# "AUTOPOSITIONS ARE DRIFTING"

APPLICABLE TO:	Precision system
ERROR MESSAGE:	[No error message present]
INFORMATION:	This is an error related to motorized movements only. There is no error message present since the system actually considers itself in the correct position - but mechanically it is not.

## HOW THE AFFECTED FUNCTIONALITY IN THE SYSTEM <u>SHOULD</u> WORK:

The system should, when a protocol is selected and the servo button is being pressed, drive to the desired position (which is the pre-programmed autoposition selected in the protocol setup). Movement should be completed from beginning to end in without any stops or error messages along the way. When the servo button goes from flashing light to steady lit the autopositioning sequence is completed – all motorized axis are considered *in position*.

(NOTE that for some examinations and depending on setup it is required that the user make final adjustments of the equipment - for example move Wallstand bucky, define stitching area etc – for the servo button to go from flashing to steady lit)

When the autopositioning sequence is completed the system should be in correct location – depending on the configuration from case to case of course – but typically this means centered and aligned towards detector field in Wall stand or Table.

## SYMPTOMS OF THIS ERROR:

When this error occur all movements will continue until completion and no error message will be present in tube stand display. Instead, the error occurs visually as an actual incorrect mechanical position.

The position is simply off, without the system noticing anything wrong.

NOTE: If there is a deviation between collimator light field and detector cross occurring when adjusting SID only (but starting point is OK) it means the mechanical angles are incorrectly adjusted. This document does not cover the kind of adjustment needed in that case. Please refer to Installation and Service manual (Installation Chapter).

## **POSSIBLE CAUSES:**

- Incorrect mechanical installation or adjustment
- Problem with encoder resolution (positioning feedback)
- Incorrect calibration and/or programming of autopositions

## **ACTION STEPS:**

In this case the log files will not give much help since there is no error reported.
And since no error is reported, this means the position feedback from the encoder is what it is supposed to be = the value which was programmed for this specific autoposition.

So the encoder value – calculated into a *position* value in Arcoma service software – is OK. But the system is not in the actual correct position – this problem is visually detected only, by users or engineers.

Now, either the autoposition is incorrectly programmed or somehow the mechanical circumstances has changed since it was programmed.

BUT – the first step before we move forward is to determine which direction to deal with. These are the directions we will refer to in this document:



**2.** See and follow the flow chart on next page to determine this – one for positioning against Table and one for positioning against Wallstand, depending on your situation.

## WALLSTAND



## TABLE



**3.** If the problem is with X or Y positioning, determine which direction by using the reference drawing on page 1 of this document. **Then move on to step 4.** 

If it is related to Alpha or Beta - go directly to **step 5**.

If it is related to Z - go directly to **step 6**.

**4.** Follow the flow chart on next page to find the root cause of incorrect X and Y positioning.



- 1. To adjust the drive units loosen the nut (A).
- 2. Turn the eccentric bolts (B), see Fig. 5-94.

It shall be possible to rotate the wheels (C) by finger pressure. Repeat until the drive units runs smoothly.

The tooth belt should not give any vibrations down to the maneuver handle, when the OTC is moved manually.

When the calibration of the OTC is done, a fine adjustment of the drive units may be needed.

Check that the tooth belt wheels does not lose contact with tooth belt, during the entire stroke of X/Y-direction.



Fig. 5-94

- Check set screws visible in below picture and tighten if needed. Then make a mark at encoder shaft and drive unit:



- Also make a mark at tooth belt and rail:



We can then later look at the marks and see if they still match – if they don't, it means there is something mechanically wrong in the system.

**5.** If you found that releasing Alpha/Beta brake solved the misalignment between detector crossfield and lightfield, it means that the Alpha/Beta-position in the used autoposition is programmed slightly wrong: The autoposition programming is telling the system to drive ALMOST to the mechanical detent position but – then again - just slightly off.

What happens when we release the brake is the mechanical detent forces it into the correct angle again. This is most likely caused by any of the following:

- o Incorrect autoposition programming
- Recalibration of Alpha/Beta zero point (without proper adjustment of autopositions afterwards)
- Incorrect encoder/potentiometer feedback

Either way, correct it by doing the following;

- 1. Drive to the autoposition
- 2. Release the Alpha/beta brake so it goes into correct mechanical angle
- 3. In this position check that Alpha/Beta is 0, 90 or -90 degrees (and not slightly off, for example 89,5). If needed, recalibrate the position.
- 4. Rewrite the autopositions

**6.** If you found that the positioning is off in Z direction it could be programming of autopositioning or mechanical issues. This section is divided for Wallstand and Table since the corresponding actions varies. But first off, check the Helix adjustment of tube stand Z according to the installation procedure described in Installation and Service.

## Z TUBE STAND (HELIX/ENCODER)

Start off by checking that the Helix adjustment is calibrated correctly.

Drive the tube to a high position, for example 1800 mm from floor. Measure the height using the SID ruler inside the collimator (=it shows measurement from focal spot which is correct for this purpose). Compare with Z value present in Arcoma service software.

Make another measurement at a low position, for example 500 mm.

If the values are deviating more than allowed, redo Helix calibration, Z position and ends tops. See Installation and Service manual for instructions and tolerances.

## WALLSTAND

- 1. Manually align the light field with cross field on Wallstand
- 2. Connect Arcoma service software and compare positions of WS and Z
- 3. Are they showing the same value? If not recalibrate WS in this position.
- 4. Move the detector bucky a full movement stroke up and down and align it again. Are Z and Ws values still the same? If not, check mechanical installation of WS encoder (cogwheel, set screws etc)
- 5. After adjusting/confirming that Z and WS values are the same when aligned, rewrite the autoposition.
- 6. Restart the system.

## TABLE

- 1. Drive the table to its lowest position possible and measure the height in mm from detector surface to floor. Compare with value in Arcoma service software.
- 2. Drive to tables highest position and measure the height again compare with value in service software.
- 3. If needed (in case the values a deviating from actual measurements) make a new calibration of the table resolution and position.

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