

## Precision replacement of HUD equipped windscreens



BMW Head up Display System

Picture: BMW

### **A guide to the critical steps during installation:**

As more and more vehicle models from the upper/premium market segment are being equipped with HUD technology, the need for more precise and accurate installations becomes crucial for auto glass fitters. Indeed, even the best components will not perform correctly if the installation is not in accordance with the original manufacturer specifications and as a consequence of an improper installation, the HUD may not produce clear pictures on the glass. Of course there may be a chance to re-calibrate or adjust the HUD system, but this:

- a) can only be done by an authorized dealer, which has the appropriate equipment
- b) is quite expensive
- c) involves extra-time as the vehicle has to be taken to the dealer

Note: In certain cases a re-calibration may not be successful if the windscreen has been installed too far out of the required tolerances and in worst case situations it may be necessary to remove the windscreen and to start again.

This document is intended to provide our customers with the relevant technical information and to inform of the tools and solutions required, which have been developed by and/or available from PMA/TOOLS AG. By following the information and instructions detailed in this document you may avoid potential quality claims, by installing the windscreen in accordance with the manufacturer's original specifications.

For additional information, you may also wish to refer to the appropriate **Autoglas Media** training videos, which highlight all the critical steps during the replacement of windscreens that comprise of such high-tech accessories. These videos are exclusively distributed by PMA/TOOLS AG.

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### Head up Display technology: How it works in general

A Head up Display or Heads up Display (HUD) is any transparent display that presents data without requiring users to look away from their usual viewpoints. The origin of the name stems from the aircraft pilots being able to view information with heads “up” and looking forward, instead of angled down looking at lower instruments.



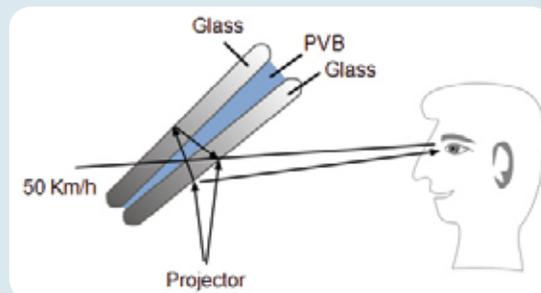
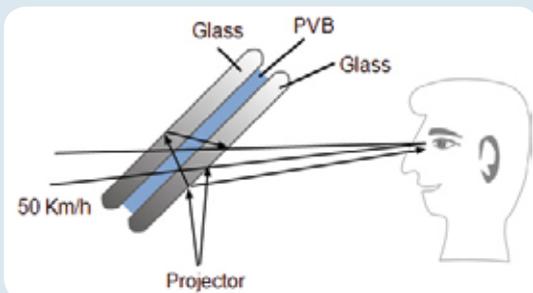
(Military aircraft HUD version: FA-18 HUD while engaged in a dogfight) Picture: Wikipedia

Although Head up Displays were initially developed for military aviation, HUDs are now used in commercial aircraft, automobiles, and other applications.

General Motors began using Head up Displays in 1988 with the first color display appearing in 2001 on the Corvette. In 2003, BMW became the first European manufacturer to offer HUDs. The displays are becoming increasingly available on production cars, and usually offer speedometer, tachometer, and navigation system displays. Nightvision information is also displayed via HUD on certain General Motors, Honda, Toyota and Lexus vehicles.

The Head up Display technology in the automotive application gives the driver the ability to see relevant information such as speed and navigation directions or technical warning messages from the vehicle's computer, without the need to look down and lose sight of what's ahead. The readout appears approx. 2 meters beyond the windscreen in the driver's line of vision. It is clear and easy to read, and can even respond to light, adjusting brightness for daytime, night-time or hazy conditions, so driving is more enjoyable and safer.

Windscreens suitable for HUD technology are being produced with a PVB layer, which differs from “standard” windscreens. As shown in the pictures below the shape of the PVB layer must be tapered to enable the HUD projection to be displayed without double images or distortions.

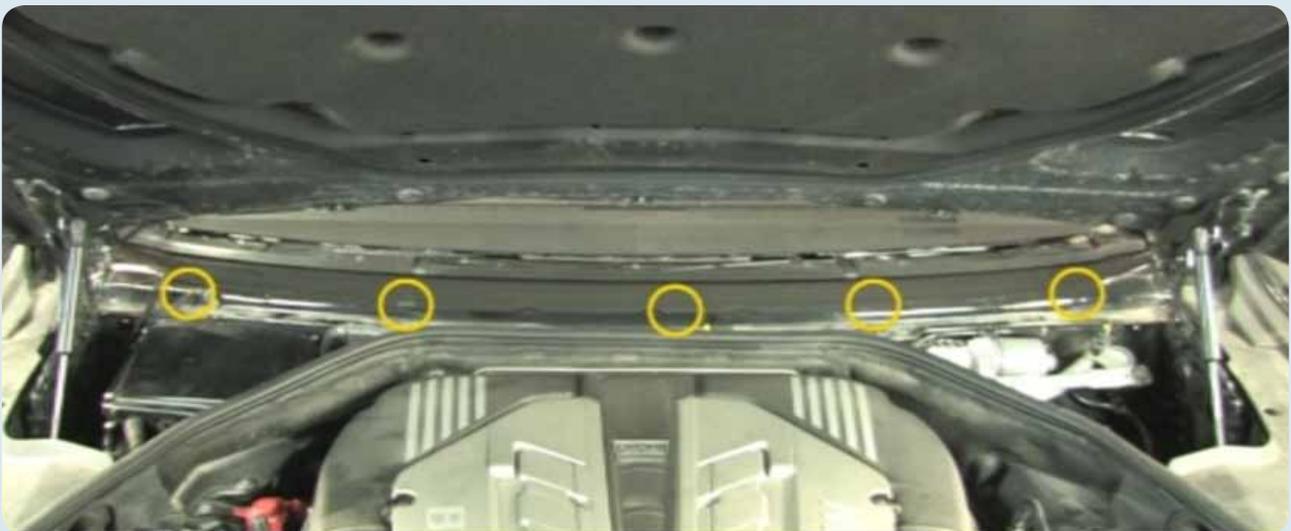


## Precision replacement of HUD equipped windscreens

After cutting out the defective windscreen and removing the remaining PU bead from the aperture, a very important component (windscreen spacer) is required for HUD equipped windscreens. These windscreen spacers need to be affixed to the car body 'A'-pillar before the new windscreen can be installed (see picture below). These spacers ensure that the windscreen is not located too 'deep' into the body as the angle between the HUD projector and the HUD layer in the windscreen may be affected and this could change the original set-up, resulting in the HUD producing unclear pictures on the glass. These windscreen spacers for the BMW 7 Series and for other vehicle makes and models are available from PMA/TOOLS AG.



Three windscreen spacers are located on the left and on the right A-pillar as shown.



A further five spacers are located at the bottom of the frame as shown.

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Note: It is important to place the spacers exactly between the corresponding markings on the body (see above).



**Windscreen spacers  
(Art. No.: 3101035)**

Before the replacement windscreen can be installed, a self-adhesive filling foam tape has to be attached to the glass in the correct position (see below). The purpose of this tape is to fill the space between the dashboard and the windscreen, to eliminate noise. This tape is available from PMA/TOOLS AG.



### **Important:**

Shortly after the filling foam tape has been attached to the windscreen the material starts to expand. If the windscreen is not installed immediately to the vehicle it may be necessary to compress the filling foam tape again. This can be done by using any type of pressing roller, preferably with a roll made from rubber (soft material) to prevent damage to the glass.



## Precision replacement of HUD equipped windscreens

### Expanding foam rubber bottom (Art. No.: 118198151)



Length: 1,50 m / width: 20 mm / color: black

#### Referred vehicle

BMW 7 Series F01/F02 (08-) - (ARGIC: 2457)

The final stage in preparing the replacement windscreen before installation is to apply the self-adhesive upper moulding in the correct position, by using the Profixx application tool. This tool positions the profile in the correct position and at the correct pressure and is available from PMA/TOOLS AG (along with other Profixx tools for different profile sections for other vehicle models).



### Profixx application tool 3 (Art. No.: 01065065)



Length: 1,50 m / width: 20 mm / color: black

#### Referred vehicle

BMW 5 Series F10/F11 (10-) - (ARGIC: 2459)

BMW 5 Series F07 GT (09-) - (ARGIC: 2461)

BMW 7 Series F01/F02 (08-) - (ARGIC: 2457)

CITROEN Berlingo II (08-) - (ARGIC: 2741)

CITROEN C3 (10-) - (ARGIC: 2743)

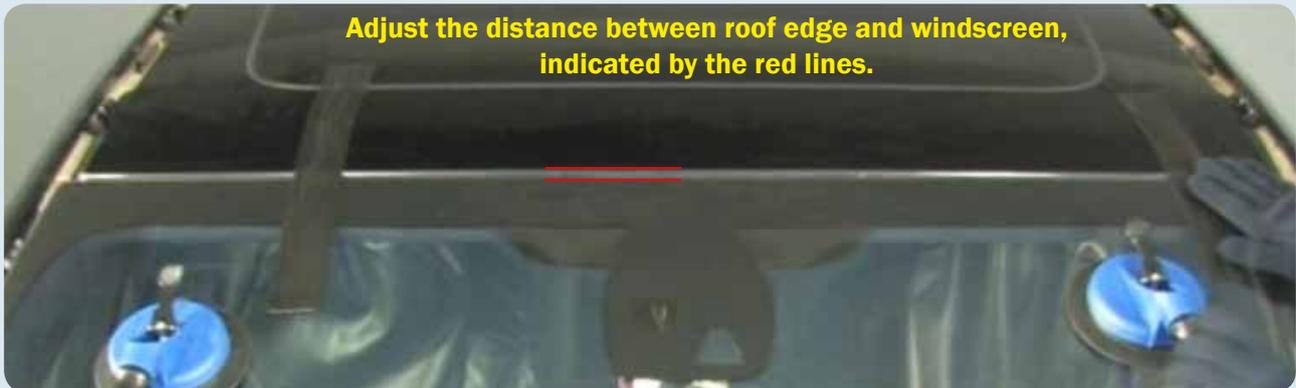
OPEL Vectra C (02-08) - (ARGIC: 6294)

PEUGEOT Expert Tepee (06-) - (ARGIC: 6553)

PEUGEOT Partner Tepee (08-) - (ARGIC: 6558)

## Precision replacement of HUD equipped windcreens

The next step is to position the glass with the correct distance between windscreen and the roof leading edge. Using a plastic **body clearance feeler gauge**, the windscreen can be positioned exactly in accordance with the manufacturer's specifications. This feeler gauge is available from PMA/TOOLS AG.



**Body clearance feeler gauge  
(Art. No.: 03193055)**



The PMA TOOLS body clearance feeler gauge is used to measure the clearance as shown below. This tool offers the possibility to position the replacement windscreen precisely using gauges which range from 1 mm - 12 mm thickness.



## Precision replacement of HUD equipped windshields

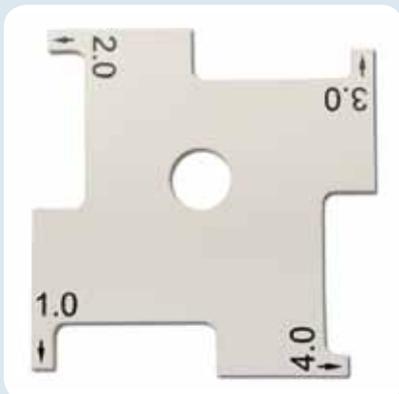
The last step is the correct adjustment regarding the height of the windshield in relation to the vehicle body. In this example the BMW specifications for the 7 Series F01 are:

- >> A windshield **with HUD** should be **3,5 mm** lower than the roof leading edge
- >> A windshield **with HUD & Acoustics** should be **3 mm** lower than the roof leading edge
- >> A windshield **without HUD** should be **4 mm** lower than the roof leading edge

To adjust the windshield precisely, use the windshield calibration gauge available from PMA/TOOLS AG.



### Windshield calibration gauge (Art. No.: 03193053)



### Referred vehicles :

- BMW 5 Series E60/E61 (03-10) - (ARGIC: 2445)
- BMW 5 Series F10/F11 (10-) - (ARGIC: 2459) w/o HUD 3,5 mm, with HUD 3,3 mm, with HUD & IR 2.9 mm
- BMW 5 Series F07 GT (09-) - (ARGIC: 2461) w/o HUD 4 mm, with HUD 3,5 mm
- BMW 7 Series F01/F02 (08-) - (ARGIC: 2457) w/o HUD 4 mm, with HUD 3,5 mm, with HUD & Acoustics 3 mm
- BMW X1 E84 (09-) - (ARGIC: 2460) 3 mm
- BMW X3 E83 (03-10) - (ARGIC: 2449)
- BMW X5 E70 (07-) - (ARGIC: 2452)
- BMW X6 E71 (08-) - (ARGIC: 2456)