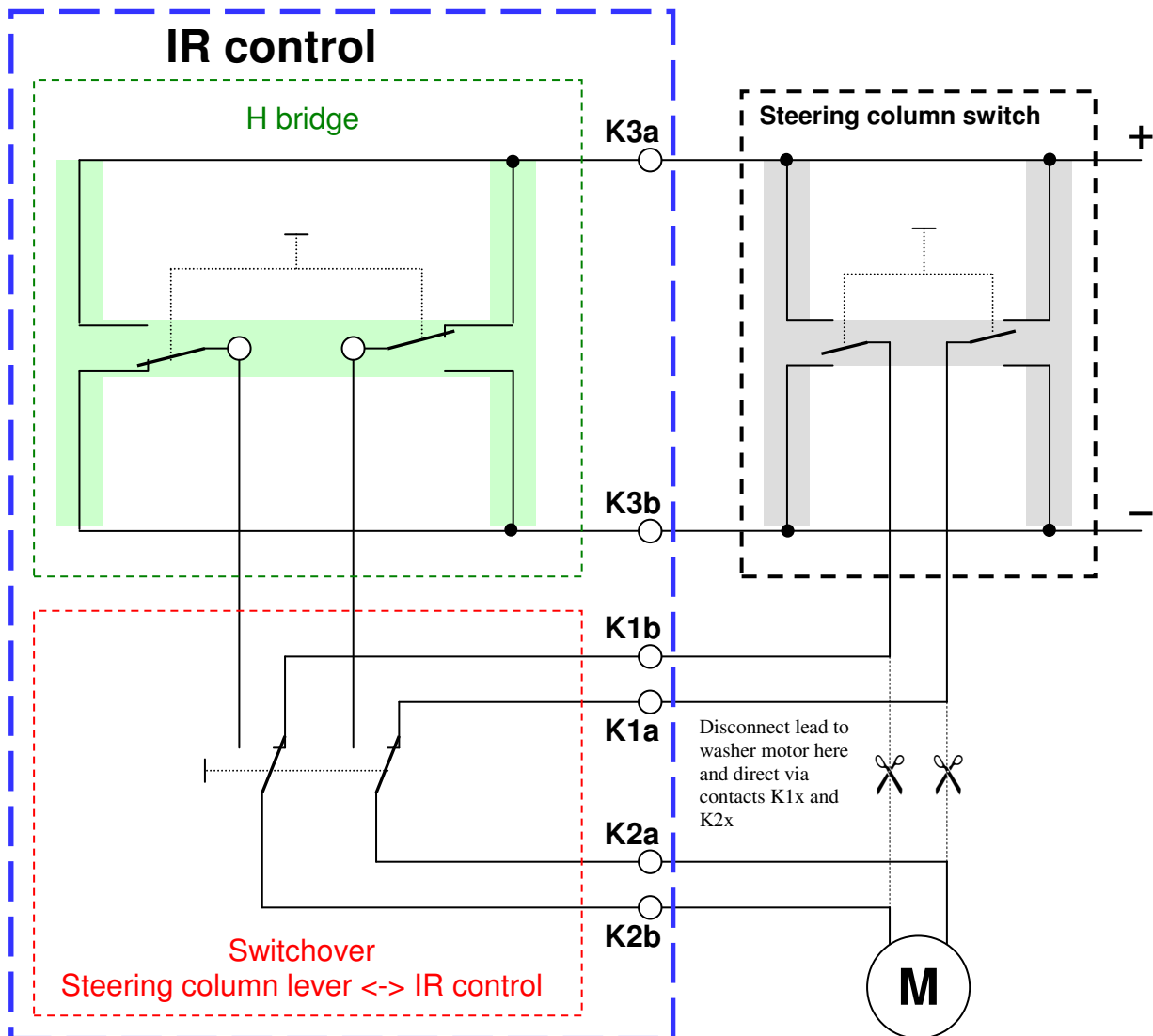
### **b. Switching the wiper function on and off using a button**

In some modern vehicles (e.g. Vauxhall/Opel), the wiper functions are no longer allocated to fixed contacts. Instead, there are only *faster* and *slower* buttons from an electrical point of view.

The device can only be configured so that K6 is closed briefly when switching the wiper function upwards, and K5 when switching downwards. The washer function remains unaffected by this.

### III. Connection variants for washer function

#### a. Vehicle has only one washer pump



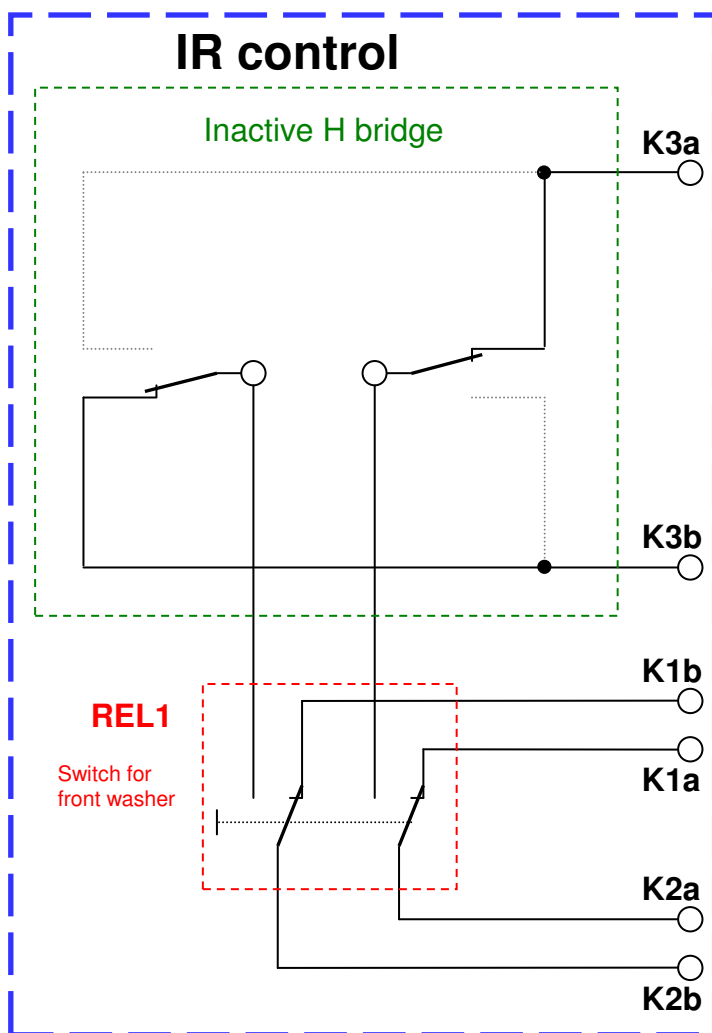
In vehicles with only one washer pump, the switchover between the front and rear washer functions is triggered by the pump running forwards in one case and backwards in the other. Valves in the washer fluid pipes allow the washer fluid to flow either towards the front windscreen or towards the back windscreen.

The steering column switch in the vehicle is therefore implemented as an H bridge. This allows the polarity of the washer pump to be reversed. Both switches in the steering column are operated in opposite directions.

To allow both washer functions to be operated via remote control, an H bridge is also integrated into the remote control, the supply voltage for which is diverted from the steering column switch (K3a, K3b).

In addition, the device contains two switching relays which deactivate the steering column switch and connect the washer pump to its own H bridge when the washer function is being operated by remote control. To do this, the two leads to the pump must be disconnected and looped through the device.

**b. Vehicle has two washer pumps**

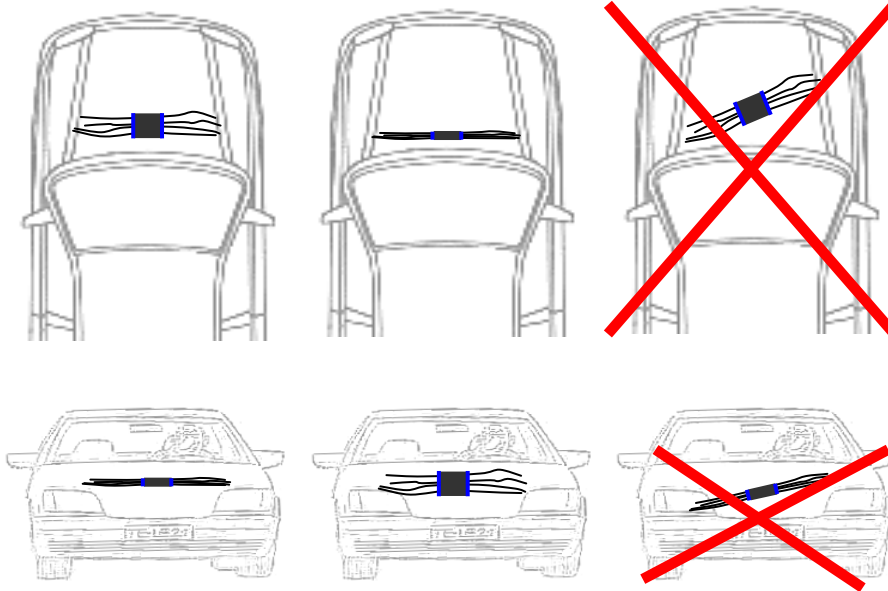


In vehicles with 2 washer pumps, the device must be reconfigured for 2 washer pumps using a data cable. The rear pump is then connected to the closing contact K4. One or both of the relay contacts from REL1 (e.g. between K3a and K2a) can be used to activate the front washer pump. The two contacts in the H bridge are fixed and never moved.

## IV. Indicator reset

### a. Installation position of the device when using the acceleration sensor

If the acceleration sensor is not used to reset the indicators, the installation position is irrelevant. If the acceleration sensor is used, the device must be installed so that the axis between the plugs is horizontal and the connectors point to the right or left. The device can be turned on this axis.



Swapping right and left affects the indicator reset. This can, however, be corrected with a software setting (see *Configuring the Software*).  
**Standard:**  
**12V connector on left!**

## V. Hazard lights

The hazard lights can be operated using the large button at the top or the O button, or by holding down an indicator button as desired.

How the hazard lights are switched on depends heavily on the type of vehicle. Multiple options for switching them on have therefore been created:

### 1. As a switching function

When the hazard lights are switched on, 1 (2) relay(s) close and remain closed until the hazard lights are switched off.

Drawback: Hazard lights switch off when the ignition is switched off.

### 2. As a key function

When the hazard lights are switched on, a contact is briefly closed, signalling to the vehicle electronics to switch on the hazard lights.

The hazard lights are switched off again when this contact is closed briefly again.

In addition, there are three options for connecting the hazard lights:

1. **Using the two indicator relays**

When the hazard lights are switched on, the two indicator contacts (K14 and K15) are closed simultaneously.

2. **Using K4**

If the vehicle has only one rear washer pump, connecting the hazard lights to K4 is recommended (key or sitching function). With this connection method, the O key can be used together with K8 for another function.

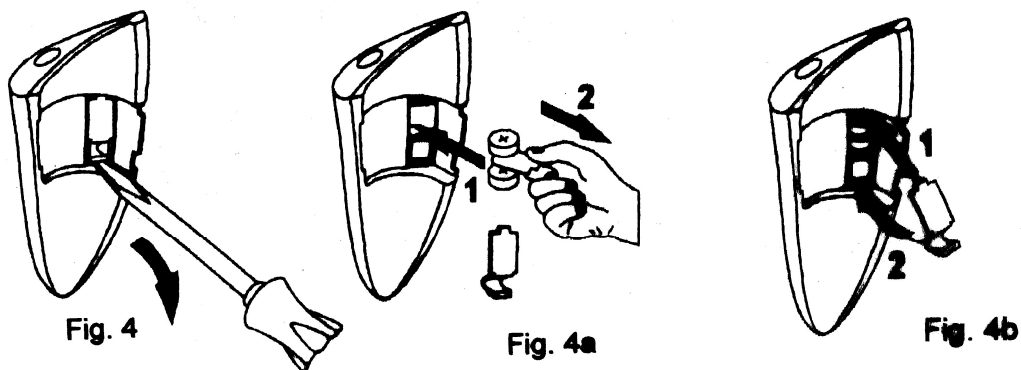
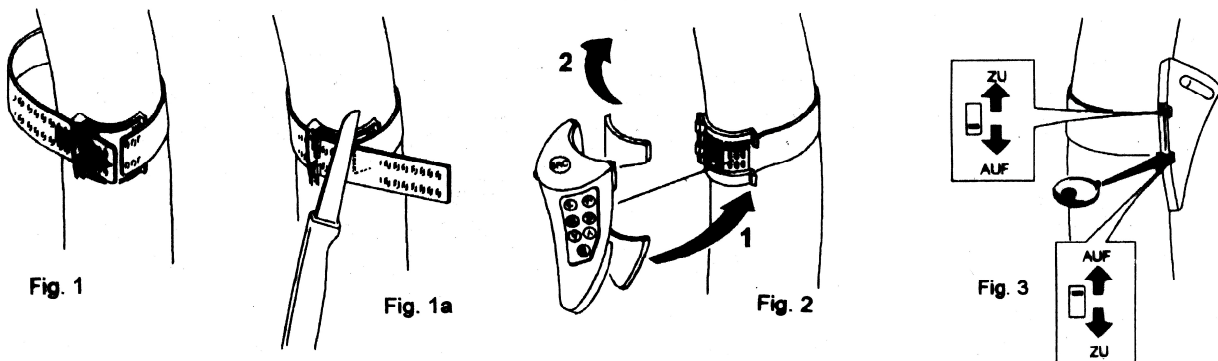
3. **Using K8**

When there is no rear wiper anyway, for example.

## VI. Installing the hand transmitter on the steering wheel

Dismount and remove the mounting plate using the tool supplied, a narrow screwdriver or a ballpoint pen (Fig. 3). Remove the cover on the battery compartment. **Remove battery insulation from between the batteries** (Fig. 4a). Close the battery compartment (Fig. 4b). Check the function of the transmitter before attaching it to the steering wheel.

When mounting the **hand transmitter** on the left of the steering wheel, have the indicator buttons swapped over by software configuration.



## Installation

Hold the operating unit on the steering wheel and define an installation position. Attach the mounting plate to the steering wheel using the strap. Pull the strap through the slit in the mounting plate (Fig. 1), pull tight and press into the retaining plug. Check that the strap is locked into the mounting plate!

The excess strap can then be cut off with a knife or similar, see Fig. 1a. (The ends of the strap should not overlap.) If necessary, depending on the diameter of the steering wheel, stick the balancing rubber to the inside of the operating unit. Use both rubbers if required, see Fig. 2 (Trial mounting is recommended).

Place the operating unit on the right, as in Fig. 2 (see arrow 1). Then hitch in and move across to the left (press towards back), see arrow 2. Press on hard and lock using the tool provided, a narrow screwdriver or a ballpoint pen (*closed*), Fig. 3. Avoid subsequent turning of the operating unit. Unlock again to replace the batteries (*open*), Fig. 3/4/4b.

## VII. Mounting the LENKOK

The holder for the LENKOK can be mounted on the steering wheel as the customer requires. It should be ensured that the adaptor does not block any switches or levers located on the steering wheel. The adaptor should be mounted so that the release button points towards the centre of the steering wheel. For people who use hand controls for the accelerator and brake, a good location in left-hand drive vehicles may be on the left-hand side of the steering wheel (approx. 8 o'clock). The following steps must be followed for mounting:

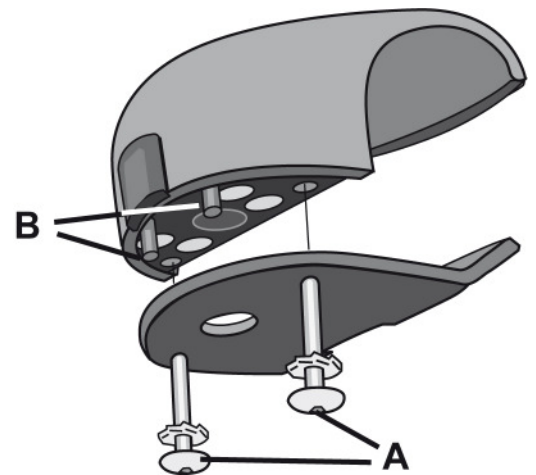
Remove the adaptor's retaining plate by undoing the two screws (A).

Check that the adaptor fits on the steering wheel.

If there are spaces, use the rubber to balance and adjust.

Adjust the two distancing screws (B) so that they counter the retaining plate.

Secure the retaining plate using the two screws (A) and the spring washers. Ensure that the screws are correctly screwed into the thread in the holes.



1. To attach the button, the release button must be pressed and the axis pushed in until it locks.
2. To remove the button, press the release button (on the side of the holder) while pulling the button out of the bracket.

## **IR receiver component (eye)**

The receiver component should be mounted so that there is a line of sight between the LENKOK and the receiver component, regardless of the position of the steering wheel.

Suggestion for mounting: At the top of the A column or on the top edge of the front windscreen near the *rear-view* mirror (if this option is chosen, take care of the sun shade).

## **C. Light sensor**

The response threshold of the light sensor can be set using a small adjusting screw on the side of the light sensor.

**Turn to the right:** Light only comes on when surroundings are dark.

**Turn to the left:** Light also comes on in light surroundings.

When setting, note that the light switches on very quickly, so that it is switched on immediately if the car is in the dark for a second.

Switching the light off automatically, however, takes up to a minute. This prevents the light from switching off under every streetlamp.

## **D. Configuring the software (optional)**

The IR electronics are supplied set for a specific vehicle. If, however, no plans are available or software modification is necessary as a result of changes to the vehicle electronics, the software can be reprogrammed via a USB cable and software provided by us.

## **E. Operation**

(see Operating Instructions)