

### **Festo\_Positioning\_Basic library – Pathcorrection**

Commissioning of a selected system with the Festo\_Positioning\_Basic library is explained step by step, so that it's successfully integrated into the user program.

FPosB

Title ..... Festo\_Positioning\_Basic library – Pathcorrection  
Version ..... 1.30  
Document no. .... 100102  
Original .....en  
Author .....Festo

Last saved ..... 11.06.2021

## Copyright Notice

This documentation is the intellectual property of Festo SE & Co. KG, which also has the exclusive copyright. Any modification of the content, duplication or reprinting of this documentation as well as distribution to third parties can only be made with the express consent of Festo SE & Co. KG.

Festo SE & Co KG reserves the right to make modifications to this document in whole or in part. All brand and product names are trademarks or registered trademarks of their respective owners.

## Legal Notice

Hardware, software, operating systems and drivers may only be used for the applications described and only in conjunction with components recommended by Festo SE & Co. KG.

Festo SE & Co. KG does not accept any liability for damages arising from the use of any incorrect or incomplete information contained in this documentation or any information missing therefrom.

Defects resulting from the improper handling of devices and modules are excluded from the warranty.

The data and information specified in this document should not be used for the implementation of safety functions relating to the protection of personnel and machinery.

No liability is accepted for claims for damages arising from a failure or functional defect. In other respects, the regulations with regard to liability from the terms and conditions of delivery, payment and use of software of Festo SE & Co. KG, which can be found at [www.festo.com](http://www.festo.com) and can be supplied on request, shall apply.

All data contained in this document do not represent guaranteed specifications, particularly with regard to functionality, condition or quality, in the legal sense.

The information in this document serves only as basic information for the implementation of a specific, hypothetical application and is in no way intended as a substitute for the operating instructions of the respective manufacturers and the design and testing of the respective application by the user.

The operating instructions for Festo products can be found at [www.festo.com/sp](http://www.festo.com/sp).

Users of this document (application note) must verify that all functions described here also work correctly in the application. By reading this document and adhering to the specifications contained therein, users are also solely responsible for their own application.

Table of contents

1      Pathcorrection ..... 5



# 1 Pathcorrection

Activation of path correction is explained in Application Note 08 CNC. The actual function is explained here, so that correction is properly executed.

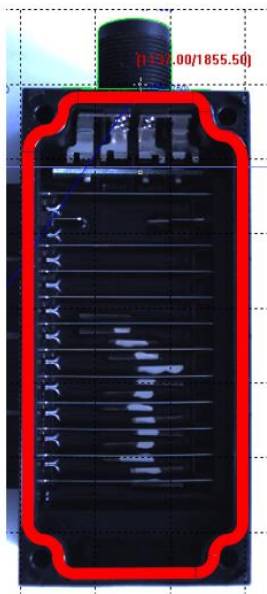
Prerequisite: A reference position and a reference angle must be discernible at the object on which the CNC will be used, for example via a 2D camera. This reference moves within the camera's field of view. As long as it's within the field of view, position can be detected and corrected if necessary.

As soon as the reference is outside of the field of view, correction is no longer possible without further action.

## Sample application:

A glue bead needs to be applied to a CPX interlinking block along a specified path.

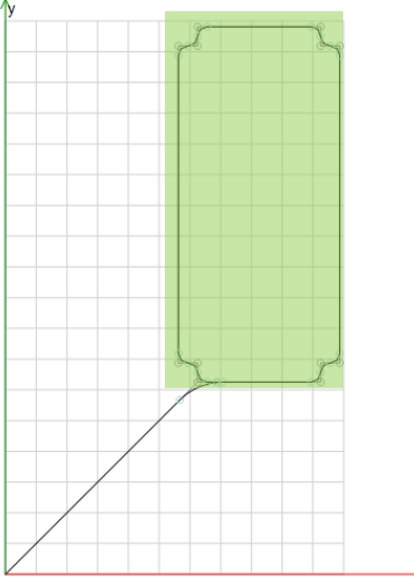
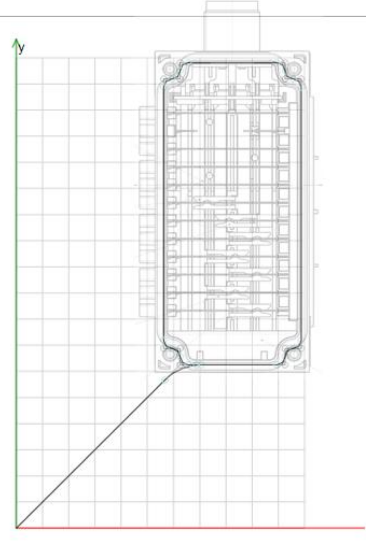
The path on the block has the following contour:



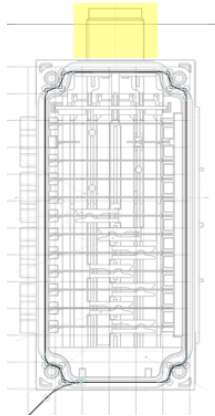
Two scenarios are possible.

1. The interlinking block is located at a defined, unchangeable position within the workspace (fixed limit stop or the like). In this case, the CNC program can be written so that no correction is necessary.
2. The position of the interlinking block and the angle of rotation of its top surface may vary. In this case the glue bead's path has to be shifted, i.e. corrected, depending on the part's positioning and angle of rotation.

## Basic procedure for setting up and using path correction

|   |                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <p>The component's dimensions and thus the path's positioning within the component are known. The path is first of all prepared as a CNC program on the basis of this information. The section identified in yellow corresponds to the actual path. Travel from the point of origin to the start position is shown here as well, although this has nothing to do with the actual gluing process.</p>                   |
|   |                                                                                                                                                                                                                                                                                                                                     |
| 2 | <p>The programmed path then coincides relatively to the component's dimensions. In the case of scenario 1, the process could now be started already because the dimensions, the position and the angle of rotation of the CNC path correspond to the actual component. In the case of scenario 2, the position of the actual component must first of all be compared with the CNC data and corrected if necessary.</p> |
|   |                                                                                                                                                                                                                                                                                                                                    |

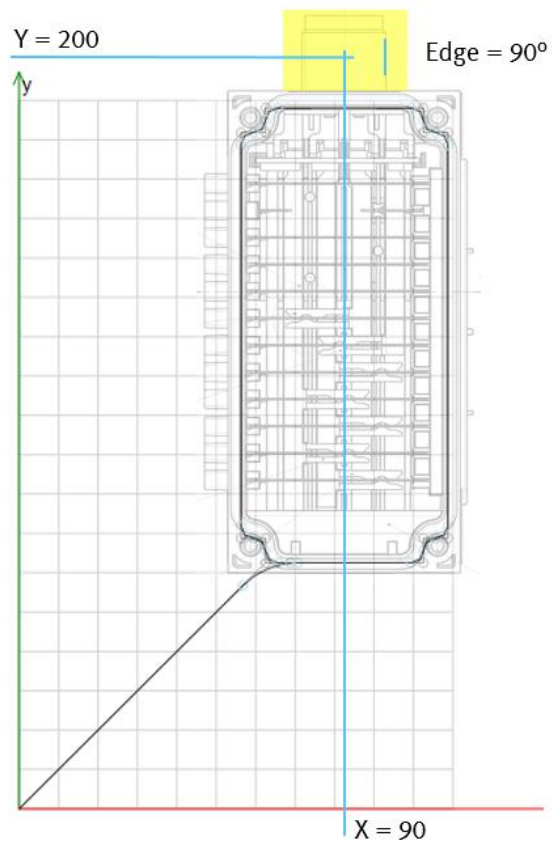
- 3 A reference feature on the component is selected, by means of which position and angle of rotation can be determined.  
The interlinking block's connecting thread is suitable for this purpose in this case.

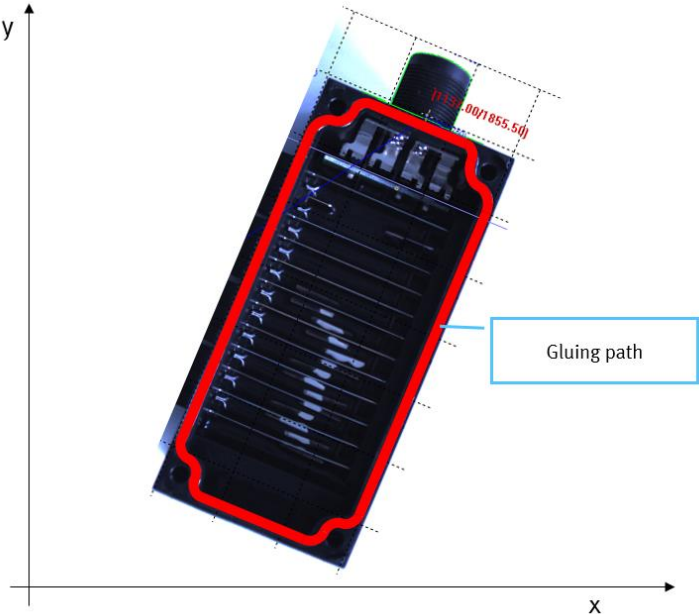
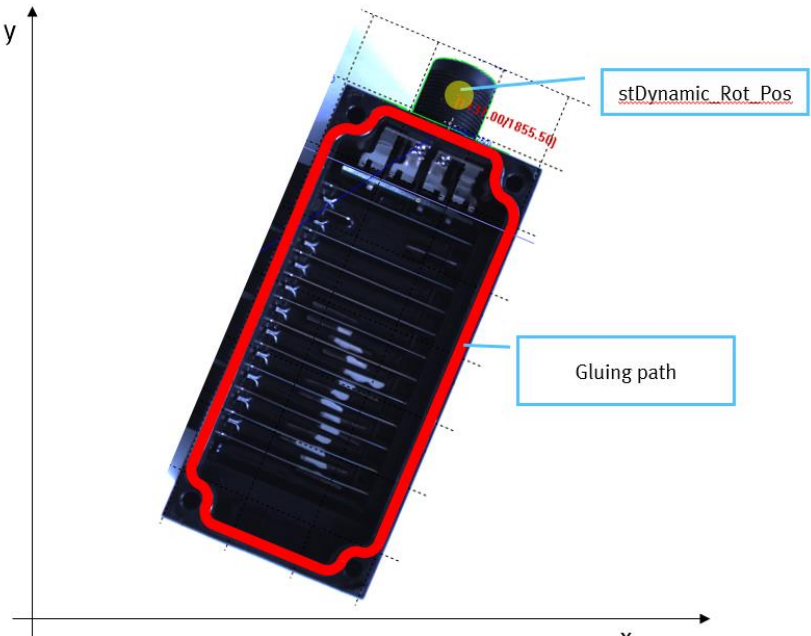


- 4 For example, position is defined based on the middle of the thread or its centre of gravity, and angle of rotation on the basis of an edge.



- 5 Within the CNC program, this position and the edge have specific values, because the path was also created with absolute values.  
The position and the angle of rotation have to be determined.



|   |                                                                                                                                                                                                                                                                                                                                                                           |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6 | <p>The position value corresponds to “stStatic_Rot_Pos” in the FPB.lib and is transferred. The angle has to be saved to Codesys by the user for subsequent angle correction.</p>                                                                                                                                                                                          |
|   | <pre>g_stIn.stCNCCorrParameters.stStatic_Rot_Pos.lrx := 90; g_stIn.stCNCCorrParameters.stStatic_Rot_Pos.lry := 200; g_stIn.stCNCCorrParameters.stStatic_Rot_Pos.lrz := 0;</pre>                                                                                                                                                                                           |
| 7 | <p>A new image of the component is now recorded by the camera within the application.</p>                                                                                                                                                                                                                                                                                 |
|   |  <p>The diagram shows a 2D coordinate system with x and y axes. A component is positioned at an angle. A red line outlines the 'Gluing path' on the component. A point on the component is labeled with the coordinates (113.00/185.50).</p>                                           |
| 8 | <p>The position of the connecting thread and the angle of rotation are determined with the help of suitable tools provided by the camera's inspection program.</p>                                                                                                                                                                                                        |
|   |  <p>The diagram shows a 2D coordinate system with x and y axes. A component is positioned at an angle. A red line outlines the 'Gluing path' on the component. A point on the component is labeled with the coordinates (113.00/185.50) and is identified as 'stDynamic_Rot_Pos'.</p> |
| 9 | <p>The newly determined point corresponds to “stDynamic_Rot_Pos” and is transferred. As a rule, the camera doesn't scan the entire workspace, but rather only an excerpt. Offset of the calibrated camera image relative to the workspace must be known. This is then added to the ascertained camera data in order to obtain the absolute position.</p>                  |
|   | <pre>g_stIn.stCNCCorrParameters.stDynamic_Rot_Pos.lrx := 180; g_stIn.stCNCCorrParameters.stDynamic_Rot_Pos.lry := 180; g_stIn.stCNCCorrParameters.stDynamic_Rot_Pos.lrz := 0;</pre>                                                                                                                                                                                       |

|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |         |        |         |   |         |         |   |       |       |      |  |        |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------|---------|---|---------|---------|---|-------|-------|------|--|--------|
| 10   | <p>In this case, the ascertained angle has a value of 70°. These 70° have to be offset against the original angle from the CNC program. The new value is subtracted from the old value to this end, because the “lrdPhi” parameter represents a relative change to the original value.</p> <p>Geometrically, the angle has been reduced by 20° but positive is calculated in the clockwise direction in the library.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |        |         |   |         |         |   |       |       |      |  |        |
|      | <div><div></div><div>g_stln.stCNCCorrParameters.lrdPhi := 20;</div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |         |        |         |   |         |         |   |       |       |      |  |        |
| 11   | <div><div><div>Internal CNC No</div><div><div>1</div><div>CNC_Example_1</div></div></div><div><div>Static / Dynamic<br/>Rotation Pos</div><table><tr><td>X</td><td>90.000</td><td>180.000</td></tr><tr><td>Y</td><td>200.000</td><td>180.000</td></tr><tr><td>Z</td><td>0.000</td><td>0.000</td></tr><tr><td>dPhi</td><td></td><td>20.000</td></tr></table></div><div><div>Start</div><div>Halt</div><div>Quick Stop</div><div>Abort</div><div>Ack M Function</div><div>Ack All M Functions</div><div>Enable Step Mode</div><div>Next Step</div><div>EnablePathCorrection</div><div>NoAbortByEMCYErr</div></div></div> <div><div>g_stln.stCNCCorrParameters.stStatic_Rot_Pos.lrx := 90;<br/>g_stln.stCNCCorrParameters.stStatic_Rot_Pos.lry := 200;<br/>g_stln.stCNCCorrParameters.stStatic_Rot_Pos.lrz := 0;<br/>g_stln.stCNCCorrParameters.stDynamic_Rot_Pos.lrx := 180;<br/>g_stln.stCNCCorrParameters.stDynamic_Rot_Pos.lry := 180;<br/>g_stln.stCNCCorrParameters.stDynamic_Rot_Pos.lrz := 0;<br/>g_stln.stCNCCorrParameters.lrdPhi := 20;</div></div> | X       | 90.000 | 180.000 | Y | 200.000 | 180.000 | Z | 0.000 | 0.000 | dPhi |  | 20.000 |
| X    | 90.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 180.000 |        |         |   |         |         |   |       |       |      |  |        |
| Y    | 200.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 180.000 |        |         |   |         |         |   |       |       |      |  |        |
| Z    | 0.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0.000   |        |         |   |         |         |   |       |       |      |  |        |
| dPhi |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 20.000  |        |         |   |         |         |   |       |       |      |  |        |