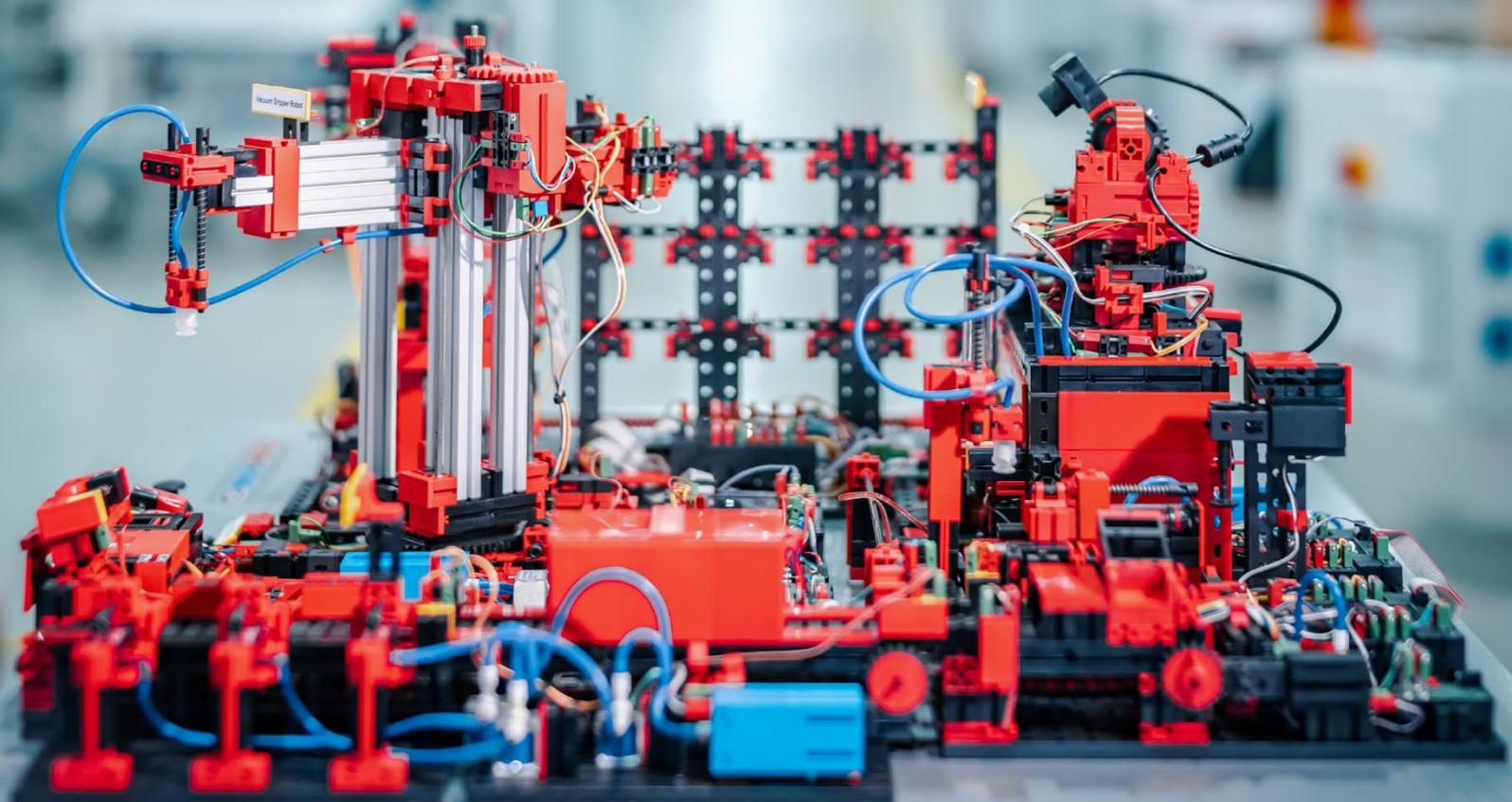


LEARNING FACTORY 4.0 24V

Accompanying booklet

Status: 22.03.2024



Calibration of the system in the fischertechnik Node-RED Dashboard of the Learning Factory

If positions in the individual factory modules are no longer correct or the color sensors need to be recalibrated, this can be done in the fischertechnik Node-RED Dashboard of the Learning Factory.

Calibration of the color sensors:

The color sensors are calibrated in the "Color sensor calibration" window in the dashboard under "HMI - Calibration".

The process is started by activating "Calibrate color sensor" and selecting the corresponding color sensor. Here, for example, "DSI".

- DSI stands for the color sensor in the input/output station
- SLD stands for the color sensor in the sorting station

First place the white workpiece in the middle of the sensor and confirm the value by clicking on **WHITE**, then the red workpiece and confirm by clicking on **RED** and finally the blue workpiece and confirm by clicking on **BLUE**.

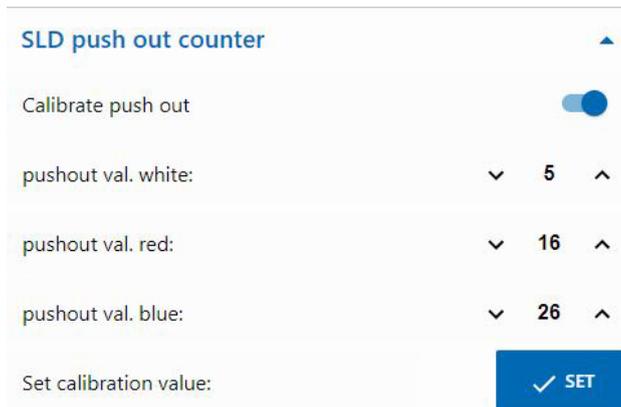
Finally, click on **CALCULATE** to calculate the threshold values.

Note: Do not forget to deactivate "Calibrate color sensor" at the end.

Calibration for the color sensor in the sorting station (SLD) is carried out in the same way, but here each workpiece is placed at the start of the belt for measurement. The conveyor belt then transports the workpiece past the color sensor to the light barrier behind the color sensor.

Calibration of the positions in the sorting line with color detection (SLD):

The positions for pushing out the workpieces in the sorting line with color detection (SLD) are calibrated in the "SLD push out counter" window in the dashboard under "HMI - Calibration".



Parameter	Value
Calibrate push out	<input checked="" type="checkbox"/>
pushout val. white:	5
pushout val. red:	16
pushout val. blue:	26

The process is started by activating "Calibrate push out" . 

Then you should first test the extent to which the current positions are correct for all 3 colors (white/red/blue).

This is done by placing the workpieces at the start of the belt. The conveyor belt then transports the workpiece past the color sensor to the set position at the corresponding ejector. There the part is ejected.

If the position is not suitable, it can be corrected and accepted by clicking on

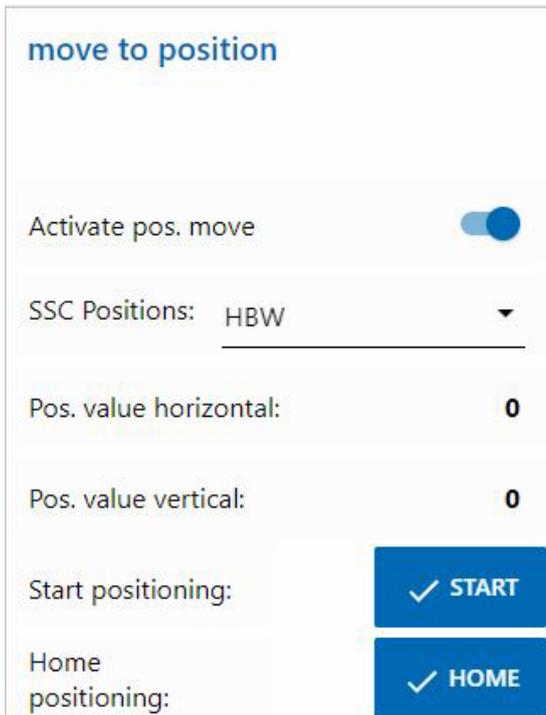


. You should then test again. Repeat this process for all 3 colors (white/red/blue) until the positions match.

Note: Do not forget to deactivate "Calibrate push out" at the end .

Calibration of a position at the sensor station with camera (SSC):

The camera positions in the sensor station with camera (SSC) are calibrated in the "move to position", "Position Center" and "Position HBW" windows in the dashboard under "HMI - SSC Positions".



The process is started by activating "Activate pos. move" . 

You can then select one of the two positions "Center" (central position with a view of the vacuum suction pad) or, as shown here, "HBW" (position with a view of the high-bay warehouse).

By clicking on , the camera first moves to the reference position (0/0) and then to the "HBW" position.

Test both positions in this way.

If one of the positions is not suitable, this can be corrected in the "Position Center" or "Position HBW" windows. You should then test again.

Repeat this process until the positions are correct.

Position Centre	Position HBW
horizontal: ▼ 3000 ▲	horizontal: ▼ 5400 ▲
vertical: ▼ 1400 ▲	vertical: ▼ 950 ▲

Click on  to move to the reference position (0/0).

Note: Do not forget to deactivate "Activate pos. m ove" again at the end 

Calibration of a position on the vacuum suction pad (VGR):

The positions of the 3-axis robot in the vacuum gripper station (VGR) are calibrated in the dashboard under "HMI - VGR Positions". There is the "move to position" window and 13 windows for the positions

"Position Color Reader", "Position DSI collect", "Position DSI discard", "Position DSO collect", "Position DSO discard", "Position HBW collect", "Position HBW discard", "Position MPO", "Position NFC", "Position NiO", "Position SLD white", "Position SLD red" and "Position SLD blue".

Position Color Reader	▼
Position DSI	▼
Position DSO	▼
Position HBW	▼
Position MPO	▼
Position NFC	▼
Position NiO	▼
Position SLD	▼

move to Position

Activate pos. move

VGR Positions: DSO discard ▼

Pos. value horizontal: **2070**

Pos. value vertical: **1480**

Pos. value rotation: **950**

Start positioning: ✓ START

Final positioning: ✓ FINAL

Start offset: ✓ OFFSET

Home positioning: ✓ HOME

The process is started by activating "Activate pos. move" .

You can then select one of the items, for example the "DSO discard" item.

By clicking on ✓ START , the 3-axis robot first moves to the reference position (0/0/0) and then to a position above (offset by the value Offset) the "DSO discard" position.

Click on ✓ FINAL to move to the final position and then back to the reference position (0/0/0).

The button ✓ OFFSET has no function here.

Test all 13 positions in this way.

Position DSO		
horizontal:	▼ 2070 ▲	
vertical Collect:	▼ 1480 ▲	
vertical Discard:	▼ 1480 ▲	
rotate:	▼ 950 ▲	
vertical Offset:	▼ 200 ▲	

If one of the positions is not suitable, this can be corrected in the windows for the positions, here for example "Position DSO". It should then be tested again.

Repeat this process until all positions fit.

Click on  to move to the reference position (0/0/0).

Note: Do not forget to deactivate "Activate pos. move" again at the end .

Calibration of a position in the automated high-bay warehouse (HBW):

The positions of the storage and retrieval machine in the automated high-bay warehouse (HBW) station are calibrated in the dashboard under "HMI - HBW Positions". There is the "move to position" window and 5 windows for the positions

"Position Belt",

"Position Rack"

with the offset for the rack,

"Position Rack Row A",

"Position Rack Row B"

and

"Position Rack Row C".

Position Belt	▼
Position Rack	▼
Position Rack Row A	▼
Position Rack Row B	▼
Position Rack Row C	▼

Only the positions Rack A1, Rack B2 and Rack C3 are approached and calibrated in the warehouse. The other 6 position values are calculated from this.

move to Position

Activate pos. move

HBW Positions: Rack B2 ▼

Pos. value horizontal: 5240

Pos. value vertical: 1750

Start positioning: ✓ START

Final positioning: ✓ FINAL

Start offset: ✓ OFFSET

Home positioning: ✓ HOME

The process is started by activating "Activate pos. move".

You can then select one of the positions, for example position "Rack B2" (position B2 in the warehouse).

By clicking on ✓ START, the storage and retrieval machine first moves to the reference position (0/0/rear cantilever) and then to the "Rack B2" position in front of the warehouse.

Click on ✓ FINAL to move the cantilever into the bearing.

With a click on ✓ OFFSET the stacker crane moves up by the Offset value to lift a pallet.

By clicking again on ✓ OFFSET, the storage and retrieval machine moves down again by the offset, then retracts the cantilever and finally returns to the reference position (0/0/rear cantilever)

Test all 3 positions in the bearing (A1, B2, C3) and the position on the belt.

Position Rack ▲

vertical Offset: ▼ 370 ▲

Position Rack Row B ▲

B2 horizontal: ▼ 5240 ▲

B2 vertical: ▼ 1750 ▲

If one of the positions is not suitable, this can be corrected in the windows for the positions, here for example "Position Rack Row B" (Position Rack B2). You should then test again.

Repeat this process until all positions fit.

Click on ✓ HOME to move to the reference position (0/0/rear boom).

Note: Do not forget to deactivate "Activate pos. move" again at the end