WHEELRESTORE

WM600

User manual

Version 20241022

This Manual is published by:

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Content

1 – Introduction

Dear technician,

We are confident that you will enjoy working with your new WM600 – Fully Automatic Wheel Spray Robot & Spray Booth.

Your machine is running with Software version: XXXX

We would like to hear about your experiences with the WM600. A few words concerning the things that have made an impression on you - positive or negative - would be of great help to us in our efforts to improve our products to an even higher standard. If you have any questions or need additional products, we will assist you with further advice.

If you have any other types of questions, we refer to our Service & Support platform at www.support.wheelrestore.com. Use your login provided at initial training.

We strongly advise integrating a water separator with your machine to ensure optiomal performance.

Thank you.

2 - Disclaimer

General Safety Guidelines for Robot Operations

Authorized Personnel:
Only authorized and properly trained personnel should operate or interact with the robot. Untrained individuals may be at risk of injury or damage when working with the robot.

Read and Follow Instructions:
Thoroughly read and understand all provided instructions, manuals, safety guidelines, and warnings associated with the robot. Adhere to the recommended operating procedures and safety precautions.

Training and Familiarization:
Ensure that all personnel operating or working with the robot receive comprehensive training on its safe operation, programming, and maintenance. Familiarize yourself with the robot's specific features, limitations, and emergency stop procedures.

Risk Assessment:
Conduct a thorough risk assessment of the work environment and tasks involving the robot. Identify potential hazards and implement appropriate safety measures to mitigate risks, such as barriers, safety interlocks, or protective enclosures.

Personal Protective Equipment (PPE):
Wear the required PPE, such as safety glasses, gloves, and protective clothing, as specified for the specific robot and its associated tasks. Additional PPE may be necessary based on the work environment.

Emergency Stop:
Know the location and operation of the emergency stop button or switches. Be prepared to stop the robot’s operation quickly and safely, in case of an emergency or unsafe situation.

Safe Work Envelope:
Be aware of the robot's reach, movement range, and any potential pinch points or collision areas. Maintain a safe distance from the robot while it is in operation to prevent accidental contact.

Restricted Access:
Control access to the robot's workspace to authorized personnel only. Ensure that non-essential personnel are kept at a safe distance from the robot during operation to prevent accidents or interference.

Interference Prevention:
Keep the work area clear of obstacles, tools, or loose objects that may interfere with the robot's movement or operation. Ensure that no personnel are within the robot's reach or hazardous zones while it is in motion.

Tooling and Fixtures:
Follow proper procedures for installing, securing, and removing tooling or fixtures on the robot. Ensure that they are correctly aligned, fastened, and suitable for the intended tasks to prevent accidents or equipment damage.

Maintenance and Inspection:

Regularly inspect the robot for signs of wear, damage, or malfunction. Follow the manufacturer's recommended maintenance schedule and promptly address any issues or faults to maintain the robot's optimal performance and safety.

Communication and Collaboration:

Establish clear communication channels and protocols when working with the robot in a shared workspace. Coordinate tasks with other personnel to prevent conflicts and ensure safe collaboration.

Power and Energy Sources:

Exercise caution when working with power sources or energy systems connected to the robot. Follow proper lockout/tagout procedures when performing maintenance, repairs, or accessing electrical components.

Reporting Safety Concerns:

If any safety hazards or concerns related to the robot are identified, report them immediately to the appropriate personnel or supervisor. Do not operate the robot if there are unresolved safety issues.

Product Liability Disclaimer

Proper Use and Maintenance:

a. Users are responsible for using the product in accordance with the provided instructions, manuals, and guidelines.

b. Regular maintenance, inspection, and servicing of the product are necessary to ensure its continued safe and effective operation.

c. Failure to follow proper use and maintenance procedures may result in personal injury, property damage, or other adverse consequences for which WheelRestore cannot be held liable.

Assumption of Risk:

a. Use of the product involves inherent risks, and users assume full responsibility for these risks.

b. Users acknowledge that WheelRestore cannot control or predict all potential circumstances or conditions under which the product may be used, and therefore, users accept any associated risks.

Product Suitability:

a. It is the responsibility of users to determine the suitability of the product for their specific needs, requirements, and intended applications.

b. WheelRestore provides product information, specifications, and recommendations to the best of its knowledge and abilities, but it does not guarantee the product's suitability for any particular purpose.

Third-Party Components or Modifications:

a. WheelRestore may incorporate third-party components or parts into its products. The performance, reliability, or safety of these components is subject to the respective manufacturer's specifications and warranties.

b. Any modifications or alterations made to the product by the user or any third party without explicit authorization from WheelRestore may void warranties and release WheelRestore from liability.

Limitation of Liability:

a. To the maximum extent permitted by applicable law, WheelRestore shall not be liable for any direct, indirect, incidental, consequential, or special damages arising from the use, misuse, or inability to use the product, including but not limited to personal injury, property damage, loss of profits, or interruption of business operations.

b. The total liability of WheelRestore for any claim related to the product shall not exceed the purchase price paid by the user for the product.

Indemnification:

a. Users agree to indemnify, defend, and hold harmless WheelRestore, its employees, agents, and affiliates from any claims, demands, damages, liabilities, and expenses, including reasonable attorney fees, arising out of or in connection with the use or misuse of the product.

Product Modifications and Discontinuation:

a. WheelRestore reserves the right to modify, improve, or discontinue its products without prior notice, and shall not be obligated to provide retrofitting or updates to previously sold products.

Applicable Laws and Jurisdiction:

a. This disclaimer shall be governed by and construed in accordance with the laws of the jurisdiction in which WheelRestore operates. b. Any disputes arising from or in connection with this disclaimer shall be subject to the exclusive jurisdiction of the courts in the forementioned jurisdiction.

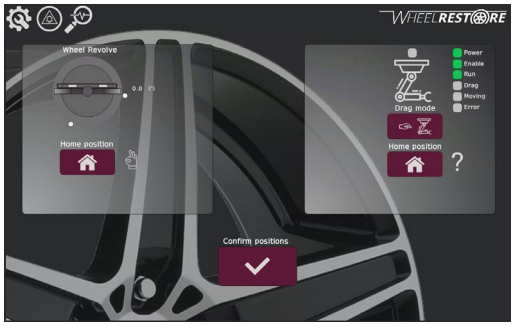
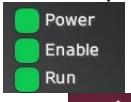
By using the product, users acknowledge that they have read, understood, and agreed to comply with this product liability disclaimer. Users should consult legal or professional advice, if they have any concerns or questions regarding their rights, responsibilities, or obligations related to the use of the product.

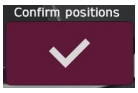
3 – General limitation and preparation for rim painting

This machine is limited to paint alloy rims, with a maximum diameter of 558 mm - 22 inch. The rim width is between 150MM – 310MM.
Clean the rim using an acid free rim cleaner and make sure all brake dust is removed from the inside and outside of the wheel.
Check the wheel for cracks and dents. If the wheel has a dent, split or tear it needs to be repaired prior to the painting process.
Remove the tire from the rim using a tire machine.
Take off all balancing weights and center cap from the rim and make sure all adhesive is removed.
Check if the painted part of the rim has damages. If so, this needs to be repaired prior to the painting process. You can use one of our HBC rim repair systems.
Prepare the painted part of the rim by using Scotch-Brite (grey) or blast the rim in our Wheel Blasting cabinet to matt the rim, making it ready for the painting process.
Remove all dust from the wheel by using HBC E3 Wheel cleaner (part no. 755) and dry it using a clean cloth
Use a TagRag (part no. 150) to remove the fine dust as the last step before painting.

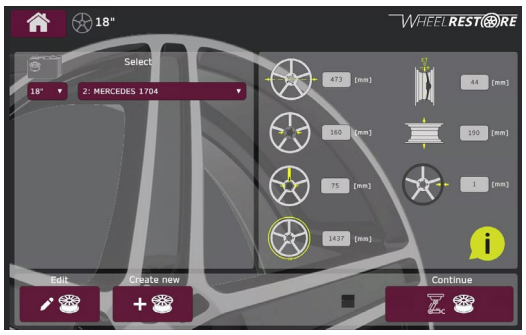
4 – Power up and initializing

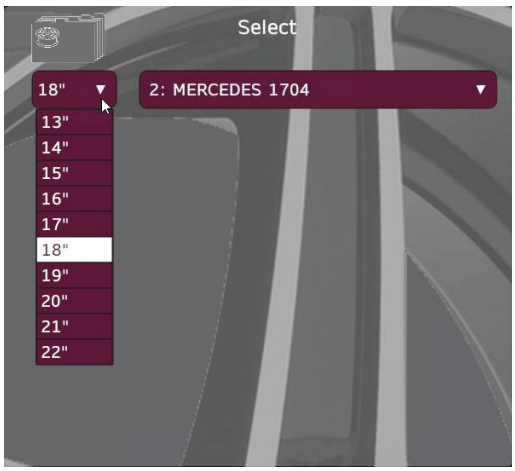
- Connect the air supply to the machine. The machine requires min. 6 bar to operate.
- Connect the LAN cable to the back of the HMI screen at the open port (ETH1).
- Connect the power by plugging in the plug into the socket. The machine requires 230V, 16A.
- Once powered up wait until you see the Startup screen.

	When switching power on, and after certain alarm conditions, the machine will require a homing routine for the robot and wheel holder. Tap the window to start. NOTE: If the HMI screen is not responsive press and hold the blue reset button for min. 3 seconds.
	Check the position of the wheel holder and robot arm. If the wheel holder is in vertical position, click  The wheel holder will now move to a horizontal (home) position. On the screen this sign  confirms the wheel holder is in home position. Check to make sure there's communication between the robot and computer. The Power, Enable and Run light turn green  Click  to bring the robot to home position. On the screen this sign  confirms the robot is in home position.

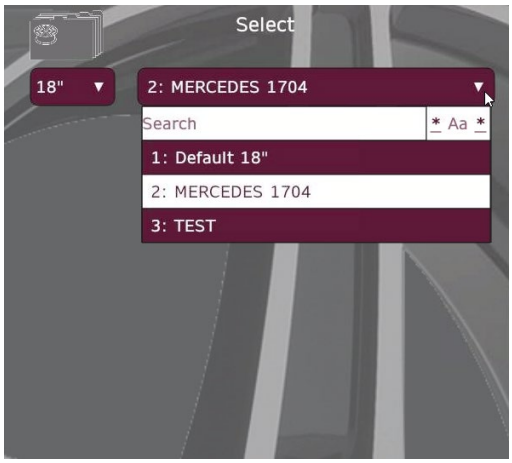
	*NOTE: If the wheel holder is within the limits of the limit switches (red lights appear on the screen next to the wheel holder) you first need to move the wheel holder out of reach of the limit switches by using the joystick Click here  to confirm the homing of the wheel holder and robot are done. NOTE: If the HMI screen is not responsive press and hold the blue reset button for min. 3 seconds.

5 – Fully Automatic Painting using the Robot

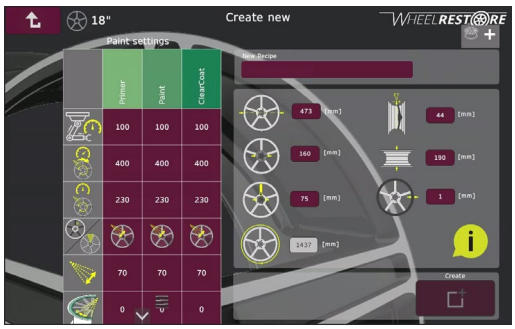
	The main screen will open. Put the selector switch on “auto”.
	Click  to open the window for the settings
	This window opens showing various settings and options. To create a new wheel which has not been saved before click 



If you want to paint a wheel from the diary click on the wheel diameter and select the size of the wheel.



If the wheel has been saved before in the machine you can select it by clicking on the arrow and select the wheel from the drop-down menu



Click 

to enter the new name of the wheel. Using a part number makes the diary easy to use.

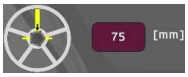
Enter the dimensions of the wheel:

Click 

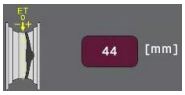
to enter the outer dimensions in mm.

Click 

to enter the inner diameter in mm.

Click 

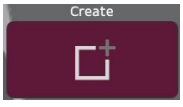
to enter the center diameter in mm.

Click 

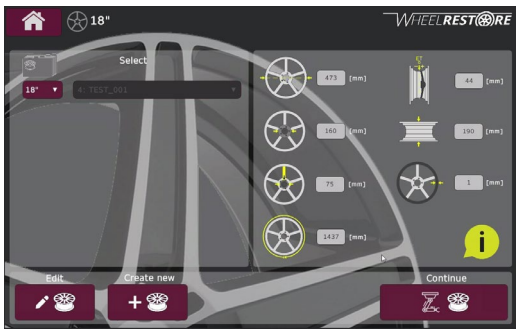
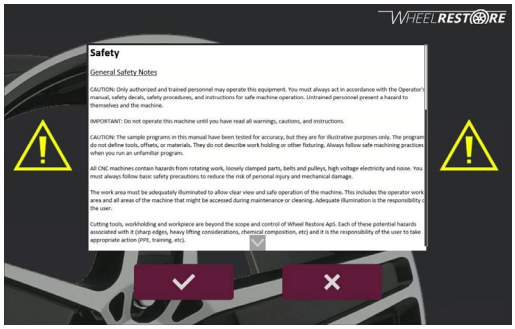
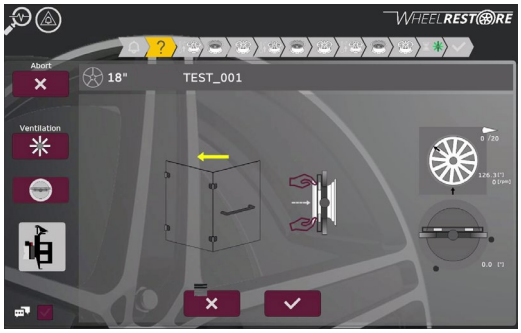
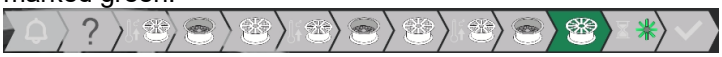
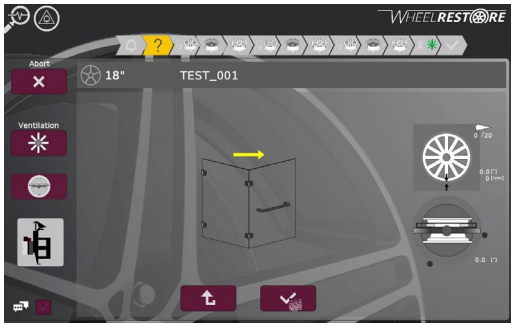
to enter the ET value

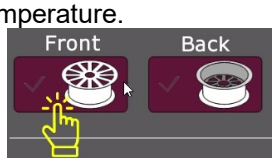
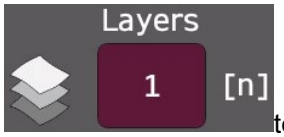
Click 

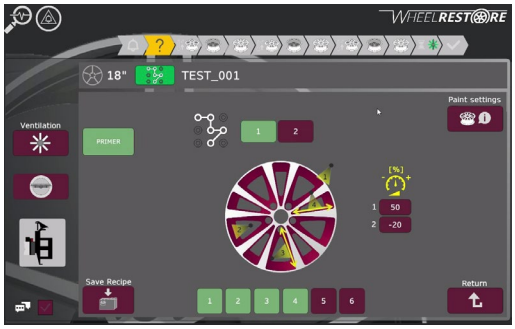
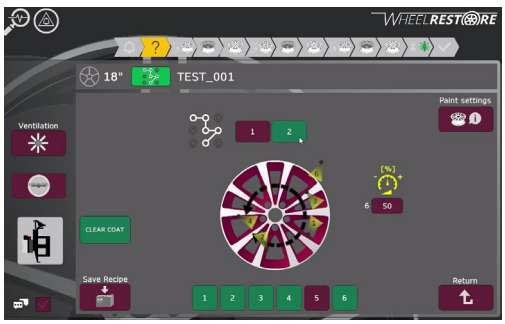
to enter the width in mm.

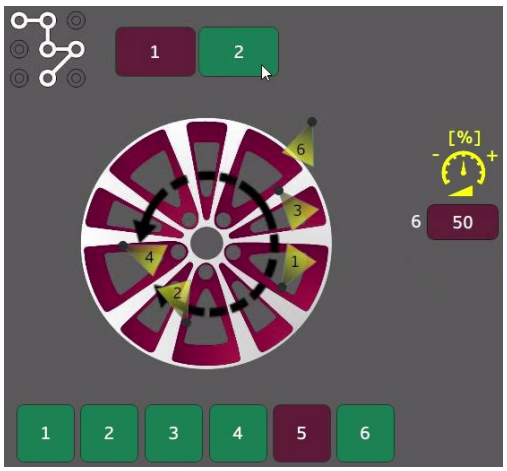
Click 

to confirm the dimensions for this wheel

	Click “continue” to go to the next window
	Read the safety disclaimer and press  once agreed
	Open the door to put the wheel in the holder. This indicates the steps in the process. The current step is marked green. 
	Tighten the wheel in the wheel holder and use a torque wrench set on 10Nm. Make sure the wheel is completely cleaned and degreased with silicon remover using a lint free cloth. When you only paint the front of the wheel mask the inner part of the wheel with masking paper and tape. Use a Tag Rag to remove the last fine dust from the wheel.
	Close the door and press the blue reset button.

	Select “primer”, “paint” and/or “clearcoat”.
	Once the selection is made, click  to edit the settings
	Select the type of primer, paint and/or clear coat you’re using in the top of the screen. This selection is depending on the part number. Aerosol selection can be either normal aerosol or upside-down aerosol as indicated on the icon. Once selected the product icon turns green. Once this is selected the type of application is default according to the TDS of the product selected. Select  if the wheel is very cold and needs preheating. 1 minute preheating equals 1 degree raise of temperature. Click  to paint front and/or back side of the wheel. Click  to change the amount of layers Click  to (de)select the first layer to be a fast coat. Click  to change the flash off time between coats. Click  to select the IR lamp or UV lamp and curing time.

	Click  to go to the robot settings. Click  to confirm the settings.
	This screen allows you to change the default settings and painting pattern. As a default painting pattern 1 is selected. Once the preferred selection gives you a satisfying result click  to save the settings for this wheel. This icon  shows what toolis inside the robot. Click here  to change the position of the wheel once the painting processis done. Click  to start/stop the ventilation Click  to go to paint settings and wheel dimensions
	Painting part direction can be (de-)selected here. The numbers 1-6 refer to the picture of the wheel above. The speed of the robot movement can be adjusted if needed. “-“ means slower speed in % “+” means higher speed in %
	When pattern 2 is selected this window will be shown. Click  to go to paint settings and wheel dimensions



Painting part direction can be (de-)selected here.
The numbers 1-6 refer to the picture of the wheel above.
The speed of the robot movement can be adjusted if needed.
“-“ means slower speed in %
“+” means higher speed in %

Here you can adjust/change the wheel dimensions, robot speed movement and painting angle/height of the gun/aerosol towards the wheel.

Click  to enable changes.

Change this value 

of the middles center cap dimension to the same value as noted here 

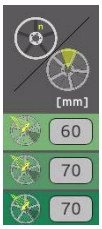
if painting direction 6 is selected.

Click 

to adjust the robot movement speed of the first (fast) coat.

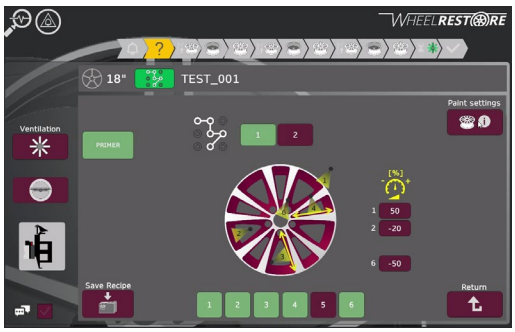
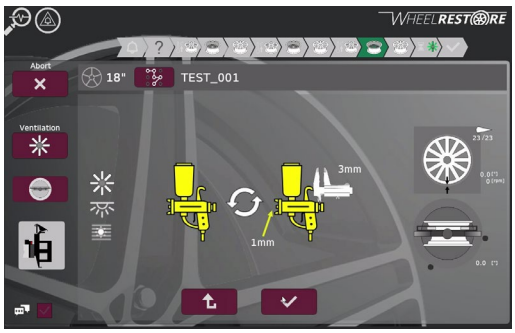
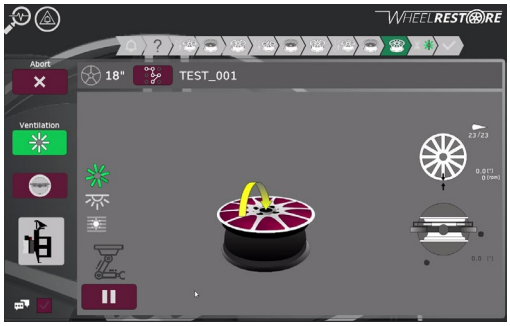
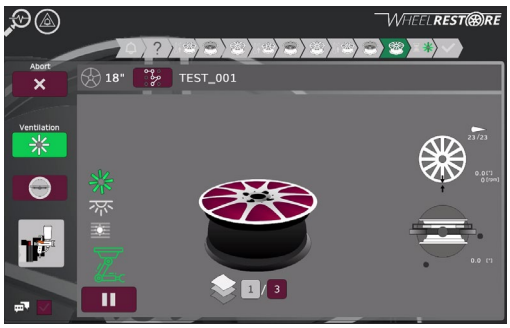
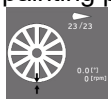
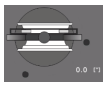
Click 

to adjust the robot movement speed of the following coats.

Click 

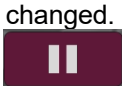
to change the size of the slices in which the wheel is diverted.

	Click here to change the distance between paintgun/aerosol and wheel when painting the outer edge: “-“ will give more paint on the flat surface of the wheel “+” will give more paint on the outer edge of the wheel
	Click here to change the distance in the center of the wheel between paintgun/aerosol: “-“will be closer to the wheel center “+” will be further from the wheel center
	Click here to change the spraying angle when moving outwards when painting the outer edge
	Click here to change the distance between the paintgun/aerosol and the outer edge of the wheel: “-“will be closer to the wheel edge “+” will be further from the wheel edge
	Click here to change the spraying angle when moving inwards to the center of the wheel
	Click here to change the spraying angle when moving outwards when painting the spokes Click  to go back to wheel settings.

	Click  to go back to primer, paint and clearcoat selections
	Once the type of application is done click 
	When using the paintgun make sure the trigger opening is as indicated on the picture. Click  to confirm. Click  to go back.
	The wheel will turn into the selected side to be painted
	The painting process starts. This  indicates the amount of “slices” in which the wheel is diverted. This  indicates the position of the wheel holder. This  indicate the layer it’s currently painting (1st out of 3). Click  if you want to change the amount of layers.

This window shows the flash off period.

Click  on the numbers if the flash off period needs to be changed.

Click  to pause the process. This allows you to do adjustments in the process.

Click  to continue the process.

Click  to go to paint and robot settings.

After the painting process and the last flash off time the robot takes the IR lamp or UV lamp to start the curing process.

The robot is indicated green  when moving.

This window is shown during the curing process.

Here  the rotating speed of the wheel while curing is shown. You can click on the value to edit this.

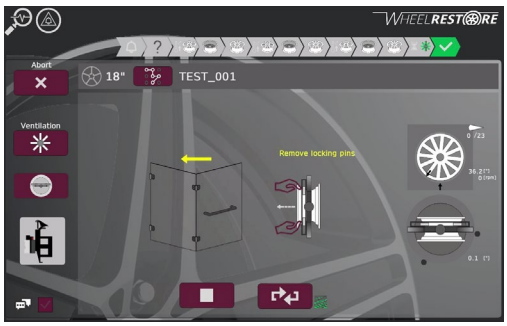
Here  the countdown timer of the curing time is shown. You can click on the value to edit this.
After curing the robot puts the curing lamp back into its holder and moves to the home position.

After the curing process this window is shown.

Click  to overwrite the existing wheel.

Click  to create a new wheel.

Click  to continue.



This window shows you have to remove the pins locking the wheel holder. Once done you can remove the wheel out of the machine.

Click  to abort the process to go to the main screen.

	This is the main screen to restart the process.

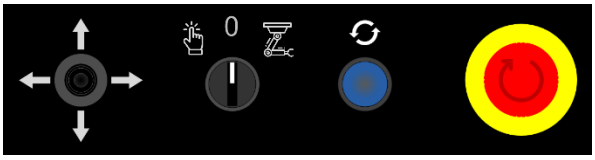
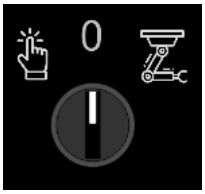
5 – Painting Quality – Final product guidance – Settings Paint gun

- Paint application has a preferable setting for the best quality. Depending on the application by either paint gun or aerosol we recommend usage of these settings.
- Ideal object temperature is 20 degrees Celsius / 70 degrees Fahrenheit.
- Ideal paint temperature is 30 degrees Celsius / 80 degrees Fahrenheit.
- Operating pressure when using the paint gun is 2 bar and can be adjusted by turning the manometer inside the cabinet.
- Mixing ratio of the 840 Diamond Cut Clearcoat is 5:1 plus 50% thinner. E.g. 100 grams Clearcoat

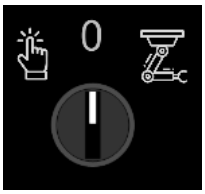
- KEY-POINTS FOR A PERFECT PAINTING RESULT
  - Rim Temperature
    - Recommended temperature is ~20 degrees Celsius / 70 degrees Fahrenheit.
  - Product temperature
    - Aerosol: recommended temperature is ~30 degress Celsius / 80 degrees Fahrenheit.
    - Mixing paint; recommended temperature is ~20 degrees Celsius / 70 degrees Fahrenheit.
  - Spray distance
    - Recommended distance between rim and aerosol/paint gun is 10-15 cm
  - Product viscosity
  - Spray travel speed
  - Spray nozzle
  - Spray pressure
  - First layer half coat
  - Flash-off time 4 min. for Clearcoat, 10 min. for Base coat. This can differ between paint suppliers. Check TDS from the paint supplier.
  - Second layer full coat “wet in wet spray”
  - Flash-off time 4 min. for Clearcoat, 10 min. for Base coat. This can differ between paint suppliers. Check TDS from the paint supplier.
  - Final curing 15 – 20 min. This can differ between paint suppliers. Check TDS from the paint supplier.

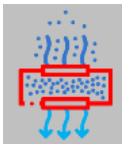
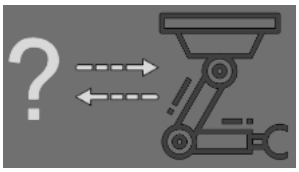
	Opening of the trigger (#1.) of the paint gun is set to 3MM. Air inlet (#2.) is fully opened. Air cap (#3.) is fully opened.

6 – Operating buttons

		Besides the display, there is a set of buttons/switches below the display. Display refers to these buttons, when prompted on the window.
	Emergency stop	When pressed the machine stops immediately. All motors release all energy (free run)
	Reset	Constant light safety function activated. Blinking or sign on the HMI screen waiting for operator, press the button to reset.
	Selector switch	Selector switch position depends on which mode machine is operating in. Switch to  for manual operation. Switch to  for Fully Automatic operation. Display prompts which position to be selected. Switching during operation results in a safety fault and can cause damage to the rim or machine.
	Joystick	Joystick moves the wheel holder horizontal and vertical. Moving the joystick to the left/right spins the rim in that direction.

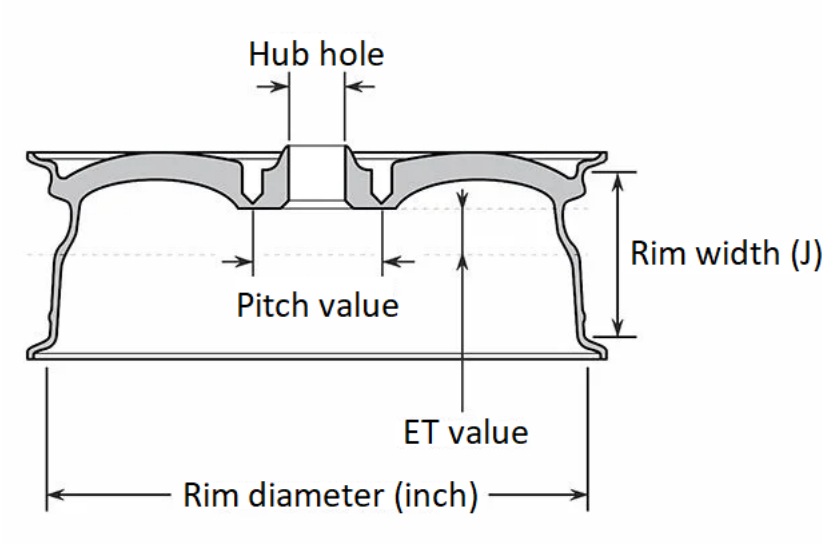
7 – HMI Screen buttons

	Emergency stop
	Reset
	Selector switch
	Joystick
	Rim profile folder
	Internet connection – When green internet connection is active
	Diagnostic screen
	Warnings
	Alarms – Turns red when alarm is present
	Settings - Locked
	Settings - Unlocked
	Fully Automatic Operation – Robot mode
	Manual Operation – Manual mode
	Home button
	Cancel button

	Extraction Fan activated
	No communitation between HMI and Robot
	Confirmation next stage – green when activated

7 – Explanation of the rim

- To fully understand the rim and description as written in the manual, below an explanation of the measurements required before starting the painting procedure. Putting in wrong information may cause damage to the equipment.



8 - Diagnostic Menu

	On the main screen select the  button to go to the Diagnostic menu

Diagnostic screen 1.

Test position of the Joystick 
The arrow of the direction will turn green when the joystick is moved in that direction. When the arrow doesn't turn green the joystick is faulty.

Test position of the Selector Switch 
The color of the position is turning green to the selectors' position. When the function doesn't turn green the selector is faulty.

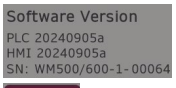
Test position of the "Reset" button 
The reset sign will turn green when the "Reset" button is pushed in. When the doesn't turn green the reset button is faulty.

 Test function emergency stop; when pressing the emergency stop a small red sign will show next to the sign. When the sign doesn't appear the emergency stop is faulty.

This icon 

turns green once the machine is connected to internet.

These QR codes are linked to the various portals:

Here 

you can find the details of your machine.

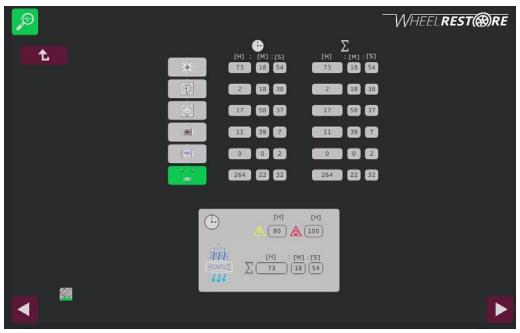
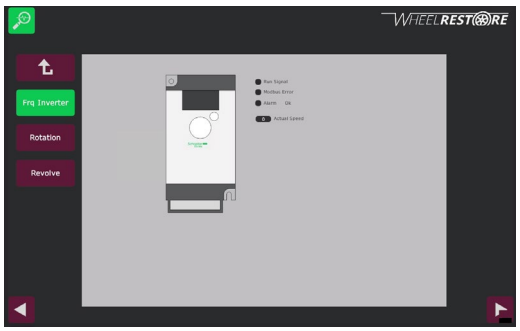
Click  to open the hour counter of the machine. Here you can see the operating hours of the fan, wheel holder motor, wheel spinning motor, IR lamp, UV lamp, light and filter.

Click  to go to the codes of the servo drives and switches.

Click  to go to last paint and robot settings.

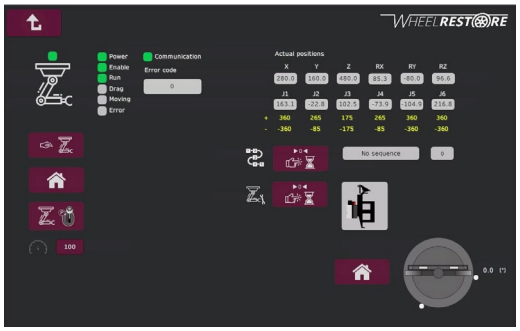
Click  to go to testing functions.

Click  to go to language selection.

	This is the hour counter of the machine. Here you can see the operating hours of the fan, wheel holder motor, wheel spinning motor, IR lamp, UV lamp, light and filter. Click  to go to the next screen. Click  to go to the previous screen.
	This is the window showing the codes of the servo drives and switches. Click  to go to the next screen. Click  to go to the previous screen. Click  to go back.
	This window shows the error codes, position of the robot and wheel holder and which current tool is in the robot Click  to go to the next screen. Click  to go to the previous screen. Click  to go back.

9 – System settings

	Select 
	When locked enter the code provided by Wheel Restore and press “enter” to unlock the settings tab. Click  to enter system settings Click  to enter language settings Click  to unlock the admin/factory settings



Window showing system settings showing the position of the robot, communication and power.

Click  to move the robot manually; press the green button on the back of the robot arm and move the robot arm to a free position.

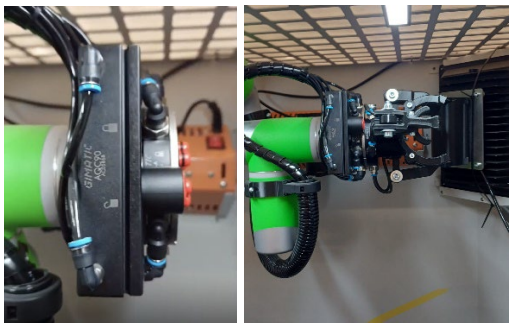
Click  to move the robot to its home position.

Click  to move the robot in the “park” position for transport purposes.

Press and keep pressed here  to reset the painting process. This is used when the painting process is interrupted or aborted in the middle of the process and allows you to start the new process without memorising the last step in the process.

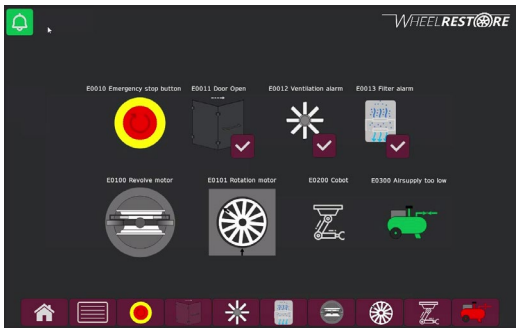
As default the aerosol holder should always be mounted in the robot arm. In case there was a collision or any sort of error during the process make sure to mount the aerosol holder in the robot.

Disconnect the air supply from the machine, unlock the holder, put the aerosol holder in the robot arm and lock the device. Connect the air supply.



Press and keep pressed  to reset the tool.

Select  to go to Alarm settings



Alarm settings window allows you to select different alarm windows.

Click  to see the alarm log.

Click  to access the emergency stop and reset button.

Click  to access the door lock and reset button.

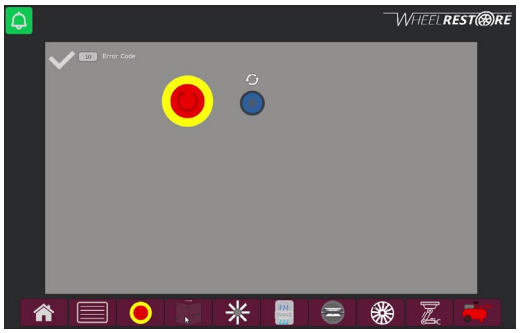
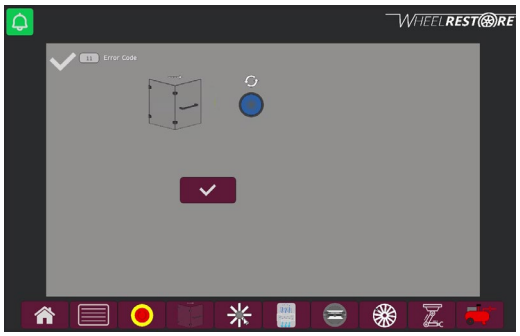
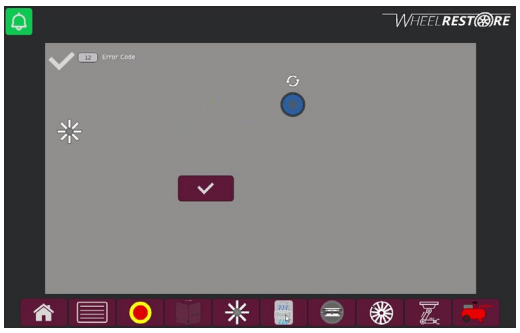
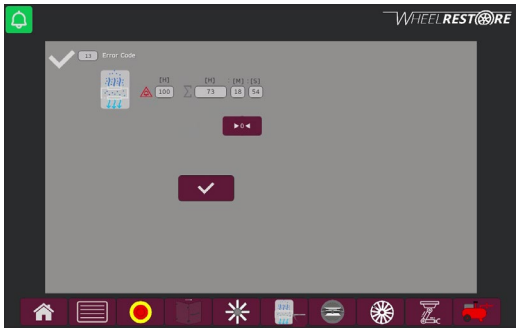
Click  to access the ventilation

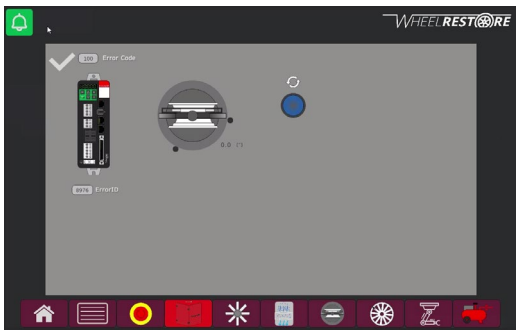
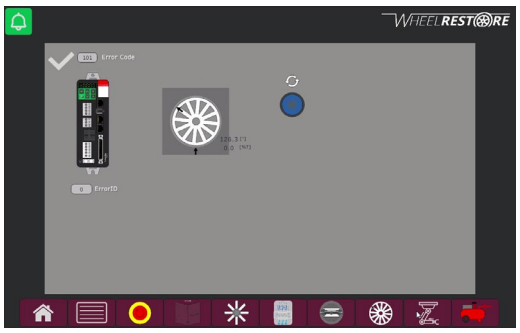
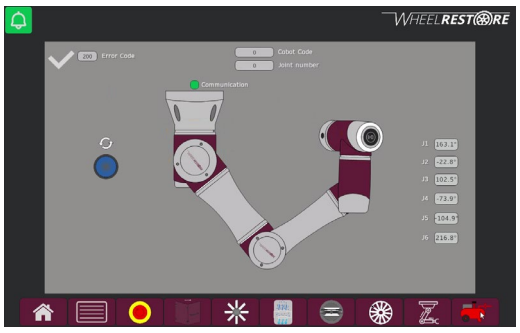
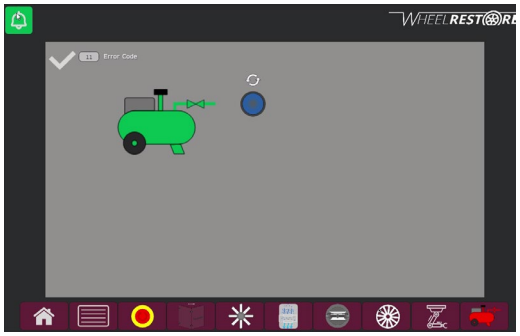
Click  to access the filter reset

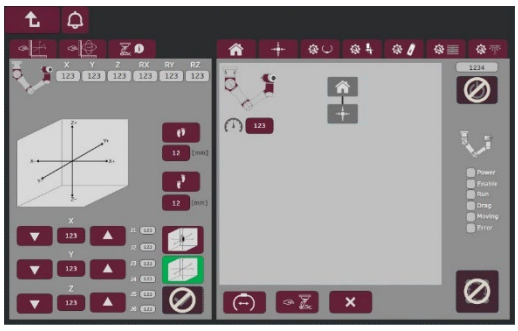
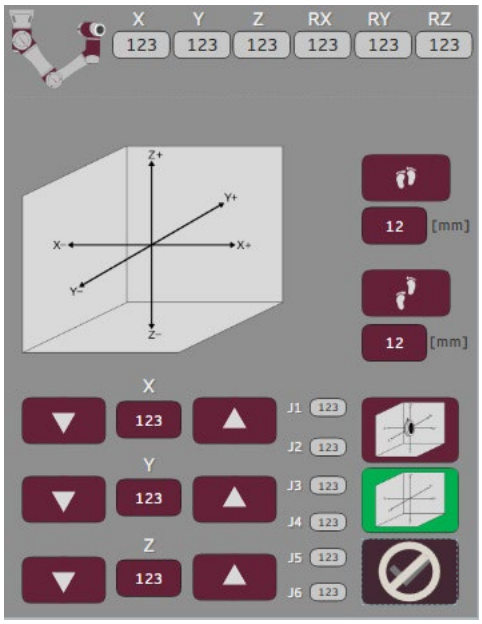
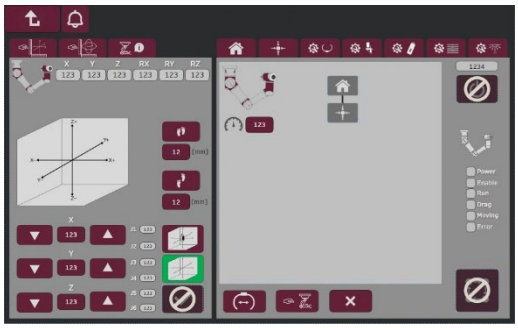
Click  to access wheel holder and servo drive

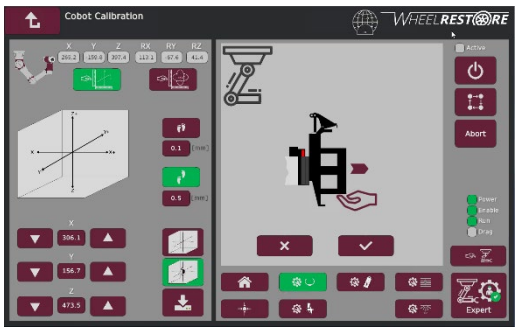
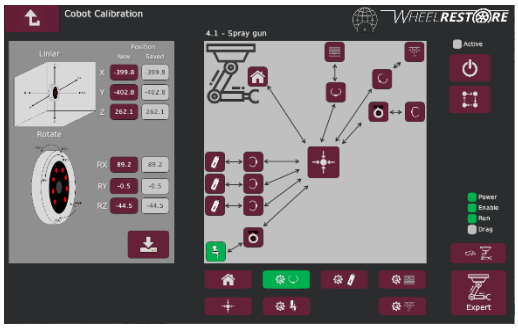
Click  to access wheel spinning motor drive

Click  to access robot position

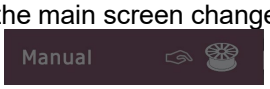
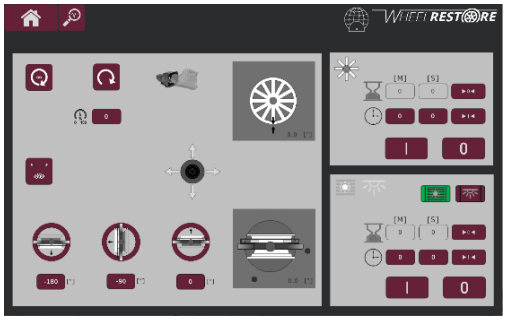
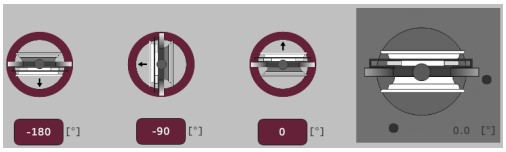
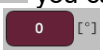
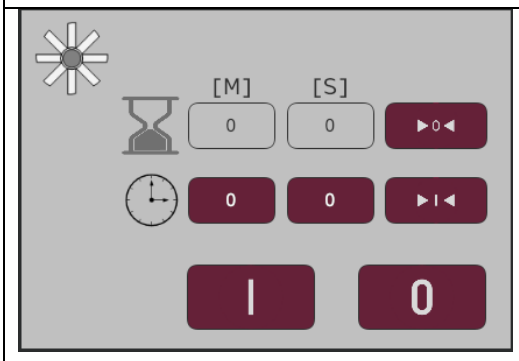
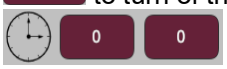
	Click  to access
	Alarm log window. Here you can see the history of the alarms.
	Emergency stop and reset botton window.
	Door lock and reset button window
	Ventilation and reset button window
	Filter reset window.

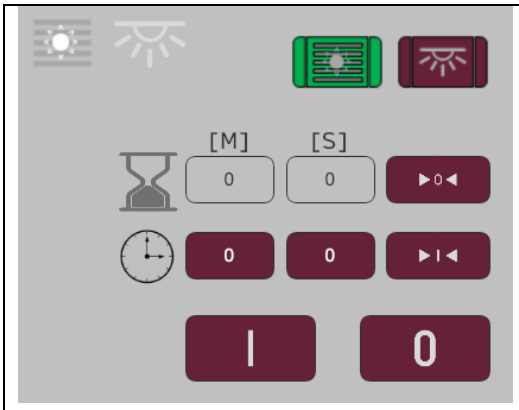
	Wheel holder and servo drive window
	Wheel spinning motor window
	Robot position window
	Compressor window. Red compressor means low air supply. Green compressor means sufficient air supply.
	Click  to unlock the admin/factory settings and enter the code provided by Wheel Restore. This unlocks the factory settings and calibration menu. Click  to access the calibration menu.

	Select  to select the movement of the robot arm in 3D directions.
	In this window you can change the robot position in the various directions. Select  for small steps in the movement. Once selected the icon turns green. You can adjust the size of the steps by clicking on the value, adjust it and click enter. Select  for big steps in movement. Once selected the icon turns green. You can adjust the size of the steps by clicking on the value, adjust it and click enter. Select  for the movement in X-axis direction. Tap  for movement in X- direction, tap  for movement in X+ direction. Select  for the movement in Y-axis direction. Tap  for movement in Y- direction, tap  for movement in Y+ direction. Once the arm has the right position save it by tapping  . NOTE: Ideal position to observe the direction to choose is from the top. Remove the inlet filter to watch the movement of the arm.
	Select  to select the movement of the robot arm in 3D directions.

 Cobot Calibration Abort Expert	
 Cobot Calibration 4.1 - Spray gun Expert	

10 - Manual Mode

	On the main screen change the selector to Manual mode Lick  to go to manual mode
	Click here  and enter the required RPM for the rim to spin Click here  to start the spinning of the rim Click here  to change the direction of the spinning rim Click here  to switch on the light
	In this section the position of the rim in the wheel holder can be adjusted. Here  you can select the required angle of the rim facing down. Click  to enter a value and press enter. Here  you can select the required angle of the rim facing forward. Click  to enter a value and press enter. Here  you can select the required angle of the rim facing up. Click  to enter a value and press enter.
	In this section you can activate the extraction fan. Click  to turn of the fan. Click  to turn of the fan. Here  you can enter the time you want the fan to run in minutes and seconds. Click  to reset. Click  to set timer to zero.

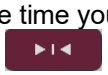


In this section you can activate the curing lamps.

Click  to switch on the Infra Red lamp. Click  to switch on the UV lamp.

Click  to turn of the light.

Click  to turn of the light.

Here  you can enter the time you want the light to run in minutes and seconds. Click  to reset.

Click  to set timer to zero.

11 – Rim types – profiles

The variaty and type of the profile of the rim to be painted is huge. Selecting the right painting pattern, speed of the robot and RPM of the rim is therefor extremely important. Here we have mode an overview of the different types of rims and our advised choise of pattern, Robot speed and RPM.

12 – Maintenance

We strongly recommend that the machine has a yearly service interval performed by a manufacturer approved service technician.

13 – Service and Support

Service and support require a service ticket. WheelRestore offers a service ticket system.
In addition to support tickets, the platform offers an overview of ongoing service on the WM600. This includes files, tasks and software updates. Yearly maintenance can be requested and set up as an event with notifications. SAS system (Service & support system)
Additional information can also be found in the Wheel Restore Knowledge base here: SAS Knowledge base

We have a network of appointed sales distributors in nearly every country around the world. Therefore, and to support you the best possible way, we kindly ask you to follow the relevant option below:

Contact your local sales distributor in your country
Send order to us at order@hbc-system.com
Please note that, if we have an appointed sales distributor in your country, your order will be forwarded to the sales distributor.

14 – Disposal

If the machine is bought: The machine is separated and sorted according to local environmental requirements.

If the machine is rented: Return machine to FSG.