

Alignment Measurement Summary
for
PFM PMW BDA
10209800-2 SN012

WARM ALIGNMENT MEASUREMENTS:

Position:

Center of feed horn entrance plane with respect to the alignment pin hole, mounting face and alignment slot as defined in the ICD drawing 10209721 sht. 3 (see Figure 1 below)

$$(x,y,z) = (24.815, -33.866, 34.611) \quad (\text{all distances in mm})$$

Nominal x,y position:

$$(x_{\text{nom}}, y_{\text{nom}}) = (24.687, -33.979)$$

x-y shift from nominal:

$$(dx, dy) = (0.128, 0.113)$$

The z position of the suspended part referenced to the 34.2 mm nominal dimension on ICD pg 2, zone G9:

Measured z dimension:

$$34.162 \text{ mm}$$

Z shift from nominal

$$-0.038 \text{ mm}$$

Rotation:

Feed horn rotation in xy plane (top view, as in ICD, sht. 3)

$$0.28^\circ \text{ counterclockwise}$$

Normal vector to feedhorn entrance plane:

$$(0.00237, 0.00842, 0.99996)$$

which is 0.50° from the z direction.

COLD ALIGNMENT MEASUREMENTS:

(BDA cooled from RmT to approximately 7-8 K)

Shifts on Cooling:

XY Shift of center of 300 mK stage on cooling (with respect to flange alignment pin hole):

$$(dx, dy) = (-0.09, 0.14)$$

300 mK stage rotation in xy plane on cooling (top view):

0.03 degrees CCW

The suspended portion of the BDA shifted approximately .05 mm down in the z axis on cooling, moving closer to the mounting flange. The rotation about the x-axis on cooling was measured as <0.03 degrees, but this angle did not return to the original value on warming to room temperature, so the reliability of this number is in question. We have no information about rotation in the y axis on cooling.

These shifts are not accurate to better than ± 40 microns, and the repeatability over multiple cooldowns is not well known.

Net Result:

xy cold position relative to alignment pin hole:

$$(x, y) = (24.72, -33.73)$$

(this doesn't agree exactly with the sum of the results above due to roundoff)

Rotation of feedhorn relative to xy axes (top view):

0.31 degrees counter-clockwise

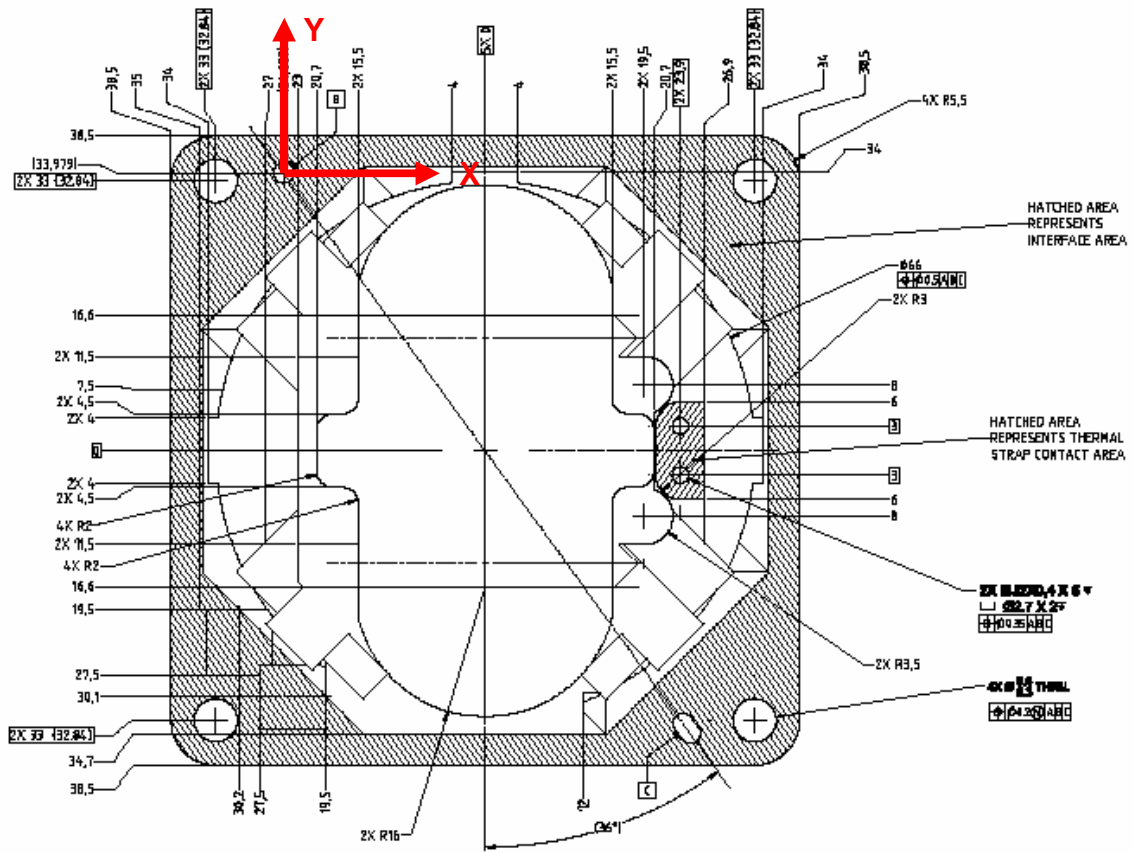


Figure 1 (excerpt from ICD dwg 10209721, with coordinate axes shown)