



Welcome to WPM 500/600 Training

WHEELRESTORE

Key-points - For a perfect painting result

- Wheel temperature
 - Product temperature
 - Spray distance
 - Product viscosity
 - Spray velocity
 - Spray nozzle
 - Spray pressure
 - First layer half coat
 - Flash-off time 4 min. Between layers
 - Second layer full coat "Wet in wet spray"
 - Flash-off after second layer 4 min.
 - Final curing 15 min.
- ✓ Preheating selection
 - ✓ Heating table
 - ✓ Spray distance settings
 - ✓ Product viscosity recommendations
 - ✓ Spray travel velocity settings
 - ✓ Spray nozzle recommendations
 - ✓ Spray pressure adjustment (spraygun) Aerosol fixed
 - ✓ First layer half coat. Possible but requires knowledge
 - ✓ Flash-off time settings
 - ✓ Second layer full coat "Wet in wet spray" Possible but requires knowledge
 - ✓ Flash-off timer settings
 - ✓ Curing time settings

Paint gun settings



- 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 (Aerosol) 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 840P Diamond Cut Clearcoat is 5:1 plus 50% thinner. E.g., 100 grams Clearcoat, 20 grams of hardener, 50 grams Thinner

Paint Gun settings

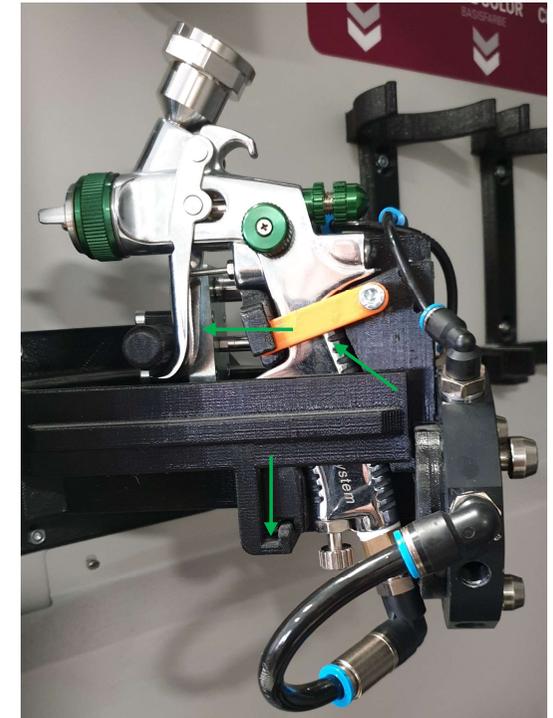
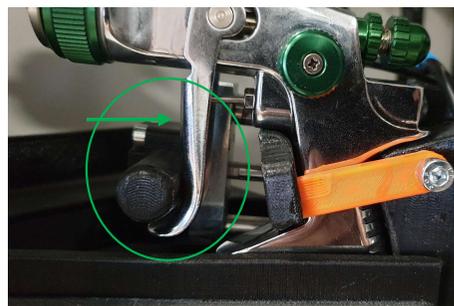
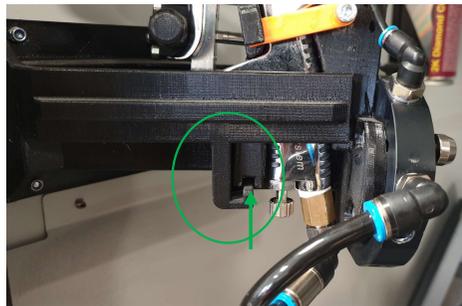
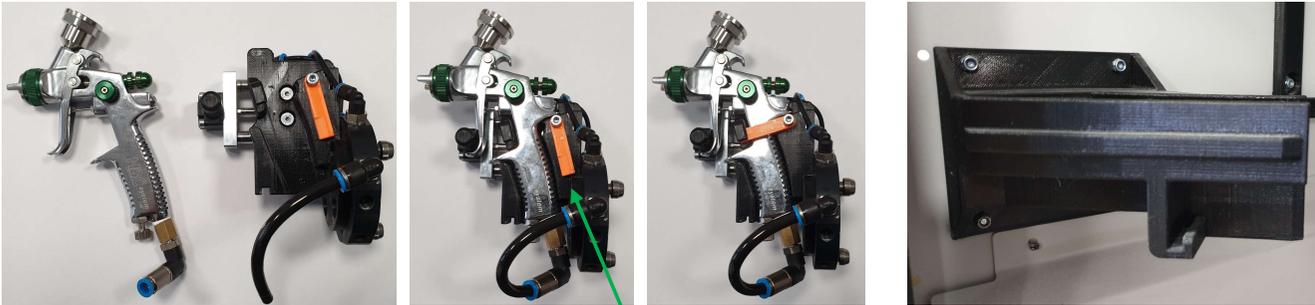


Opening of the trigger (#1.) of the paint gun is set to 3MM.
Air inlet (#2.) is fully opened.
Air cap (#3.) is fully opened.

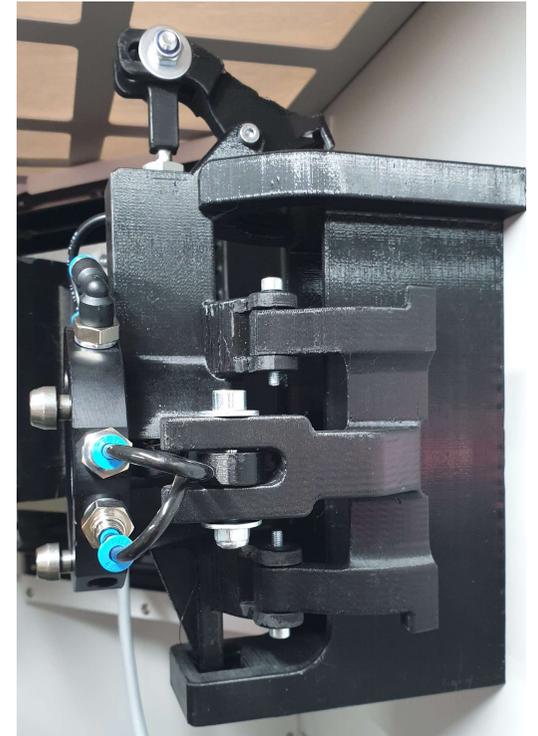
Paint settings

- Base coat (color):
 - 2 Coats
 - Flash off time: 10 min.
 - Check TDS from the paint supplier.
- Clear coat:
 - 2 Coats
 - Flash-off time 4 min.
 - Curing time 15 - 20 min.
 - Check TDS from the paint supplier.

Placing Quicktool Spraygun



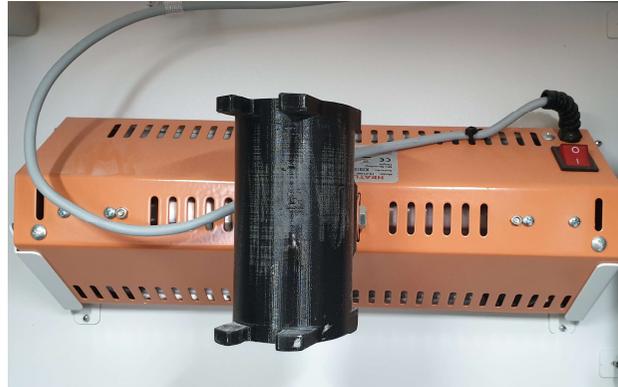
Placing Quicktool Gripper



Gripper - Tools



Aerosoles – Primer, Basecolor, Clearcoat



IR Lamp



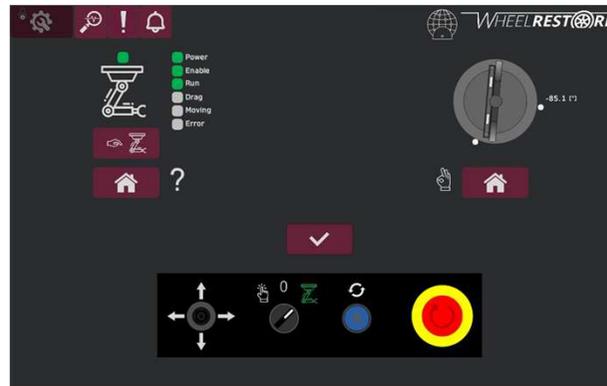
UV Lamp



StartUp



Sleep Mode

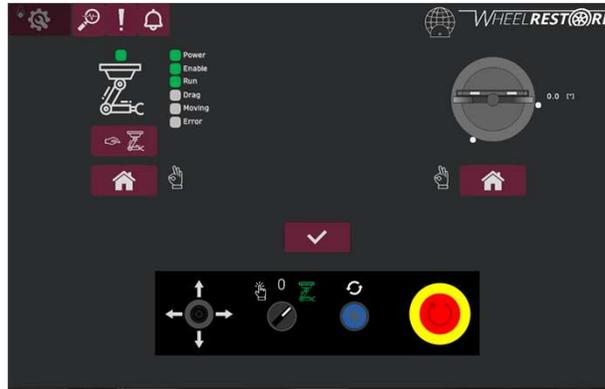


Homing Stage

Important!

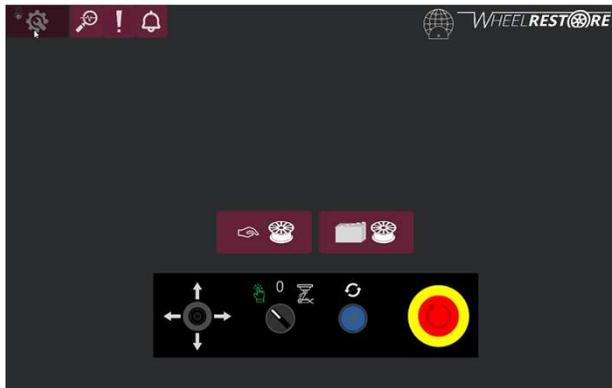
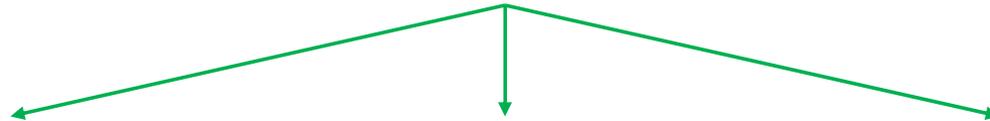
Operator needs to verify which part can be homed first? Revolve motor or Cobot.

Both need to be homed before continuing

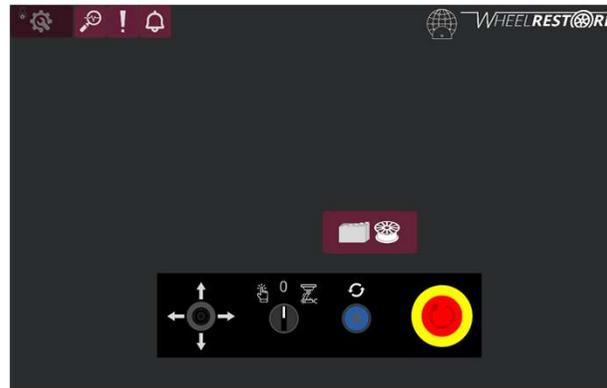


Revolve motor and Cobot Homed.

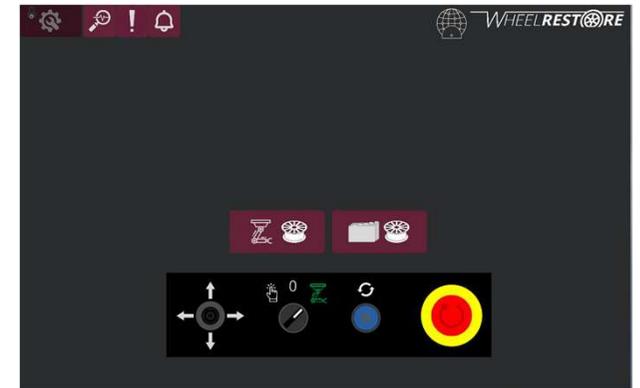
Homing Stage



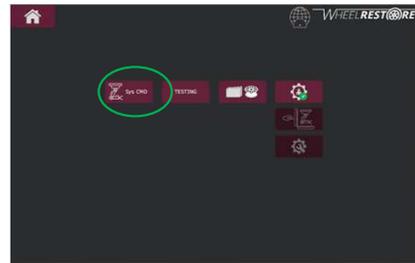
Manual Painting



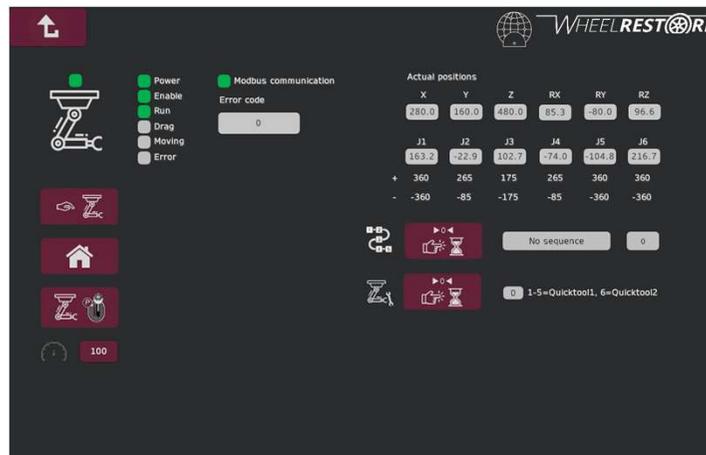
No Selection



Cobot Painting

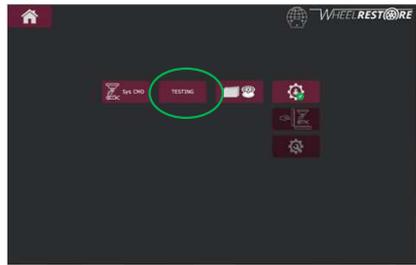


Cobot system commands

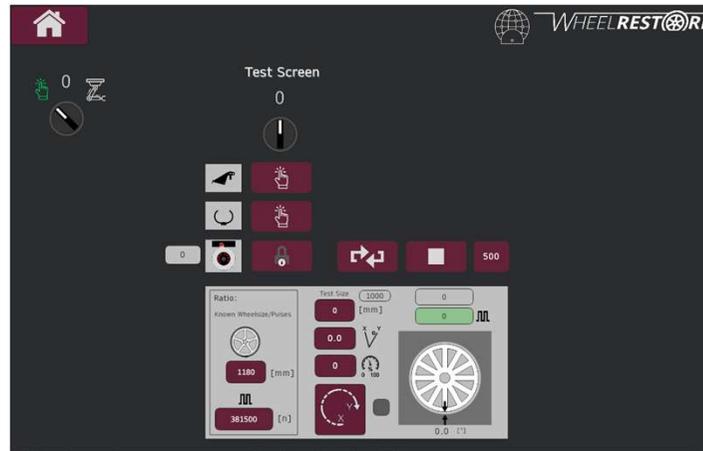


- Drag mode
- Homing
- Parking
- Speed between tasks
- Reset Cobot sequence
- Reset tool selection

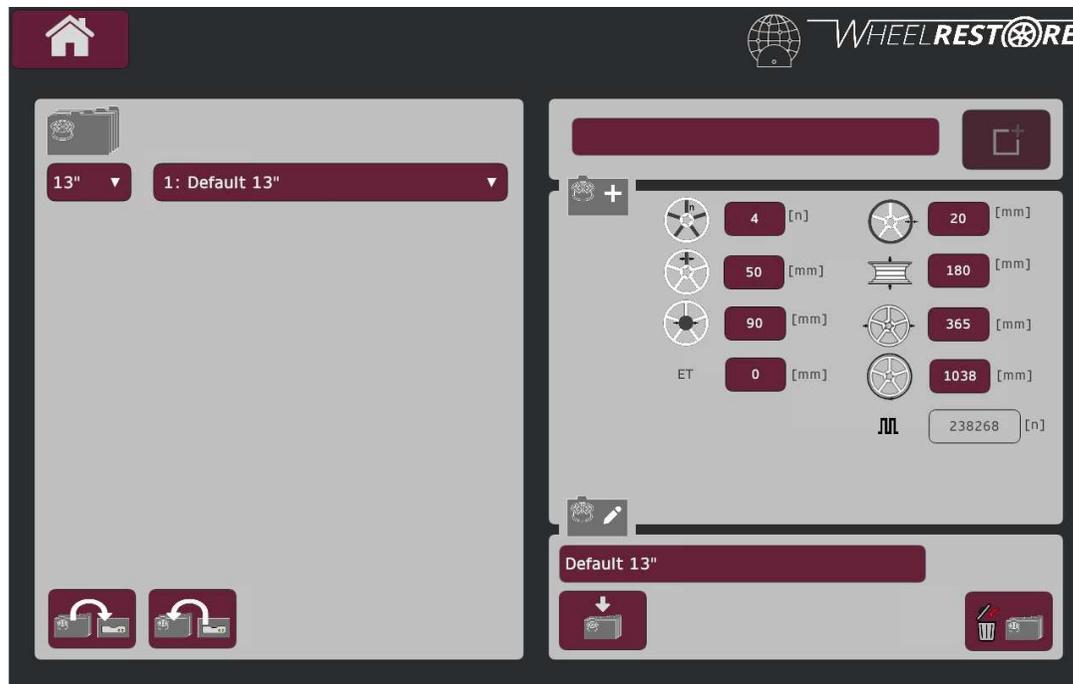
Important!
 Resetting Cobot sequence and tool selection.
 Requires both to be set to zero.
 Press and hold buttons for 3 sec.



Valve testing/Circumference adjustment

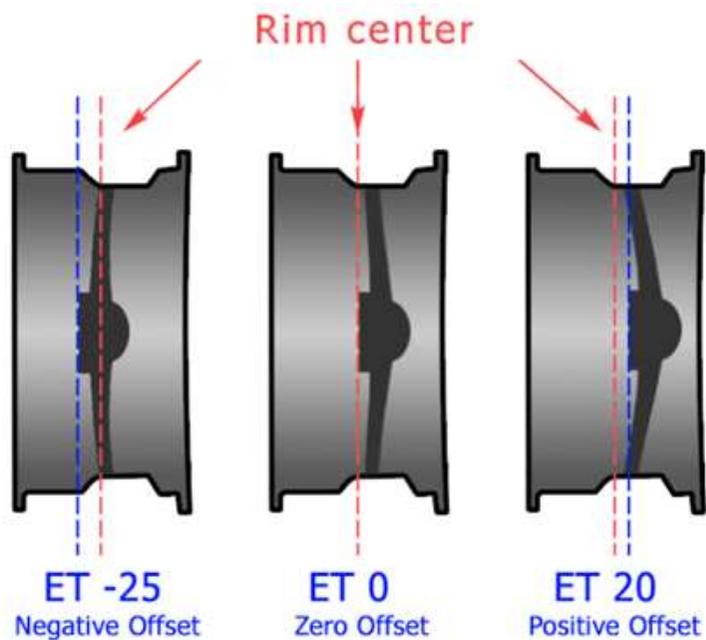


Wheel data



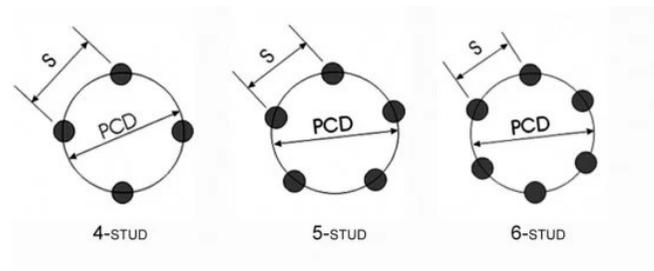
- Recipe categories
- Recipename
- Devided into Inch size
- Number of spokes
- Wheel outer diameter
- Spoke width
- Wheel face diameter
- Wheel edge width
- Wheel depth
- Wheel circumference
- Number of pulses (calculated)
- Wheel ET specification

Wheel data



- Pitch circle diameter (PCD)

This is the diameter to be entered when selecting the center size of the rim



Paint Process data

The screenshot displays the Wheel Restore software interface. At the top right, the logo 'WHEEL RESTORE' is visible. The main interface is divided into several sections:

- Top Bar:** Contains a search icon, a warning icon, a bell icon, and a gear icon. The text 'Default 16"' is displayed.
- Parameters:** A row of icons and numerical values: 16 [°], 300 [mm/S], 1 [n], 70 [mm], -10 [mm], 0 [mm], 0 [°], 5 [°], 15 [°].
- Process Flow:** A sequence of icons representing the steps of the paint process, with a yellow question mark icon highlighted.
- Coat Settings:** Three rows of settings for 'PRIMER', 'COLOR', and 'CLEAR COAT'. Each row includes a wheel icon, a paint can icon, a spray gun icon, and numerical values (1, 0, 0).

On the left side of the interface, there are two status indicators:

- A green checkmark icon with the text 'Air pressure level ok' next to it.
- A blue checkmark icon with the text 'Filter level ok, based on running hours' next to it.

Air pressure level ok

Filter level ok, based on running hours

Paint Process data adjustment

Default 16"

300 [mm/S]

8 [n]

100

70 [mm]

Extra speed

0 [%]

1 2 3

Paint pattern 1, 2 or 3

-10 [mm] 0 [mm] 0 [mm] 5 [°] 15 [°]

Return while painting

Can be saved on the actual processed wheel

JS0

Outer edge adjustment
 Inner edge height adjustment
 Spoke center height adjustment
 Spoke Inner angle adjustment
 Spoke outer angle adjustment

Sprayspeed/Rotation speed adjustment

Number of spokes or spraywidth selection

Extra speed on the edge (Less paint)

Cobot speed between tasks adjustment

Dia 16

JS0

Outer edge adjustment; [-] -> more paint on outer edge, [0] -> paint on the exact edge, [+] -> paint on inner edge

Inner edge height adjustment; [-] -> closer to the rim, [0] -> on the default height, [+] -> further from the rim;

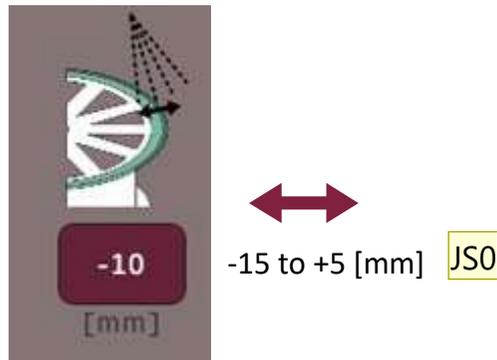
Spoke center height adjustment; [-] -> closer to the rim, [0] -> on the default height, [+] -> further from the rim

Spoke Inner angle adjustment; [0] -> painting straight , [value] -> spray in angle

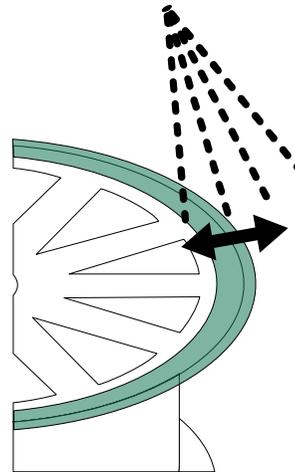
Spoke outer angle adjustment; [0] -> painting straight , [value] -> spray out angle

John Speet; 2023-07-19T08:32:11.107

Paint Process data



Spraying Outer edge
Edge adjustment



Edge adjustment

Can or Spraygun can be moved inwards/outwards

Mainly used to improve coverage on edges

Dia 17

JS0

Outer edge adjustment; [-] -> more paint on outer edge, [0] -> paint on the exact edge, [+] -> paint on inner edge

John Speet; 2023-07-19T08:57:26.267

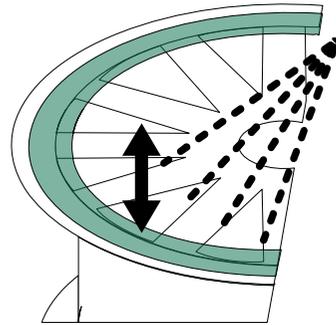
Paint Process data



Spraying Inner edge
Hight adjustment



+5
To
-10 [mm]



Hight adjustment

Can or Spraygun can be moved upwards/downwards

Mainly used to improve coverage on wheels with deep edges

Dia 18

JS0

Inner edge height adjustment; [-] -> closer to the rim, [0] -> on the default height, [+] -> further from the rim;

John Speet; 2023-07-19T08:58:08.316

Paint Process data



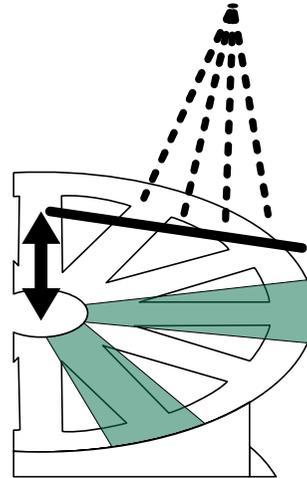
+30
To
-10 [mm]

JS0

Note!

Left spoke is limited to +20[mm] to avoid conflict with IR lamp

Spraying Spokes
Center hight adjustment



Center hight adjustment
Can or Spraygun be moved
Upwards/downwards
at the center of the paintstroke

Mainly used with wheels with a deep/high center

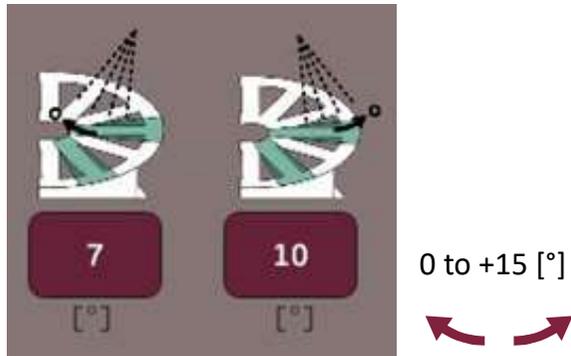
Dia 19

JS0

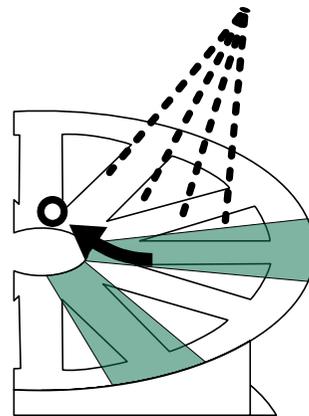
Spoke center height adjustment; [-] -> closer to the rim, [0] -> on the default height, [+] -> further from the rim

John Speet; 2023-07-19T08:58:50.892

Paint Process data

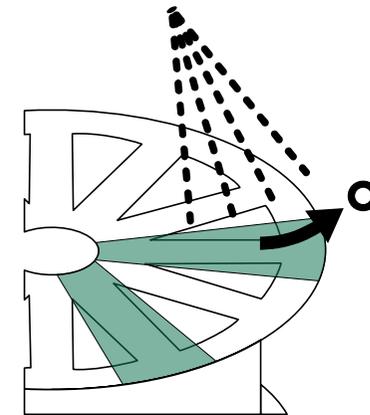


Spraying Spokes
Inner & Outer angle adjustment



Inner angle adjustment
Can or Spraygun will move upwards
At the end of the paintstroke

Mainly used to reduce coverage in center



Outer angle adjustment
Can or Spraygun will move upwards
At the end of the paintstroke

Mainly used to improve coverage on edges

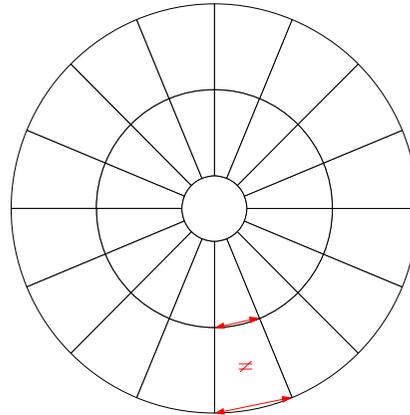
Dia 20

JS0 Spoke Inner angle adjustment; [0] -> painting straight , [value] -> spray in angle
John Speet; 2023-07-19T08:59:21.862

Paint Process data

$$\uparrow \text{Slice[mm]} = \frac{\text{Circumference[mm]}}{\text{Spokes[n]}} \uparrow$$

$$\uparrow \text{Slice[}^\circ\text{]} = \frac{\text{Circumference[mm]}=360^\circ}{\text{Spokes[n]}} \uparrow$$

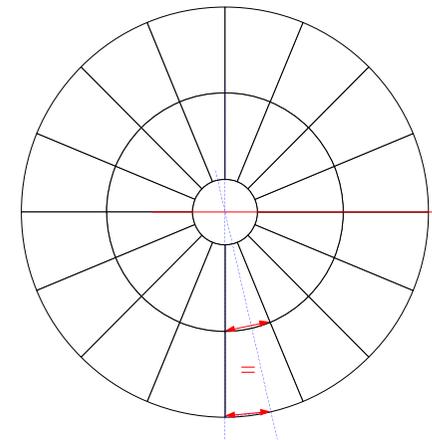


3 to 17 Spokes

Different sprayarea (Outer edge):
Depending on wheel size

$$\uparrow \text{Slice[mm]} = \frac{\text{Circumference[mm]} \uparrow}{\text{SprayWidth[mm]}} \uparrow$$

$$\downarrow \text{Slice[}^\circ\text{]} = \frac{\text{Circumference[mm]}=360^\circ \uparrow}{\uparrow \text{Slice[mm]}}$$



60 to 130 [mm]

Same sprayarea (outer edge):
Undependable on wheel size



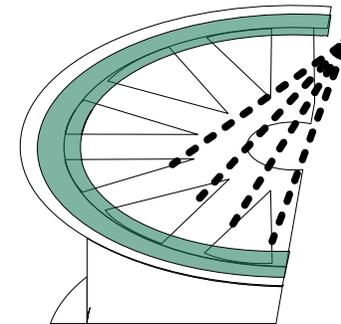
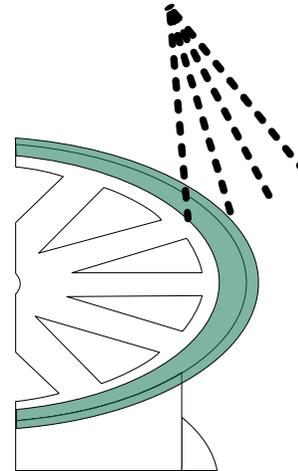
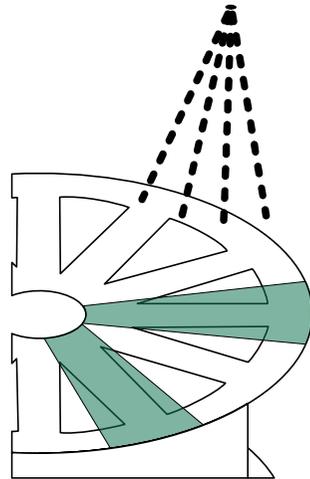
Spraying by:
Number of Spokes OR Spraywidth selection

Paint Process data



20 to 500 [mm/S]

Painting velocity
Velocity adjustment



Paint velocity adjustment

Can or Spraygun and rotation of the wheel, will move with selected speed in [mm/s]

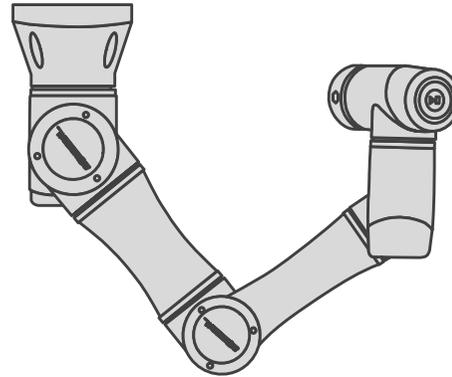
Used to adjust coverage layer

Paint Process data



10 to 200 [mm/S]

Cobot velocity
Velocity adjustment

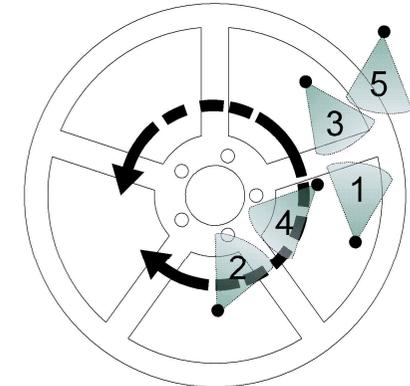
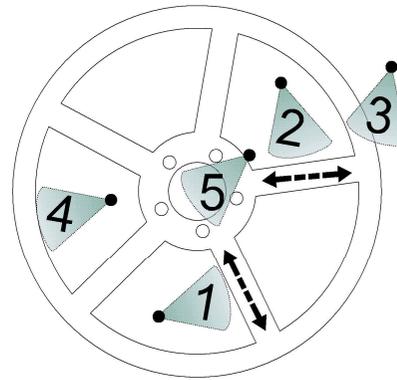
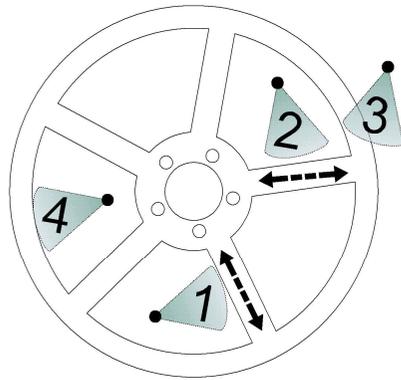


Cobot velocity adjustment

Cobot, will move with selected speed in [mm/s] between task's

Used to optimize process time

Paint Process data



Paint patterns

----- **Spoke principle** -----

Pattern 1

1. Paint right side of spokes
2. Paint left side of spokes
3. Paint Outer edge
4. Paint Inner edge

Pattern 2

1. Paint right side of spokes
2. Paint left side of spokes
3. Paint Outer edge
4. Paint Inner edge
5. Paint Center

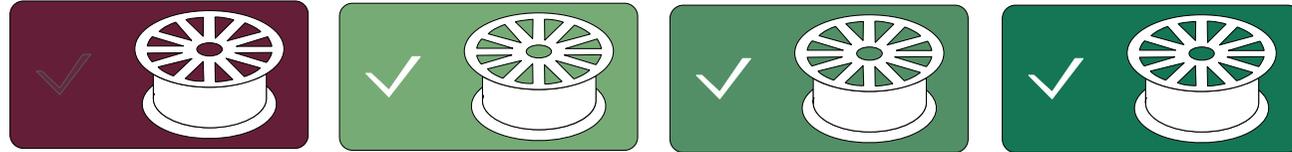
----- **Spinning principle** -----

Pattern 3

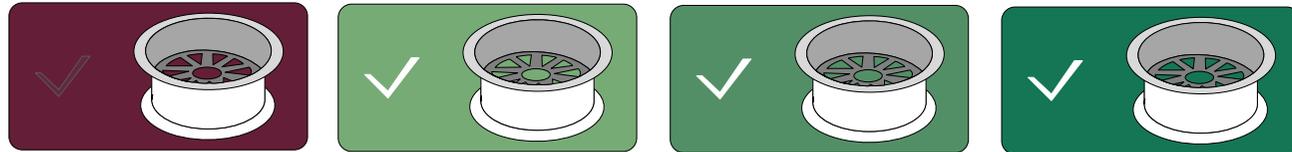
1. Paint right side of spokes
2. Paint left side of spokes
3. Paint Outer edge
4. Paint Inner edge

Paint Process data

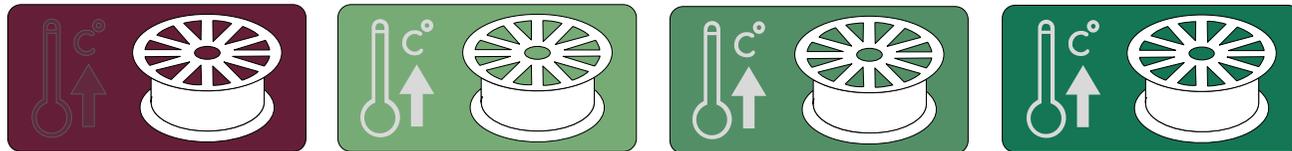
Front selection



Back selection



Preheating selection



Paint Process data

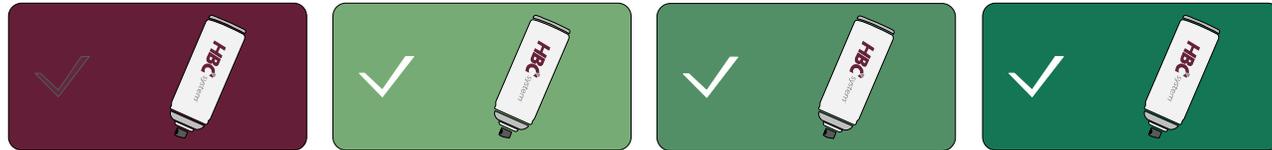
Spraycan selection



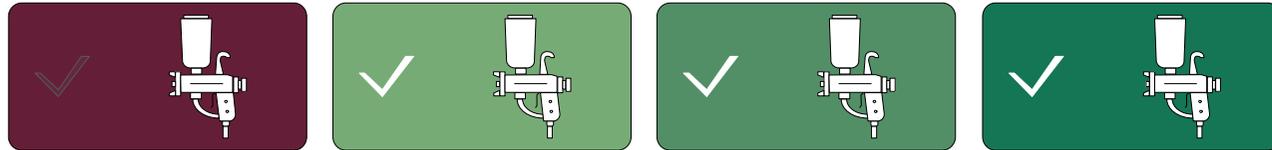
Normal Spraycan selection



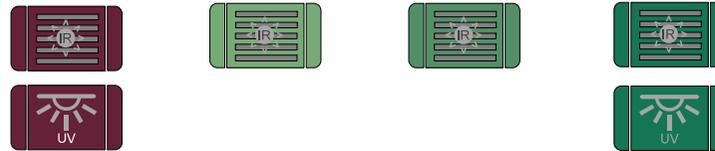
UpsideDown Spraycan selection



Spraygun selection

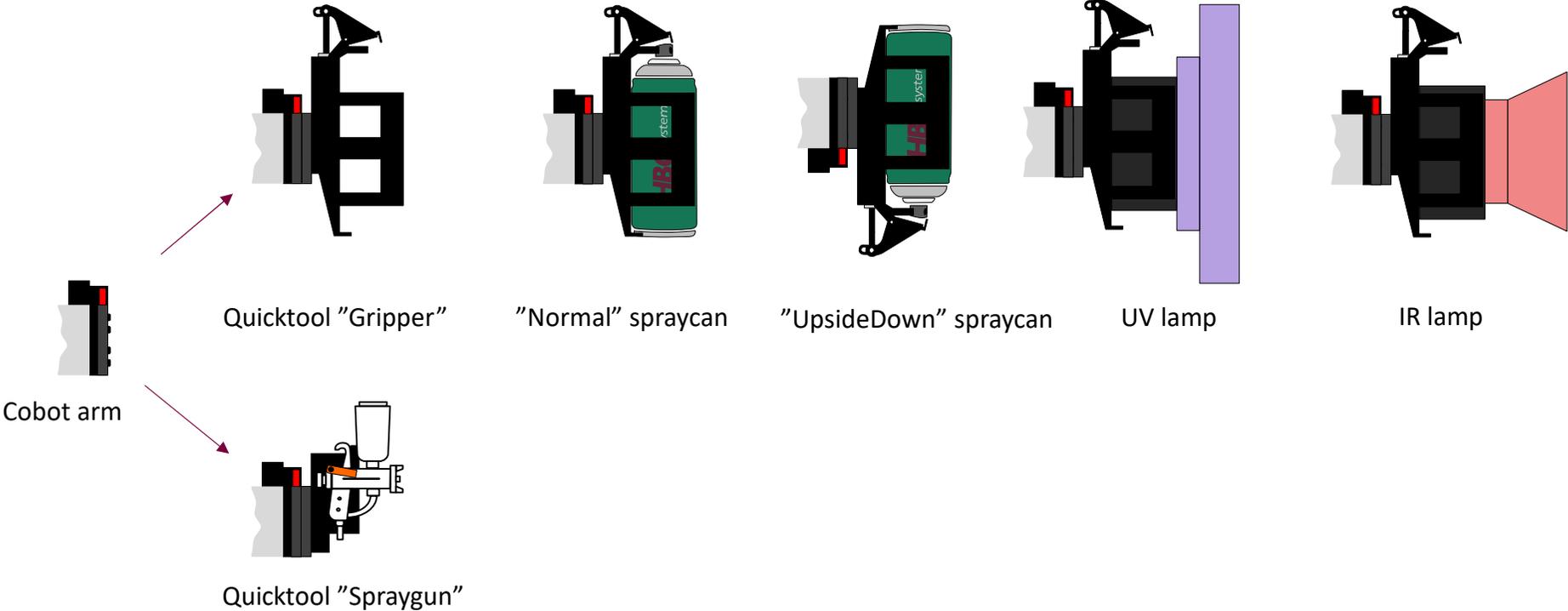


Paint Process data



Spoke Inner & Outer angle adjustment

Tool Selections

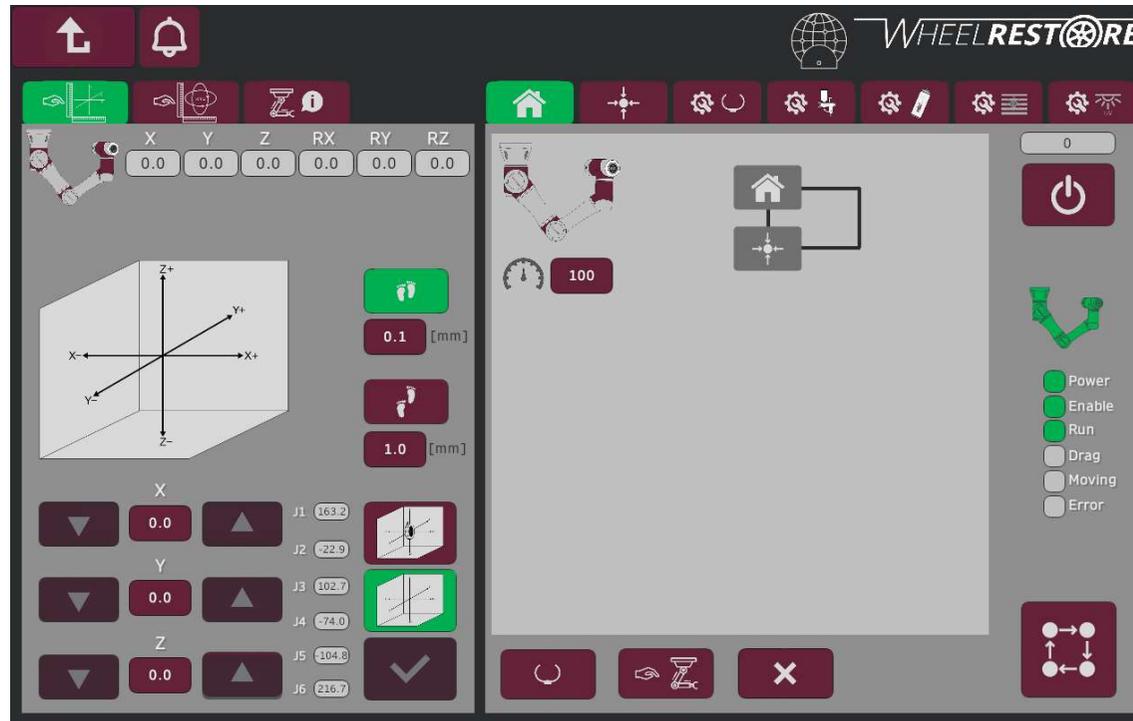


Tool Calibration

Minor adjustmenst might be needed, but basically this should be done from factory

X - Y - Z adjustment

Movement according to "room"

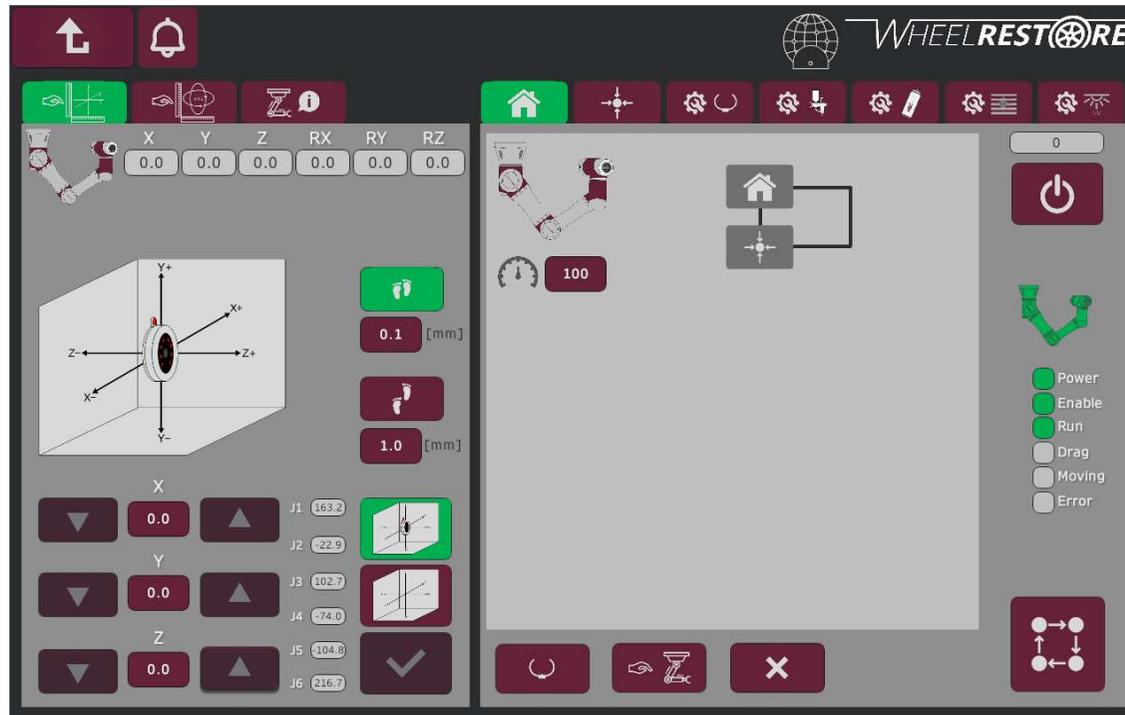


Tool Calibration

Minor adjustmenst might be needed, but basically this should be done from factory

X - Y - Z adjustment

Movement according "Cobot arm"

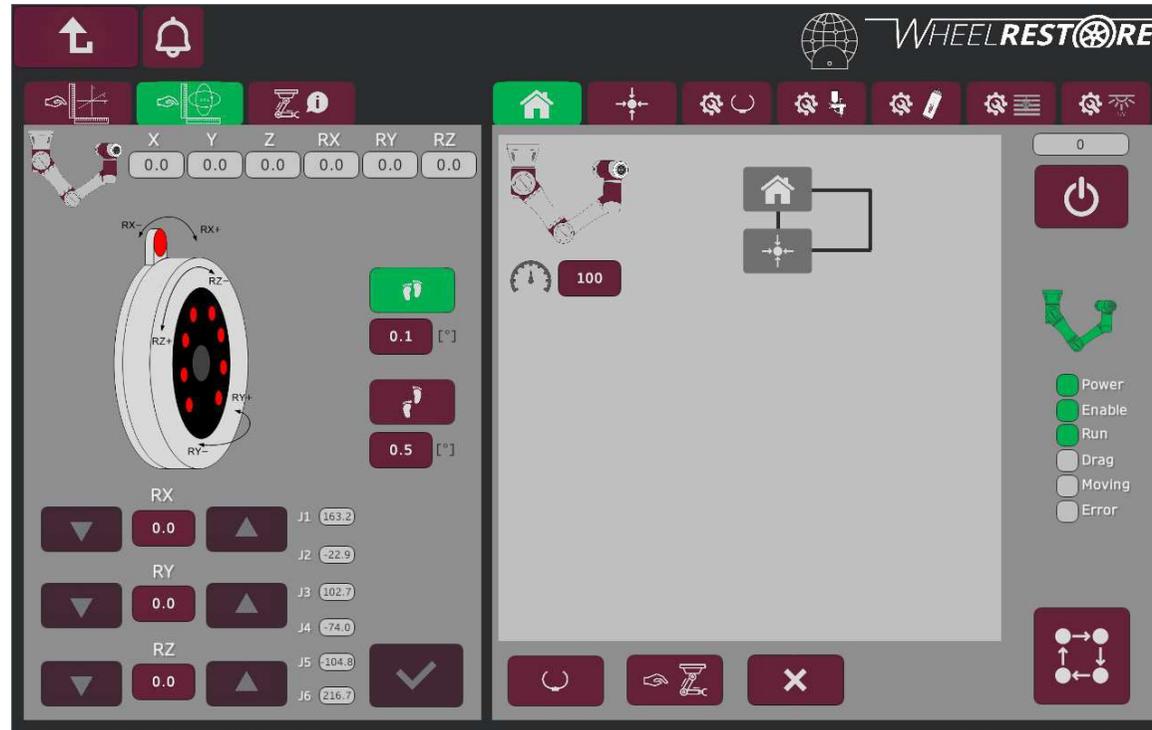


Tool Calibration

Minor adjustments might be needed, but basically this should be done from factory

RX - RY - RZ angle adjustment

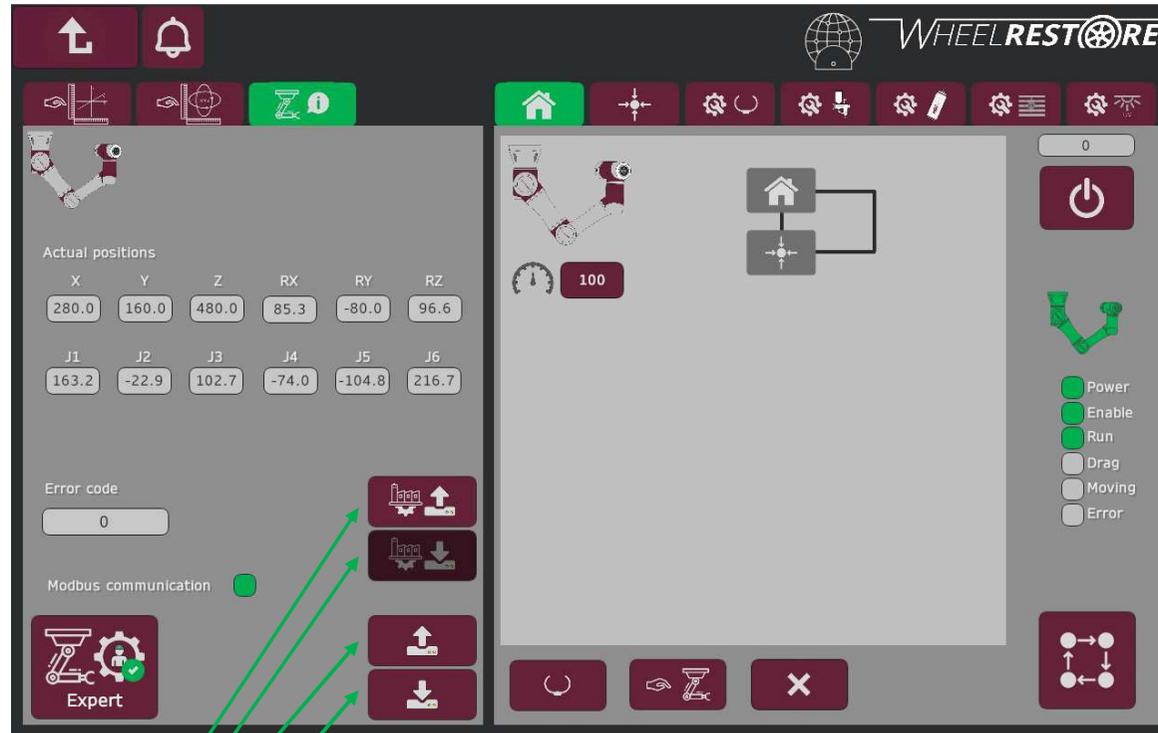
Movement according "Cobot arm"



Tool Calibration

Minor adjustmenst might be needed, but basically this should be done from factory

Saving tool positions



Load Factory calibration settings

Save Factory calibration settings (Only WR Production Staff)

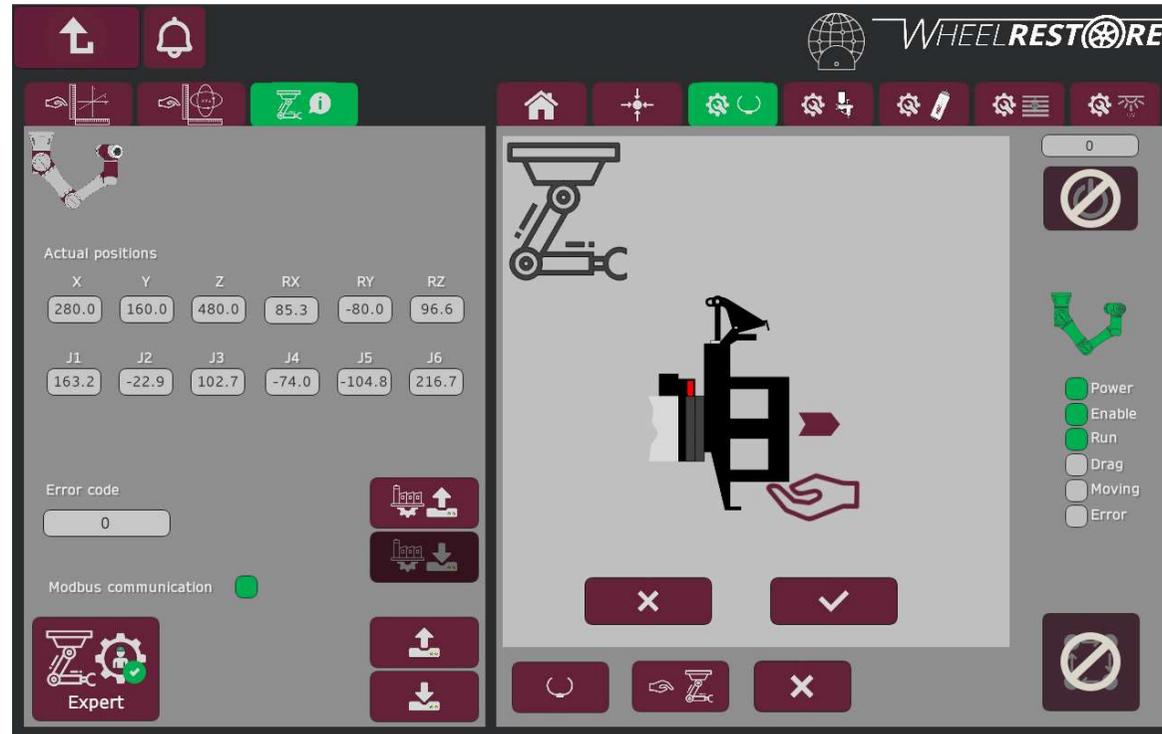
Load user calibration settings

Save user calibration settings

Tool Calibration

Minor adjustmenst might be needed, but basically this should be done from factory

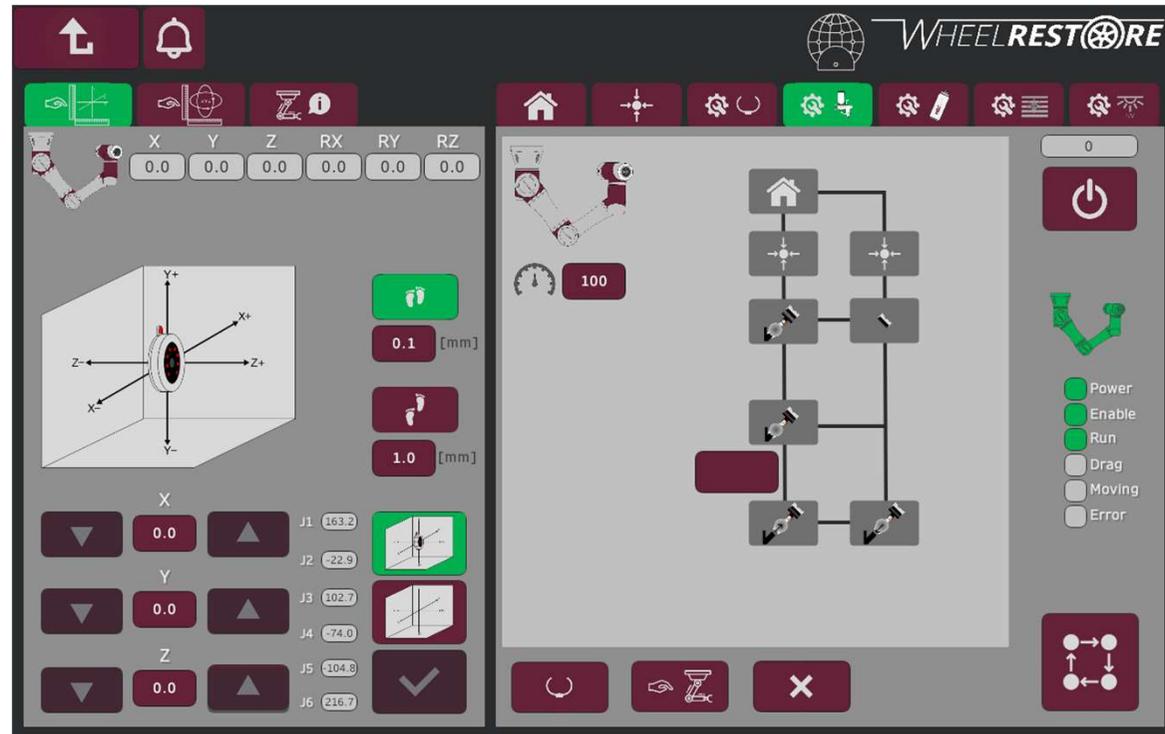
Calibrate Quicktool - Gripper



Tool Calibration

Minor adjustmenst might be needed, but basically this should be done from factory

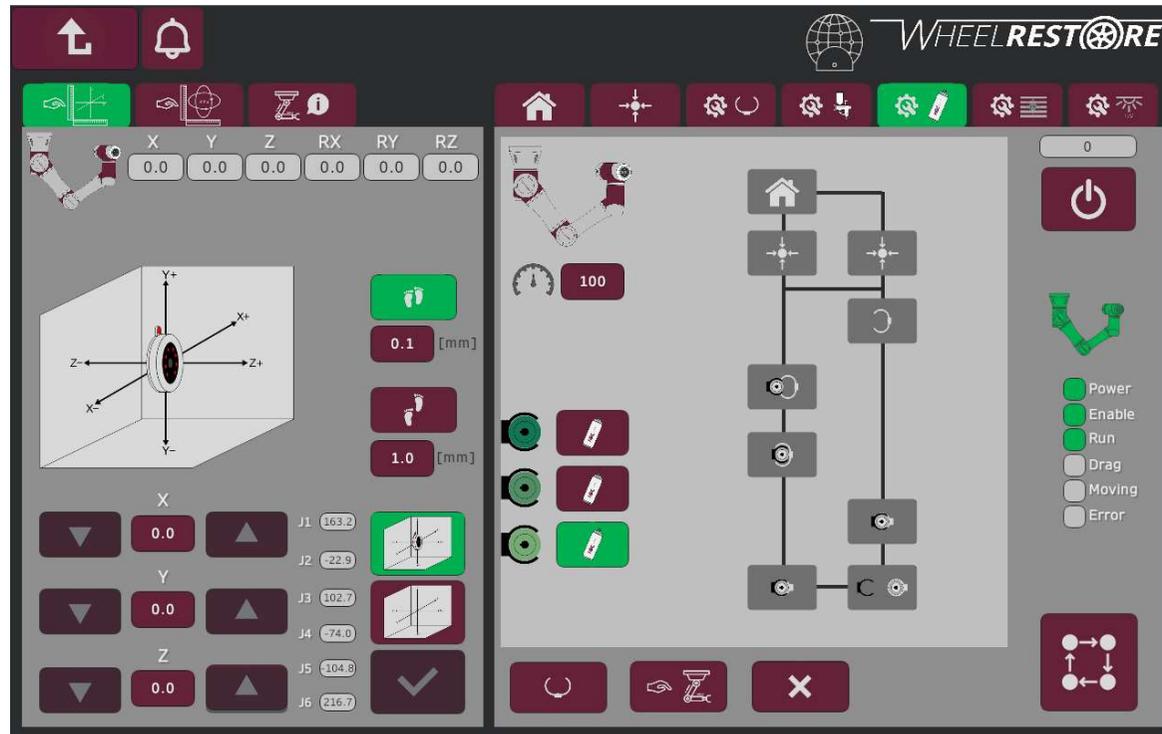
Calibrate Quicktool - Spraygun



Tool Calibration

Minor adjustmenst might be needed, but basically this should be done from factory

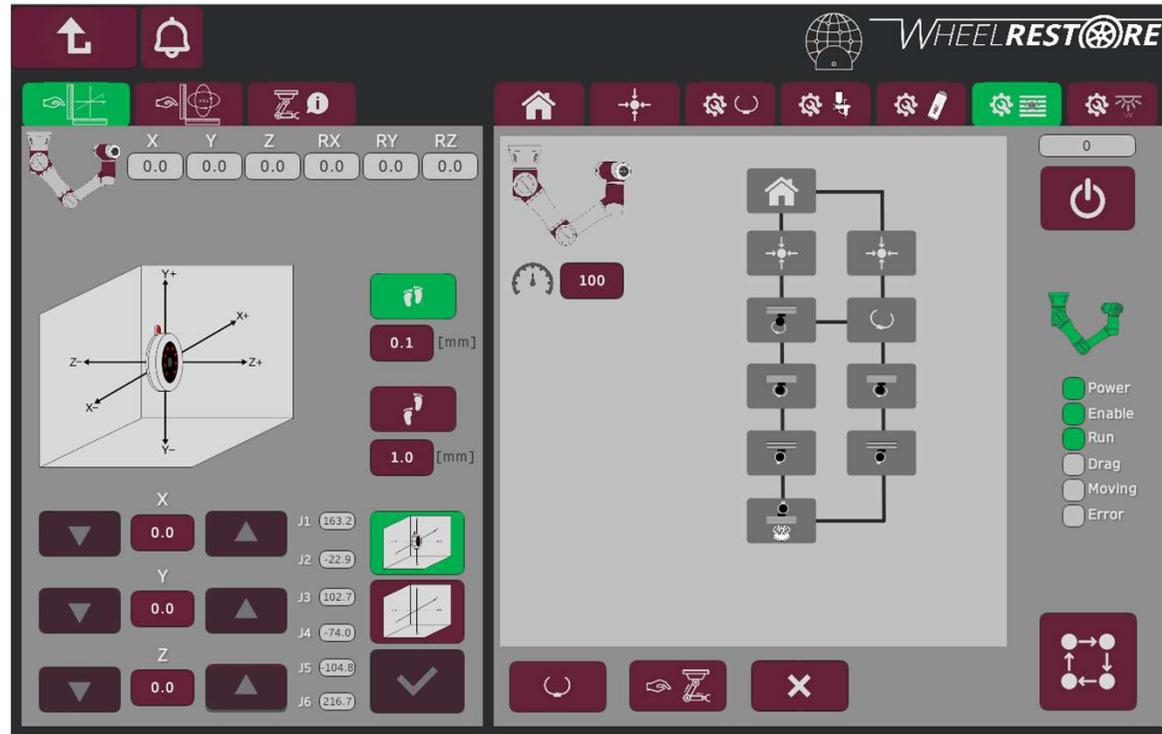
Calibrate Spracan(s) "Aerosole"



Tool Calibration

Minor adjustmenst might be needed, but basically this should be done from factory

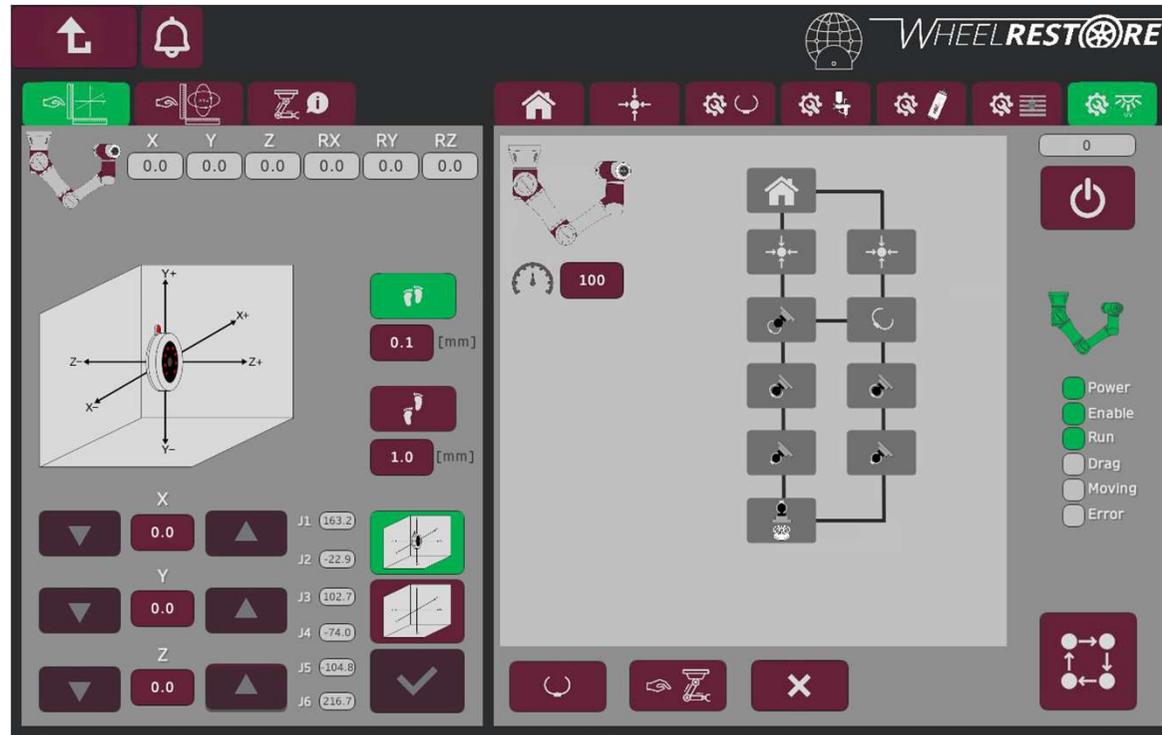
Calibrate IR lamp



Tool Calibration

Minor adjustmenst might be needed, but basically this should be done from factory

Calibrate UV Lamp



Cobot system commands

The screenshot shows the WHEELREST@RE cobot control interface. On the left, there is a status panel with a robot icon and several indicator lights: Power (green), Enable (green), Run (green), Drag (grey), Moving (grey), and Error (grey). To the right of this panel is a 'Modbus communication' status (green) and an 'Error code' field showing '0'. The main area displays 'Actual positions' for X, Y, Z, RX, RY, and RZ axes, and joint positions for J1 through J6. Below the joint positions are two rows of values: '+ 360 265 175 265 360 360' and '- -360 -85 -175 -85 -360 -360'. At the bottom, there are buttons for 'Reset Cobot sequence' (labeled 'No sequence' and '0') and 'Reset Cobot tool' (labeled '0 1-5=Quicktool1, 6=Quicktool2'). A speed dial is set to '100'. The WHEELREST@RE logo is in the top right corner.

Annotations on the left side of the interface:

- Dragmode → [Dragmode button]
- Homing → [Homing button]
- Parking → [Parking button]
- Speed between task's → [Speed dial set to 100]

Annotations on the right side of the interface:

- Reset Cobot sequence → [Reset Cobot sequence button]
- Reset Cobot tool → [Reset Cobot tool button]

JS0

Dia 38

JS0

Quick tool 1 is aerosol holder

Quick tool 2 is spray gun holder

John Speet; 2023-07-19T09:27:19.793

Test mode

The screenshot shows the 'Test Screen' interface for the Wheel Restore system. It features a dark background with various control elements. At the top right is the 'WHEEL RESTORE' logo. The main area contains several buttons and displays. On the left, there are icons for spray, gripper, and quick tool test, each with a '0' counter. In the center, there are buttons for spray, gripper, and quick tool test, each with a '0' counter. On the right, there are buttons for test start, test stop, and a '500' counter. At the bottom, there is a 'Ratio' section with a wheel icon and a 'Test Size' section with a wheel icon. A large wheel icon is also present on the right side of the bottom section.

Spray function

Gripper function

Quick tool test

Number of test cycles

Gear ratio

Wheel Restore alloy repair solutions



Diamond Cut Wheel Machine
WR-DCM3 - Automated



Alloy Wheel Blast Cabinet
Filtration + Dust Collection



Wheel Painting Robot
Patented process

