**BEAMLINE PARAMETERS CALCULATIONS**

**For the Period :**

Calculate beam line period from horizontal position.

If the default is 1, then this is a bend magnet so N/A; Skip calc and use given values.

If it is greater than zero : BL04 = 10, BL06 = 27, BL07 = 10, BL09 = 8, BL10 = 15, BL11 = 13, BL12-2 = 67, BL13 = 23, BL15 = 86, BL05 = ?

Otherwise, allow 5 different periods where "in-between" is zero.

 Inputs:

 A = Horizontal Position (ticks)

 B = 30 Period Position (ticks)

 C = 24 Period Position (ticks)

 D = 15 Period Position (ticks)

 E = 23 Period Position (ticks)

 F = 10 Period Position (ticks)

 G = Tolerance (ticks)

 H = Default Period (use if non-zero)

Outputs:

 K = A - G (ticks)

 L = A + G (ticks)

 VAL = Period (H or 30, 24, 15, 23, 10, 0)

**For the Field :**

Calculate magnetic field from gap depending on beam line.

For bend magnets (period of 1), set field to the 0.

For beamlines with in-between periods (period of 0), return an error.

For all other beamlines, use a Gap Vs MagField table.

**For the K :**

Calculate K from magnetic field and period.

For bend magnets (period of 1), K = N/A

For beamlines with in-between periods (period of 0), K = N/A

For others :

 Inputs:

 A = Magnetic Field (T)

 B = Period Value (0 = in-between, 1 = bend magnet, >1 are IDs)

 F = LDEV (length of device)

 G = Conversion (93.4)

 H = Multiplier (1.059203 for BL09, 1 for others)

K = 93.4 \* Magnetic Field (T) \* LDEV (Length of Device) \* Multiplier / Number of Periods

LDEV : BL04 = 2.30 ; BL06 = 1.89; BL07 = 2.30; BL09 = 2.08; BL10 = 2.056; BL11 = 2.275; BL12-2 = 1.474; BL13 = 1.83; BL15 = ?; BL05 = ?

**For the Power :**

Calculate power from magnetic field, current, and energy.

For bend magnets (period of 1), set field to the value provided.

For beamlines with in-between periods (period of 0), return an error.

 Inputs:

 A = Beam Energy (GeV)

 B = Period Value (0 = in-between, 1 = bend magnet, >1 are IDs)

 C = Beam Current (mA)

 D = Magnetic Field (T)

 E = Bend Magnet Power (W)

 F = LDEV

 G = Conversion (0.63333)

 H = Multiplier (1.059203 for BL09, 1 for others)

Pwr = Beam Current \* LDEV (Length of Device) \* 0.63333 (conversion) \* Multiplier ^ 2 \* Beam Energy ^ 2 \* Magnetic Field ^2