



# 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.

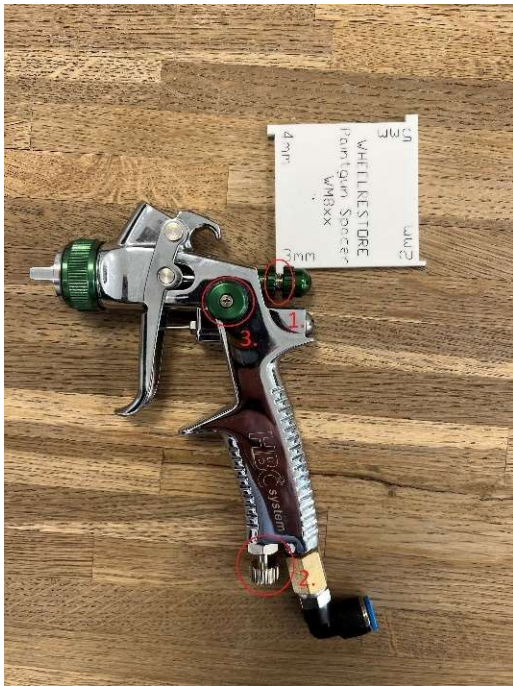
- ✓ Preheating selection
- ✓ Heating table
- ✓ Spray distance settings
- ✓ Product viscosity recommendations
- ✓ Spray travel velocity settings
- ✓ Spray nozzle recommendations
- ✓ Spray pressure adjustment (spraygun) Aerosol fixed
- ✓ First layer half coat. Possible but requires knowledge
- ✓ Flash-off 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

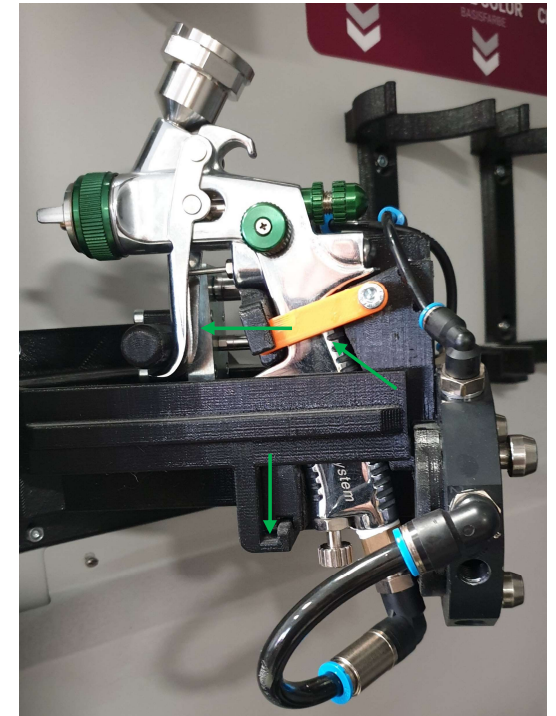
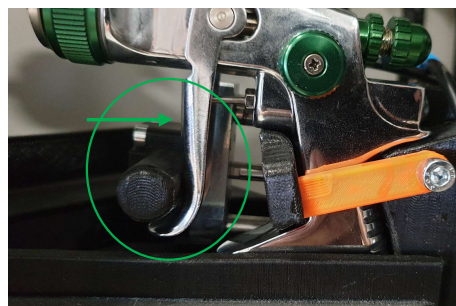
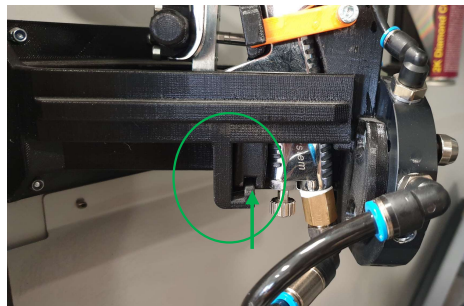
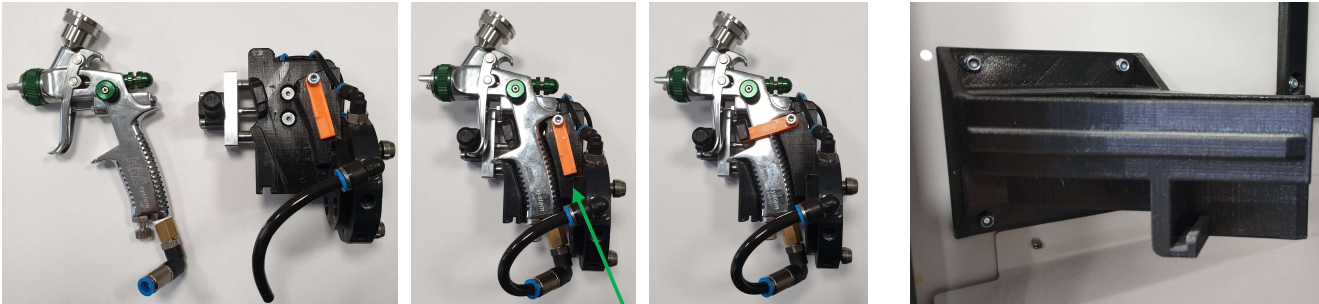


Opening of the trigger (#1.) of the paint gun is set to 3MM.  
Air inlet (#2.) is fully opened.  
Air cap (#3.) is fully opened.

# Paint settings

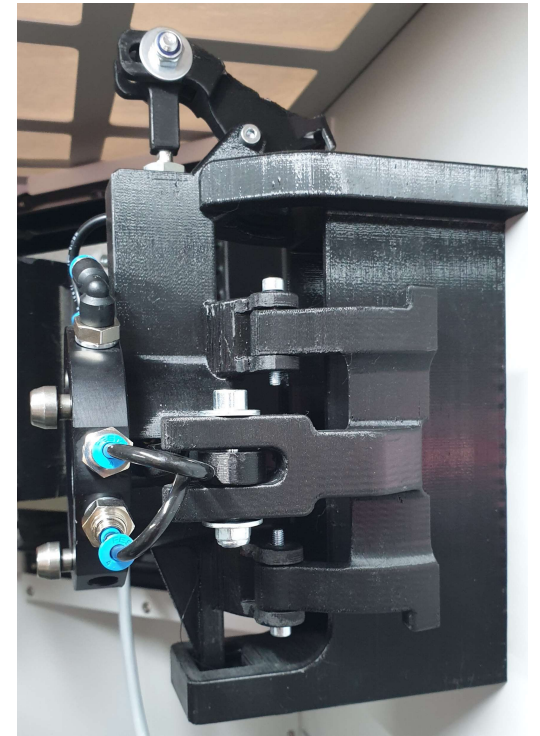
- Base coat (color):
  - 2 Coats
  - Flash off time: 10 min.
  - Check TDS from the paint supplier.
- Clear coat:
  - 2 Coats
  - Flash-off time 4 min.
  - Curing time 15 - 20 min.
  - Check TDS from the paint supplier.

# Placing Quicktool Spraygun





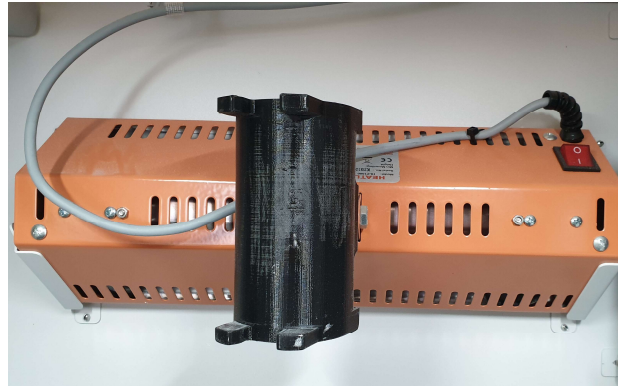
# Placing Quicktool Gripper



# Gripper - Tools



Aerosoles – Primer, Basecolor, Clearcoat



IR Lamp



UV Lamp

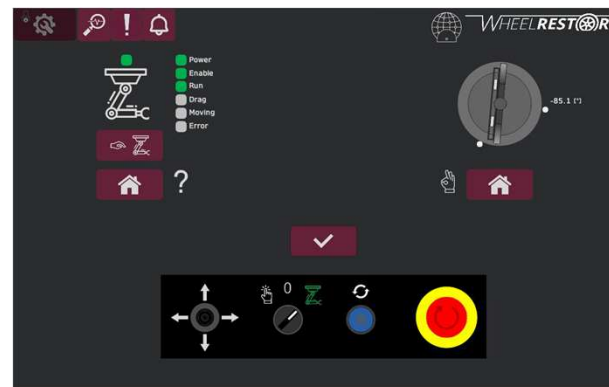




StartUp



Sleep Mode

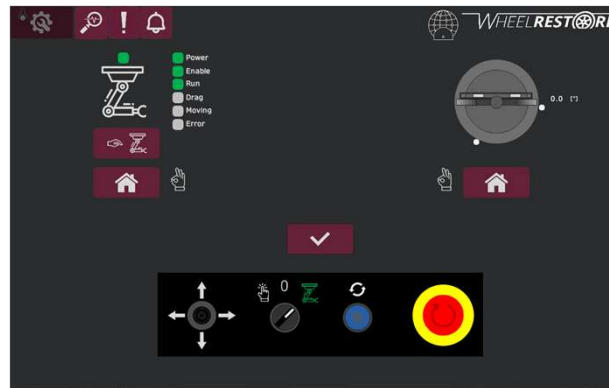


Homing Stage

### Important!

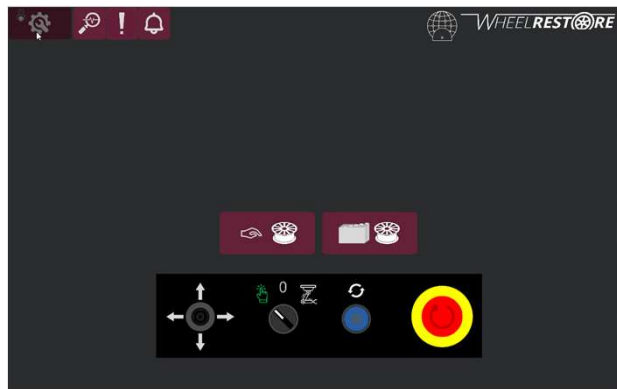
Operator needs to verify which part can be homed first? Revolve motor or Cobot.

Both need to be homed before continuing

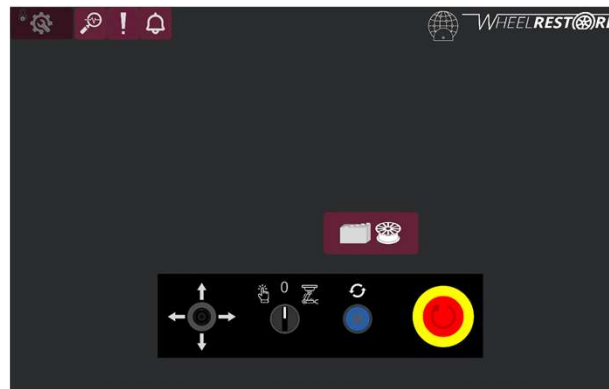


Revolve motor and Cobot Homed.

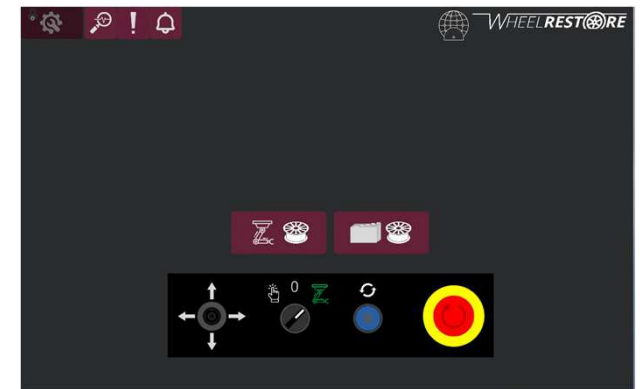
Homing Stage



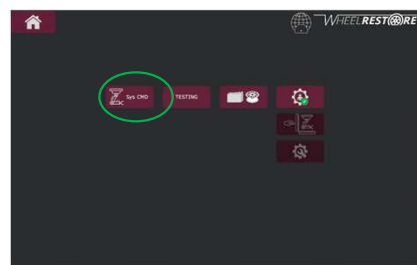
Manual Painting



No Selection



Cobot Painting



### Cobot system commands

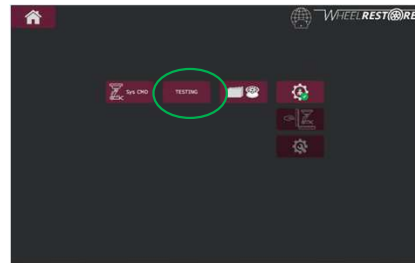


- Drag mode
- Homing
- Parking
- Speed between tasks
- Reset Cobot sequence
- Reset tool selection

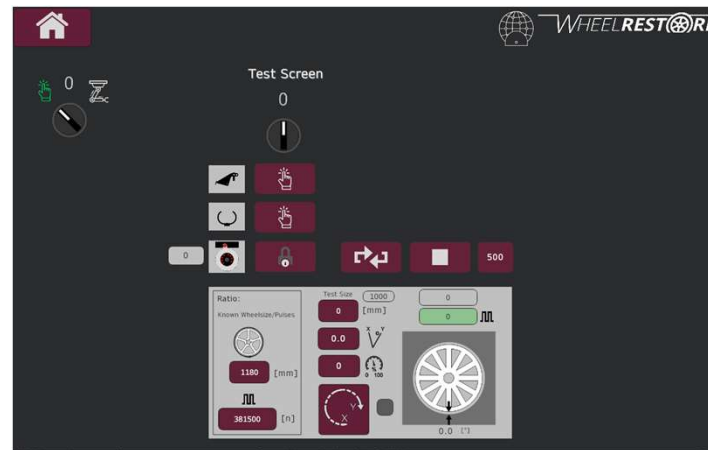
**Important!**  
Resetting Cobot sequence and tool selection.  
Requires both to be set to zero.

Press and hold buttons for 3 sec.

WHEELRESTORE



Valve testing/Circumference adjustment



# Wheel data

The screenshot shows the WHEEL RESTORE software interface. On the left, there is a sidebar with a home icon, a folder icon, and two disk backup icons. The main area is divided into two panels. The left panel shows a dropdown menu for '13"' and a button for '1: Default 13"'. The right panel contains various input fields for wheel specifications, including number of spokes, wheel outer diameter, spoke width, wheel face diameter, wheel edge width, wheel depth, wheel circumference, number of pulses, and wheel ET specification. The interface is dark-themed with maroon accents.

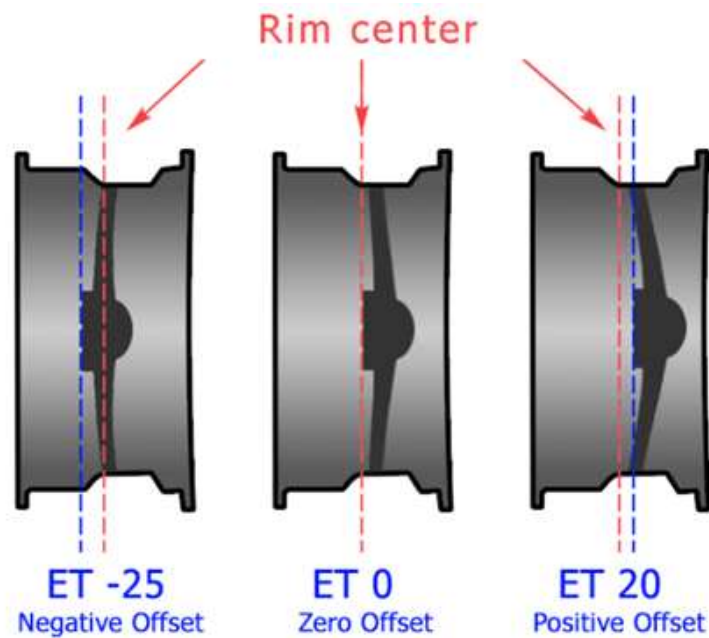
Field	Value	Unit
Number of spokes	4	[n]
Wheel outer diameter	20	[mm]
Spoke width	50	[mm]
Wheel face diameter	180	[mm]
Wheel edge width	90	[mm]
Wheel depth	365	[mm]
Wheel circumference	1038	[mm]
Number of pulses (calculated)	238268	[n]
Wheel ET specification	0	[mm]

Disk Backup

- 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

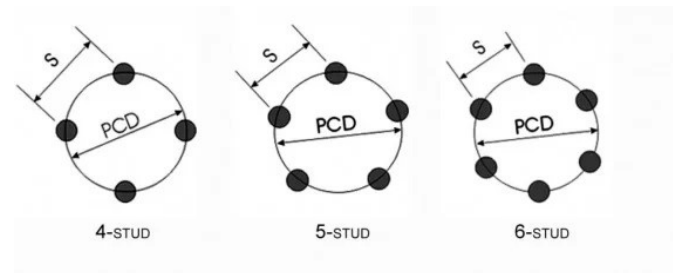


# Wheel data



- Pitch circle diameter (PCD)

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



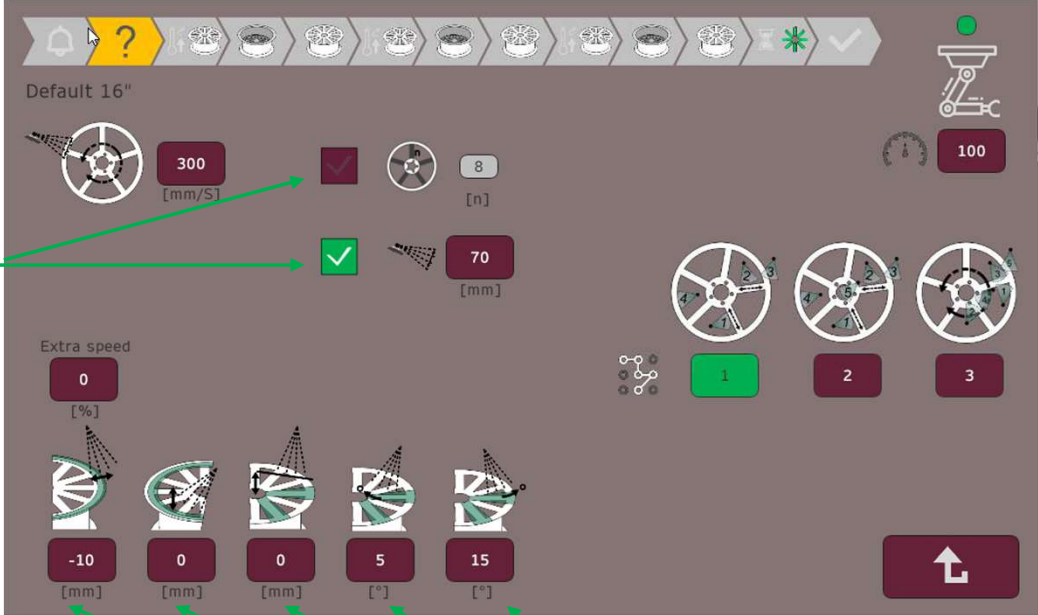
# Paint Process data

Air pressure level ok

Filter level ok, based on running hours



# Paint Process data adjustment



Default 16"

Sprayspeed/Rotation speed adjustment: 300 [mm/S]

Number of spokes or spraywidth selection: 8 [n]

Extra speed: 0 [%]

Paint pattern 1, 2 or 3: 1, 2, 3

Return while painting: [Up Arrow]

Outer edge adjustment: -10 [mm]

Inner edge height adjustment: 0 [mm]

Spoke center height adjustment: 0 [mm]

Spoke Inner angle adjustment: 5 [°]

Spoke outer angle adjustment: 15 [°]

JS0

Can be saved on the actual processed wheel

Cobot speed between tasks adjustment: 100

## Dia 16

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### 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

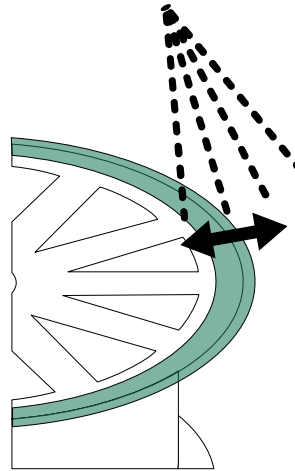
John Speet; 2023-07-19T08:32:11.107

# Paint Process data



Spraying Outer edge  
Edge adjustment

↔  
-15 to +5 [mm] JS0



Edge adjustment

Can or Spraygun can be moved inwards/outwards

Mainly used to improve coverage on edges



## Dia 17

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**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

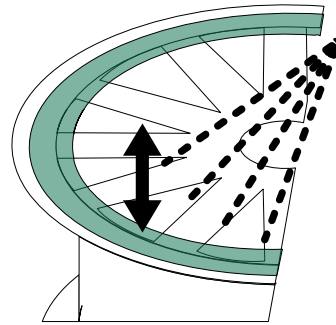
# Paint Process data



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

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**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



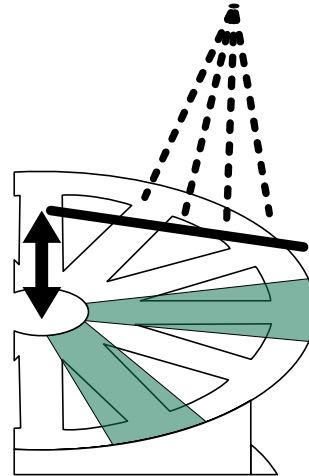
+30  
To  
- 10 [mm]

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

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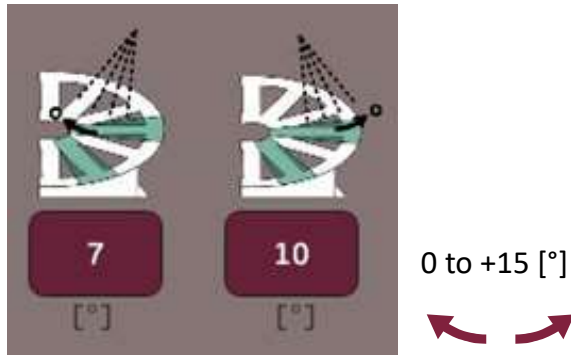
**JS0**

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

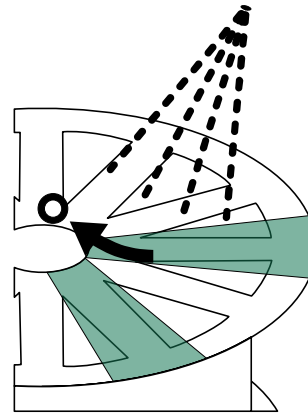
John Speet; 2023-07-19T08:58:50.892



# Paint Process data

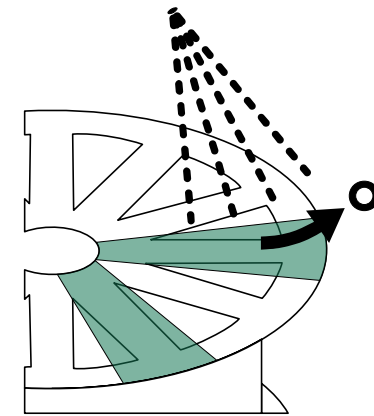


Spraying Spokes  
Inner & Outer angle adjustment



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

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**JS0**

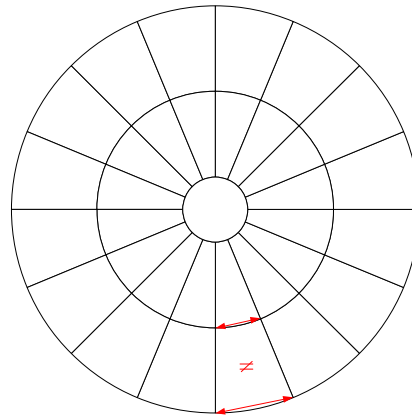
Spoke Inner angle adjustment; [0] -> painting straight , [value] -> spray in angle

John Speet; 2023-07-19T08:59:21.862

# Paint Process data

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

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

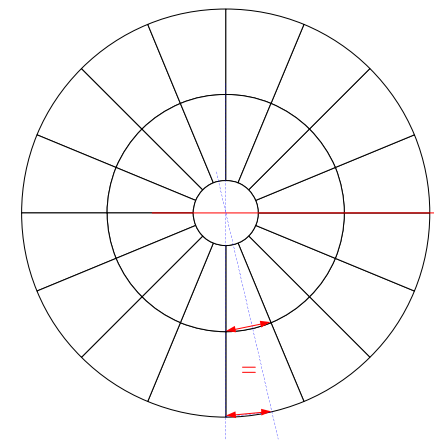


3 to 17 Spokes

Different sprayarea (Outer edge):  
Depending on wheel size

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

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



60 to 130 [mm]

Same sprayarea (outer edge):  
Undependable on wheel size



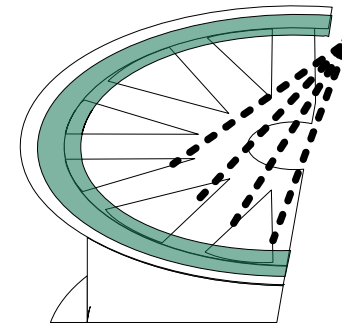
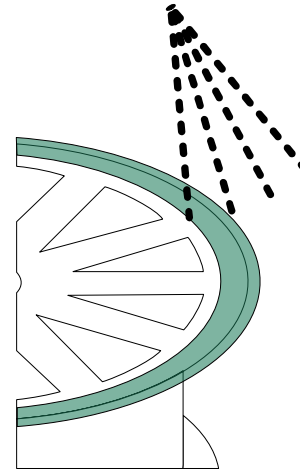
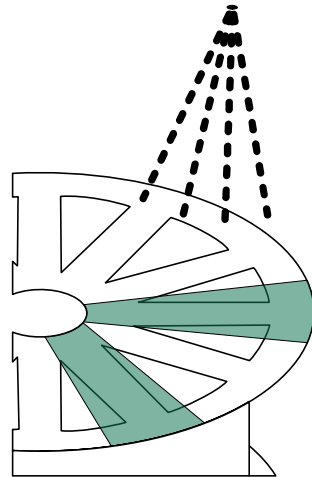
Spraying by:  
Number of Spokes OR Spraywidth selection

# 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]

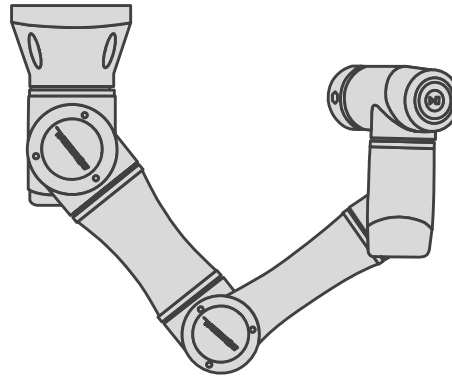
Used to adjust coverage layer

# Paint Process data



10 to 200 [mm/S]

Cobot velocity  
Velocity adjustment

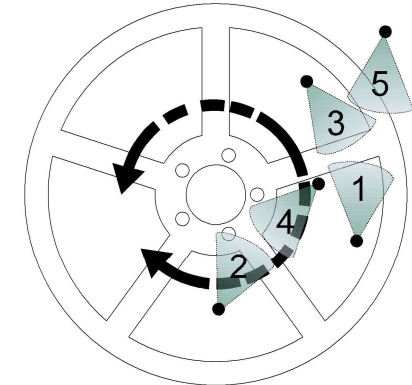
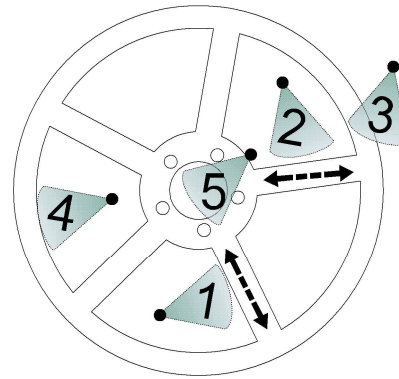
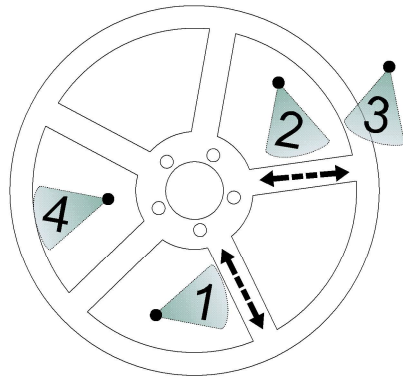


Cobot velocity adjustment  
Cobot, will move with selected speed in [mm/s] between task's

Used to optimize process time



# Paint Process data



Paint patterns

## Pattern 1

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

## Spoke principle

## 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

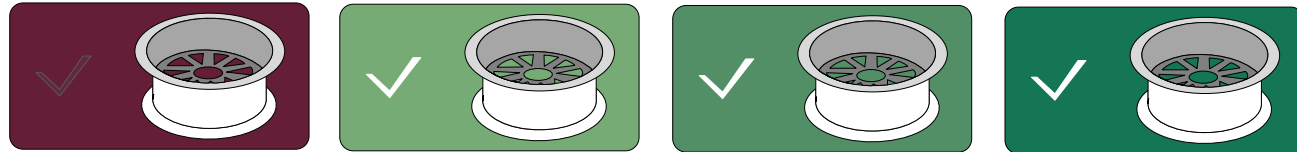
1. Paint right side of spokes
2. Paint left side of spokes
3. Paint Outer edge
4. Paint Inner edge

# Paint Process data

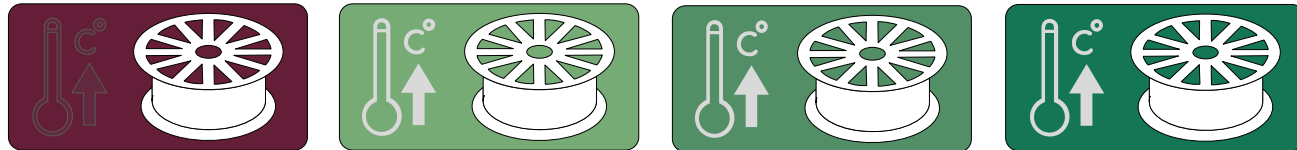
Front selection



Back selection



Preheating selection

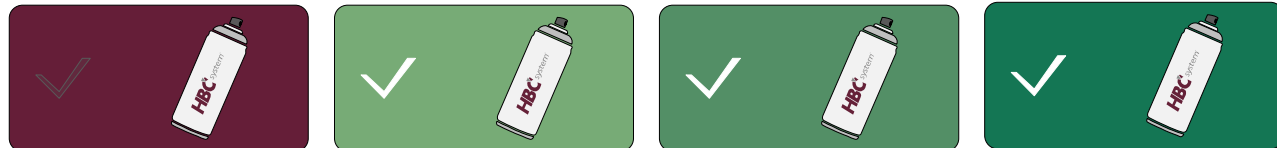


# Paint Process data

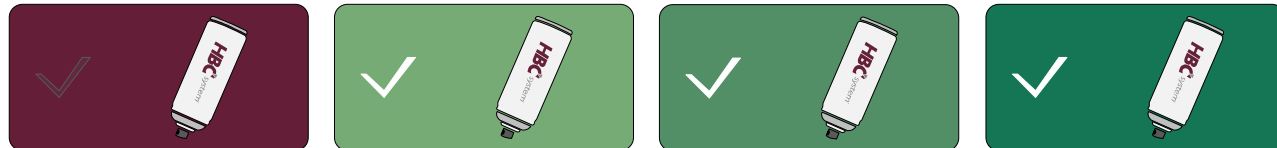
Spraycan selection



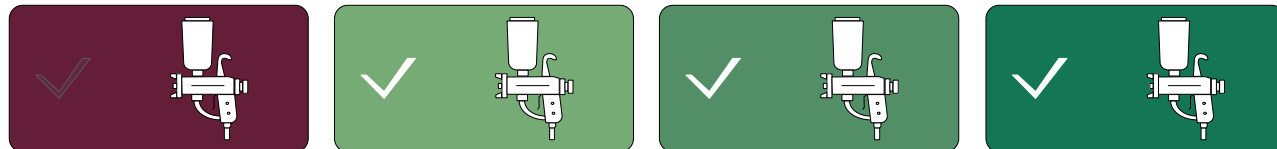
Normal Spraycan selection



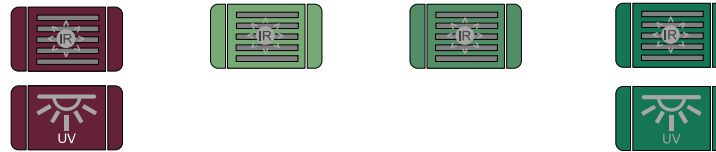
UpsideDown Spraycan selection



Spraygun selection

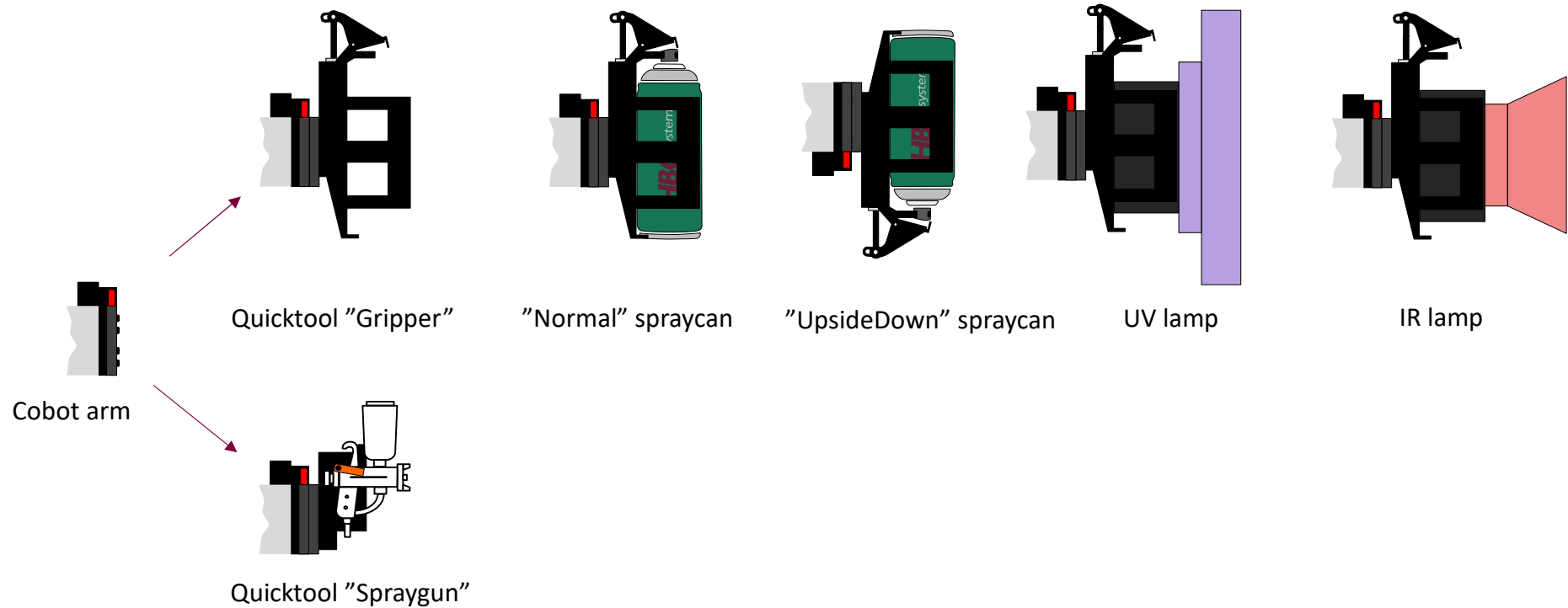


# Paint Process data



Spoke Inner & Outer angle adjustment

# Tool Selections

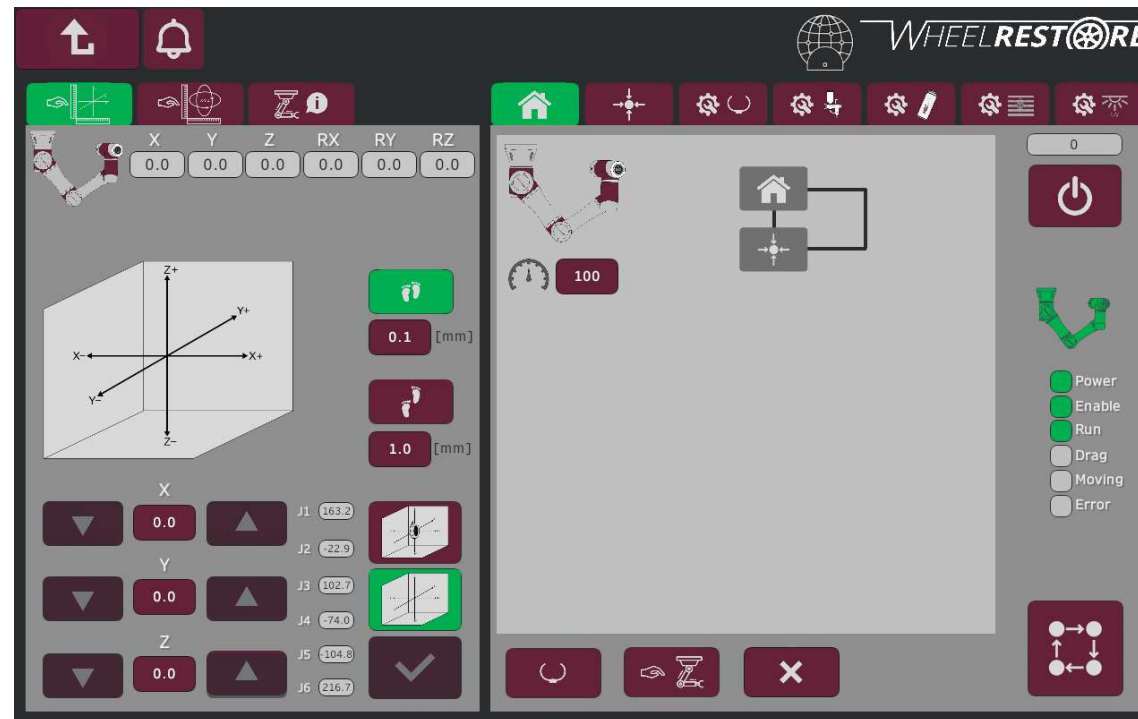


# Tool Calibration

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

X - Y - Z adjustment

Movement according to "room"

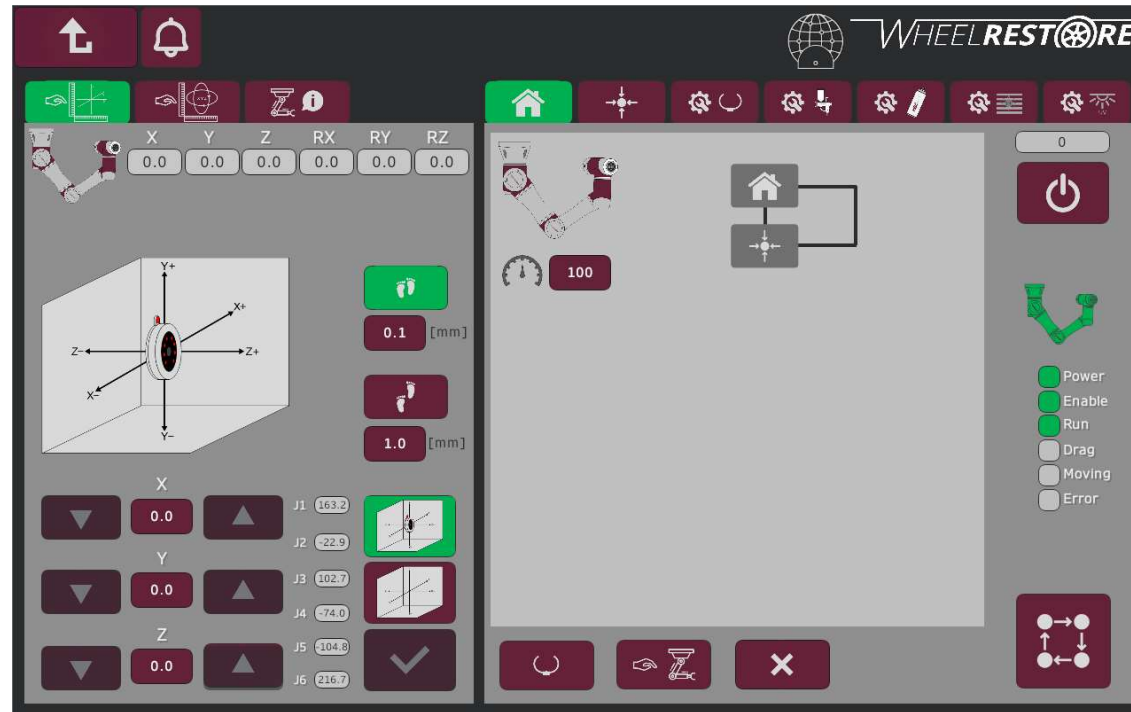


# Tool Calibration

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

X - Y - Z adjustment

Movement according "Cobot arm"

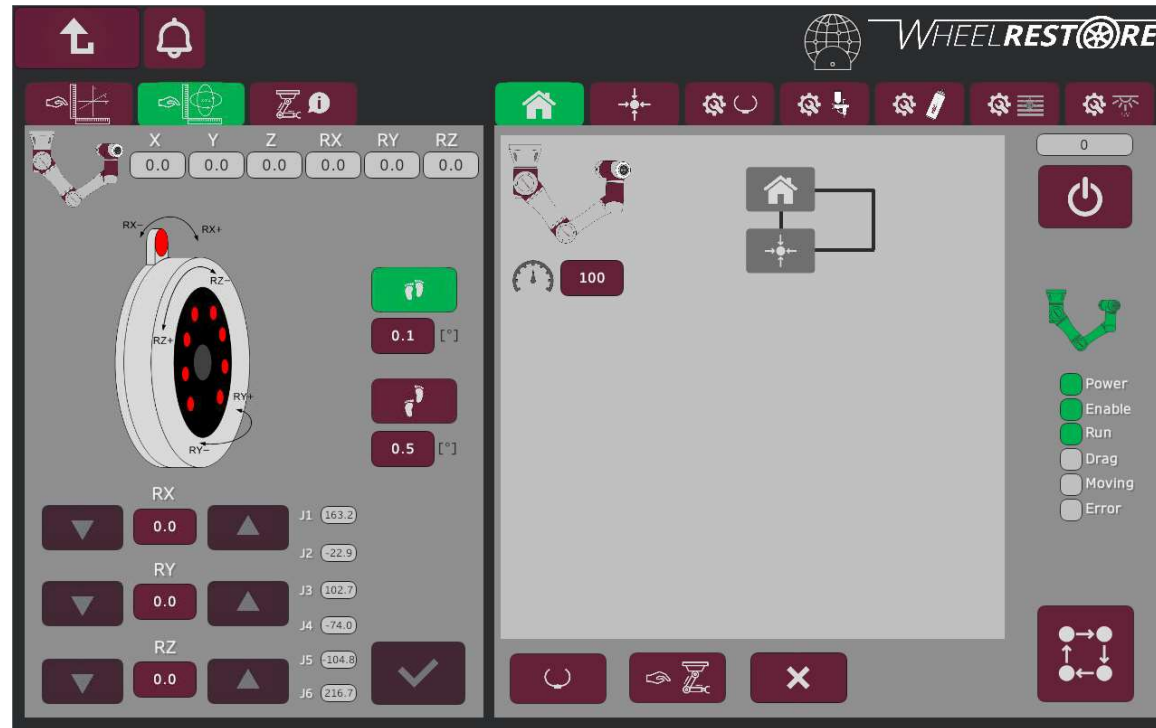


# Tool Calibration

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

RX - RY - RZ angle adjustment

Movement according "Cobot arm"

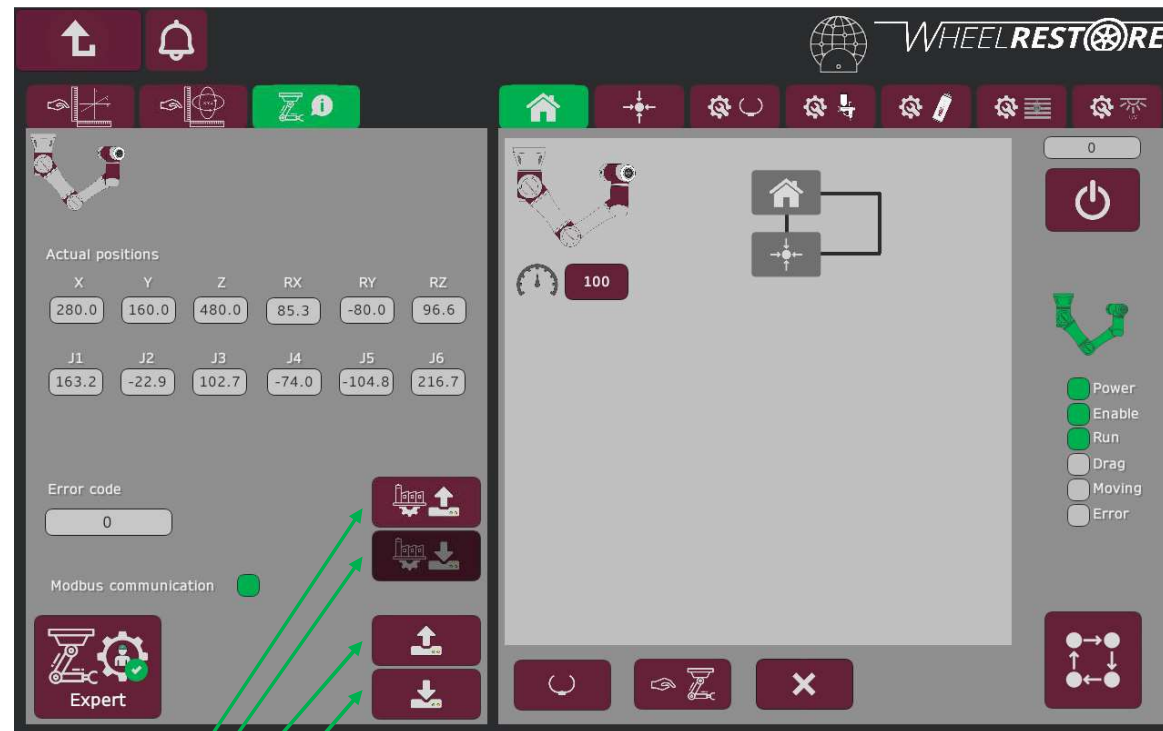




# Tool Calibration

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)

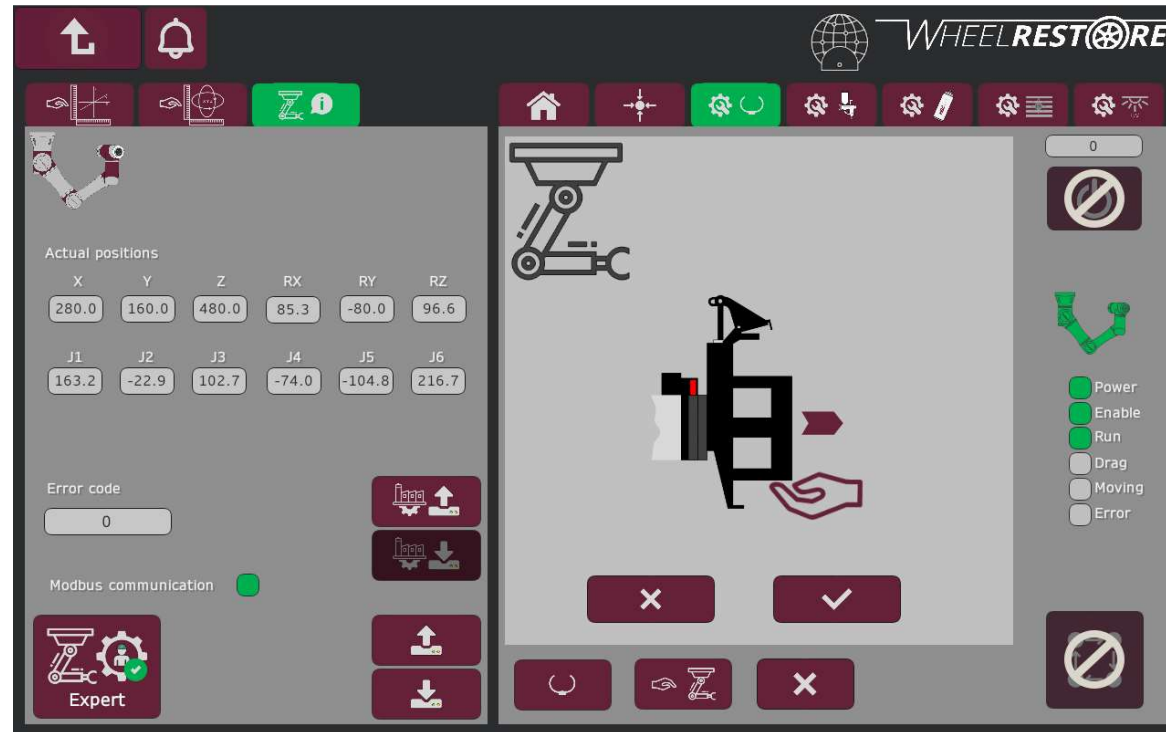
Load user calibration settings

Save user calibration settings

# Tool Calibration

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

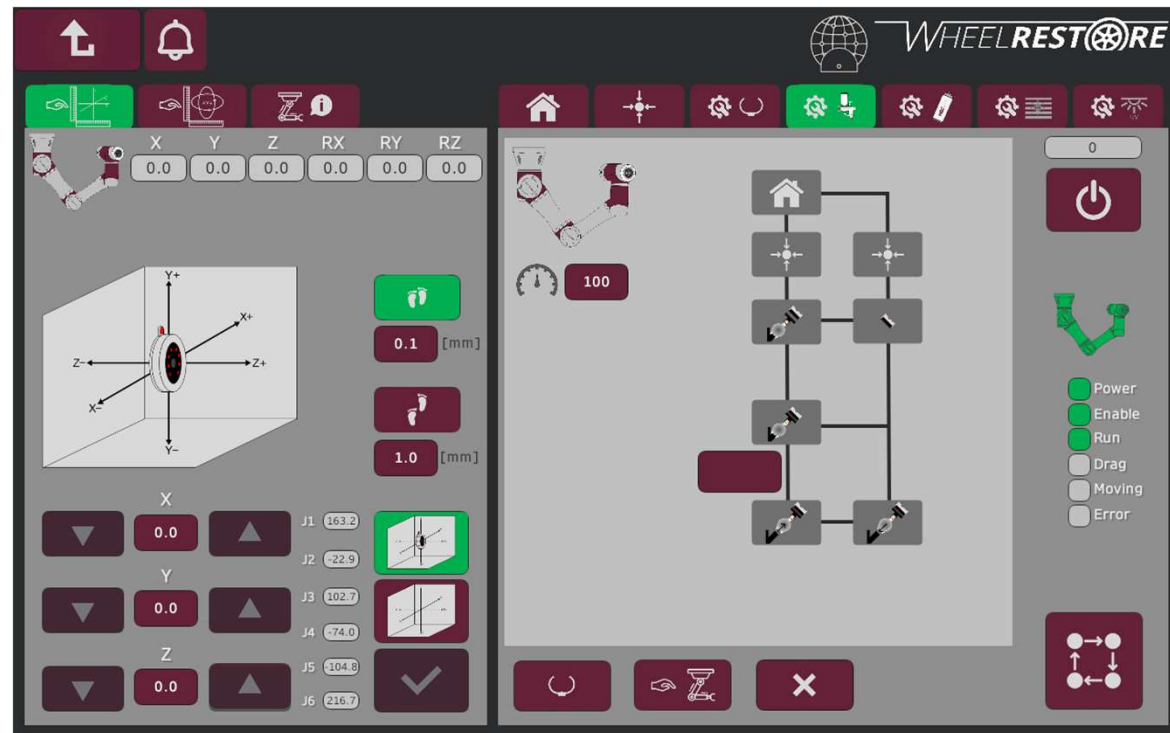
Calibrate Quicktool - Gripper



# Tool Calibration

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

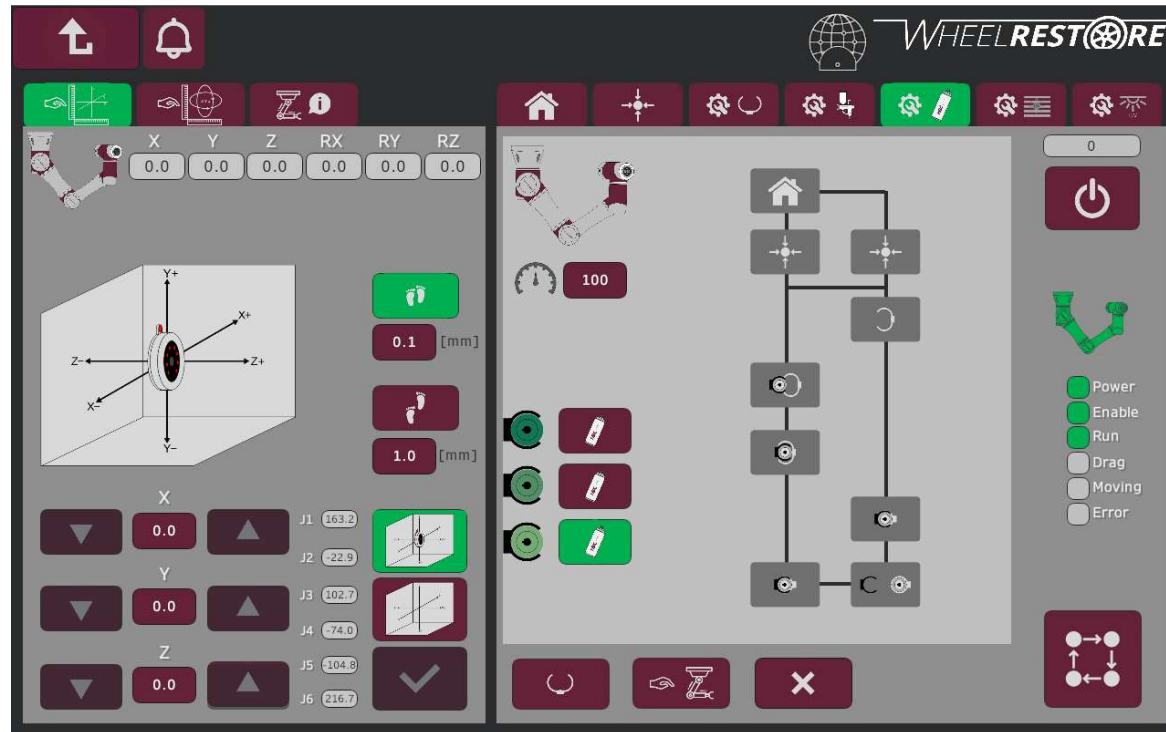
Calibrate Quicktool - Spraygun



# Tool Calibration

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

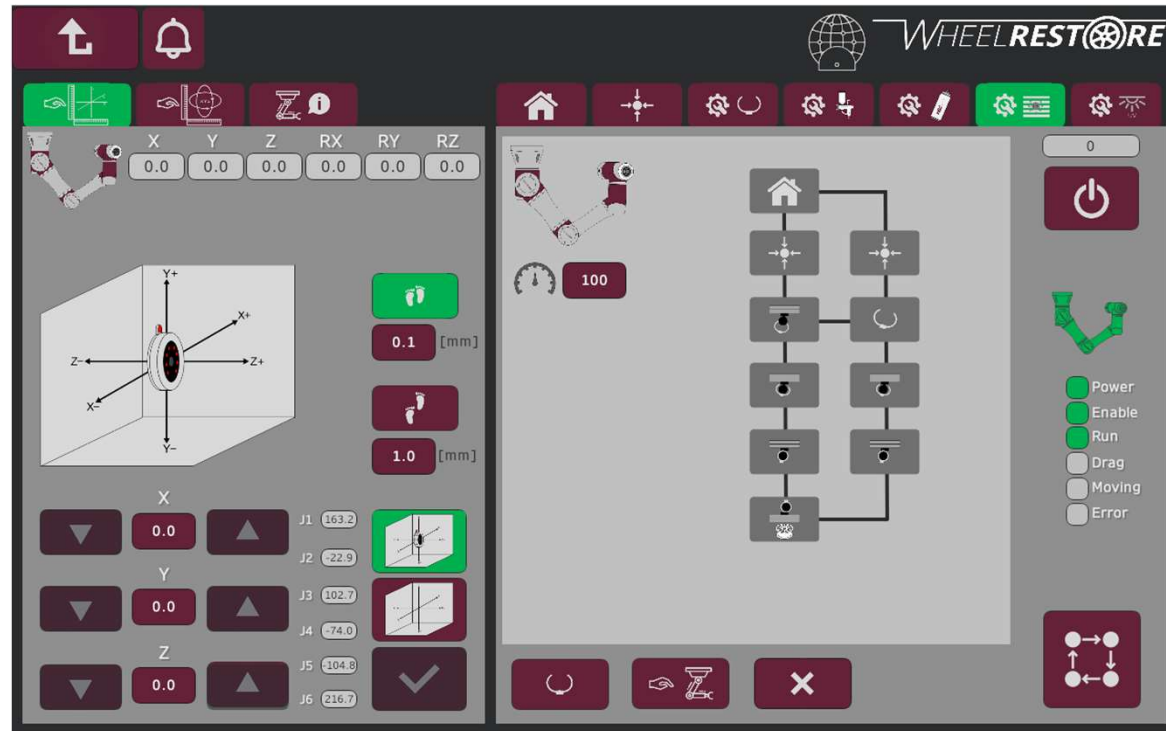
Calibrate Spracan(s) "Aerosole"



# Tool Calibration

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

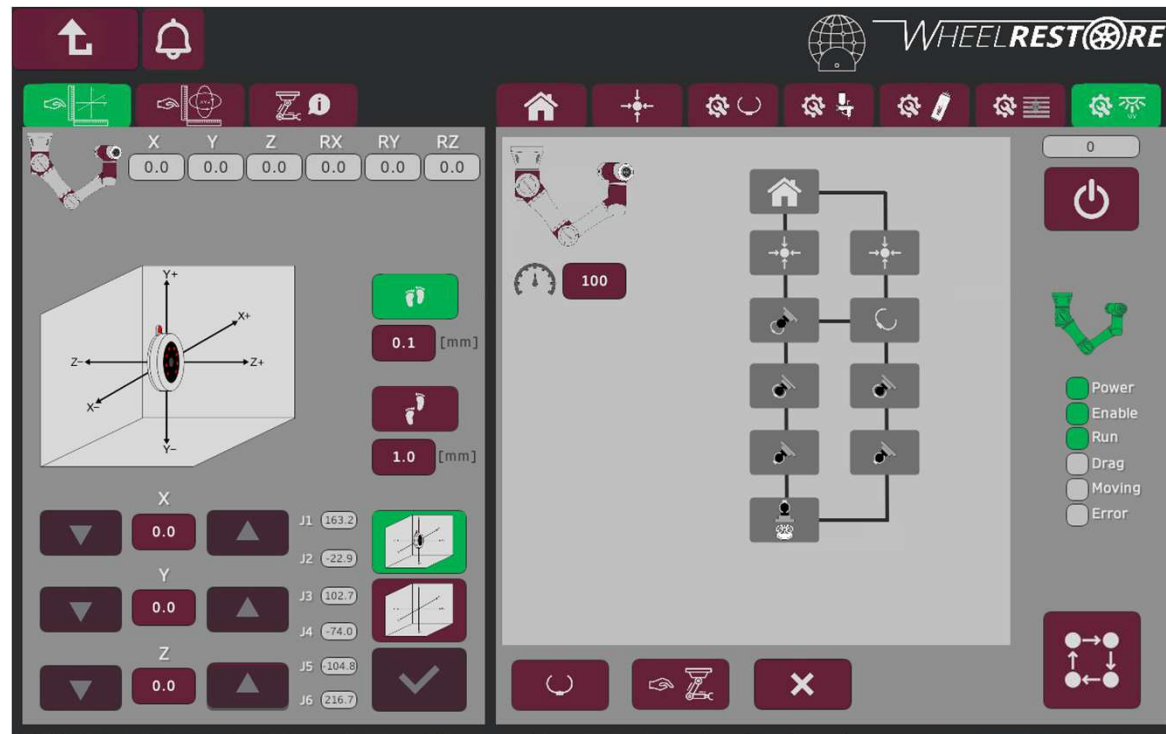
Calibrate IR lamp



# Tool Calibration

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

Calibrate UV Lamp



# Cobot system commands

The screenshot shows the WHEELRESTORE Cobot system control interface. On the left, there are four green arrows pointing to specific buttons: 'Dragmode' points to a button with a hand icon, 'Homing' points to a button with a house icon, 'Parking' points to a button with a robot icon and a 'P' symbol, and 'Speed between task's' points to a speed dial set to 100. The interface itself has a dark background with various status indicators and data tables. At the top right is the WHEELRESTORE logo. Below it, there are status indicators for Power, Enable, Run, Drag, Moving, and Error, all shown as green squares. To the right of these is a 'Modbus communication' status indicator and an 'Error code' field showing '0'. In the center, there are two tables of 'Actual positions'. The first table shows X, Y, Z, RX, RY, and RZ values. The second table shows J1, J2, J3, J4, J5, and J6 values. Below these tables are two buttons: 'No sequence' and '0'. To the right of these buttons are two green arrows pointing to them: 'Reset Cobot sequence' points to the '0' button, and 'Reset Cobot tool' points to the 'No sequence' button. At the bottom right, there is a yellow box containing the text 'JS0'.

Dragmode

Homing

Parking

Speed between task's

Reset Cobot sequence

Reset Cobot tool

JS0

## Dia 38

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**JS0**

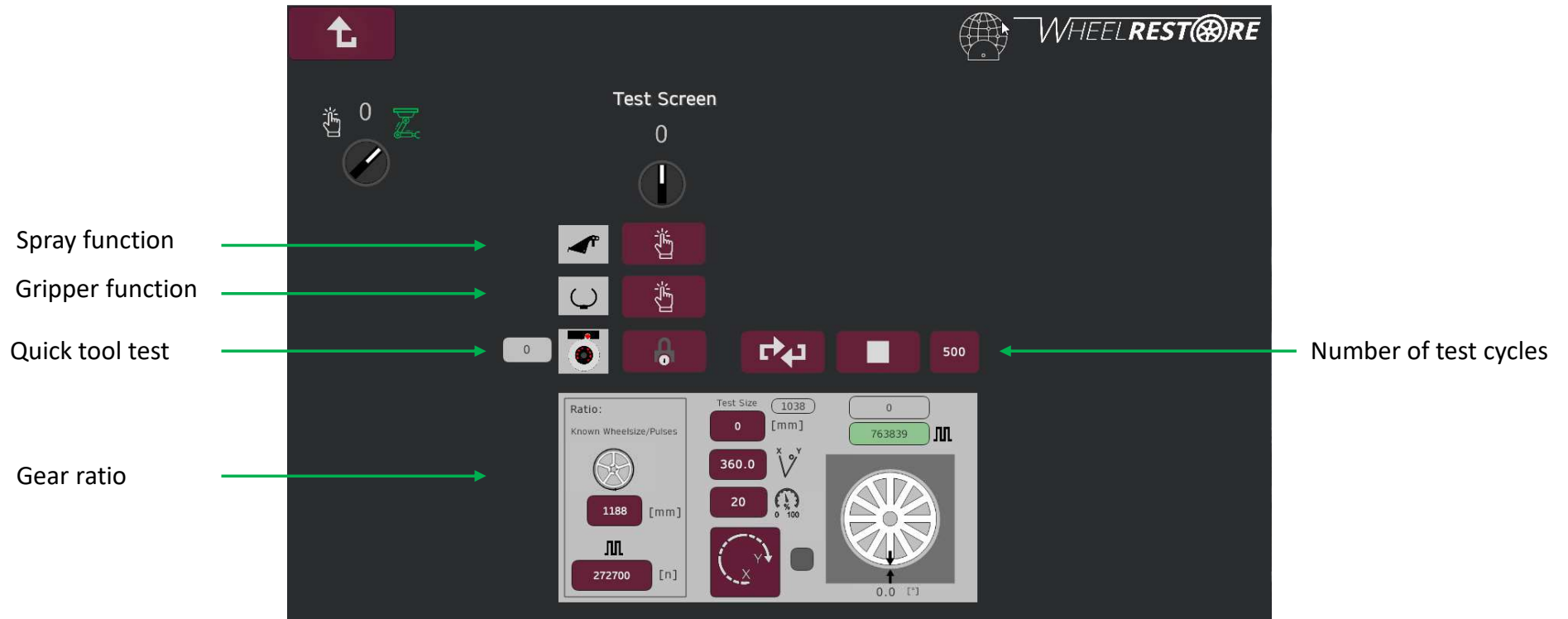
Quick tool 1 is aerosol holder

Quick tool 2 is spray gun holder

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



# Test mode



# Wheel Restore alloy repair solutions



**Diamond Cut Wheel Machine**  
WR-DCM3 - Automated



**Alloy Wheel Blast Cabinet**  
Filtration + Dust Collection



**Wheel Painting Robot**  
Patented process

