



The new generation

BLACK BOX 2.0

Art. No. **10453400**

PURPOSE OF THIS MANUAL

This instruction manual provides a brief overview of the operation of the Black Box 2.0 and the products contained in the set, as well as the safety regulations that must be observed.

Only use the device after you have carefully read and understood the operating instructions. Observe all the safety instructions listed in the instructions. Keep all of the documentation in such a way that anyone using the Black Box 2.0 can refer to it at any time.

An application example for operating the Black Box 2.0 can be found on the Internet under the following QR code:



This device may only be used for its intended purpose as specified.
The device may only be operated by trained specialists.

Content

Explanation of symbols	6	Operation	16
Safety instructions	6	Notes on stone chip preparation	16
For your protection	6	Preparation for repairs	16
To protect your device	8	Commissioning the Black Box 2.0	16
CE notes on the declaration of conformity	9	Homescreen: Touch display	17
Technical data	9	Automated control programmes	18
Intended use	10	Manual control programme	19
Changes and modifications	10	Semi-automated control programme for UV LED lamp	20
What to do in the event of malfunctions and irregularities	10	Settings	21
Switching off the device in an emergency	10	Repair finish	22
Properly charging the Black Box 2.0	10	Cleaning	22
Disposal and storage	11	Error messages	23
Operating and display elements	13	Possible malfunctions and their sources of error	24
Connections	15	Equipment and accessories	26

Explanation of symbols



Warning sign

Warning: Potential personal injury
Caution: Potential material damage



Mandatory sign

In occupational safety, the mandatory sign indicates the protective equipment to be worn.



Rescue sign

The rescue sign indicates facilities, devices or escape and rescue routes that are important for rescuing people.

Safety instructions

For your protection



Warning

Compressed air is a potentially dangerous form of energy, which is why care must be taken when using the Black Box 2.0 and its accessories such as the Black Rocket.

Never direct the compressed air/liquid jet at people, animals or yourself.

The device may only be operated in the specified pressure range of 150 mbar to 4200 mbar.

The work area must always be kept tidy.



Warning of sharp objects!

There is a risk of injury when working with the enclosed blades and scribe.



Wear eye protection!

The UV light can cause irreversible damage to the eyes, so suitable UV/shock protection goggles (EN 166) must be worn when working.



Use hand protection!

When handling chemical substances such as synthetic resin, only chemical protective gloves with a CE mark including a four-digit test number may be worn. Wear suitable safety gloves DIN EN 374 NBR (nitrile rubber).



Wear protective clothing!

Wear suitable protective clothing when working.



What to do in case of emergency

Initiate the necessary first aid measures appropriate to the injury and request qualified medical help as soon as possible. Protect the injured person from further damage and calm them down. In the event of an accident, a first-aid kit in accordance with DIN 13164 should always be available at the workplace. Material removed from the first-aid kit must be replenished immediately. If you need help, please provide the following information:

1. Place of accident
2. Type of accident
3. Number of injured persons
4. Type of injuries

To protect your device



Warning/Caution!

Do not expose the device to the weather (rain, sun, fog, snow).

If the Black Box 2.0 and Black Rocket are used outdoors, the devices must be stowed in a covered place or in a closed room after use. The Black Box 2.0 must not be used outdoors in rain or bad weather! Do not carry out a stone chip repair in direct sunlight in order to avoid premature UV curing of the synthetic resins (PMA/TOOLS UV repair resin BB1 and PMA/TOOLS UV sealing resin BB2)!

Observe the relevant safety data sheets when using UV synthetic resins (PMA/TOOLS UV synthetic resin BB1 and PMA/TOOLS UV sealing resin BB2) and PMA/TOOLS polishing compound BB3. These are available for download free of charge from our website <https://eshop.pma-tools.de/>.



Warning/Caution!

The device must not be used if it is damaged. If the device is defective, repairs must only be carried out by PMA/TOOLS AG. Use only original accessories and original spare parts. The Black Box 2.0, Black Rocket and their components as well as the accessories included in the set must not be cleaned with inflammable or toxic liquids. The cleaning recommendations can be found in the "Cleaning" section.

Only a well-maintained device can be a satisfactory tool. Inadequate maintenance and care can lead to unpredictable accidents and injuries.



Warning of electrical voltage

Follow the instructions for charging the Black Box 2.0 in the instruction manual under the item "Proper charging of the Black Box 2.0".

CE notes on the declaration of conformity

This device complies with the basic requirements and other relevant regulations of the European Directive for Electromagnetic Compatibility 2014/30/EU and Directive 2011/65/EU (RoHS 2). The complete original declaration of conformity is available from PMA/TOOLS AG.

The nameplate of the Black Box 2.0 and Black Rocket must be mentioned in the CE declaration of conformity. In addition, a CE symbol must be affixed to the Black Box 2.0 and Black Rocket.



Technical data

Mean Well power pack:

Input: 100-240 V AC, 50/60 Hz, 1.3 A

Output: 24 V = 3.75 A, 90 W MAX.

Indoor use only

Article No.: GST90A24-P1M

Black Box 2.0:

Article No: 10453400

Input: 18-24 V = 3.5 A

Output: 10 V = 250 mA

Outlet pressure range: 150-4200 mbar

Integrated battery: Li-Ion-14.8 V-5200 mAh 4S2P-block

Protection class: 3, safety extra-low voltage

Dimensions Black Box 2.0: L: 213 mm/W: 157 mm/H: 151 mm

Spiral hose: L: 2 m

Display: L: 108 mm/W: 64.80 mm/Pixels: 800 x 480

Black Rocket:

Input: 10 V = 250 mA

Wavelength: 365 nm

UV-LED lamp cable: L: approx. 2 m

Black Box 2.0 case:

Total weight: 7.5 kg

Case dimensions: 464 mm x 366 mm x 176 mm

Intended use

The Black Box 2.0 is a semi-automated repair system for vehicle windows. The repair programs of the Black Box 2.0 fill a synthetic resin through alternating pressure states.

Changes and modifications

The device may not be modified or changed without authorization. No parts may be added or installed that are not approved by PMA/TOOLS AG. Unauthorised modifications or changes will void the CE conformity of the unit and the unit may no longer be operated. PMA/TOOLS AG is not liable for damage, dangers, injuries or misappropriation of the device resulting from unauthorised modifications or changes or from failure to observe the regulations in this manual.

What to do in the event of malfunctions and irregularities

The device may only be operated if it is in perfect condition. If, as operator, you determine irregularities, faults or damage, take the device out of operation immediately and inform PMA/TOOLS AG.

Switching off the device in an emergency

Switch off the device using the on/off switch (illuminated button). If the power pack is connected, immediately disconnect the power plug from the power supply.

Properly charging the Black Box 2.0

The Black Box 2.0 may only be charged with the included power pack from Mean Well. Check whether the mains voltage corresponds to the specification on the nameplate of the power pack. Connect the device to the power pack/a standardised mains socket, see chapter for connection value "Technical data". The internal Li-Ion battery of the Black Box 2.0 can only be charged between 5°C and 30°C ambient temperature. The Black Rocket does not contain an integrated rechargeable battery, it is operated exclusively by the Black Box 2.0 with the help of the UV lamp cable.

Illuminated button battery indicator:

When the device is charged, the green LED in the on/off button pulsates.

When the battery is fully charged, the green LED in the on/off button lights up continuously.

Please note:

The Black Box 2.0 can also be put into operation with the power pack connected.

Battery status in the display:

- Green 50 to 100 %
- Orange 20 to 50 %
- Red < 20 %



Please note:

If the battery indicator lights up red, the device must be charged using the Mean Well power pack supplied.

Environment parameters:

Use of the Black Box 2.0 only in dry environments with temperatures between 8°C and 40°C and between 30 % and 85 % relative humidity.

Disposal and storage

Disposal

The symbol of a crossed-out wheeled bin shows that this device is subject to Directive 2012/19/EU. This directive states that at the end of its useful life you may not dispose of this device with normal household waste, but must hand it in at specially set up collection points, recycling centres, waste disposal companies or at PMA/TOOLS AG.

Disposal at PMA/TOOLS AG is free of charge for you. Protect the environment and dispose of it properly. For more information, please contact your local waste disposal company or the city or local authority.

WEEE - Waste of Electrical and Electronic Equipment: We are registered with the Stiftung Elektro-Altgeräte Register (EAR) for articles according to §6 (2) ElektroG (German Law on Electric and Electronic Appliances). DE 65439833



Storage

Store the device in a dry and dust-free place out of direct sunlight. The integrated Li-ion battery should be fully charged for longer storage in order to extend the service life. Charge the integrated Li-ion battery regularly if it is not going to be used for a longer period of time. This is necessary to save the battery.

Storage time at a relative humidity between 10 % and 90 %, non-condensing and at an ambient temperature between -20 °C and +20 °C for a maximum of 1 year.

Storage time at a relative humidity between 10 % and 90 %, non-condensing and at an ambient temperature between -20 °C and +45 °C for a maximum of 3 months.

Operating and display elements



Speed button

Automated control programme runtime: 2 minutes automated change between negative and positive pressure phases.



6 minutes button

Automated control programmruntime: 6 minutes automated change between negative and positive pressure phases.



12 minutes button

Automated control programme runtime: 12 minutes automated change between negative and positive pressure phases.



Manual button

Manual control programme. The runtime and change between negative pressure and positive pressure phases can be controlled by the user.



UV LED button

Semi-automated control programme for the UV LED lamp. The runtime of the UV LED lamp can be set by the user.



Mandatory sign

Use eye protection: Wear suitable UV/shock protection goggles (EN166) when working.



Return button

Within the control programmes, the system inflates or deflates to ambient pressure and returns to the programme selection. In the settings, the “Return button” is used to switch to the previous mask.



Play button

Starts the selected control programme.



Stop button

Ends the selected control programme.



Minus button

Negative pressure in the manual control programme. Reduces the previously selected runtime of the UV LED lamp by 10 seconds.



Plus button

Press in the manual control programme. Increases the runtime of the UV LED lamp by 30 seconds.



Setting button



Please note

This pictogram indicates error messages.



Information button

Software version, serial number, number of repairs.



Illuminated button

On/off switch on the Black Box 2.0 housing.



Battery indicator

Indicates the charge status of the battery.



Language settings button

Changes the menu languages. German, English, French, Spanish, Italian



Screen brightness

Setting bright/dark.



Brightness control

Connections:

- UV LED lamp plug/socket
- Power supply plug/socket
- Air connection for Black Box 2.0 (male)
- Spiral hose, air connection (female)

Operation

Notes on stone chip preparation

Open the centre of impact with the included scribe.

Use the nylon brush to remove chips and glass dust from the damaged area.

Make sure the repair site is dry and free of grease.
Recommendation: PMA/TOOLS Prep & Clean (Art. No. 13345102)

Preparation for repairs

Attach the inspection mirror to the windscreen from the inside so that the entire stone chip is visible from the outside.

Position the Black Rocket repair bridge centred over the centre of impact and also ensure that the suction cups are firmly seated.

Now turn the injector of the Black Rocket repair bridge down onto the glass surface, you should feel a slight pressure. Make sure that the centre of impact is inside the sealing ring of the injector.

Fill in 3-5 drops, depending on the size of the stone chip Resin in the injector of the Black Rocket.

Recommendation: PMA/TOOLS UV repair resin BB1 (Art. No. : 10453135) Note: When using the synthetic resin, please note the safety instructions on the safety data sheet.

Commissioning the Black Box 2.0

The Black Box 2.0 is switched on by pressing the illuminated on/off button once.

Pressing the illuminated on/off button again switches off the system immediately (regardless of which function the Black Box 2.0 is in).

In the switch-on phase, the Black Box 2.0 carries out a self-diagnosis. The current ambient pressure is determined in order to always achieve optimal negative and positive pressure states.

Homescreen: Touch display overview of all control programmes



Automated control programme 2 min. SPEED

- 10 sec. negative pressure
- 50 sec. positive pressure
- 10 sec. negative pressure
- 50 sec. positive pressure



Automated control programme 6 min.

- 30 sec. negative pressure
- 2 min. positive pressure
- 30 sec. negative pressure
- 3 min. positive pressure



Automated control programme 12 min.

- 1 min. negative pressure
- 4 min. positive pressure
- 30 sec. negative pressure
- 2 min. positive pressure
- 30 sec. negative pressure
- 4 min. positive pressure



Manual control programme

Negative and positive pressure phases can be time controlled.



Semi-automated control programme for UV LED lamp

The runtime of the UV LED lamp can be set by the user.

Automated control programmes

After selecting an automated control programme, the operating options listed below are displayed. The currently measured ambient pressure is also displayed in millibars and the running time of the selected time programme in minutes and seconds.



The automated control programme is started by pressing the "Play button". The system changes between negative and positive pressure phases.



The programme is ended by pressing the "Stop button". The state last reached (negative or positive pressure) is retained and continues to be shown on the display.



By pressing the „UV LED button“, the system switches to the semi-automated control programme for the UV LED lamp.



Pressing the "Manual button" changes the system to the manual control programme.



By pressing the "Return button", the system is ventilated or vented and changes to the home screen.

Please note

During the alternating pressure states, all operating options are inactive except for the "Stop button".

After a programme runtime has elapsed or by pressing the "Stop button", the following operating options become active again:
UV LED button/Manual button/Return button. The pressure state is retained.



During the negative or positive pressure phase, all operating options are inactive except for the "Stop button". The programme is stopped by pressing the "Stop button". The last state reached (positive pressure or negative pressure) is retained and continues to be shown in the display, the other operating options are activated again.

Manual control programme



By pressing the "Minus button" once, the negative pressure phase is started.



By pressing the "Plus button" once, the positive pressure phase is started.



By pressing the "UV LED button", the system switches to the semi-automated control programme for the UV LED lamp.



By pressing the "Return button", the system is ventilated or vented and changes to the home screen.

Semi-automated control programme for the UV-LED lamp



By pressing the "Minus button" once, the UV LED lamp time is reduced in 10 second increments. A user-specific runtime of the UV lamp is thus possible.



By pressing the "Plus button" once, the UV LED lamp time is increased in 30 second steps. The maximum runtime of the UV LED lamp is limited to 2 minutes.

Please note:
Establish connection between the Black Box 2.0 and Black Rocket with the UV-LED connection cable.



By pressing the "Start button", the previously set runtime and the integrated UV LED lamp in the Black Rocket are started.



By pressing the "Stop button" the UV LED lamp is switched off and the runtime is reset to 00:00.



By pressing the „Return button“ the system is ventilated or vented and changes to the home screen.

Settings



Language selection

German, English, French, Spanish, Italian
By selecting the desired national language, the complete Black Box 2.0 menu including all information and warnings is switched to the selected language.



Information

Software version, serial number, number of repairs.



Screen brightness

The brightness can be adjusted by moving the slider of the display individually.

Repair finish

Remove the Black Rocket from the laminated glass.

Carefully clean the damaged area. Recommendation: PMA/TOOLS Prep & Clean (Art. No.: 13345102)

Seal the damaged area on the laminated glass pane with synthetic resin.

Recommendation: PMA/TOOLS UV sealing resin BB2 (Art. No.: 10453136). Note: When using the synthetic resin, follow the safety instructions on the safety data sheet.



In order to be able to achieve complete curing, you need a cover film, this is placed on the applied synthetic resin on the glass surface without air bubbles. Recommendation: PMA/TOOLS UV resin sealing film (Art. No.: 10453815).

The curing takes place with the Black Rocket, it must be ensured that the injector of the Black Rocket is screwed upwards.

The required settings on the Black Box 2.0 can be found in the instruction manual under "Operation of the semi-automated control programme" for the UV lamps.

After curing, the Black Rocket and cover film are removed from the laminated glass pane.

The remaining hardened synthetic resin is scraped off with the replacement blades included in the set.

Recommendation: The PMA/TOOLS polishing compound BB3 allows the damaged area to be polished (Art. No.: 10453137).

Cleaning

The Black Box 2.0, Black Rocket and their components as well as the accessories contained in the set may only be cleaned with the PMA/TOOLS Prep & Clean (Art. No.: 13345102).

We recommend cleaning the components that have come into contact with synthetic resin after each repair to prevent the synthetic resin from curing.

You can buy the articles in the PMA/TOOLS webshop at: <https://eshop.pma-tools.com>.

Error messages



Leak!
Check connections!
Program must be restarted!

If the error message "Leak" appears on the display, the integrated pump of the Black Box is unable to reach the cut-off pressure for negative pressure and positive pressure. In this case, all air connections and support for the injector seal of the Black Rocket on the glass surface should be checked for correct seating. The programme must be restarted.



Software error!
Please contact our customer support!
0049 2154 922230

Contact the technical customer support of PMA/TOOLS AG immediately if see the error message "Software error".



Caution,
low device temperature!



The recommended operating temperature is below minimum.

Possible malfunctions and their sources of error

Fault	Possible sources of error	Remedial measures
The Black Box 2.0 cannot be switched on after pressing the illuminated on/off switch.	The integrated Li-ion battery is fully discharged.	Connect the Black Box 2.0 with the enclosed power pack from Mean Well and connect it to a standardised power socket for at least 30 minutes, refer to chapter "Technical data" for connection value.
The integrated Li-Ion battery of the Black Box 2.0 is not charged even though the power pack is connected.	<ol style="list-style-type: none"> 1. The Mean Well power pack is not properly connected. 2. The power pack used is defective or not suitable for the Black Box 2.0. 	<ol style="list-style-type: none"> 1. When connecting the power pack, ensure that the plug connections are correctly seated. 2. To charge the internal Li-ion battery of the Black Box 2.0, only the included power pack from Mean Well with article no. GST90A24-P1M is to be used.

Fault	Possible sources of error	Remedial measures
The integrated Li-Ion battery of the Black Box 2.0 is not charged despite the connected power pack.	<ol style="list-style-type: none"> 3. The Black Box 2.0 was not charged in the approved ambient temperature, see chapter "Properly charging the Black Box 2.0". 	<ol style="list-style-type: none"> 3. When charging the Black Box 2.0, make sure that the ambient temperatures are as described in the chapter "Properly charging the Black Box 2.0".
The shutdown pressure cannot be attained.	<ol style="list-style-type: none"> 1. Leak in the spiral hose. 2. Leak in the injector. 	<ol style="list-style-type: none"> 1. Check the quick coupling systems for correct seating. 2. Check the contact of the injector on the windscreen.
The synthetic resin does not cure completely.	<ol style="list-style-type: none"> 1. The synthetic resin used is not suitable for the integrated UV LED lamp of the Black Rocket. 2. The UV LED lamp in the Black Rocket does not come on. 	<ol style="list-style-type: none"> 1. Only use synthetic resins that cure in a wavelength range of 365 nm. Recommendation: PMA/TOOLS UV repair resin BB1/BB2. 2. Check connection to the Black Box 2.0. In the case of a defective device inform PMA/TOOLS AG.

Equipment and accessories

No.	Article	Art. No.	Description	Cont.	Unit
1	Black Box Set	10453400	Black Box 2.0 case	1	pc.
2	Black Box 2.0	10453401	Electronic device	1	pc.
3	Black Rocket	10453417	Repair bridge with integrated UV LED lamp/injector	1	pc.
4	Mean Well power pack 24 V	10453406	Power pack	1	pc.
5	Mains adapter 14,4 V	10453407	Mains adapter for power pack	1	pc.
6	Spiral hose	10453411	Spiral hose with quick coupling	1	pc.
7	UV LED lamp cable	10453420	Black Rocket connection cable	1	pc.
8	Sealing rings	10453409	Injector	10	pcs.
9	Marking tool	10453132	To extend the point of impact	1	pc.
10	Nylon brush	10453134	To remove the glass fragments	1	pc.
11	UV resin sealing films	10453815	Cover film for synthetic resin	25	pcs.
12	Replacement blades	02160303-1	Replacement blades for scraping off the synthetic resin	100	pcs.
13	Fleece pads	13353309	For polishing the damaged area	25	pcs.

No.	Article	Art. No.	Description	Cont.	Unit
14	Inspection mirror	10453402	For a better view of the damaged area	1	pc.
15	PMA/TOOLS UV repair resin BB1	10453135	UV repair resin BB1 with low viscosity to fill the stone chip, 14 ml	1	pc.
16	PMA/TOOLS UV sealing resin BB2	10453136	UV sealing resin BB2 is used to seal the treated stone chip repair spot, 2 ml	1	pc.
17	PMA/TOOLS Polishing compound BB3	10453137	Polishing compound used to polish the repaired stone chip, 80 ml	1	pc.



Head office

PMA/TOOLS AG

Siemensring 42
47877 Willich/Germany
Tel.: +49 2154 922230
Fax: +49 2154 922255
E-Mail: info@pma-tools.de
www.pma-tools.de

Subsidiaries

PMA/TOOLS FRANCE

Z.A.-214, rue de la Warnave
59850 Nieppe
Tél.: +33 320 970249
Fax: +33 320 326140
E-Mail: info@pma-tools.fr
www.pma-tools.fr

PMA/TOOLS España S.L.U.

Sta. Margarida de Boada Vell 7-9
P.I. Riera de Caldes, Nave 12
08184 Palau-solità i
Plegamans (BCN)
Tel.: +34 93 8648517
Fax: +34 93 8640020
E-Mail: info@pma-tools.es
www.pma-tools.es

PMA/TOOLS Inc.

201 Mills St.
East Flat Rock
NC 28726, USA
Tel.: +1 828 2334060
Fax: +1 828 2334070
E-Mail: info@pma-tools.com
www.pmatools.com

PMA Tools Co. Ltd.

Building No. 8
East Guangzhou Road No. 188
215413 Taicang
Jiangsu Province
P.R. China
Tel.: +86 512 33011211
E-Mail: china@pma-tools.com

