Trio Motion Technology Ltd.,
Shannon Way,
Tewkesbury,
Gloucestershire,
GL20 8ND
United Kingdom
Tel : +44 (0)1684-292333

Trio Motion Technology LLC.,
187 Northpointe Blvd,
Suite 105 Freeport,
PA 16229,
USA
Tel : +1 724 472 4100

Trio Motion Technology (Shanghai) Co. Ltd.,
A1104 Yunding International Commercial Plaza,
800 Chengshan Rd,
Pudong New Area,
Shanghai,
CHINA
Tel : +86 21 587 976 59

Trio Motion Technology,
Teerth Business Center,
3rd Floor, Unit No. 7, Block EL - 15,
MIDC, Bhosari,
Pimpri-Chinchwad,
Pune, 411026, INDIA
Tel : +91 827 506 5446

TRIO MOTION TECHNOLOGY
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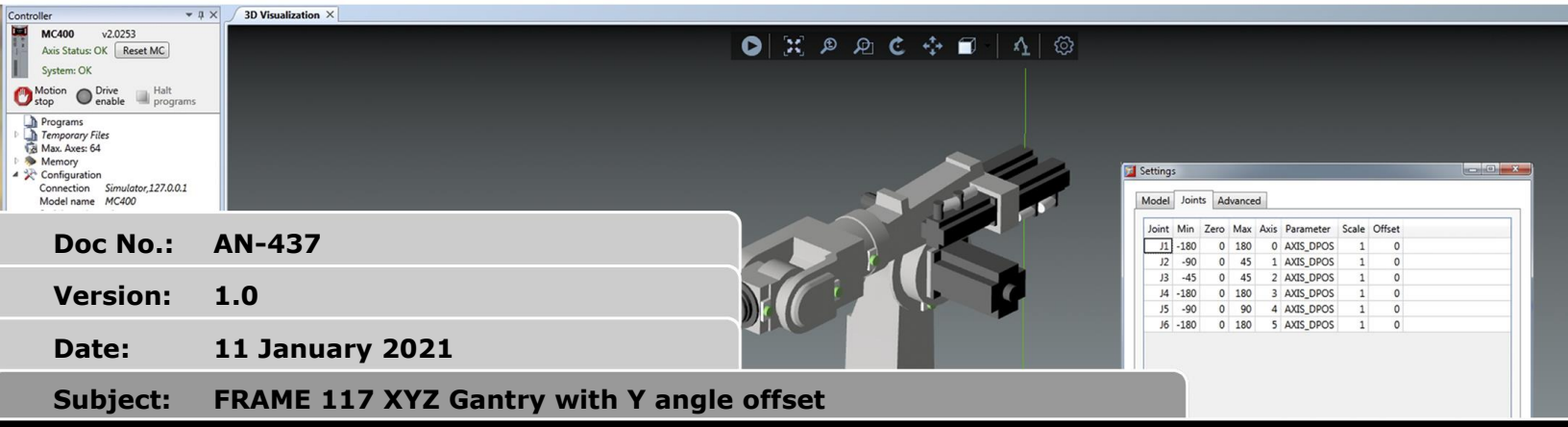


Doc No.: **AN-437**

Version: **1.0**

Date: **11 January 2021**

Subject: **FRAME 117 XYZ Gantry with Y angle offset**

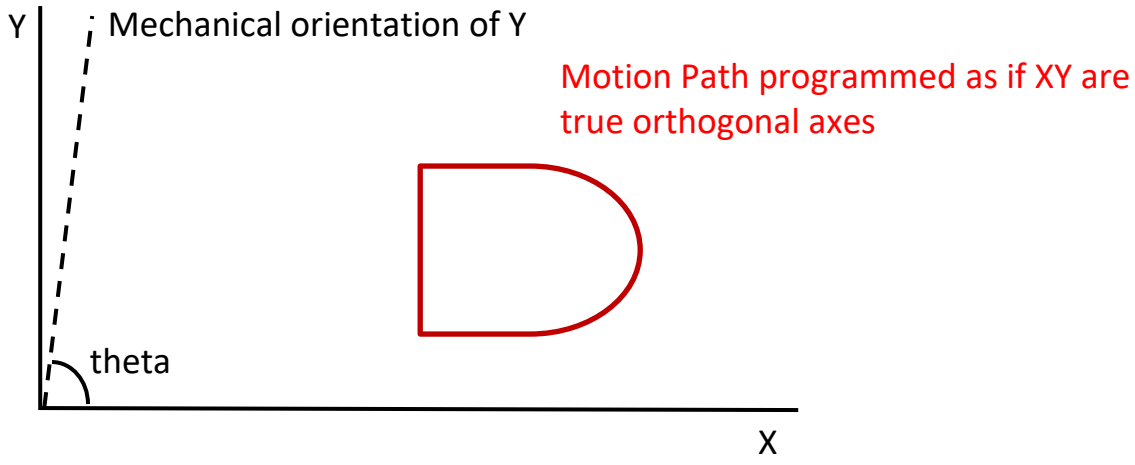
APPLICATION NOTE

1. Changes:

Version 1.0 11th Jan 2021

2. Introduction

FRAME=117 enables the transformation of XYZ cartesian movements to a physical layout that does not have axes X and Y perfectly aligned at 90 degrees. The transformation allows the programmer to measure the angle error and enter it as a fixed offset angle in table.



Compensation for miss-aligned Y axis orientation. Angle in Radians.

3. Parameter table

4 parameters needed to be set into a sequence of TABLE values for use by the transformation mathematics. The base TABLE position is set using FRAME_GROUP.

Table data	0	X axis counts per mm
	1	Y axis counts per mm
	2	Z axis counts per mm
	3	Angle in Radians between X and Y Use PI/2 (90 degrees) if perfectly aligned

4. Example

Program to initialise the frame and axes.

```
' Example 3 Axis Gantry Robot with angled Y configuration using FRAME 117:
' Use for more than 60 minutes requires FEC code 22 set on the controller !

t1_encoder = 16000 'Encoder counts per revolution
t1_gearbox = 50
t1_mm_per_rev = 1
t1_edges_per_mm = t1_encoder * t1_gearbox / t1_mm_per_rev

t2_encoder = 16000 'Encoder counts per revolution
t2_gearbox = 50
t2_mm_per_rev = 1
t2_edges_per_mm = t2_encoder * t2_gearbox / t2_mm_per_rev

t3_encoder = 16000 'Encoder counts per revolution
t3_gearbox = 50
t3_mm_per_rev = 1
t3_edges_per_mm = t3_encoder * t3_gearbox / t3_mm_per_rev

alignment_error = 1.0 ' Degrees
theta = (90 - alignment_error) * PI / 180

TABLE(100,t1_edges_per_mm)
TABLE(101,t2_edges_per_mm)
TABLE(102,t3_edges_per_mm)
TABLE(103,theta)


GOSUB config_joint

' Set up axes 0,1,2 as group 1 with config data at 100
FRAME_GROUP(1,100,0,1,2)

BASE(0)
DEFPOS(0,0,0,0)' Datum Robot to 0
GOSUB config_world

STOP
```

```
config_joint:
FRAME = 0
BASE(0)
UNITS = t1_edges_per_mm
AXIS_UNITS = UNITS
FRAME_SCALE = 1000000
SPEED = 10
ACCEL = 1000
DECEL = ACCEL
AXIS_FS_LIMIT = 500
AXIS_RS_LIMIT = -500
FS_LIMIT = 500
RS_LIMIT = -500

BASE(1)
UNITS = t2_edges_per_mm
AXIS_UNITS = UNITS
FRAME_SCALE = 1000000
SPEED = 10
ACCEL = 1000
DECEL = ACCEL
AXIS_FS_LIMIT = 500
AXIS_RS_LIMIT = -500
FS_LIMIT = 500
RS_LIMIT = -500

BASE(2)
UNITS = t3_edges_per_mm
AXIS_UNITS = UNITS
FRAME_SCALE = 1000000
SPEED = 10
ACCEL = 1000
DECEL = ACCEL
AXIS_FS_LIMIT = 500
AXIS_RS_LIMIT = -500
FS_LIMIT = 500
RS_LIMIT = -500

RETURN

config_world:
FRAME = 117
BASE(0)
UNITS = 1000000
SPEED = 10
ACCEL = 1000
DECEL = ACCEL
FS_LIMIT = 500
RS_LIMIT = -500

BASE(1)
UNITS = 1000000
SPEED = 10
ACCEL = 1000
DECEL = ACCEL
FS_LIMIT = 500
RS_LIMIT = -500
```

```
BASE(2)
UNITS = 1000000
SPEED = 10
ACCEL = 1000
DECEL = ACCEL
FS_LIMIT = 500
RS_LIMIT = -500

RETURN
```