

Video inserters

CI-HDV-NAC12 / CI-HDA-NAC12

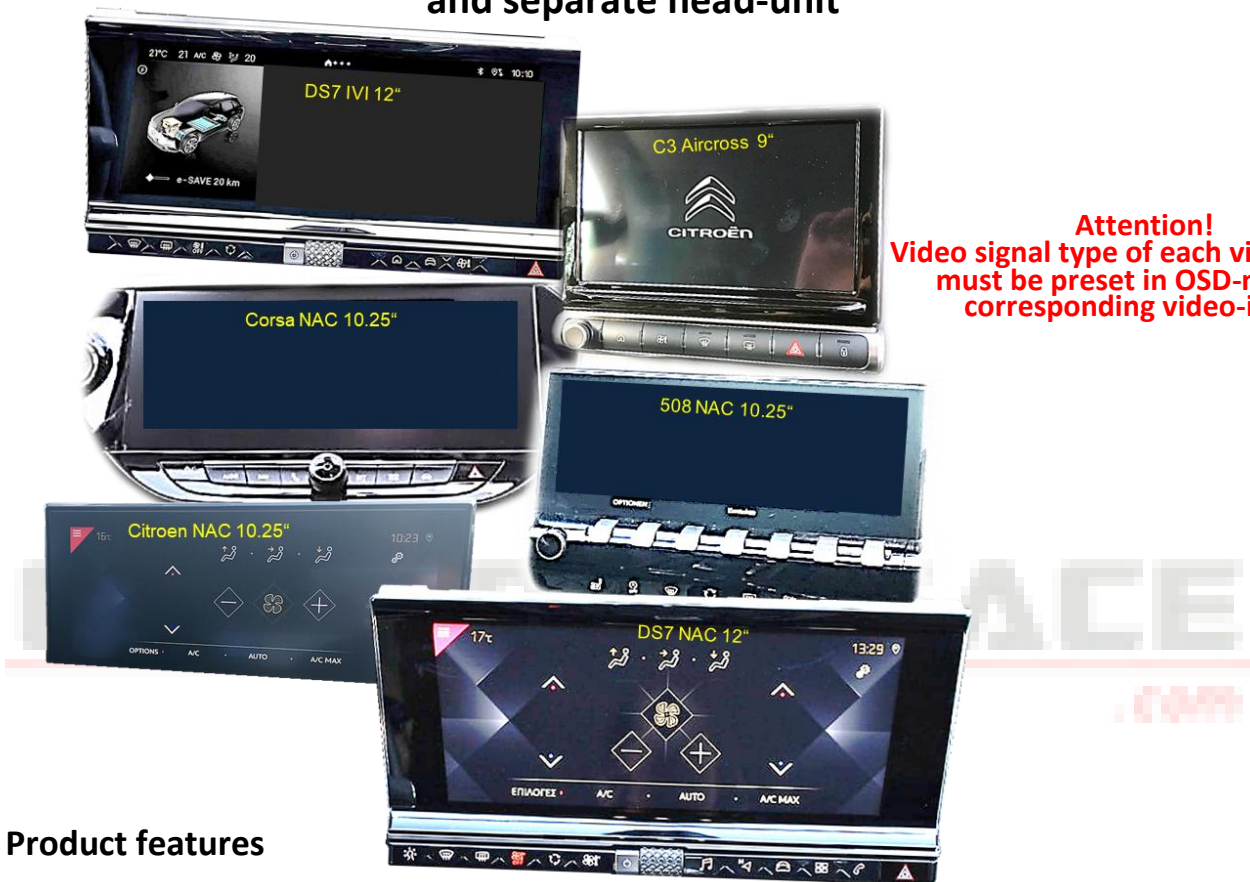
Compatible with

Alfa Romeo, Citroen, DS, Fiat, Jeep, Opel, Peugeot and Toyota vehicles

with NAC, RCC or IVI infotainment

with 7inch, 8inch, 9inch, 10.25inch or 12.3inch monitor

and separate head-unit



Attention!
Video signal type of each video source
must be preset in OSD-menu of
corresponding video-input.

Product features

- 1 x CVBS/AHD-input for rear-view camera
- 1 x CVBS/AHD-input for front camera
- 2 x CVBS/AHD-input for side-cameras or additional after-market video-sources (e.g., USB-AV-player, DVB-T2 tuner, etc.)
- All inputs NTSC and PAL compatible
Supported AHD resolutions 720p NTSC (30Hz), 720p PAL (25Hz), 960p NTSC (30Hz), 960p PAL (25Hz), 1080p NTSC (30Hz), 1080p PAL (25Hz)
- **HDV-NAC12 only:** 1 HDMI-input for HD rear-view camera or additional HDMI-sources (e.g., IOS/Android, laptop, streaming stick, DVD-Player, DVB-T2 Tuner, etc.)
Supported HDMI resolutions 720p NTSC (60Hz), 720p PAL (50Hz), 1080p NTSC (60Hz), 1080p PAL (50Hz)
- **HDV-NAC12 only:** Analogue audio output for HDMI source
- Automatic switching to rear-view camera input while reverse gear is engaged
- Automatic front camera switching after reverse gear for 5, 10, 15 or 20 seconds
- Adjustable guide lines (fixed or movable) can be activated for rear-view camera (movable guide lines not available for all vehicles)
- Activatable PDC graphic (not available for all vehicles)
- Picture free during the car ride (only for inserted video-sources)

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Legal Information

By law, watching moving pictures while driving is prohibited, the driver must not be distracted. We do not accept any liability for material damage or personal injury resulting, directly or indirectly, from installation or operation of this product. Apart from using this product in an unmoved vehicle, it should only be used to display fixed menus (for example the MP3 menu of USB devices) or (rear-view) cameras' video when the vehicle is moving.

Changes/updates of the vehicle's software can cause malfunctions of the interface. Up to one year after purchase we offer free software-updates for our interfaces. To receive a free update, the interface has to be sent in at own cost. Wages for de- and reinstallation or other expenditures involved with the software-updates will not be refunded.

1 Prior to installation

Read the manual prior to installation. Technical knowledge is necessary for installation. The video interface's place of installation must be free of moisture and away from heat sources.

Before the final installation in the vehicle, we recommend a test-run to ensure the compatibility of vehicle and interface. Due to changes in the production of the vehicle manufacturer there's always a possibility of incompatibility.

1.1 Delivery contents



Requirements

Brand	Compatible vehicles	Infotainments
Alfa Romeo	Junior (966) from 04/2020	Connect or Connect NAV - IVI Head-Unit from Harman with 10.25inch monitor and separate silver box head unit
Citroen	Berlingo3 (K9) from 09/2018 til 03/2024, C3 3.G from 01/2017 til 04/2024, C3 Aircross from 11/2017, C4 (N) from about 2017-05/2018, C4 Cactus II from 01/2018 til 09/2020, C4 Picasso from model year 2017, C4 X from 10/2022, Grand (C4) SpaceTourer from 06/2018, C5 Aircross from 12/2018, Dispatch from 2016, Jumpy III from 2016	NAC or RCC with 7inch or 8inch touch screen. Continental or Bosch head unit <i>For Continental High version an additional cable CAB-HSD-MF026 might be required!</i>
	Berlingo4 from 03/2024, C3 4.G from 04/2024, C3 Aircross 2.G from 06/2021 til 05/2024, C3 Aircross 3.G from 09/2023, C4 from 11/2020, C4 X from 10/2022, C5 Aircross from 10/2022, C5 X from 02/2022, DS3 Crossback from 12/2018, DS4 from 11/2021, DS7 Crossback from 03/2017 til 2022, DS9 from 11/2020 til 2022, SpaceTourer facelift from 2024	IVI Mid, IVI High, NAC Low, NAC High or DS Connect Radio/Nav from Bosch, Continental or Harmann with 9inch, 10.25inch or 12.3inch touch screen and separate silver box head unit NOT compatible with PSA AIO Radio/Nav from Bosch with 10.25inch all-in-one head unit! <i>For Continental High version an additional cable CAB-HSD-MF026 might be required!</i>
Fiat	Doblo3 (K9) from 06/2022, Scudo3 from 2021, Ulysse3 from 03/2022	RCC (Bosch) with 7inch monitor
	Doblo3 facelift from model year 2024, Scudo3 facelift from model year 2024	IVI Mid, IVI High, NAC Low, NAC High or DS Connect Radio/Nav from Bosch, Continental or Harmann with 9inch, 10.25inch or 12.3inch touch screen and separate silver box head unit. NOT compatible with PSA AIO Radio/Nav from Bosch with 10.25inch all-in-one head unit! <i>For Continental High version an additional cable CAB-HSD-MF026 might be required!</i>
	600e from 09/2023, 600 from 01/2024	Uconnect Infotainmentsystem - IVI High, IVI Mid2 - with 10.25inch ultrawide touch monitor and separate silver box head unit <i>No CAN-bus support. External 12V analogue S-contact/ACC and R-gear signal required.</i>

Brand	Compatible vehicles	Infotainments
Jeep	Avenger from model year 2023	Uconnect Infotainmentsystem - IVI - with 10.25inch ultrawide touch monitor and separate silver box head unit <i>No CAN-bus support. External 12V analogue S-contact/ACC and R-gear signal required.</i>
Opel	Combo E from 11/2018 til 11/2023, Corsa F from 07/2019, Crossland X from model year 2017, Grandland X from model year 2017, Mokka B from 09/2020, Vivaro C from 03/2019, Zafira Life from 03/2019	Navi 5.0 IntelliLink 8inch (NAC low Continental), Multimedia Radio 7inch (RCC Bosch), Multimedia Navi Pro 7inch and Multimedia 8inch
	Astra L from 05/2022 Combo E from 11/2023, Corsa F from 07/2019, Grandland from 06/2021, Mokka B from 09/2020, Vivaro C from 09/2023	Connect Nav Pack, Infotainmentsystem High, Multimedia Navi Pro - IVI, NAC, RCC - with 10.25inch ultrawide touch monitor and separate silver-box head unit NOT compatible with PSA AIO Radio/Nav from Bosch with 10.25inch all-in-one head units! <i>For Continental High version an additional cable CAB-HSD-MF026 might be required!</i>
Peugeot	208 from 02/2017 til 03/2019, 208 II from 06/2019, 2008 from 02/2017 til 06/2019, 2008 II from 11/2019, 308 II from 07/2017 til 06/2021, 3008 II from 10/2016 til 03/2024, 508 from 02/2017 til 08/2018, 508 II from 10/2018, 5008 II from 02/2017, Expert III from 03/2016, Partner III from 03/2016, Rifter from 09/2018 til 03/2024, Traveller from 09/2016 til 04/2024	NAC or RCC with 7inch or 8inch touch screen. Continental or Bosch head unit <i>For Continental High version an additional cable CAB-HSD-MF026 might be required!</i>
	208 II from 06/2019, 2008 II from 11/2019 til about 04/2023 (NAC), 308 III from 09/2021, 3008 II from 05/2021 til 03/2024, 3008 III from 04/2024, 408 III from 11/2022, 508 II from 10/2018, 5008 II from 10/2020, Rifter from 03/2024, Traveller from 04/2024	IVI Mid, IVI High, NAC Low, NAC High or RCC from Bosch, Continental or Harmann with 10.25inch or 12.3inch touch screen and separate silver box head unit NOT compatible with PSA AIO Radio/Nav from Bosch with 10.25inch all-in-one head unit! <i>For Continental High version an additional cable CAB-HSD-MF026 might be required!</i>

Brand	Compatible vehicles	Infotainments
Toyota	ProAce II from 09/2016 til MY 2023 ProAce City from 04/2020 til MY 2023 ProAce Verso from 09/2016 til MY 2023	RCC (Bosch) with 7inch monitor
	ProAce II from model year 2024, ProAce City from model year 2024, ProAce Verso from model year 2024	IVI Mid, IVI High Radio/Nav from Bosch or Harmann with 10.25inch touch screen and separate silver box head unit NOT compatible with PSA AIO Radio/Nav from Bosch with 10.25inch all-in-one head unit!

Limitations

CAN-bus compatibility

CAN-bus compatibility of interface may to some vehicles have no or limited compatibility. This can show on installation as well as later. Interface and all its video-inputs can be operated with analogue trigger signals, without connection to vehicle CAN-bus. Yet, in this case, some features do not work, see chapter 2.4.2 *Analogue connection without CAN-bus*.

Video only

Interface inserts **only video-signals** into the infotainment. To insert audio signals a possibly existing factory audio-AUX-input or other optional products (e.g. FM-Modulator) must be used. For HDMI source, the audio is output via an analogue audio output (3.5mm jack socket).

Factory rear-view camera

Automatic switching to factory rear-view camera input is only possible while reverse gear is engaged. For deviating switching times optional accessories are required.

After market front camera

Front camera will automatically be switched to for 5, 10, 15 or 20 seconds (depending on menu setting) after disengaging the reverse gear. Manual switching to front camera is possible by external keypad.

Guide lines and PDC

It is possible that the vehicle CAN-bus is not fully compatible to the interface or the interface is connected analogue. In these cases, moving guide lines for rear-view camera and optical PDC display will not be supported.

NAC high-version

If the female double HSD connector of the vehicle harness cannot be separated in two female single HSD connectors, the optionally available cable CAB-HSD-MF026 is required.

1.3 Limitations

1.4 Warnings

Damage to head-unit or interface can occur, if interface is installed to older SMEG or SMEG+ head-units (by Magneti Marelli).

Damage can also occur if the 4-pin HSD connectors are connected incorrectly.

Prior to installation the head-unit version must be identified. The very head-unit can differ in number and colours of the below pictures as there is sub-versions.

1.4.1 NAC Head-Unit Versions

NAC low version head-unit

(Single black male 4pin

HSD on backside)



OR

NAC high version head-unit

(Double black male 4pin

HSD on the backside)



RCC head-units (examples RCC A2 with DAB)



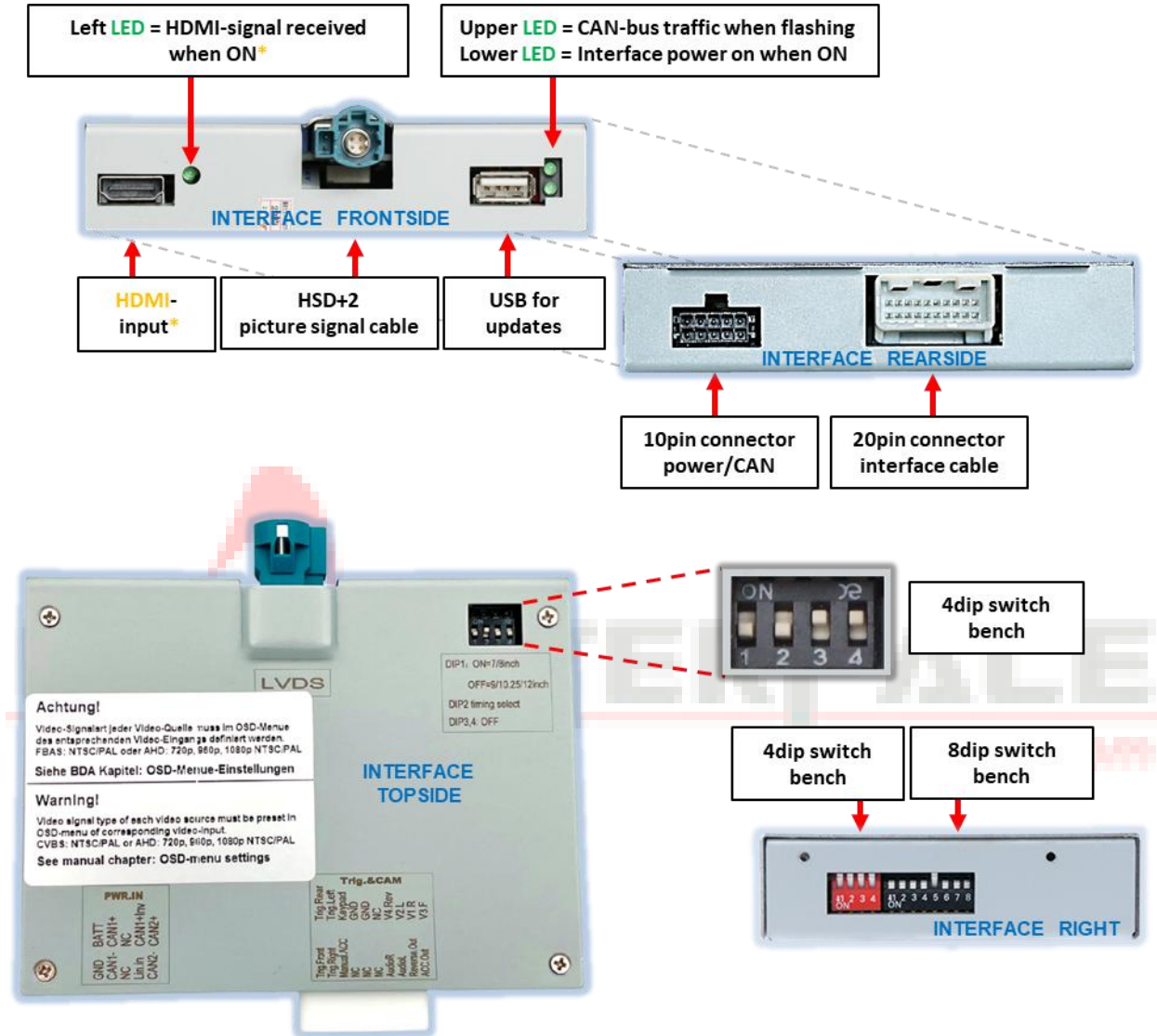
IVI head-units (examples High/Mid)



Please, carefully follow the corresponding parts of the manual for your identified head-unit!

1.5 Boxes and connectors - interface

The interface converts connected after-market sources' video-signals into a video-signal compatible with the factory monitor. It can then be inserted, using separate trigger options. The interface also reads the vehicle's CAN-bus signals and uses them for own functions.



* HDMI-input only available on HDV-NAC12

1.6 Settings - 8dip switch bench (interface functions)

Interface box, right side, black

Dip position **UP = OFF** and **DOWN = ON**.



Dip	Function	ON (down)	OFF (up)
1	Video 1 / V1-Left	enabled	disabled
2	Video 2 / V2-Right	enabled	disabled
3	Frontcamera / V3-Front	enabled*	disabled
4	Rear-view cam type (V4-Rear)	after-market	factory or none
5	Connection type of After-market rear-view camera*	HDMI*	V4-Reverse (FBAS/AHD)
6	HDMI input*	enabled	disabled
7	Brightness of the inserted video sources	test both settings*	
8	PDC	enabled	disabled

Power reset interface after each dip change to activate changes!

* The front camera will automatically be switched for 5, 10, 15 or 20 seconds after disengaging reverse gear (depending on OSD-menu setting).

* On **HDA-NAC12**, dip 5 and dip 6 have no function. Set both **OFF**.



* **The brightness setting of the inserted video sources should definitely be tested outdoors, as artificial light affects the brightness of the factory infotainment system!**

See following chapters for detailed information about 8dip switch bench.

1.6.1 Video inputs **V1-Left** and **V2-Right** (dip 1-2)

With dip 1 (dip 2) = **ON**, the CVBS/AHD input **V1-Left** (**V2-Right**) for side-camera or other video-sources is enabled. Only enabled video inputs can be accessed – no matter whether automatically or manually switched. We recommend to enable only used inputs to avoid unwanted switching.

1.6.2 Front camera input **V3-Front** (dip 3)

With dip 3 = **ON** the interface switches to its CVBS/AHD front camera input **V3-Front** after disengagement of reverse gear. Additionally, manual switching to front camera input is possible by the external keypad (short press) from any video mode.

In the OSD-menu settings it is possible to set the automatic front camera display time from 5, 10; 15 or 20 seconds or shut it off. Therefore, it is also possible to connect a video-source other than from camera.

1.6.3 Rear-view camera settings (dip 4)

With dip 4 = **OFF**, the interface switches to factory picture while reverse gear is engaged, to display factory rear-view camera or factory optical park system picture.

With dip 4 = **ON**, while the reverse gear is engaged the interface switches to its CVBS/AHD rear-view camera input **V4-Reverse** (provided that dip 5 is set to **OFF**) or to its **HDMI-input*** (provided dip 5 and dip 6 are set to **ON**).

Note: **V4-Reverse** remains without function with HDMI rear-view camera (dip 5 = **ON**).

1.6.4 Rear-view cam connection type (dip 5)

With dip 5 = **ON**, the **HDMI-input*** will be used as rear-view camera input. Additionally, the **HDMI-input*** must be enabled with dip 6 = **ON**.

With dip 5 = **OFF**, the **V4-Reverse** input is used as rear-view camera input.

Note: Automatic switching to front camera for the pre-set time, after disengaging reverse, is working in both cases.

1.6.5 HDMI-input* (dip 6)

With dip 6 = **ON**, the **HDMI-input*** is enabled and can be used for various HDMI-sources (e.g., rear-view camera or 360° camera-system, smartphone, laptop, streaming stick, DVB-T2 tuner, etc.). For rear-view camera or 360° camera system, additionally set dip 5 = **ON**.

With dip 6 = **OFF**, the **HDMI-input*** is disabled.

1.6.6 Brightness of the inserted video sources (dip 7)

Dip 7 can be used to adjust the brightness of the video sources fed into the system. To find the best picture quality, test the **ON** and **OFF** settings.



Note: The brightness setting of the inserted video sources should definitely be tested outdoors, as artificial light affects the brightness of the factory infotainment system!

1.6.7 PDC Graphic (dip 8)

With dip 8 = **ON**, the interface PDC-graphic will be enabled and shown picture-in-picture in combination with the rear-view camera image.

With dip 8 = **OFF**, the rear-view camera image is shown full-screen, without PDC-graphic.

Note: On vehicles, where the PDC-graphic due to lack of CAN-bus compatibility cannot be used or is subject to post installation problems, the function cannot be used. In this case set dip 8 = **OFF**.

* **HDMI-input only available on HDV-NAC12**

Power reset interface after each dip change to activate changes!



Interface box, top side, black
(monitor definition)

1.7 Settings - 4dip switch bench



Monitor sizes	Dip 1	Dip 2	Dip 3	Dip 4
10.25inch, 8inch	ON	OFF	OFF*	OFF
7inch, 8inch with alternative timing	ON	ON	OFF*	OFF
9inch, 10.25inch, 12.3inch	OFF	OFF	OFF*	OFF
9inch, 10.25inch, 12.3inch with alternative timing	OFF	ON	OFF*	OFF

Attention:
Opposite
to other
dip
benches
(8dip and
4dip), the

2dip position

here is **UP = ON** and **DOWN = OFF!**

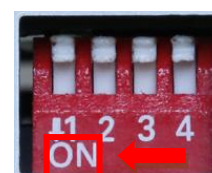
Interface box, right side, red

If picture- or touch problems appear, try also the other dipswitch settings!

*Bei Problemen mit Startup/Schwarzbild Dip3 auf ON stellen

Power reset interface after each dip change to activate changes!

1.8 Settings - 4dip switch bench (monitor and CAN-bus)



Set dips according to below table.

Dip position UP = OFF and DOWN = ON.

Monitor sizes	Dip 1	Dip 2	Dip 3	Dip 4
10.25inch, 12.3inch	OFF	OFF	OFF	OFF
9inch	OFF	ON	OFF	OFF
8inch	ON	OFF	OFF	OFF
7inch	ON	ON	OFF	OFF

If picture- or touch problems appear, try also the other dipswitch settings!

Power reset interface after each dip change to activate changes!



2 Installation

For installation, first switch off the ignition and disconnect the vehicle's battery following the instructions of the vehicle manufacturer regarding battery disconnection! If disconnecting battery is not suggested, enable vehicle sleep-mode (hibernation mode).

In case the sleep-mode does not succeed, the disconnection of battery can be done with a resistor lead.

Before final installation, a test-run of interface and all connected devices is recommended to ensure compatibility of the complete installation. Due to at any time possible changes in the vehicle manufacturers' productions, incompatibilities can never be ruled out.

As on any installation of retrofit equipment, a stand-by test is necessary after installation to ensure that the retrofit products switch off after the vehicle enters sleep mode.

2.1 Place of connection

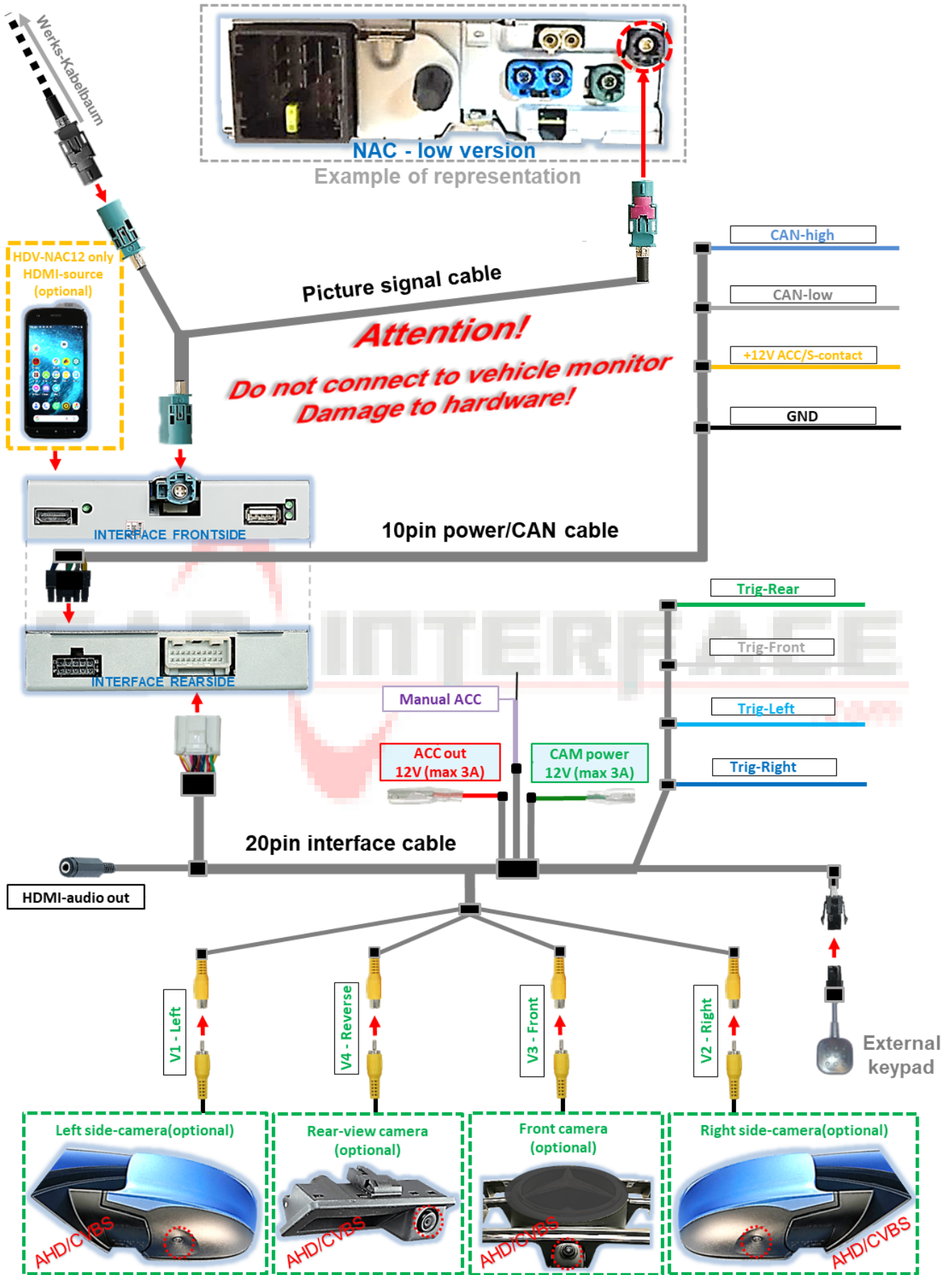
The video-interface has to be connected to rear side of head-unit. Depending on the vehicle manufacturer and model, the installation location of the head unit in the vehicle varies.

Attention!
Do not connect to vehicle monitor
damage to hardware!

Examples:

- Alfa Romeo Junior – centrally behind the factory monitor and the air vents





2.2 Connection schema

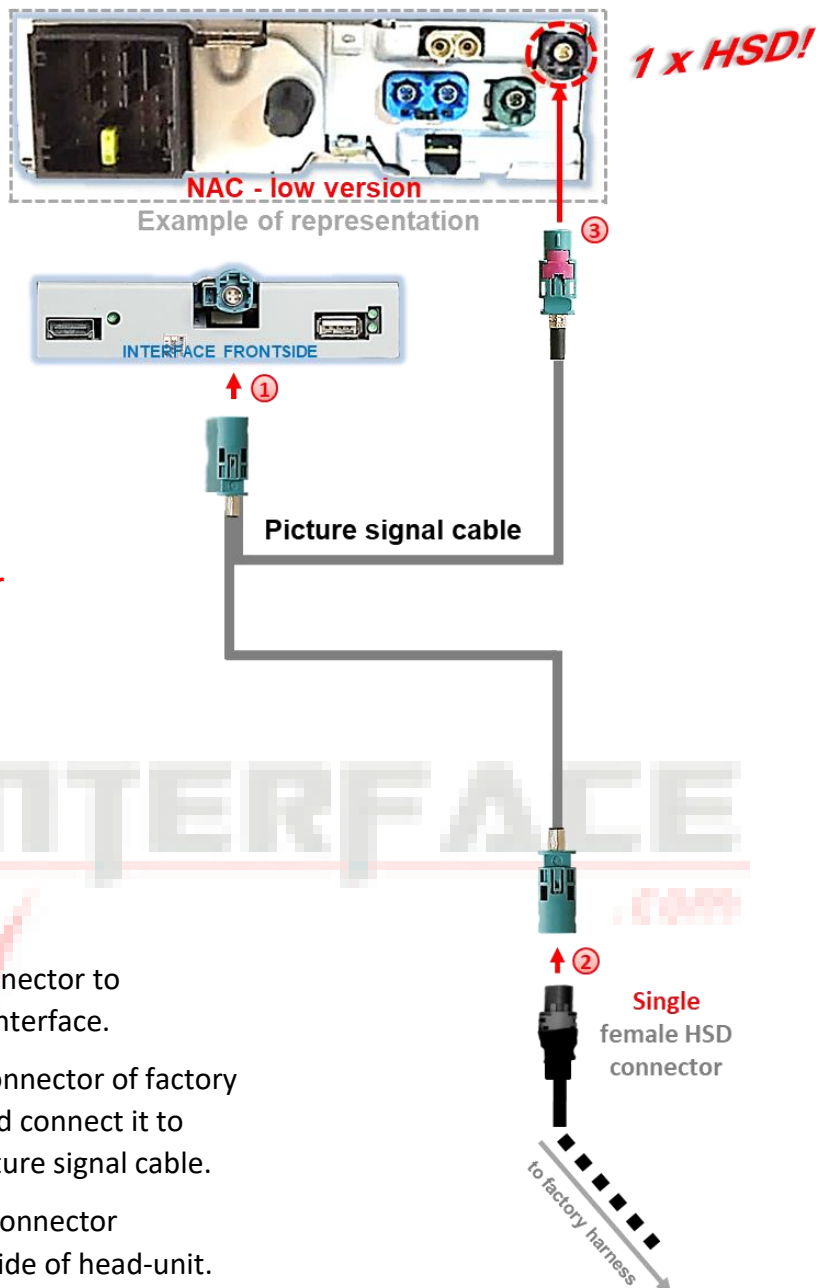
Version 16.03.2026

from SW: GD4.7/GW256_2.1/OSD4.2/RC

CI-HDV-NAC12 / CI-HDA-NAC12

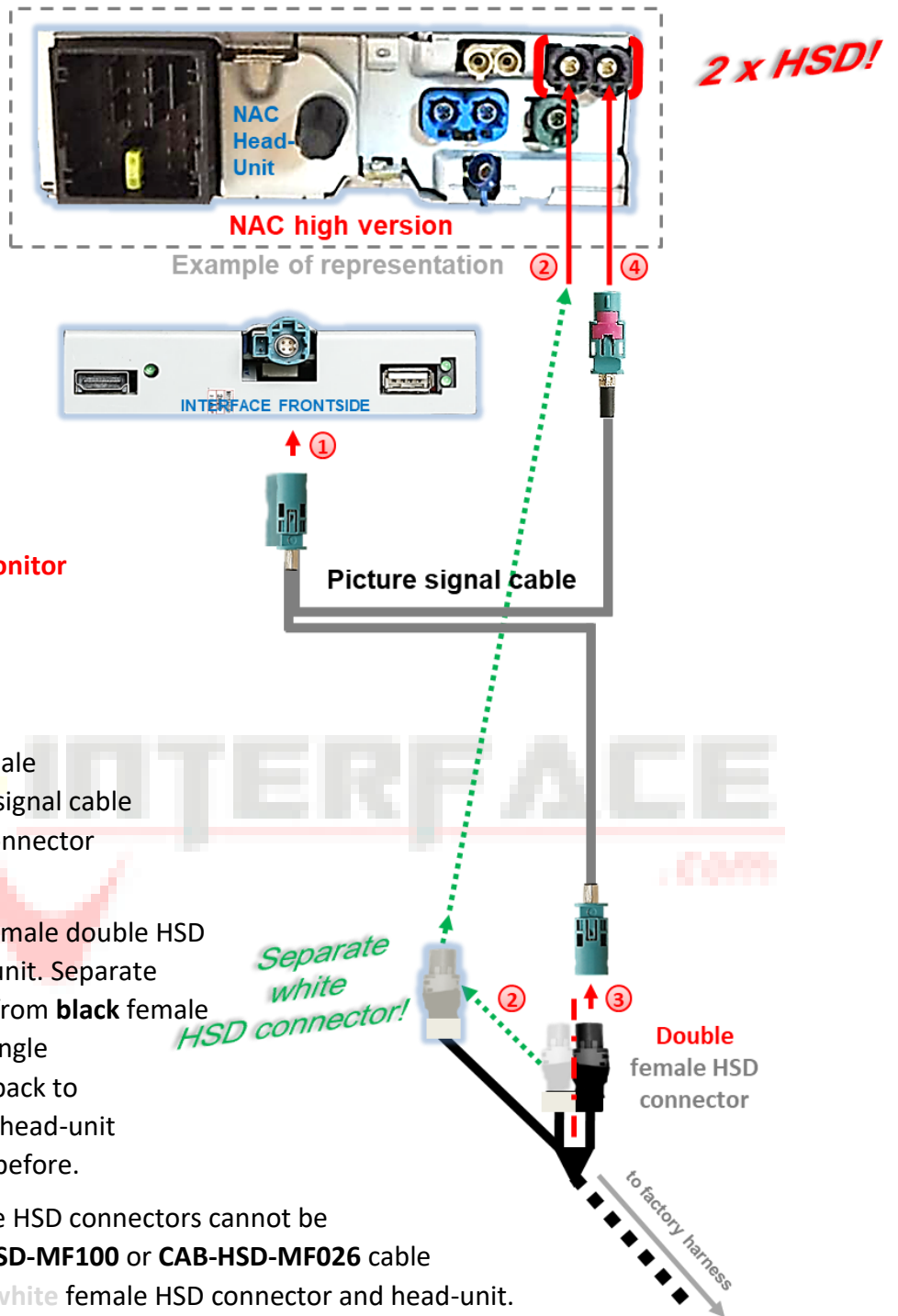
2.3 Connection - picture signal cable

2.3.1 NAC low version head-unit (HSD)



2.3.2 NAC high version (double HSD)

Remove the head-unit and disconnect white/black female double HSD connector from rear side.



- ① Connect single **waterblue** female HSD connector of the picture signal cable to the **waterblue** male HSD connector of the interface.
- ② Disconnect vehicle harness' female double HSD connector from rear of head-unit. Separate **white** female HSD connector from **black** female HSD connector and connect single **white** female HSD connector back to same male HSD connector, of head-unit where it has been connected before.

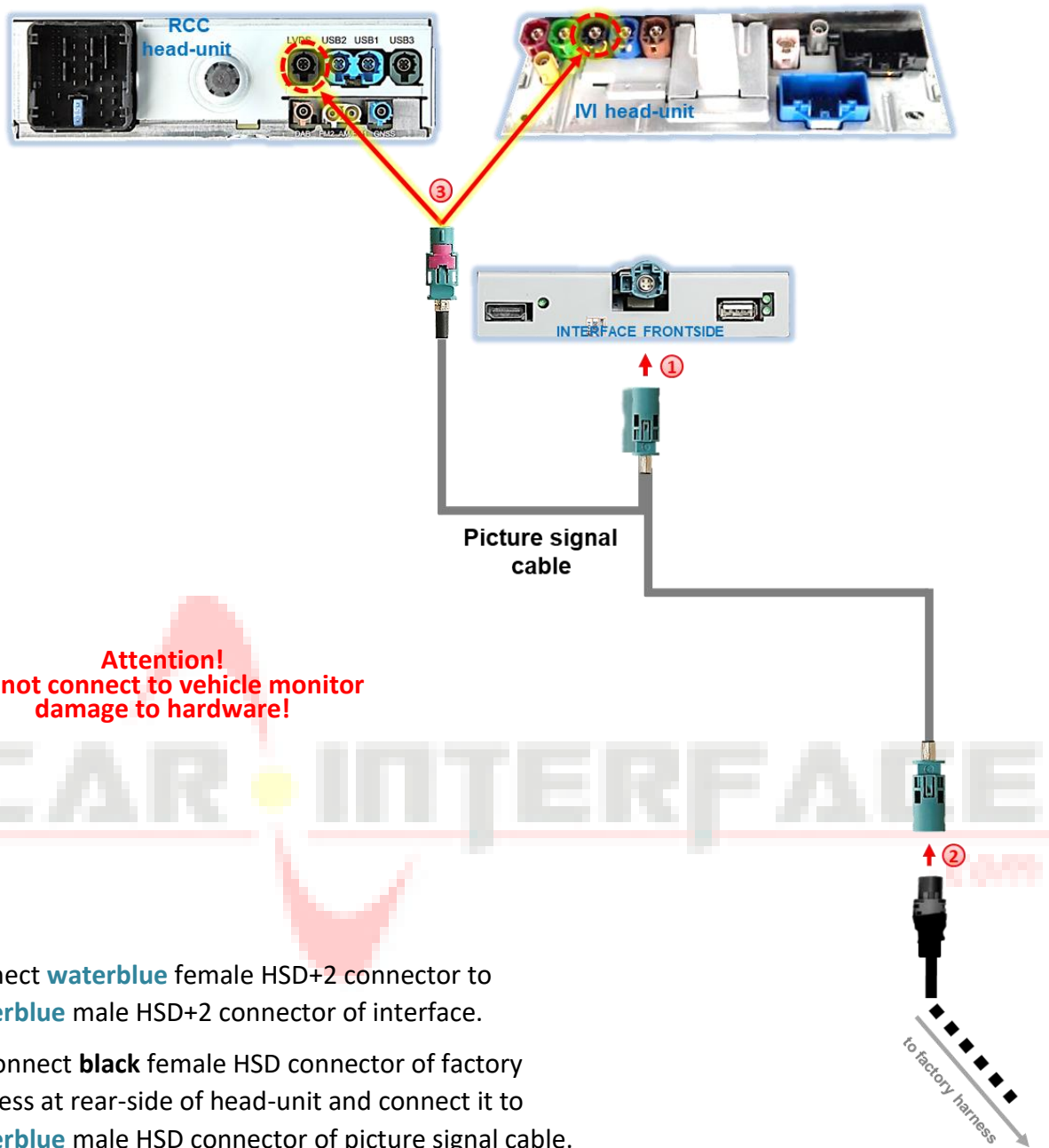
Special case: If the two female HSD connectors cannot be separated, an optional **CAB-HSD-MF100** or **CAB-HSD-MF026** cable must be connected between **white** female HSD connector and head-unit.

- ③ Connect female **black** single HSD connector to **waterblue** male HSD connector of picture signal cable.
- ④ Connect **waterblue** female HSD connector of picture signal cable to the black male HSD connector where the **black** female HSD connector of double female HSD connector of vehicle harness has been previously connected.



Attention: Above schema might show the double female HSD connector reversed. Make sure that the **white** female HSD connector is reconnected to the same position of the head-unit, where it has been connected before!

2.3.3 IVI und RCC versions



- 1 Connect **waterblue** female HSD+2 connector to **waterblue** male HSD+2 connector of interface.
- 2 Disconnect **black** female HSD connector of factory harness at rear-side of head-unit and connect it to **waterblue** male HSD connector of picture signal cable.
- 3 Connect **waterblue** female HSD connector to **black** male HSD connector at rear-side of head-unit.

2.4 Connection – harnesses, power supply and CAN-bus or analogue without CAN-bus

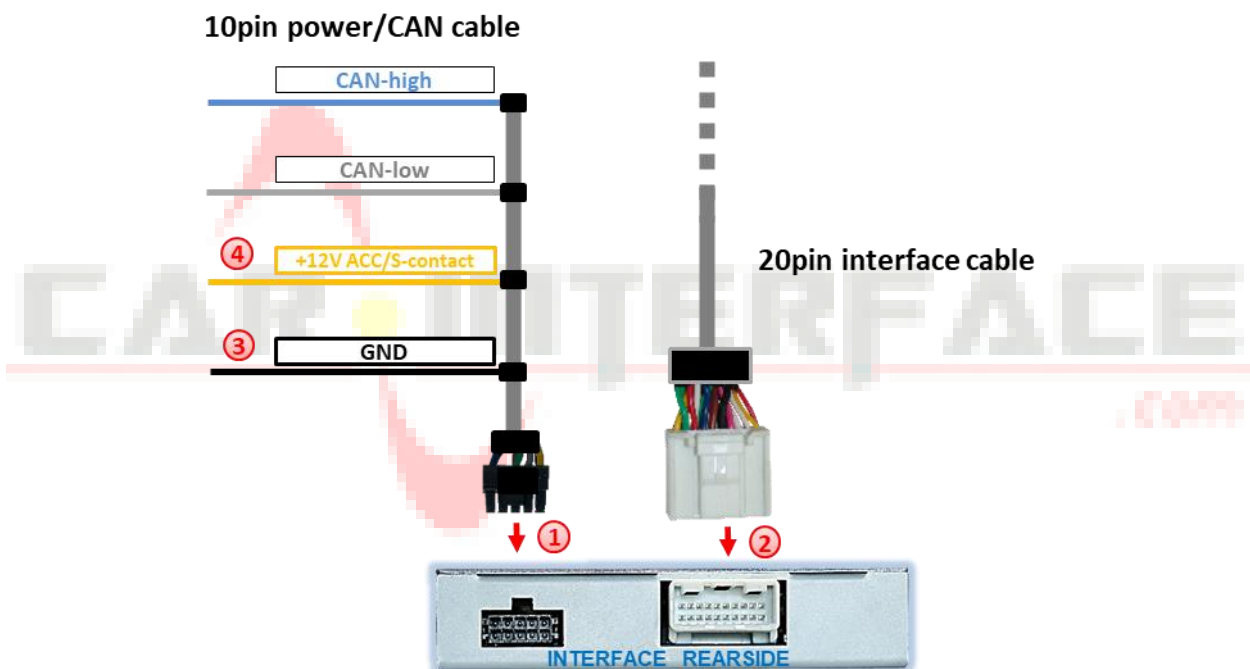
The interface can be integrated via CAN-bus as well as operated in analogue mode without CAN-bus connection.

When integrated via CAN-bus, the interface is switched on by the vehicle CAN-bus and R-gear signal and turn signals are usually recognized. In some vehicles also driving-path lines and optical PDC can be displayed, using CAN-bus steering signals and parking sensor data.

Exceptionally, the CAN-communication is not (fully) compatible. If after connection of **10pin power/CAN cable** with ignition on, no interface LED is on, the analogue connection described hereinafter must be made. Also, to avoid possible afterwards CAN-bus incompatibility, an analogue connection is also possible. Thereby the interface must be switched on as well as switched over to its inputs by +12V switch inputs.

With analogue connection, movable guide lines and PDC cannot be displayed.

No matter whether connection is done with CAN-bus or analogue without CAN-bus, **black GND wire** and **yellow +12V ACC/S-contact wire** of 10pin power/CAN cable must be connected.

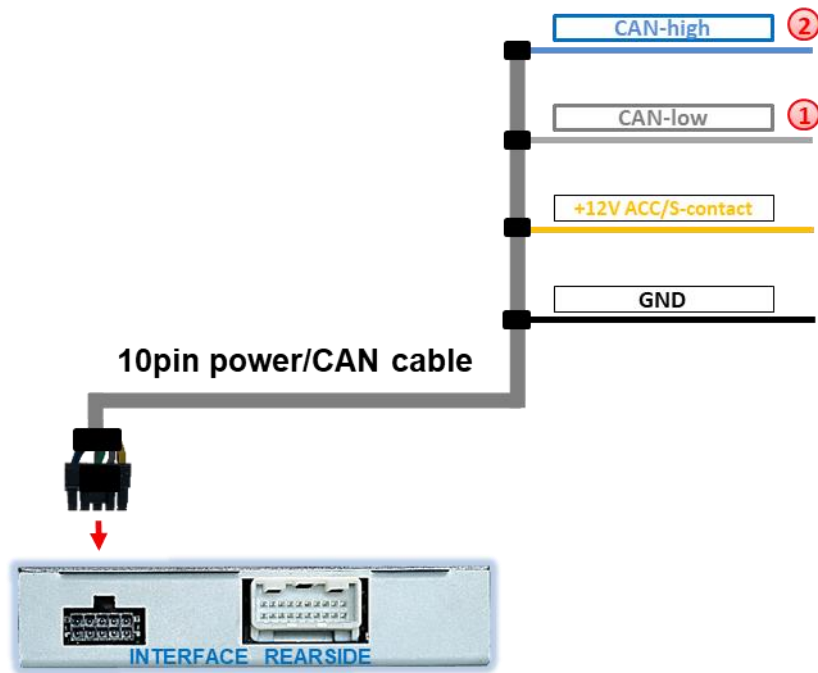


- ① Connect female 10pin connector of **10pin power/CAN cable** to male 10pin connector of interface.
- ② Connect female 20pin connector of **20pin interface cable** to male 20pin connector of interface.
- ③ Connect **black GND wire** of 10pin power/CAN cable to stable vehicle's negative ground.
- ④ Connect **yellow +12V ACC/S-contact wire** of 10pin power/CAN cable to **+12V ACC (terminal 15r) or S-contact (terminal 86s)** of vehicle.



Note: It is technically also possible to connect the interface to the +12V battery (terminal 30). However, in the event of a (partial) CAN bus incompatibility or a defect, it cannot be ruled out that the interface does not switch off in sleep mode. A connection to +12V battery (terminal 30) is at your own risk!

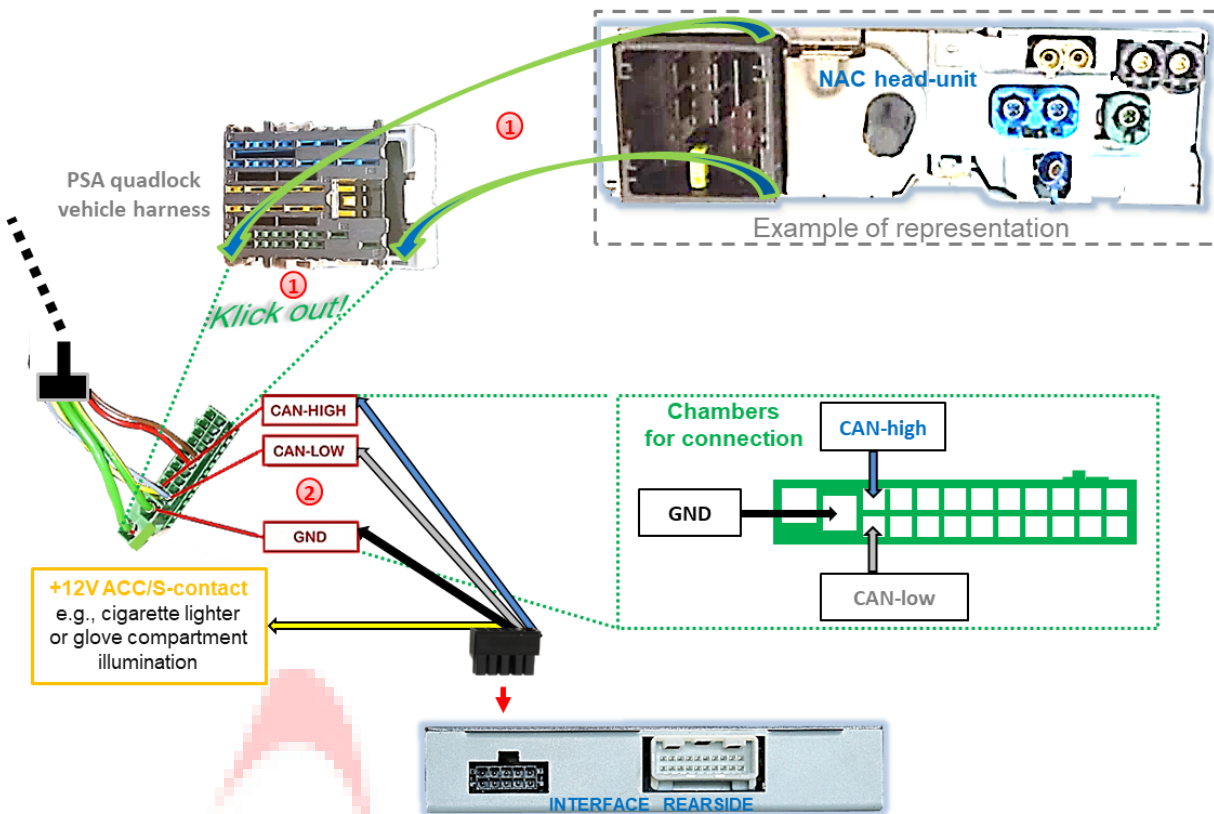
2.4.1 Connection with CAN-bus



- 1 Connect grey wire of 10pin power/CAN cable to vehicle's CAN-low (see following chapters for place of connection).
- 2 Connect blue wire of 10pin power/CAN cable to vehicle's CAN-high. (see following chapters for place of connection).

Attention!
In exceptional cases, CAN communication is not (fully) compatible. If no interface LED lights up after connecting the 10-pin power/CAN cable set when the ignition is switched on, the analogue connection described below must be made.

2.4.1.1 Place of connection power/CAN - NAC and RCC head-unit



- 1 Disconnect female PSA Quadlock connector at rear-side of head-unit and click-out green female 22pin section.
- 2 Connect **blue CAN-high wire**, grey CAN-low wire and black GND wire of 10pin power/CAN cable to corresponding chambers of female 22pin section of factory harness.
- 3 Reconnect the green female 22-pin section into the female PSA Quadlock connector and plug the female PSA Quadlock connector back into the rear side of the head unit.

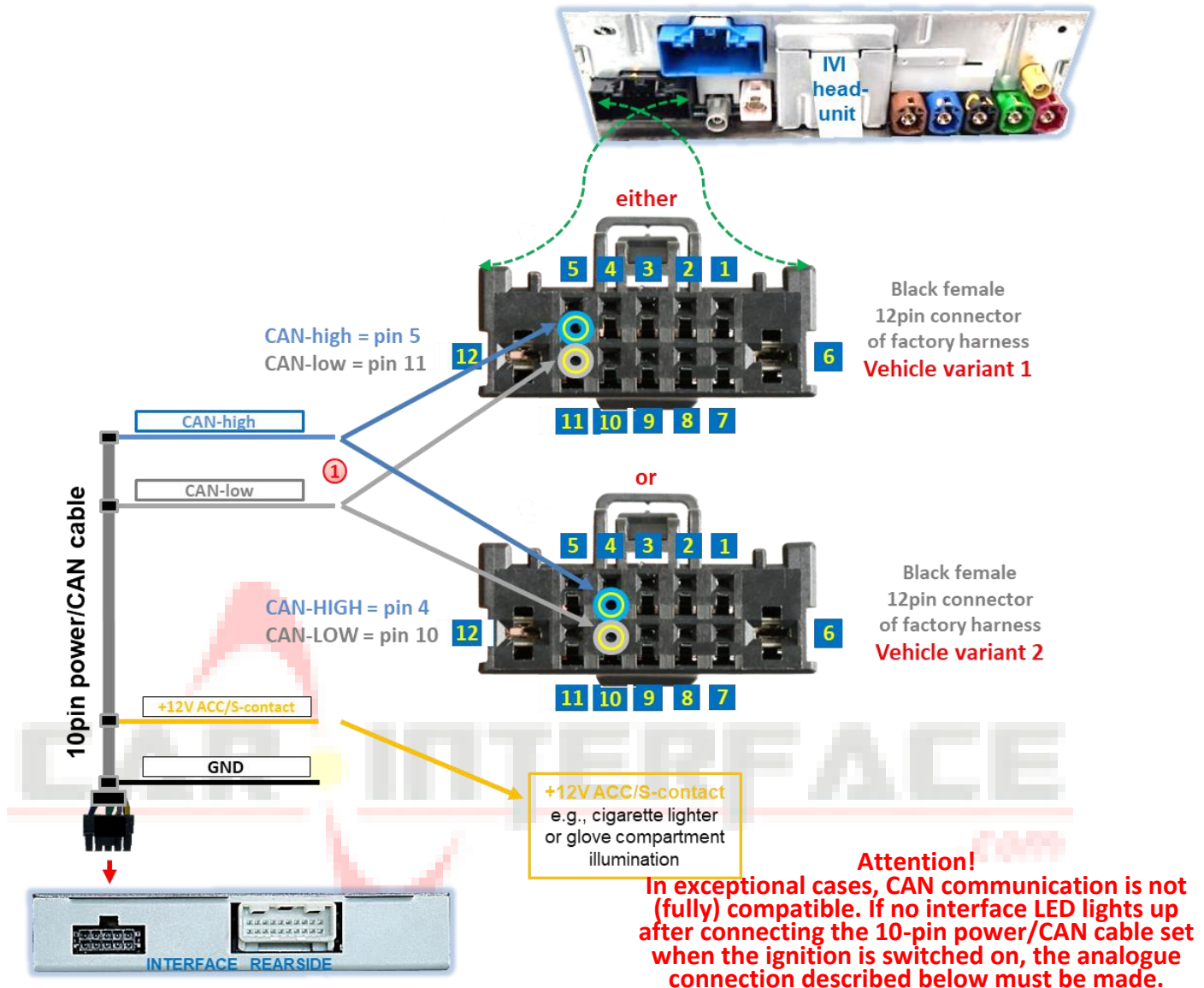


Attention: cable colors in vehicle may vary!

Note: It is technically also possible to connect the interface to the +12V battery (terminal 30). However, in the event of a (partial) CAN bus incompatibility or a defect, it cannot be ruled out that the interface does not switch off in sleep mode. A connection to +12V battery (terminal 30) is at your own risk!

Attention!
In exceptional cases, CAN communication is not (fully) compatible. If no interface LED lights up after connecting the 10-pin power/CAN cable set when the ignition is switched on, the analogue connection described below must be made.

2.4.1.2 Place of connection power/CAN - IVI head-unit



- 1 Connect **blue CAN-high wire** and **grey CAN-low wire** of 10pin power/CAN cable to corresponding chambers of black female 12pin connector of vehicle harness. There are two known vehicle pin definition variants displayed above.

Tip: If CAN-bus is on chambers 4 and 10, chambers 5 and 11 are usually not occupied.

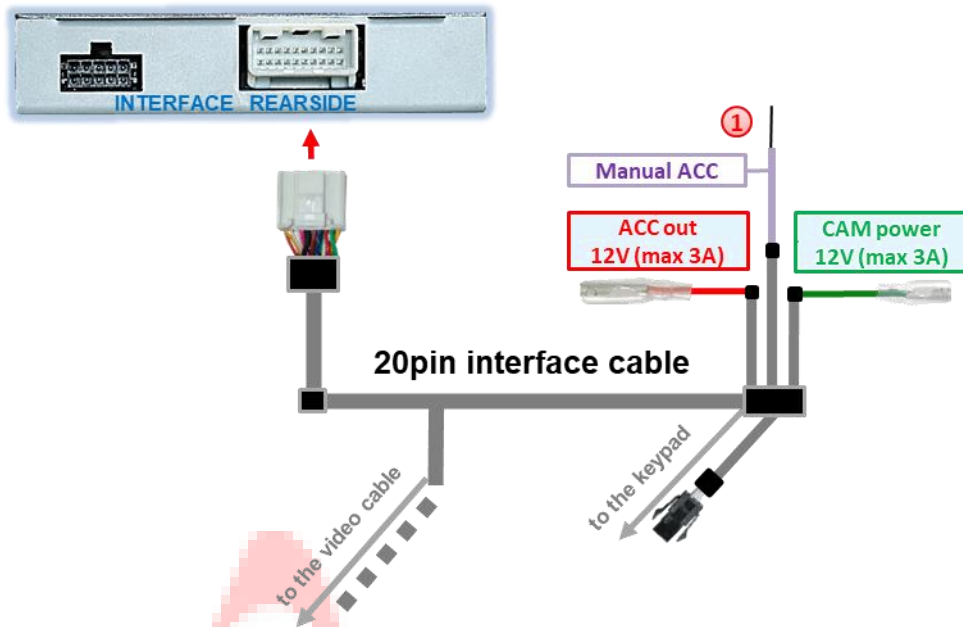


Attention: cable colors in vehicle may vary!

Note: It is technically also possible to connect the interface to the +12V battery (terminal 30). However, in the event of a (partial) CAN bus incompatibility or a defect, it cannot be ruled out that the interface does not switch off in sleep mode. A connection to +12V battery (terminal 30) is at your own risk!

2.4.2 Analogue connection without CAN-bus

On analogue connection, **blue CAN-high wire** and grey CAN-low wire of 10pin power/CAN cable are not connected.



- 1 Connect **purple wire Manual ACC** of 20pin interface cable to **+12V S-contact terminal 86s or ACC terminal 15r** of vehicle (e.g., cigarette lighter, glove compartment illumination).

Notes



- Only as long as the interface is switched on via +12V on **Manual ACC**, the monitor can show picture. Otherwise, also the factory picture is black. When selecting the switch-on signal, please check whether the factory picture is available in all desired operating states.
- The display of movable guide lines for the rear-view camera is omitted with an analogue connection.
- With analogue connection of interface (without CAN-bus), the connection of rear-view camera and side-cameras must also be made analogue.

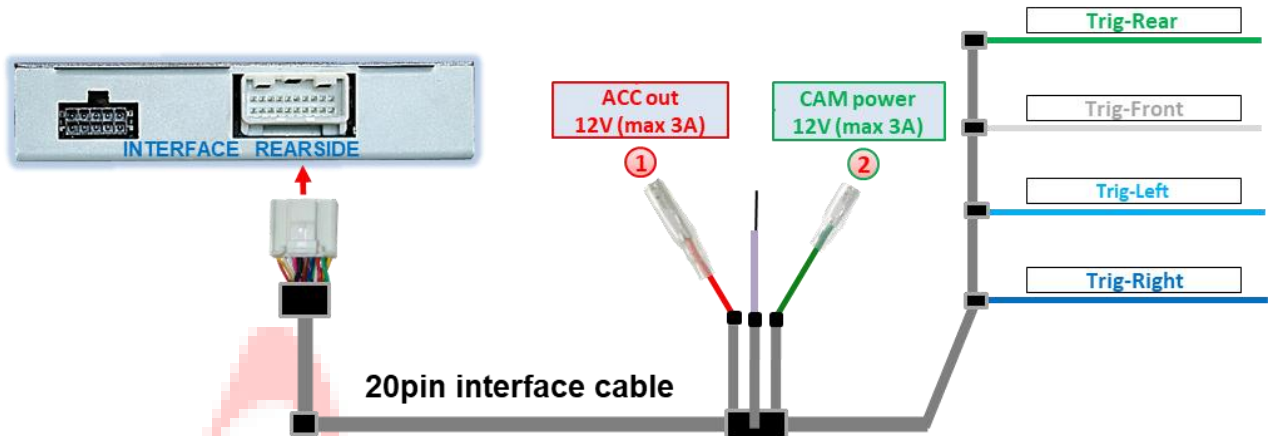
See chapters:

2.6.2 Case 2: Reverse signal from analogue signal

2.8.2 Case 2: Turn signal from analogue signal

2.5 Power supply outputs

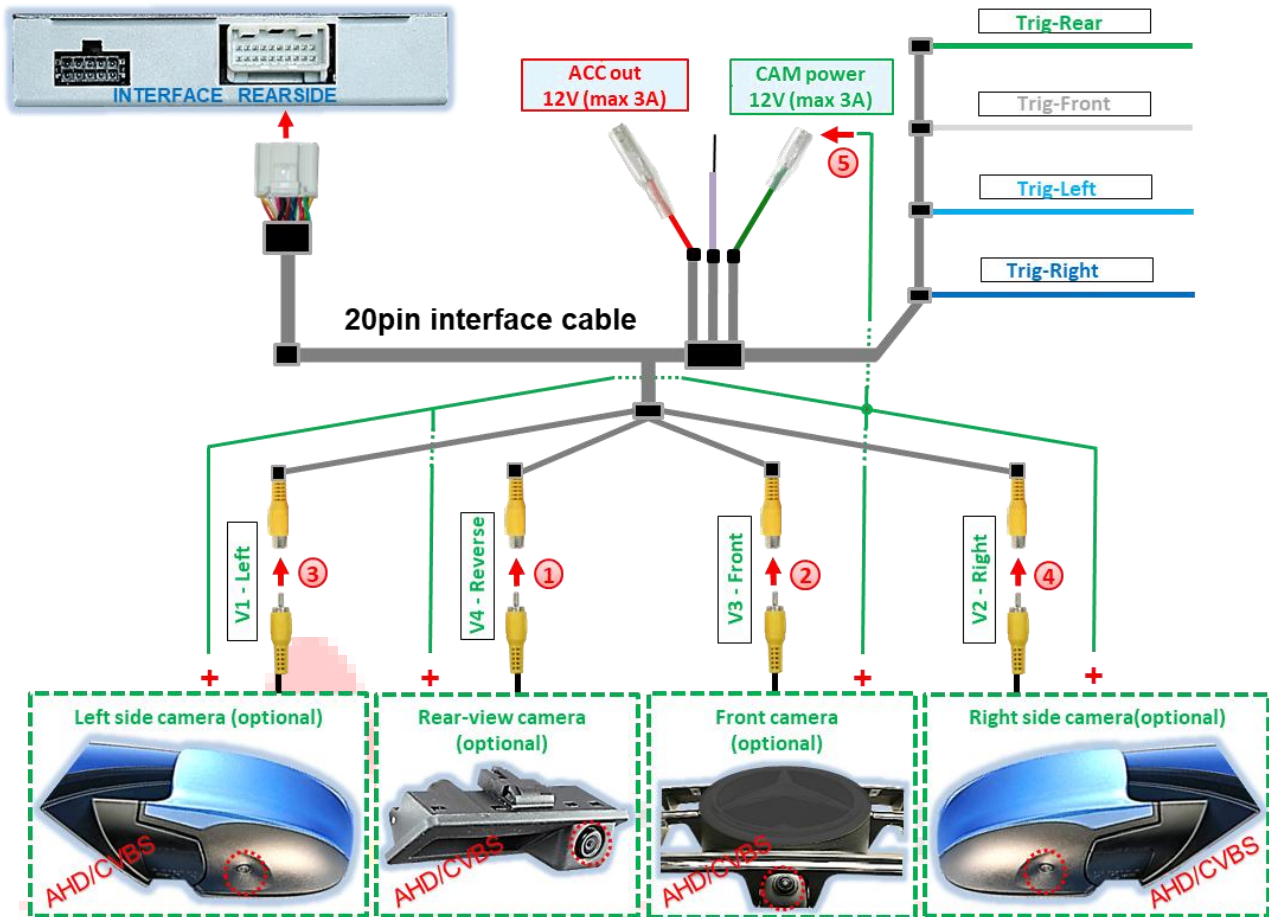
The two **red** and **green** power supply cables **ACC out 12V (max 3A)** and **CAM power 12V (max 3A)** of the **20-pin interface cable** can be used either as ACC power supply for **external video-sources** connected to the inputs **V1-Left, V2-Right, V3-Front** or **HDMI-input*** (e.g., iOS/Android devices, laptop, streaming stick, DVB-T2 tuner), or as power supply for the **after-market cameras** connected to the **V1-Left, V2-Right, V3-Front, V4-Reverse** or **HDMI-input*** (e.g., rear-view, front and side-cameras).



- ① **External video-sources** (no cameras) can be supplied with power via the red power supply cable **ACC out 12V (max 3A)** of the 20pin interface cable. The cable carries +12V ACC trigger out power **permanently** while interface is powered (see following chapters for connection).
- ② The power supply for **after-market cameras** (e.g., rear-view, side and/or front camera) can be supplied by the green power supply cable **CAM power 12V (max 3A)** of the 20pin interface cable. The cable carries **+12V trigger out power** exclusively as long as any of the camera inputs is shown, regardless of whether the switching is by vehicle CAN-bus or by trigger wires (see following chapters for connection).

* **HDMI-input only available on HDV-NAC12**

2.5.1 Connection and power-supply - video-sources rear-view camera, front camera and 2 side-cameras



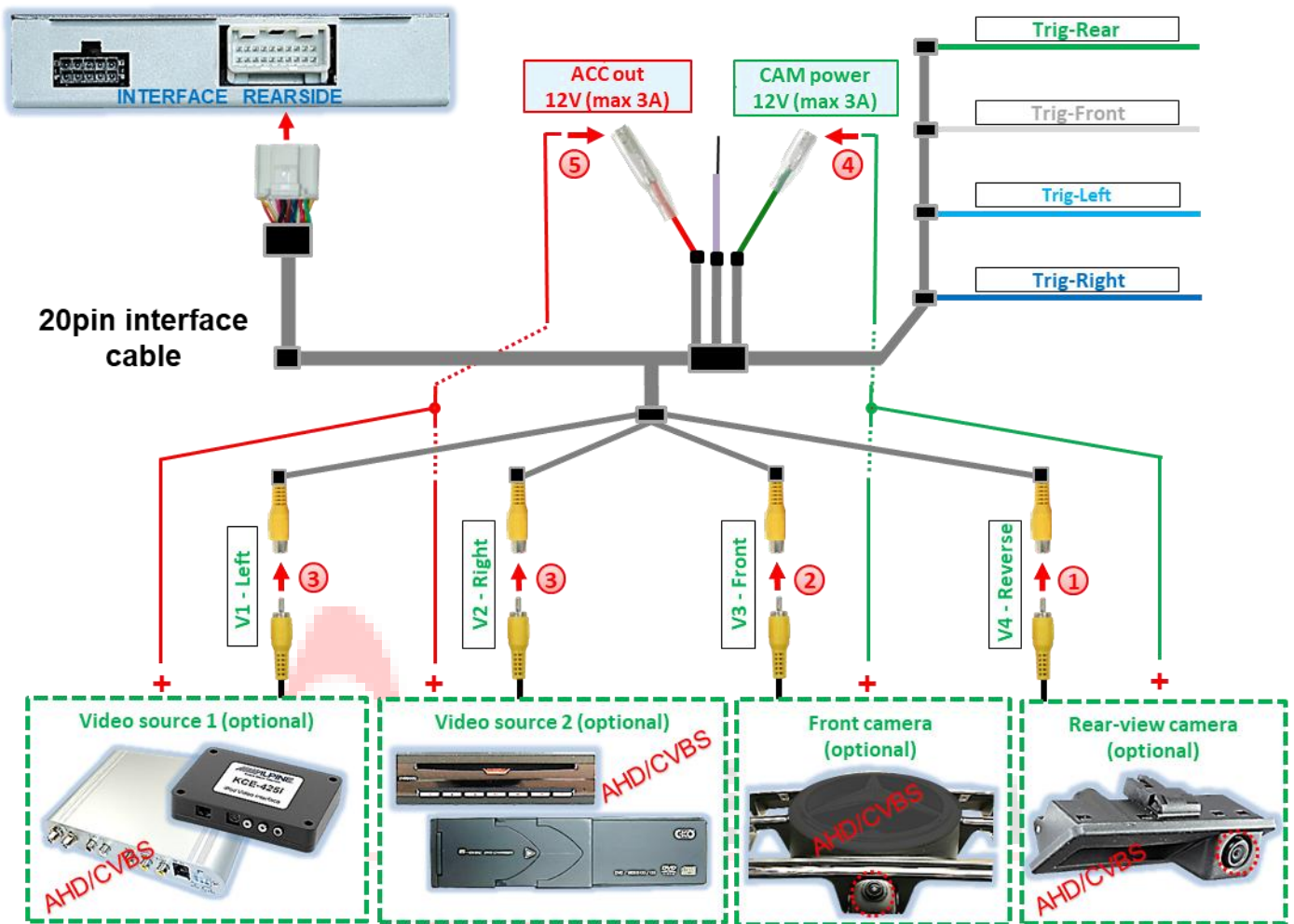
- ① Connect male RCA connector of rear-view camera to female RCA connector **V4-Reverse** of 20pin interface cable.
- ② Connect male RCA connector of front camera to female RCA connector **V3-Front** of 20pin interface cable.
- ③ Connect male RCA connector of left side-camera to female RCA connector **V1-Left** of 20pin interface cable.
- ④ Connect male RCA connector of right side-camera to female RCA connector **V2-Right** of 20pin interface cable.
- ⑤ Connect power supply for all after-market cameras to **green wire CAM power +12V (max 3A)** of 20pin interface cable.



Note: The type of camera switching (by CAN-bus or trigger cables) can be preset in the OSD-menu settings individually for each input.

Attention!
Video signal type of each video source must be preset in OSD-menu of corresponding video-input.

2.5.2 Connection and power-supply - video-sources rear-view camera, front camera and 2 video-sources



- ① Connect male RCA connector of rear-view camera to female RCA-connector **V4-Reverse** of 20pin interface cable.
- ② Connect male RCA connector of front camera to female RCA-connector **V3-Front** of 20pin interface cable.
- ③ Connect male RCA connectors of video-source 1 and 2 to female RCA connectors **V1-Left** and **V2 Right** of 20pin interface cable.
- ④ Connect power supply for after-market cameras to **green cable CAM power +12V (max 3A)** of 20pin interface cable.
- ⑤ Connect power supply for other video-sources to **red cable ACC out +12V (max 3A)** of 20pin interface cable.



Note: The type of camera switching (by CAN-bus or trigger cables) can be preset in the OSD-menu settings individually for each input.

Attention!
Video signal type of each video source must be preset in OSD-menu of corresponding video-input.

2.6 After-market rear-view camera

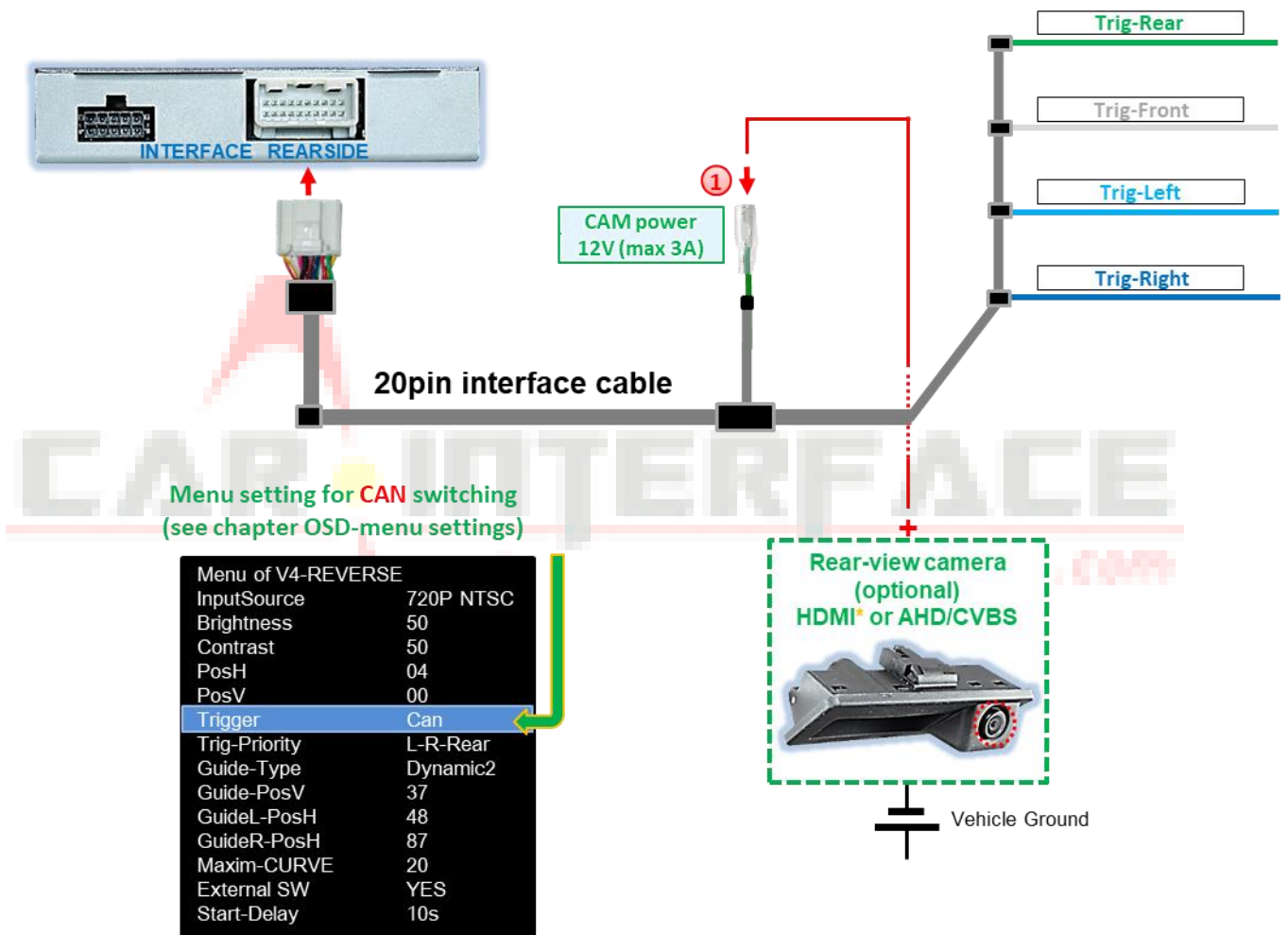
Automatic switching to rear-view camera is possible by CAN-bus or by analogue reverse signal.

2.6.1 Case 1: Reverse signal from CAN-bus

Basic requirement is that the interface is connected to CAN-bus. Furthermore, vehicle CAN-bus reverse signal and its detection by the interface must be compatible.

If so, interface supplies +12V on **green wire CAM power 12V (max 3A)** of 20pin interface cable while reverse gear is engaged and interface automatically switches to rear-view camera input **V4-Reverse** or **HDMI-input***.

See also chapter 1.6 Settings - 8dip switch bench (interface functions).



- 1 The +12V (max. 3A) power supply for the rear-view camera can be taken from the **green wire CAM power 12V (max 3A)** of the 20pin interface cable, as it carries voltage only for the time of camera input activation (some cameras are not continuously current-stable).



Notes

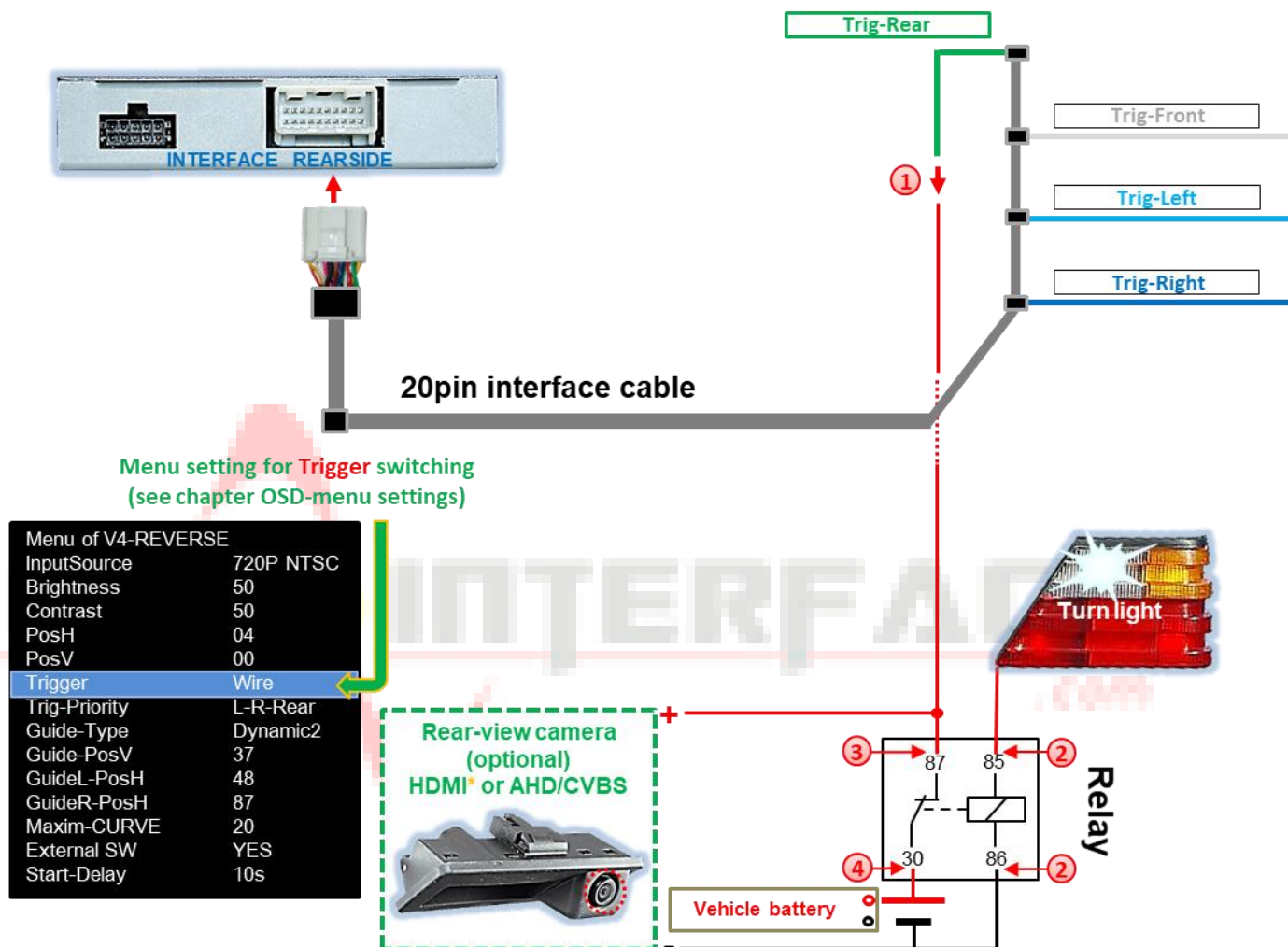
If **HDMI-input*** is defined as rear-view camera input by dip 5, **V4-Reverse** input remains without function!

If reverse gear detection of interface by CAN-bus does not work, reverse gear signal has to be connected analogue.

* **HDMI-input only available on HDV-NAC12**

2.6.2 Case 2: Reverse signal from analogue signal

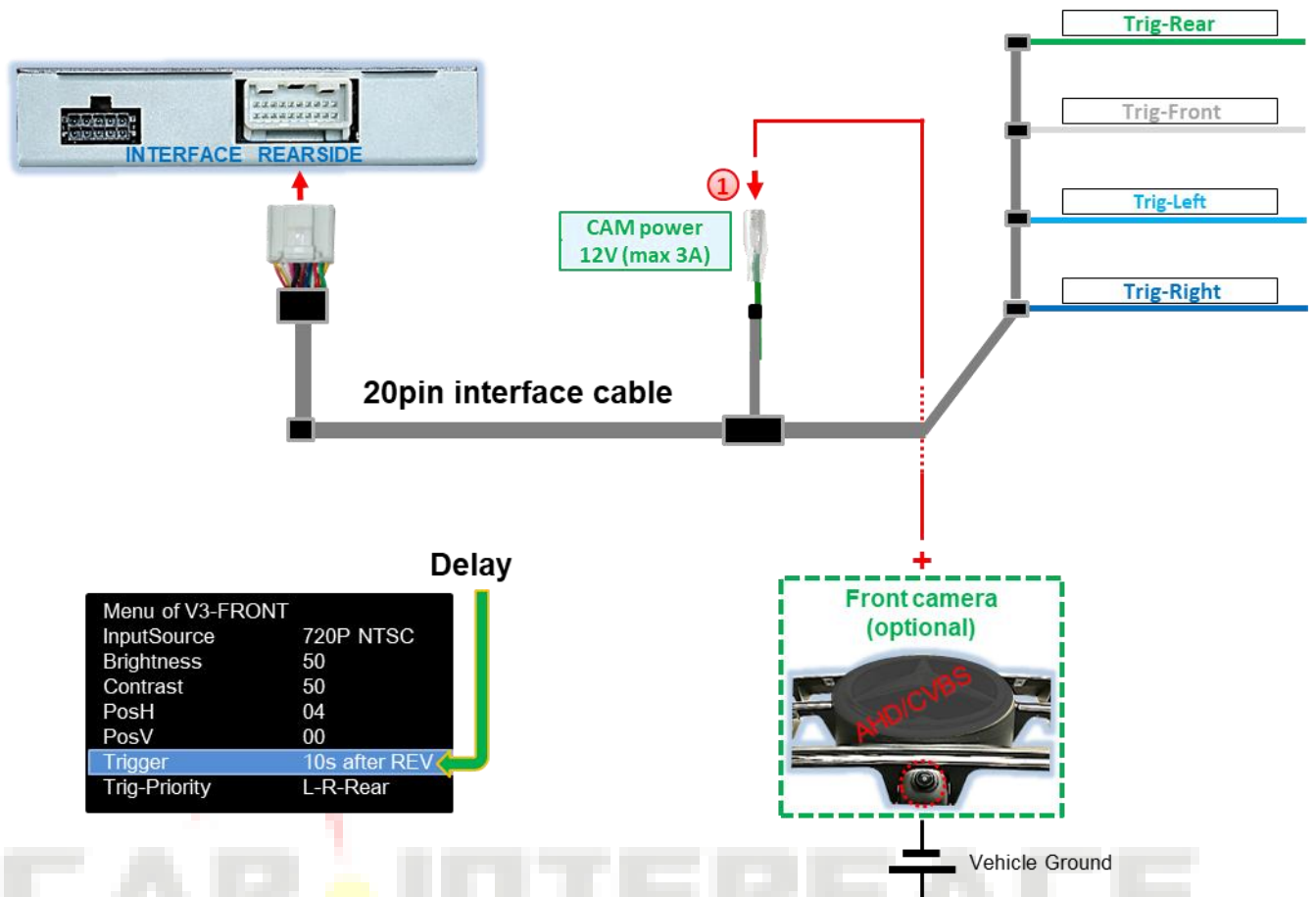
When connected the interface without CAN bus or when connected with CAN bus, if reverse gear is engaged and the interface does not provide +12V on the **green wire CAM Power 12V (max 3A)** of the **20pin interface cable** (not all vehicles are compatible), an external reversing light switch signal is required. As the reversing signal contains electronic interference, a normally open relay (e.g. AC-MR-312 or AC-MR-201) or a noise filter (e.g. AC-PNF-RVC) is required. The following diagram shows the use of a normally open relay.



- ① Connect **green wire Trig-Rear** to output connector (87) of relay.
- ② Connect the power cable of vehicle reverse light to relay coil (85) and vehicle ground to relay coil (86).
- ③ Connect output connector (87) of relay to power cable of rear-view camera, additionally to **green wire Trig-Rear**.
- ④ Connect stable and permanent +12V to input connector (30) of relay.

* HDMI-input only available on HDV-NAC12

2.7 After-market front camera



1 The **green wire CAM power 12V (max 3A)** can be used to supply power to front camera (and all other cameras connected to the video inputs), as it only carries current for the duration of any camera activation (some cameras are not continuously current-stable). Requirement is dip 3 = **ON** (black 8dip switch bench). Then **green wire** carries +12V (max 3A) as power supply for the front camera as long as the front camera input is displayed.

The time of display delay can be selected individually for **5, 10, 15** or **20** seconds in the front camera OSD-menu settings.

Switching to front camera after disengaging reverse gear for the time set in the OSD-menu, takes place both, with connection by vehicle CAN-bus and with analogue connection of the rear camera.



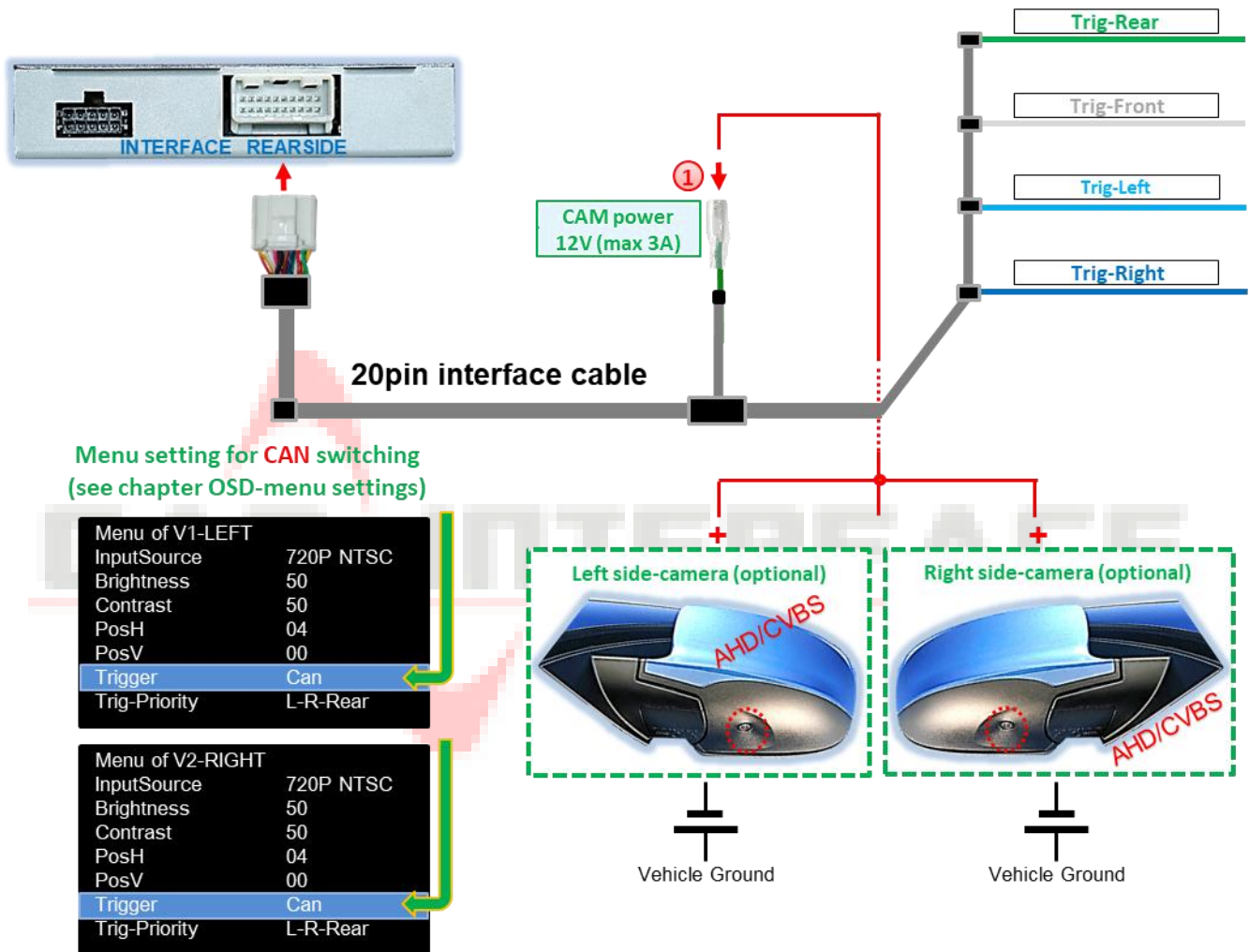
Note: In addition, manual switching to front camera input (short press) is possible by external button from any image mode (see chapter 3 Interface operation)

2.8 After-market side-cameras

Side-cameras can be connected with switching by CAN-bus or analogue.

2.8.1 Case 1: Turn signal from CAN-bus

Basic requirement is that the interface connection is made with CAN-bus. Furthermore, vehicle CAN bus turn signals and their recognition by the interface must be compatible. If so, interface supplies +12V on **green wire CAM power 12V (max 3A)** of 20pin interface cable for the duration of turn signal operations.



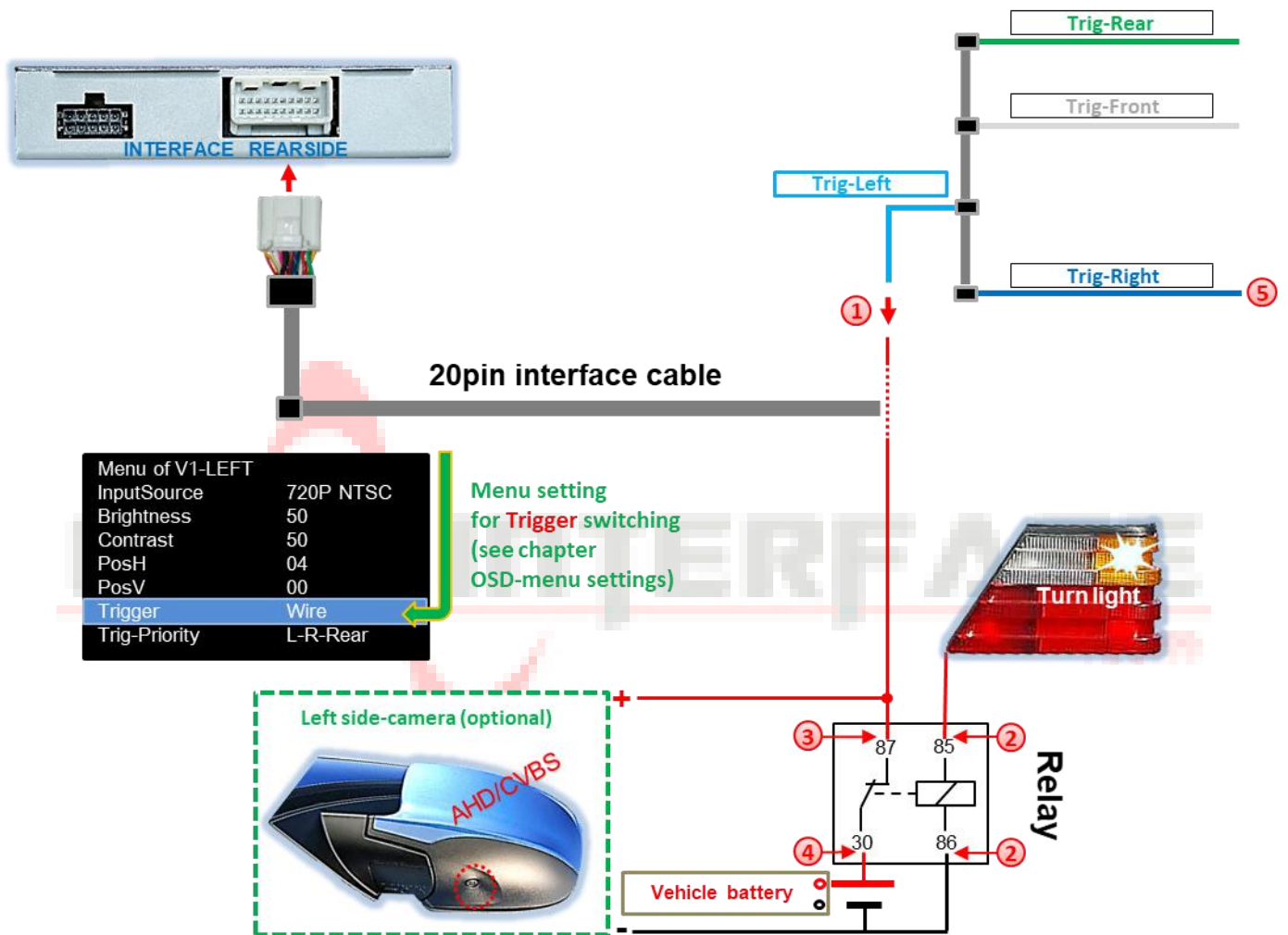
- 1 Power supply for side-cameras should be connected to **green wire CAM power 12V (max 3A)** of 20pin interface cable, as this cable is only powered during camera activation (some cameras are not continuously current stable).



Note: If turn signal detection of interface is not compatible with the vehicle CAN-bus, the turn signals must be connected analogue.

2.8.2 Case 2: Turn signal from analogue signal

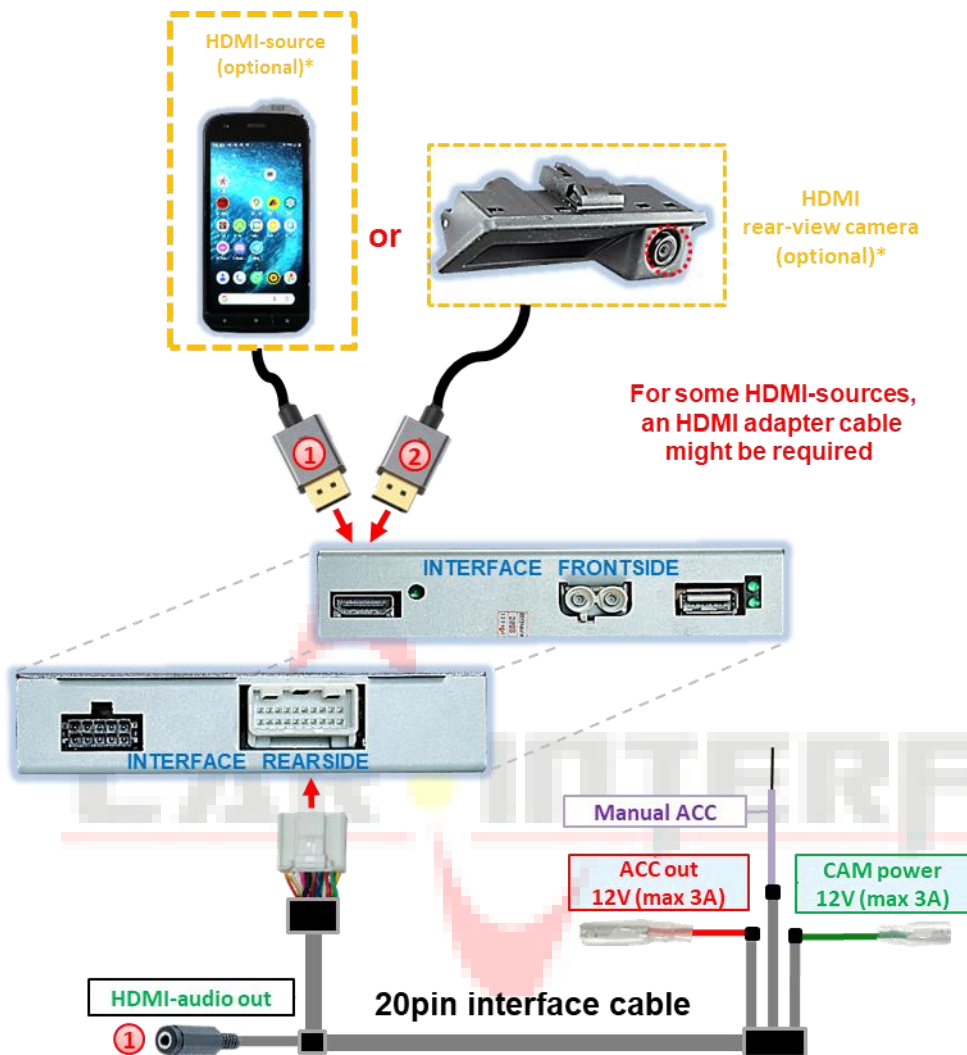
When the interface is connected without CAN bus or when the interface is connected with CAN bus and the turn signals from the vehicle CAN bus are not recognised, an analogue activation of the side camera inputs is possible via the +12V switching input wires **Trig-Left** and **Trig-Right**. An external switching signal from the turn signal bulbs is required to switch to the side camera inputs. As turn signals may contain electronic interference, a normally open relay (e.g. AC-RW-1230 with AC-RS5 wiring) or a noise filter (e.g. AC-PNF-RVC) is required for each input. The diagram below shows the use of a normally open relay.



- ① Connect **light blue wire Trig-Left** to output connector (87) of relay.
- ② Connect power-cable of left turn signal to coil (85) of relay and coil (86) of relay to vehicle ground.
- ③ Connect output connector (87) of relay to power cable of rear-view camera, additionally to **light blue wire Trig-Left**.
- ④ Connect stable and permanent +12V to input connector (30) of relay.
- ⑤ Same connection applies to right side-camera just the **dark blue wire Trig-Right**.

2.9 HDMI rear-view camera or other HDMI-source (only HDV-NAC12)

The **HDMI-input*** of the interface can generally be used for any video-source with HDMI-output, connected to it, e.g., rear-view camera, 360° camera-system or other video-source such as smartphones, laptop, streaming stick, DVB-T2 tuner, etc.



Picture settings in the HDMI menu

Menu of HDMI	
InputSource	AutoDetect
Brightness	50
Contrast	50
PosH	04
PosV	00

Picture settings in the HDMI menu for rear-view camera

Menu of HDMI-REVERSE	
InputSource	AutoDetect
Brightness	50
Contrast	50
PosH	04
PosV	00
Trigger	Can
Trig-Priority	L-R-Rear
Guide-Type	Dynamic2
Guide-PosV	37
GuideL-PosH	48
GuideR-PosH	87
Maxim-CURVE	20
External SW	YES
Start-Delay	10s

- 1 If an optional HDMI video-source (e.g., smartphone, laptop, etc.) is connected to the **HDMI-input***, the video shown on the display of the HDMI-source will be mirrored on the vehicle monitor. The video-signal from display-free sources (e.g., streaming stick, DVD-Player, DVB-T2 Tuner, etc.) will be displayed on the vehicle monitor. The power supply for the video-source can be taken from **red wire ACC out 12V (max 3A)**. Received audio signals will only be supplied by the female 3.5 mm jack connector **HDMI-Audio out*** of the 20pin interface cable. See following chapter 2.10 Audio-insertion.
- 2 If a rear-view camera or 360° camera-system is connected to the **HDMI-input*** (switched to by CAN-bus or analogue), the image displayed while reverse gear is engaged, and the image of a front camera connected to **V3-Front** is also displayed for the preset time when reverse gear is disengaged. Power supply can be taken from **green wire CAM power 12V (max3A)**.

* HDMI-input only available on HDV-NAC12

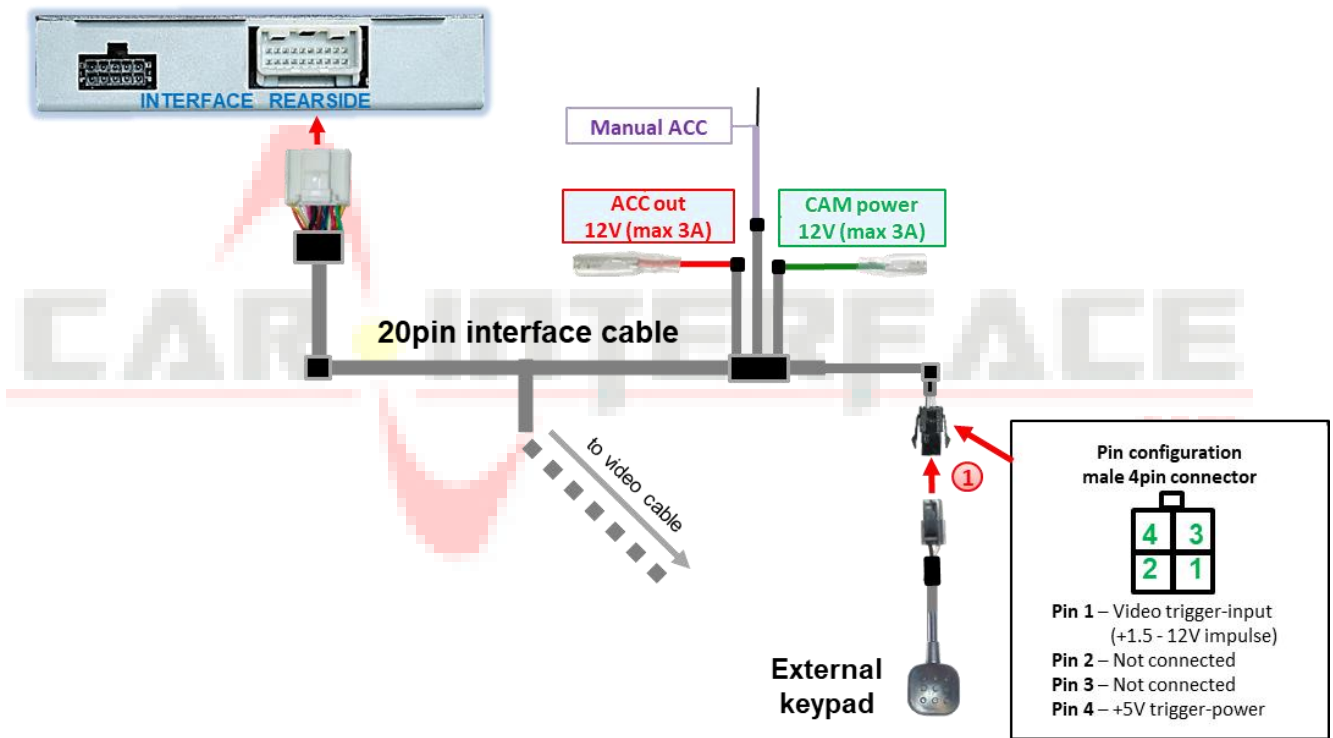
2.10 Audio-insertion

The interface can only insert video-signals into the factory infotainment. Audio signals of the **HDMI-input*** are supplied through the 3.5 mm female jack connector **HDMI-Audio out*** of the interface. For all AV-sources connected to the interface, their audio output must be connected factory AUX input or an optional audio-inserter (e.g., AUX-UNI0x, FM modulator). If several AV-sources are connected to the infotainment, an audio-switch might be required additionally.

Inserted video-signal can be switched simultaneously to any audio mode of the factory infotainment.

* **HDMI-input only available on HDV-NAC12**

2.11 Connection - Interface and external keypad



1 Connect female 4pin connector of keypad to male 4pin connector of **20pin interface cable**.



Note: We recommend to install the external keypad for possible support reasons even if not required for customer needs. Make sure the external keypad is not installed “pressed” then.

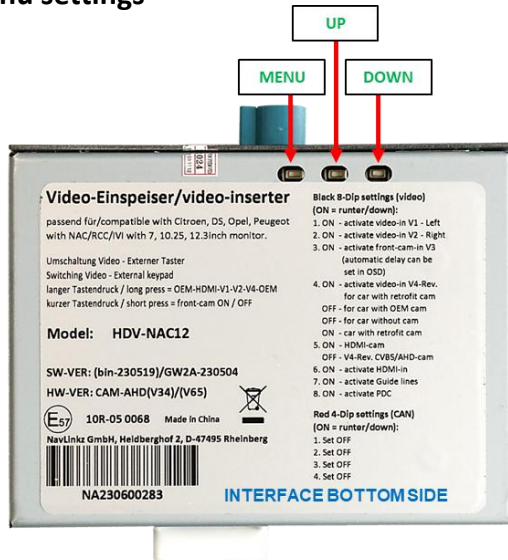
Optional: Instead of the external keypad, the interface can also be operated using the optionally available remote control ‘HDA-RC’. This enables direct selection of the video/camera inputs and more convenient changing of settings in the respective OSD menus.

* The remote control is compatible with all HDA and HDV interfaces that are labelled with ‘RC’ at the end of the software version.



Remote control ‘HDA-RC’ optionally available

2.12 OSD-menu settings



Attention!
Video signal type of each video source must be preset in OSD-menu of corresponding video-input.

OSD-menu settings can be changed by using the 3 keys on rear-side of interface. Pressing MENU key opens the OSD-menu or moves cursor to next menu item. UP (UP) and DOWN (DOWN) change values of current menu item.



The individual OSD-menu of every video input is only accessible when this input is displayed, regardless of whether a video-source is connected.

The following setting options are available in the individual OSD-menus of the 5 video inputs:

Menu V1-Left (V2-Right)

Input Source Video-signal type for video-source(s) connected to **V1-Left (V2-Right)**. This setting **must** be preset for correct video playback. The following video-source signal types can be selected:
CVBS video-sources: **NTSC, PAL**
AHD video-sources: **720p NTSC, 960p NTSC, 1080p NTSC, 720p PAL, 960p PAL, 1080p PAL**

Brightness Brightness
Contrast Contrast
Pos H Horizontal image position
Pos V Vertical image position
Trigger Type of selection of video input **V1-Left (V2-Right)**

"CAN" function for side cameras via CAN bus. Selection of the video input **V1-Left (V2-Right)** when activating the blink signal left (right). The prerequisite is that the blink signal is recognised by the interface on the vehicle CAN bus. Manual selection of this input using an external keypad does not work with this setting.

"Wire" function for other video sources or side cameras without CAN bus. The video input **V1-Left (V2-Right)** is selected exclusively via the **light blue (dark blue) Trig-Left (Trig-Right)** wire or manually via an external keypad.

Trig-Priority Switching priority when switching signals are present for multiple inputs simultaneously (CAN bus or analogue +12 V triggers). The signal with the highest priority is displayed:
L-R-Rear: V1-Left → V2-Right → V4-Reverse
Rear-R-L: V4-Reverse → V2-Right → V1-Left

Menu of V1-LEFT	
InputSource	720P NTSC
Brightness	50
Contrast	50
PosH	04
PosV	00
Trigger	Can
Trig-Priority	L-R-Rear

Menu of V2-RIGHT	
InputSource	720P NTSC
Brightness	50
Contrast	50
PosH	04
PosV	00
Trigger	Can
Trig-Priority	L-R-Rear



Menu **V3 front** Switch bench of 8 dip switches Dip 3 = ON

Input Source Video-signal type for video-source(s) connected to **V3-Front**.
 This setting **must** be preset for correct video playback.
 The following video-source signal types can be selected:

CVBS video-sources: **NTSC, PAL**
 AHD video-sources: **720p NTSC, 960p NTSC, 1080p NTSC, 720p PAL, 960p PAL, 1080p PAL**

Brightness Brightness
Contrast Contrast
Pos H Horizontal image position
Pos V Vertical image position
Trigger Type of selection of video input **V3 front**.

"Delay" function for front camera. The **"Delay"** setting is used to determine the automatic switching of a front camera connected to the V3 **front input** after reverse gear is engaged and its display duration on the display. Available are 5s after REV, 10s after REV, 15s after REV, 20s after REV.

"Wire" function for other video sources. If another video source is to be connected to **V3-Front** instead of a front camera, select the **"Wire"** setting. This switches off the **"Delay"** function and the input can only be selected via the **white Trig-Front** wire or manually via an external keypad.

Trig-Priority Switching priority when switching signals are present for multiple inputs simultaneously (CAN bus or analogue +12 V triggers). The signal with the highest priority is displayed:

L-R-Rear: **V1-Left** → **V2-Right** → **V4-Reverse**
Rear-R-L: **V4-Reverse** → **V2-Right** → **V1-Left**

Menu of V3-FRONT	
InputSource	720P NTSC
Brightness	50
Contrast	50
PosH	04
PosV	00
Trigger	10s after REV
Trig-Priority	L-R-Rear



Menu V4 reverse Switch bench of 8 dip switches Dip 4 = ON, Dip 5 = OFF, Dip 6 = OFF

V4-Reverse input has no function if **HDMI input*** is defined as rear-view camera input (Dip 5 = ON).

Menu of V4-REVERSE	
InputSource	720P NTSC
Brightness	50
Contrast	50
PosH	04
PosV	00
Trigger	Can
Trig-Priority	L-R-Rear
Guide-Type	Dynamic2
Guide-PosV	37
GuideL-PosH	48
GuideR-PosH	87
Maxim-CURVE	20
External SW	YES
Start-Delay	10s

Input Source Video-signal type for video-source(s) connected to **V4-Reverse**. This setting **must** be preset for correct video playback.

The following video-source signal types can be selected:

CVBS video-sources: **NTSC, PAL**

AHD video-sources: **720p NTSC, 960p NTSC, 1080p NTSC, 720p PAL, 960p PAL, 1080p PAL**

Brightness Brightness

Contrast Contrast

Item H Horizontal image position

Item V Vertical image position

Trigger Type of selection of rear-view camera input **V4 reverse**.

"CAN" function with CAN bus connection. With the "CAN" setting, the system automatically switches to **V4 reverse** for CVBS/AHD rear-view camera when reverse gear is engaged. The interface must recognise the reverse gear in the CAN bus.

"Wire" function with analogue connection. The selection of a rear-view camera connected to the **V4 reverse** via the **green Trig-Rear wire** is possible with both the "Wire" and "CAN" settings. It is recommended to set "Wire" for analogue (reversing signal) connection.

Trig-Priority Switching priority when switching signals are present for multiple inputs simultaneously (CAN bus or analogue +12 V triggers). The signal with the highest priority is displayed:

L-R-Rear: V1-Left → V2-Right → V4-Reverse

Rear-R-L: V4-Reverse → V2-Right → V1-Left

Guide Type Setting 6 different angles of the guide lines for the rear-view camera

Moving guide lines **Dynamic 1-6**

Fixed guide lines **Fixed 1-6**

No guide lines **OFF**

Guide Pos. V Vertical position of the auxiliary wires **00-69**

Guide L Pos.H Horizontal position of the left auxiliary wire **00-90**

Guide R Pos.H Horizontal position of the right-hand auxiliary wire **00-121**

Maxim. Curve Radius of the auxiliary wires **01-20**

External SW Selectable via external keypad **V4 Reverse**

YES: Factory video → **HDMI*** → **V1-Left** → **V2-Right** → **V4-Reverse** → Factory video

NO: Factory video → **HDMI*** → **V1-Left** → **V2-Right** → Factory video

Start-Delay Switch delay of the interface at start-up. This function is technically necessary in some vehicles, as otherwise the factory system may malfunction (e.g. black screen, touch problems). The following options are available (in seconds):

5s/6s/7s/8s/9s/10s/12s/15s/20s

Changing the default settings may cause malfunctions!

* **HDMI input only available with HDV-NAC12**

Menu HDMI* Switch bench of 8 dip switches (dip 4 = ON, dip 5 = **ON/OFF**, dip 6 = ON)

HDMI AV input (Dip 5 – OFF)

- InputSource** The picture resolution of connected HDMI sources is detected automatically.
- Brightness** Brightness
- Contrast** Contrast
- Item H** Horizontal image position
- Item V** Vertical image position

Menu of HDMI	
InputSource	AutoDetect
Brightness	50
Contrast	50
PosH	04
PosV	00

HDMI rear-view camera input (Dip 5 = ON)

- InputSource** The picture resolution of connected HDMI sources is detected automatically.
- Brightness** Brightness
- Contrast** Contrast
- Pos. H** Horizontal image position
- Pos. V** Vertical image position
- Trigger** Type of selection of rear-view camera input **HDMI-REV**.

Menu of HDMI-REVERSE	
InputSource	AutoDetect
Brightness	50
Contrast	50
PosH	04
PosV	00
Trigger	Can
Trig-Priority	L-R-Rear
Guide-Type	Dynamic2
Guide-PosV	37
GuideL-PosH	48
GuideR-PosH	87
Maxim-CURVE	20
External SW	YES
Start-Delay	10s

"CAN" function with CAN bus connection. With the "CAN" setting, the system automatically switches to **HDMI*** for HDMI rear-view camera when reverse gear is engaged. The interface must recognise the reverse gear in the CAN bus.

"Wire" function with analogue connection. The selection of a rear-view camera connected to the **HDMI*** via the **green Trig-Rear wire** is possible with both the "Wire" and "CAN" settings. It is recommended to set "Wire" for analogue (reversing signal) connection.

- Trig-Priority** Switching priority when switching signals are present for multiple inputs simultaneously (CAN bus or analogue +12 V triggers). The signal with the highest priority is displayed:

L-R-Rear: V1-Left → V2-Right → V4-Reverse

Rear-R-L: V4-Reverse → V2-Right → V1-Left

- Guide Type** Setting 6 different angles of the guide lines for the rear-view camera

Moving guide lines **Dynamic 1-6**

Fixed guide lines **Fixed 1-6**

No guide lines **OFF**

- Guide Pos. V** Vertical position of the guide lines **00-69**
- Guide L Pos.H** Horizontal position of the left hand guide line **00-90**
- Guide R Pos.H** Horizontal position of the right-hand guide line **00-121**
- Maxim. Curve** Radius of the guide lines **01-20**

- External SW** Selectable via external keypad **V4 Reverse**
YES: Factory video → HDMI* → V1-Left → V2-Right → V4-Reverse → Factory video
NO: Factory video → HDMI* → V1-Left → V2-Right → Factory video

- Start-Delay** Switch delay of the interface at start-up. This function is technically necessary in some vehicles, as otherwise the factory system may malfunction (e.g. black screen, touch problems). The following options are available (in seconds):

5s/6s/7s/8s/9s/10s/12s/15s/20s

Changing the default settings may cause malfunctions!



Notes: **V4-Reverse** input has no function if the **HDMI input*** is defined as a rear-view camera input (dip 5 = **ON**).

*** HDMI input only available with HDV-NAC12**

3 Interface operation

3.1 Via steering wheel button

The "Volume +" button on the steering wheel can be used to switch between all active inputs.



Pressing and holding the "Volume +" button on the steering wheel (for 2–3 seconds) switches from the factory video to the first activated interface video input. Each subsequent long press switches to the next activated interface input, until the system switches back to the factory video after the last activated input.

Deactivated inputs are automatically skipped.

If all inputs are activated via the corresponding DIP switches, switching takes place in the following order:

Factory video → HDMI → V1-Left → V2-Right → V4-Reverse** → Factory video*

The 'Volume +' button on the steering wheel does not work in all vehicles. In some vehicles, the external button must be used to switch inputs instead.

*** HDMI-input only available on HDV-NAC12**

****V4-Reverse** can only be selected via "Volume +" button on the steering wheel if the "External SW" function is set to "Yes" in the **V4-Reverse** menu.

3.2 Via external keypad

The external keypad of the can be used to switch all enabled inputs.

➤ Long press of keypad (2-3 seconds)

Long press of external keypad (2-3 seconds), switches from factory video to inserted first enabled interface video-input. Any additional long press switches to the next enabled interface video-input and after last back to factory video. Disabled inputs are skipped.

If all inputs are enabled by the corresponding dip-switches, the order is as follows:

➤ *Factory video* → **HDMI*** → **V1-Left** → **V2-Right** → **V4-Reverse**** → *Factory video*

* **HDMI-input only available on HDV-NAC12**

****V4-Reverse** can only be selected via the external keypad if the "External SW" function is set to "Yes" in the **V4-Reverse** menu.

➤ Short press of keypad (only if dip 3 is set to ON)

Short press of external keypad, switches from any video mode to front camera input **V3-Front** and next short press switches back to the previous video mode.



Note: We recommend to install the external keypad for possible support reasons even if not required for customer needs. Make sure the external keypad is not installed "pressed" then.

3.3 Optional: Operating the video interface via the 'HDA-RC' remote control

Instead of the external keypad, the interface can also be operated using the optionally available 'HDA-RC' remote control.* This allows direct selection of the video/camera inputs and more convenient changing of settings in the respective OSD menus.



* The remote control is compatible with all HDA and HDV interfaces that are labelled with 'RC' at the end of the software version.

Remote control 'HDA-RC'
optionally available

4 Specifications

BATT/ACC range	9V - 16V
Stand-by power drain	about 2mA
Power consumption	400mA @12V
Video input	0.7V - 1V
Video input signal types	CVBS/AHD/ HDMI (HDV-version only)
Signal standards CVBS/AHD	NTSC/PAL
Temperature range	-40°C to +85°C
Dimensions video-box	115 x 25 x 109 mm (W x H x D)

5 FAQ - Troubleshooting interface functions - product-specific

Problem	Possible reasons	Solution
Vehicle battery discharges	Power connection made to battery terminal 30	See chapter 2.4 <i>Connection – harnesses, power supply and CAN-bus or analogue without CAN-bus</i> – Connection of 10-pin power / CAN cable
Distorted or no inserted video	Video-signal type of video-source not defined in OSD-menu of the corresponding video input	See chapter 2.12 <i>OSD-menu settings</i> - menu of corresponding input

