Document Introduction and Revision Approval

Title of Document: TVM & Xpress Verification Procedure

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Approval Signatures:

	Title	Name	Signature	Date
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Manager Approval: (*Production, Metrology, Quality, Sales or GM*)	Manager	Colin Robinson	*Colin Robinson*	06/23/2021

AMENDMENT RECORD SHEET

Date or previous Revision No.	Change requested by:	Date Released:
Ver. 001	Kalpesh Maniar	06/22/2021

ISO 10360 Verification
TVM & Xpress

10360 Verification Procedure

M3 Setup Procedure for TVM & Xpress

This procedure requires the use of the Pyser Glass Scale and follows ISO-10360 Part 7 - 2011, Section 6.2.5.

1. Sign in to M3 as Supervisor – Password 011009
    a. Click on M3 icon + "Shift" key
    b. If already in M3, then the logout icon (bottom left from the pop-up window), and log back in as the supervisor.

2. Make sure system units is set to "mm" and resolution to "0.0001"
    a. Go to M3>Settings>Display Formats>**Current inch/mm** "mm"
    b. Go to M3>Settings>Display Formats>**Display resolution for mm** "0.0001" > Press "Done" twice to return to M3 live Video

3. Set up the thermometer close to the machine. Make a note of the Temp and Humidity. Ideal temperature approx. 20 °C / 68.0 °F and Humidity 50%

4. Using a soft lint free cloth, clean the Stage and glass calibration scale/rule.

5. Set the view to Fit the screen. In the M3 software, click on the zoom icon from Measure toolbar at bottom and then click on the Fit icon.

6. Make sure that edge calibration is disabled from the system toolbar at top.
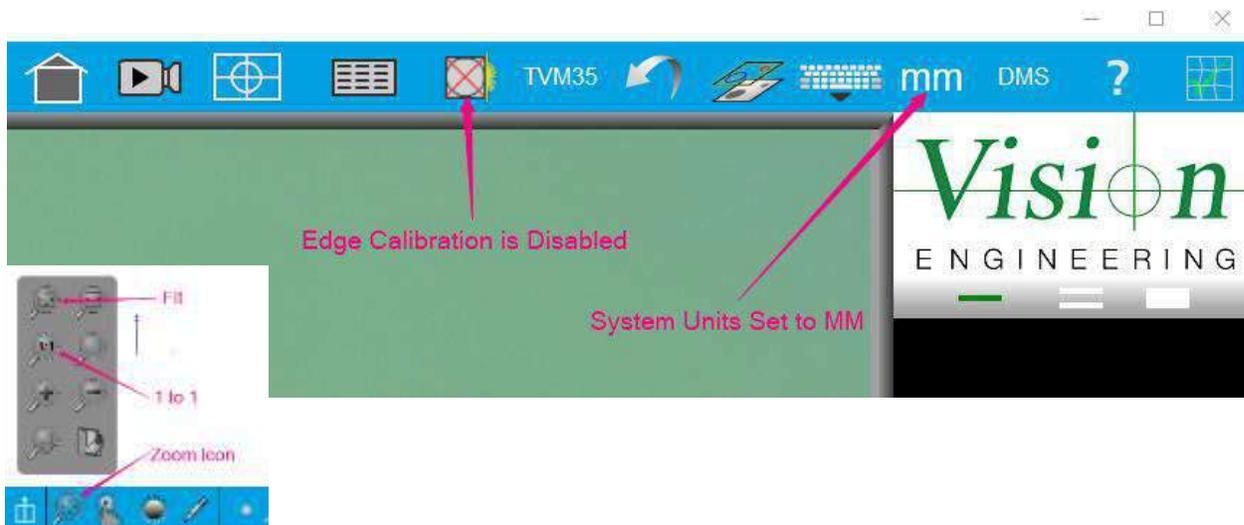
As Found and As Left 10360 Verification Procedure

TVM20-MS and TVM35-MS

Measurement Lengths

10360 Verification requires 5 different measurements, 3 times each, in 4 different locations yielding total of 60 measurements. The 4 different locations of the measuring scale are parallel to the X axes, parallel to the Y axes, perpendicular to the X and Y axes from top left to bottom right, and perpendicular to the X and Y axes from bottom left to top right. Refer table 1 & 2 depending on your stage size .

Scale Position	Length 1	Length 2	Length 3	Length 4	Length 5
Parallel to X	20 mm circle	**40 mm circle**	80 mm circle	**120 mm circle**	160 mm circle
Parallel to Y	20 mm circle	**40 mm circle**	50 mm circle	**60 mm circle**	80 mm circle
Perpendicular to X & Y	20 mm circle	**60 mm circle**	100 mm circle	**140 mm circle**	180 mm circle

Table 1   200mm X 100mm Stage

| Scale Position	Length 1	Length 2	Length 3	Length 4	Length 5
Parallel to X	20 mm circle	**40 mm circle**	80 mm circle	**120 mm circle**	140 mm circle
Parallel to Y	20 mm circle	**40 mm circle**	50 mm circle	**60 mm circle**	80 mm circle
Perpendicular to X & Y	20 mm circle	**60 mm circle**	100 mm circle	**140 mm circle**	160 mm circle

Table 2   150mm X 100mm Stage

Parallel to the X - Axes of the machine

1. On a **200mm X 100mm Stage**, position the glass calibration scale so that it is parallel to the **X -axes** of the machine. The zero circle needs to be on the left-hand side of the stage and making sure you can drive the X axes and reach both the zero circle and 160 mm circle for measuring.
   (Use hot glue / putty to avoid any shift)

2. *(Follow the same instructions as for 200m x 100mm Stage as explained below and Table 2)*
   On a **150mm X 100mm Stage**, position the glass calibration scale so that it is parallel to the X -axes of the machine. The zero circle needs to be on the left-hand side of the stage and you can drive the axes and reach both the zero circle and 140 mm circle for measuring. *(Use hot glue / putty to avoid any shift)*
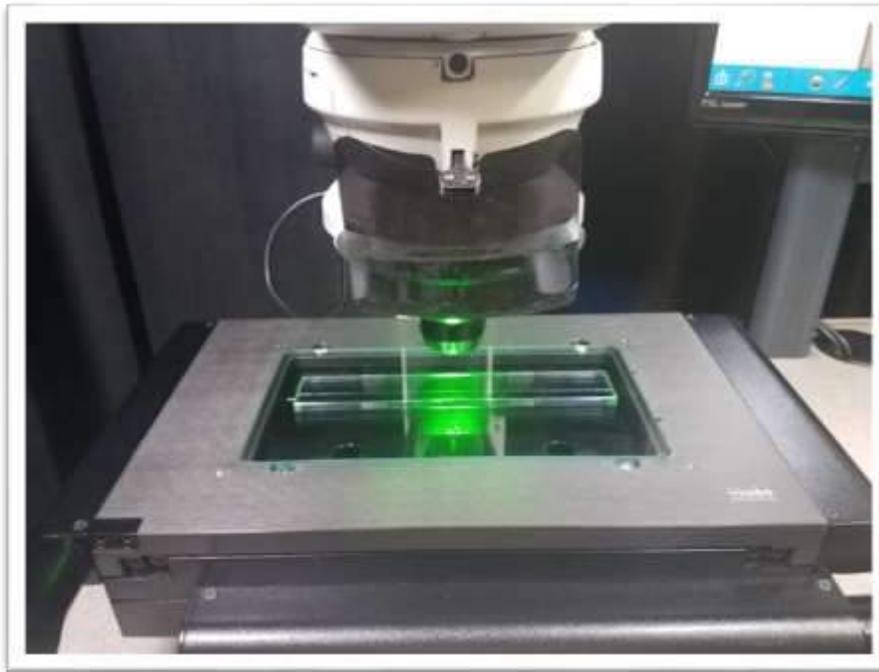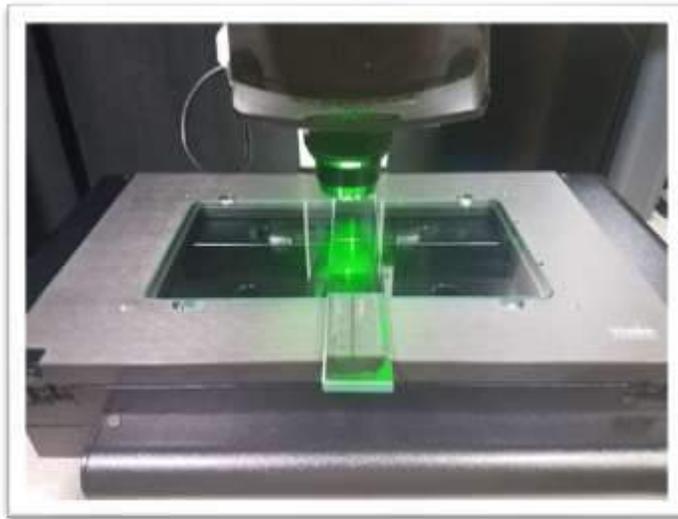

(200mm x 100mm Stage)

3. Length 1 - Measure the zero circle and the length 1 circle on the glass scale and construct a distance between the two circles.

4. Repeat step 3 for Length 2, 3, 4, and 5.

5. Repeat steps 3 and 4 two more times to have three runs with a total of 15 distance measurements

6. After finishing measuring all 5 lengths along X-axis. Save and Export the 15 distance measurements

   a. On feature panel click and highlight on any ***Dist***
   b. Click on **Data** icon on top
   c. Select **All** feature icon from bottom and select **Feature type** last one
   d. Click on Output icon from bottom and select .CSV
   e. Enter File name as "***X Verification.csv***"
   f. Click Done to export the file

Parallel to the Y - Axes of the machine

7. Click on the M3 icon, and then the new part icon. Click yes to clearing features and skews.

8. Reposition the glass calibration scale so that it is parallel to the **Y-axes** of the machine. The zero circle needs to be on the Top side of the stage and making sure you can drive the Y axes and reach both the zero circle and 80 mm circle for measuring. *(Use hot glue / putty to avoid any shift)*

9. Length 1 - Measure the zero circle and the length 1 circle on the glass scale and construct a distance between the two circles.

10. Repeat step 9 for Length 2, 3, 4, and 5.

11. Repeat steps 9 and 10 two more times to have three runs with a total of 15 distance measurements

12. After finishing measuring all 5 lengths along Y-axis. Save and Export the 15 distance measurements
    a. On feature panel click and highlight on any *Dist*
    b. Click on **Data** icon on top
    c. Select **All** feature icon from bottom and select **Feature type** last one in list
    d. Click on Output icon from bottom and select .CSV
    e. Enter File name as "*Y Verification.csv*"
    f. Click Done to export the file

Perpendicular to the XY - Axes of the machine

13. Click on the M3 icon, and then the new part icon. Click yes to clearing features and skews.

14. Reposition the glass scale so that it is **perpendicular to the X and Y** axes with the zero circle in the top left corner of the stage, and the 180 mm circle is in the bottom right corner. Check that both the zero circle and 180 mm circle are within the travel range of the stage. See picture below.
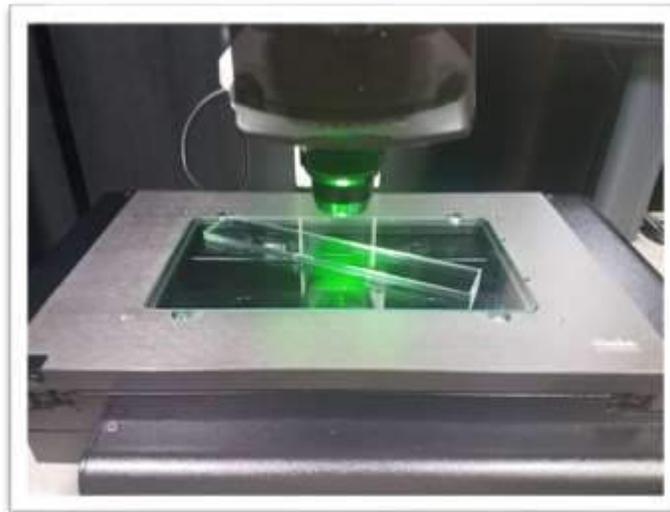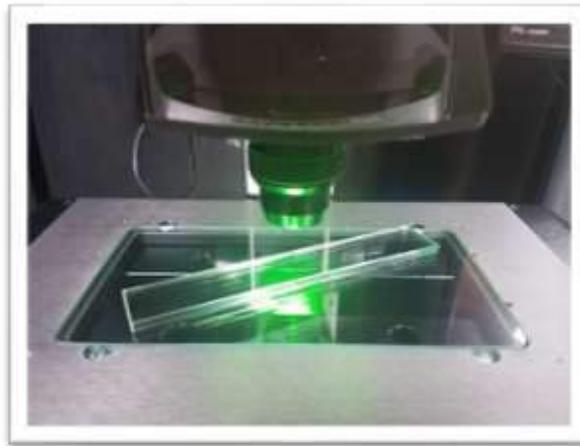

15. Length 1 - Measure the zero circle and the length 1 circle on the glass scale and construct a distance between the two circles.

16. Repeat step 15 for Length 2, 3, 4, and 5.

17. Repeat steps 15 and 16 two more times to have three runs with a total of 15 distance measurements

18. After finishing measuring all 5 lengths along XY-axis. Save and Export the 15 distance measurements
    a. On feature panel click and highlight on any *Dist*
    b. Click on **Data** icon on top
    c. Select **All** feature icon from bottom and select **Feature type** last one in list
    d. Click on Output icon from bottom and select .CSV
    e. Enter File name as "*XY Verification.csv*"
    f. Click Done to export the file

Perpendicular to the YX - Axes of the machine

19. Click on the M3 icon, and then the new part icon. Click yes to clearing features and skews.

20. On a 200mm X 100mm stage: Reposition the glass scale so that it is **perpendicular to the Y and X** axes with the zero circle in the bottom left corner of the stage, and the 180 mm circle is in the top right corner. Check that both the zero circle and 180 mm circle are within the travel range of the stage

21. Length 1 - Measure the zero circle and the length 1 circle on the glass scale and construct a distance between the two circles.

22. Repeat step 21 for Length 2, 3, 4, and 5.

23. Repeat steps 21 and 22 two more times to have three runs with a total of 15 distance measurements

24. After finishing measuring all 5 lengths along YX-axis. Save and Export the 15 distance measurements
    a. On feature panel click and highlight on any *Dist*
    b. Click on **Data** icon on top
    c. Select **All** feature icon from bottom and select **Feature type**
    d. Click on Output icon from bottom and select .CSV
    e. Enter File name as "*YX Verification.csv*"
    f. Click Done to export the file

25. Copy the exported measurements .CSV files from the follwoing location
    C:\Users\Public\Documents\MetLogix\Exports

TVM20-FS, TVM35-FS and Xpress35

10360 Verification requires 5 different measurements, 3 times each, in 4 different locations yielding total of 60 measurements. The 4 different locations of the measuring scale are Parallel to the X axes, Y axes, Perpendicular to the X Y axes and Y X axes.

TVM20-FS Measurement Lengths

Scale Position	Length 1	Length 2	Length 3	Length 4	Length 5
Parallel to X	3 mm line	**6 mm line**	9 mm line	**12 mm line**	15 mm line
Parallel to Y	2 mm line	**4 mm line**	6 mm line	**8 mm line**	10 mm line
Perpend to X & Y	3 mm line	**5 mm line**	10 mm line	**12 mm line**	15 mm line

Table 1

TVM35-FS Measurement Lengths

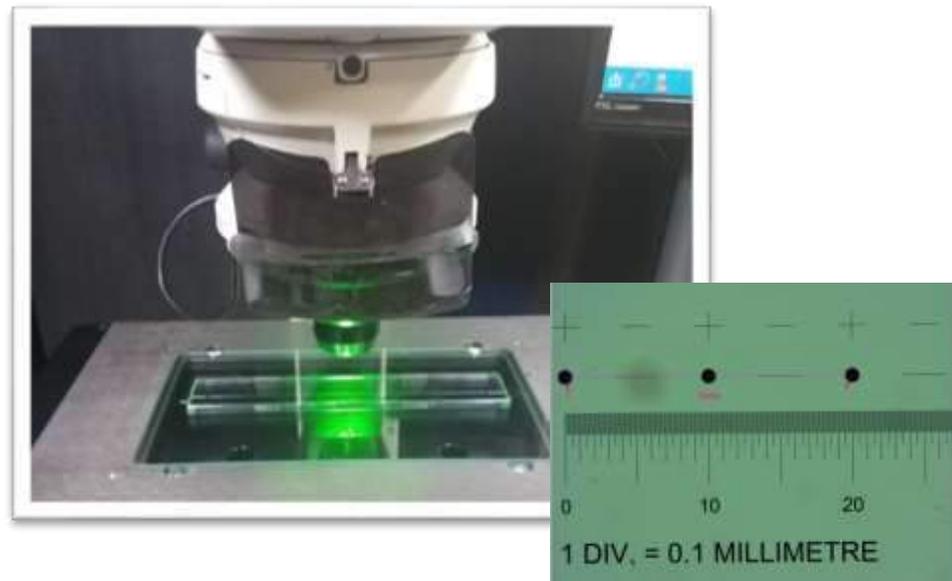| Scale Position	Length 1	Length 2	Length 3	Length 4	Length 5
Parallel to X	5 mm line	**10 mm line**	15 mm line	**20 mm line**	25 mm line
Parallel to Y	4 mm line	**8 mm line**	10 mm line	**15 mm line**	20 mm line
Perpend to X & Y	5 mm line	**10 mm line**	15 mm line	**25 mm line**	30 mm line

Table 2

Xpress35 Measurement Lengths

Scale Position	Length 1	Length 2	Length 3	Length 4	Length 5
Parallel to X	5 mm line	**10 mm line**	15 mm line	**20 mm line**	25 mm line
Parallel to Y	4 mm line	**8 mm line**	10 mm line	**15 mm line**	20 mm line
Perpend to X & Y	5 mm line	**10 mm line**	15 mm line	**25 mm line**	30 mm line

Table 3

Parallel to the X - Axes of the machine

Position the glass calibration scale so that it is parallel to the X -axes of the machine. The zero mark needs to be on the left-hand side of the stage. Ensure that the zero mark and the mark for length five (see tables above for the machine you are calibrating) are equally spaced from the left and right edges of the stage. See the picture below.
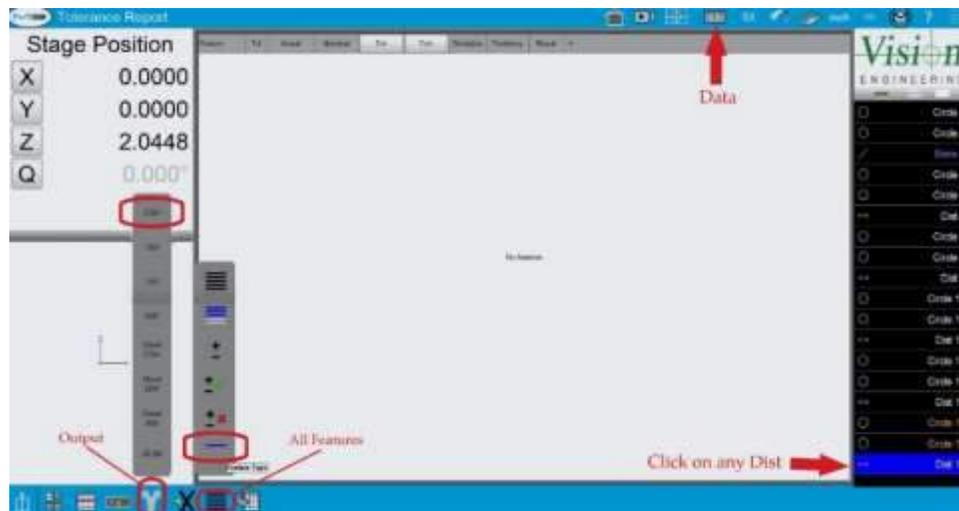*(Use hot glue / putty to avoid any shift)*

1 DIV. = 0.1 MILLIMETRE

1. Measure the scale for 5 lengths as per the table above. You will need to zoom in and make sure you measure the positive side of each scale line as shown below. *Measure as lines*, then construct a distance between the two measured lines.

Length 1 - Measure the zero line and the Length 1 measuring line on the glass scale and construct a distance between the two lines.
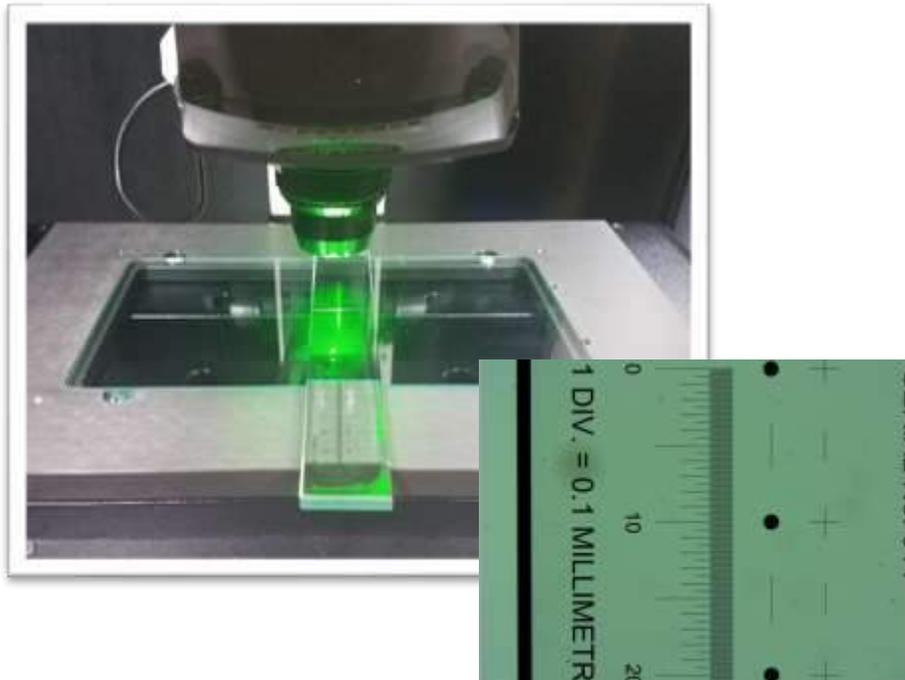
2. Repeat step 1 for lengths 2, 3, 4 and 5.

3. Repeat steps 1 and 2 two more times to have three runs with a total of 15 distance measurements

4. Exporting the measurements. After finishing measuring all 5 locations along X axis

    a. On feature panel click and highlight on any **_Dist_**
    b. Click on **Data** icon on top
    c. Select **All** feature icon from bottom and select **Feature type** last one
    d. Click on Output icon from bottom and select .CSV
    e. Enter File name as "**_Stage #_X Verification_**"
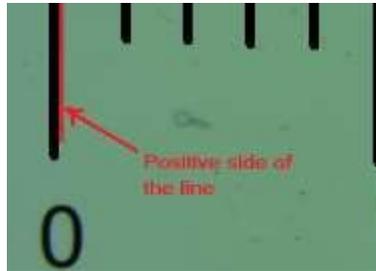   f. Click Done to export the file

Parallel to the Y - Axes of the machine

5. Click on the M3 icon, and then the new part icon. Click yes to clearing features and skews.

6. Reposition the glass calibration scale so that it is parallel to the **Y-axes** of the machine and you see at least two dots. The zero mark needs to be at the top of the screen. Ensure that the zero mark and the mark for length five (see table above for the machine you are calibrating) are equally spaced from the top and bottom edges of the glass and screen. (Use hot glue / putty to avoid any shift)

7. Measure the scale for 5 lengths as per the table above. You will need to zoom in and make sure you measure the positive side of each scale line as shown below. ***Measure as lines***, then construct a distance between the two measured lines.
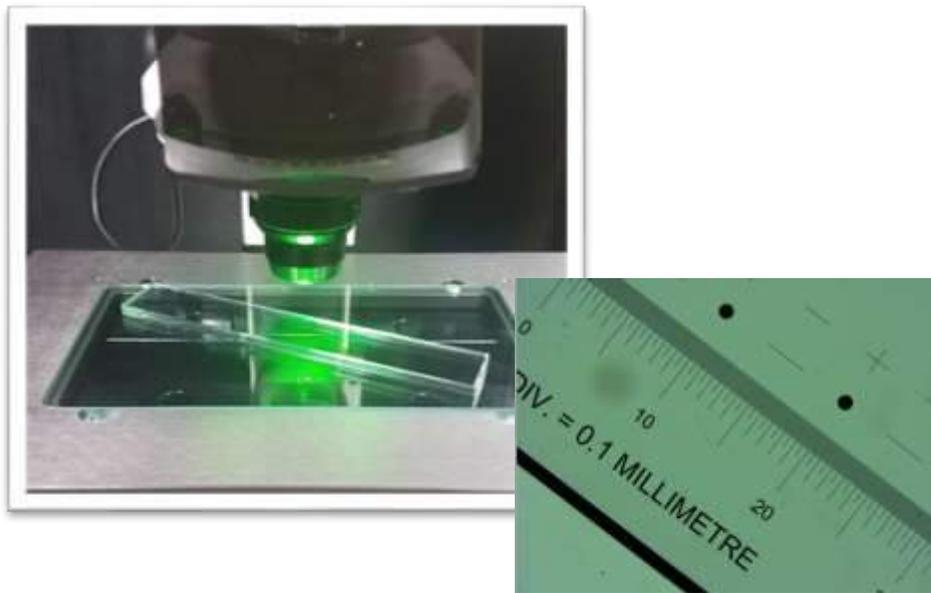

Length 1 - Measure the zero line and the Length 1 measuring line on the glass scale and construct a distance between the two lines.

8. Repeat step 7 for lengths 2, 3, 4 and 5.

9. Repeat steps 7 and 8 two more times to have three runs with a total of 15 distance measurements

10. Exporting the measurements. After finishing measuring all 5 locations along Y axis
    a. On feature panel click and highlight on any ***Dist***
    b. Click on **Data** icon on top
    c. Select **All** feature icon from bottom and select **Feature type** last one
    d. Click on Output icon from bottom and select .CSV
    e. Enter File name as "***Stage #_Y Verification***"
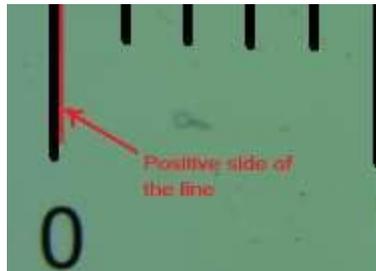   f. Click Done to export the file

Perpendicular to the XY - Axes of the machine

11. Click on the M3 icon, and then the new part icon. Click yes to clearing features and skews.

12. Reposition the glass scale so that it is **perpendicular to the X and Y** axes with the zero circle in the top left corner of the stage. Ensure that the zero mark and the mark for length five (see table above for the machine you are calibrating) are equally spaced from the top and bottom edges of the glass & screen. See the picture below:

13. Measure the scale for 5 lengths as per the table above. You will need to zoom in and make sure you measure the positive side of each scale line as shown below. ***Measure as lines***, then construct a distance between the two measured lines.
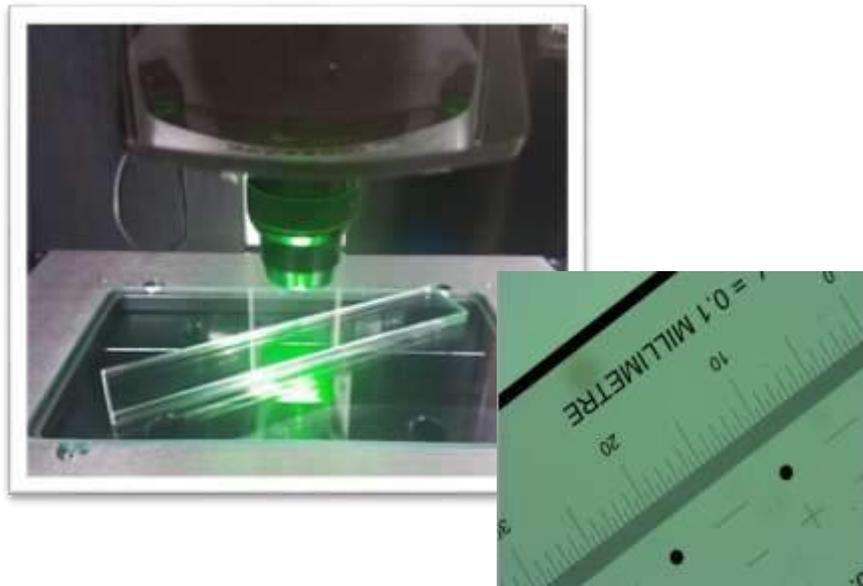

Length 1 - Measure the zero line and the Length 1 measuring line on the glass scale and construct a distance between the two lines.

14. Repeat step 13 for lengths 2, 3, 4 and 5.

15. Repeat steps 13 and 14 two more times to have three runs with a total of 15 distance measurements

16. Exporting the measurements. After finishing measuring all 5 locations along XY axis

    a. On feature panel click and highlight on any ***Dist***

    b. Click on **Data** icon on top

    c. Select **All** feature icon from bottom and select **Feature type** last one

    d. Click on Output icon from bottom and select .CSV

    e. Enter File name as "***Stage #_XY Verification***"
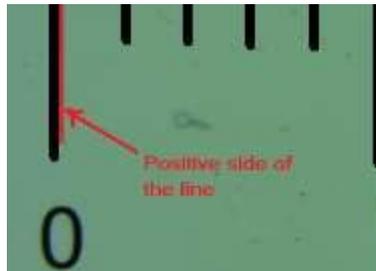
    f. Click Done to export the file

Perpendicular to the YX - Axes of the machine

17. Click on the M3 icon, and then the new part icon. Click yes to clearing features and skews.

18. Reposition the glass scale so that it is **perpendicular to the Y and X** axes with the zero circle in the top Right corner of the stage. Ensure that the zero mark and the mark for length five (see table above for the machine you are calibrating) are equally spaced from the top and bottom edges of the glass & screen. See the picture below:

19. Measure the scale for 5 lengths as per the table above. You will need to zoom in and make sure you measure the positive side of each scale line as shown below. ***Measure as lines***, then construct a distance between the two measured lines.

Length 1 - Measure the zero line and the Length 1 measuring line on the glass scale and construct a distance between the two lines.

20. Repeat step 19 for lengths 2, 3, 4 and 5.

21. Repeat steps 19 and 20 two more times to have three runs with a total of 15 distance measurements

22. Exporting the measurements. After finishing measuring all 5 locations along YX axis
    a. On feature panel click and highlight on any ***Dist***
    b. Click on **Data** icon on top
    c. Select **All** feature icon from bottom and select **Feature type** last one
    d. Click on Output icon from bottom and select .CSV
    e. Enter File name as "***Stage #_YX Verification***"
    f. Click Done to export the file

23. Retrive the exported measurements .CSV files from the follwoing location
    C:\Users\Public\Documents\MetLogix\Exports

End of Verification Procedure

Xpress70

10360 Verification requires 5 different measurements, 3 times each, in 4 different locations yielding total of 60 measurements. The 4 different locations of the measuring scale are Parallel to the X axes, Y axes, Perpendicular to the X Y axes and Y X axes.
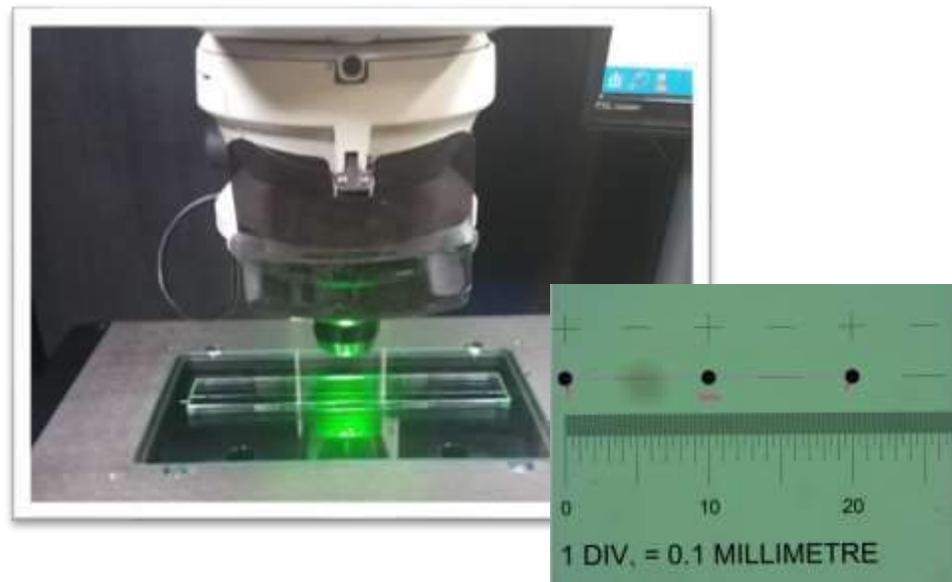
Xpress70 Measurement Lengths

Scale Position	Length 1	Length 2	Length 3	Length 4	Length 5
Parallel to X	10 mm Dia.	**20 mm Dia.**	30 mm Dia.	**40 mm Dia.**	50 mm Dia.
Parallel to Y	10 mm Dia.	**20 mm Dia.**	30 mm Dia.	**40 mm Dia.**	50 mm Dia.
Perpend to X & Y	10 mm Dia.	**20 mm Dia.**	30 mm Dia.	**50 mm Dia.**	60 mm Dia.

Table 4

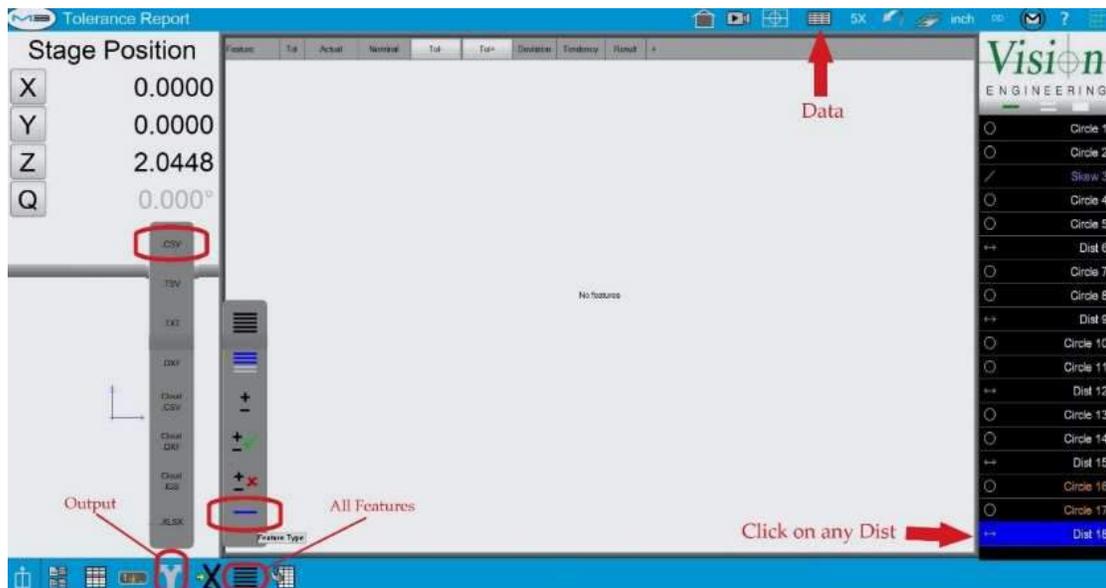## Parallel to the X - Axes of the machine

Position the glass calibration scale so that it is parallel to the X -axes of the machine. The zero mark needs to be on the left-hand side of the stage. Ensure that the zero mark and the mark for length five (see tables above for the machine you are calibrating) are equally spaced from the left and right edges of the stage. See the picture below.
(Use hot glue / putty to avoid any shift)
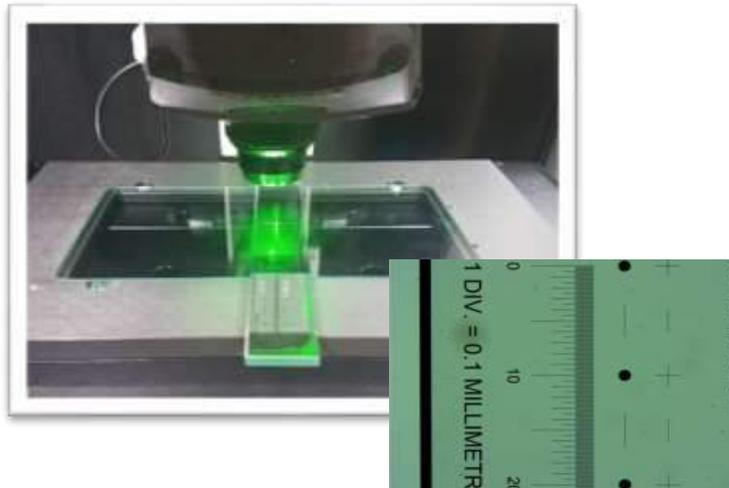

1 DIV. = 0.1 MILLIMETRE

1. Length 1 - Measure the zero circle and the Length 1 circle on the glass scale and construct a distance between the two circles.

2. Repeat step 1 for Lengths 2, 3, 4, and 5.

3. Repeat steps 1 and 2 two more times to have three runs with a total of 15 distance measurements

4. Exporting the measurements. After finishing measuring all 5 locations along X axis
   a. On feature panel click and highlight on any ***Dist***
   b. Click on **Data** icon on top
   c. Select **All** feature icon from bottom and select **Feature type**
   d. Click on Output icon from bottom and select .CSV
   e. Enter File name as "***Stage #_X Verification"***
   f. Click Done to export the file

Parallel to the Y - Axes of the machine

5. Click on the M3 icon, and then the new part icon. Click yes to clearing features and skews.

6. Reposition the glass calibration scale so that it is parallel to the **Y-axes** of the machine and you see at least two dots. The zero mark needs to be at the top of the screen. Ensure that the zero mark and the mark for length five (see table above for the machine you are calibrating) are equally spaced from the top and bottom edges of the glass and screen. (Use hot glue / putty to avoid any shift)
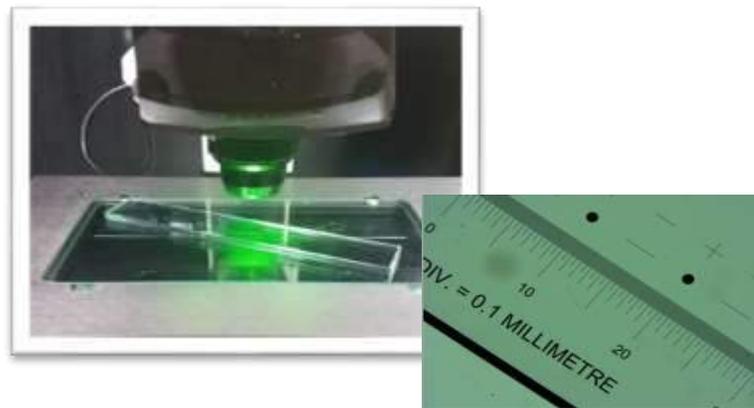

7. Length 1 - Measure the zero circle and the Length 1 circle on the glass scale and construct a distance between the two circles.

8. Repeat step 7 for Lengths 2, 3, 4, and 5.

9. Repeat steps 7 and 8 two more times to have three runs with a total of 15 distance measurements

10. Exporting the measurements. After finishing measuring all 5 locations along Y axis
    a. On feature panel click and highlight on any *Dist*
    b. Click on **Data** icon on top
    c. Select **All** feature icon from bottom and select **Feature type**
    d. Click on Output icon from bottom and select .CSV
    e. Enter File name as "***Stage #_Y Verification***"
    f. Click Done to export the file

Perpendicular to the XY - Axes of the machine

11. Click on the M3 icon, and then the new part icon. Click yes to clearing features and skews.

12. Reposition the glass scale so that it is **perpendicular to the X and Y** axes with the zero circle in the top left corner of the stage. Ensure that the zero mark and the mark for length five (see table above for the machine you are calibrating) are equally spaced from the top and bottom edges of the glass & screen. See the picture below:
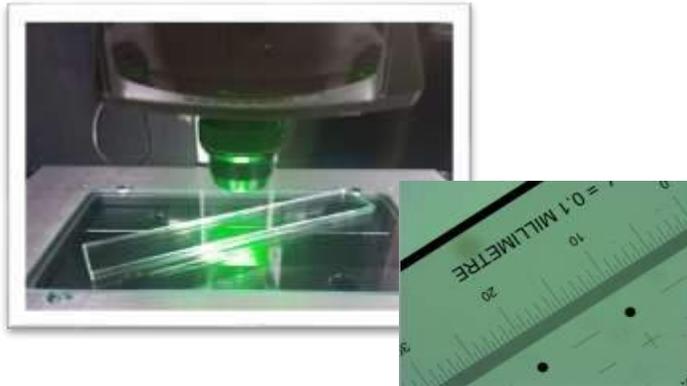

13. Length 1 - Measure the zero circle and the Length 1 circle on the glass scale and construct a distance between the two circles.

14. Repeat step 13 for Lengths 2, 3, 4, and 5.

15. Repeat steps 13 and 14 two more times to have three runs with a total of 15 distance measurements

16. Exporting the measurements. After finishing measuring all 5 locations along XY axis
    a. On feature panel click and highlight on any *Dist*
    b. Click on **Data** icon on top
    c. Select **All** feature icon from bottom and select **Feature type**
    d. Click on Output icon from bottom and select .CSV
    e. Enter File name as "*Stage #_XY Verification*"
    f. Click Done to export the file

Perpendicular to the YX - Axes of the machine

17. Click on the M3 icon, and then the new part icon. Click yes to clearing features and skews.

18. Reposition the glass scale so that it is **perpendicular to the Y and X** axes with the zero circle in the top Right corner of the stage. Ensure that the zero mark and the mark for length five (see table above for the machine you are calibrating) are equally spaced from the top and bottom edges of the glass & screen. See the picture below:

19. Length 1 - Measure the zero circle and the Length 1 circle on the glass scale and construct a distance between the two circles.

20. Repeat step 19 for Lengths 2, 3, 4, and 5.

21. Repeat steps 19 and 20 two more times to have three runs with a total of 15 distance measurements

22. Exporting the measurements. After finishing measuring all 5 locations along XY axis
    a. On feature panel click and highlight on any **_Dist_**
    b. Click on **Data** icon on top
    c. Select **All** feature icon from bottom and select **Feature type**
    d. Click on Output icon from bottom and select .CSV
    e. Enter File name as "**_Stage #_YX Verification_**"
    f. Click Done to export the file

23. Retrive the exported measurements .CSV files from the follwoing location
    C:\Users\Public\Documents\MetLogix\Exports

End of Verification Procedure