

Anexo: Gráficas picos fallos en motores

Introducción

En este documento se presentan las gráficas correspondientes al análisis de los picos de los armónicos de frecuencia estudiados, que son los relacionados con la velocidad de giro nominal y los fallos de rodamientos y en las aspas del ventilador del motor.

Cada grafica indica en el eje X, las muestras en orden cronológico desde el 28 de junio hasta principios de noviembre. En el eje Y, se presenta la amplitud de cada grafica en el punto que se está analizando. Están eliminadas de la gráfica las muestras de motor parado (amplitud 0).

Aparecen dos parámetros en la gráfica, el máximo, que es solo el punto máximo de amplitud en el rango que se ha estudiado y la media, que es la obtenida entre todos los valores de los puntos del intervalo que se ha tomado.

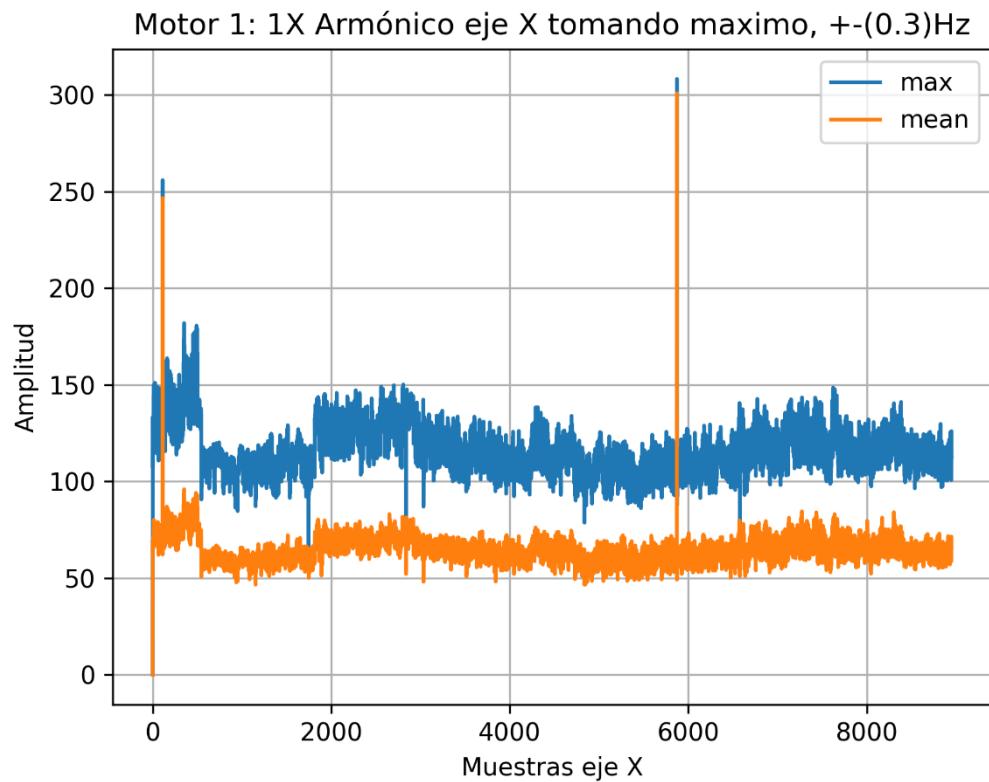
Hay graficas para ambos motores, así como se presenta el análisis del pico del primer armónico (1X) y 2X y 3X en el caso de que hayan sido relevantes para el análisis.

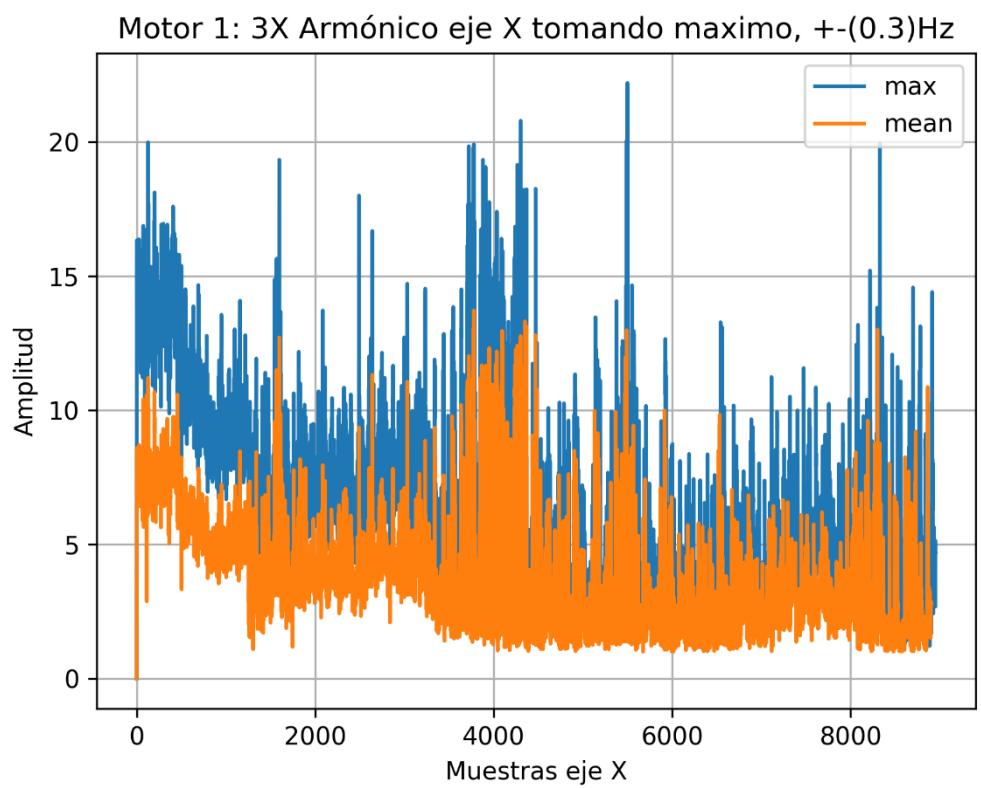
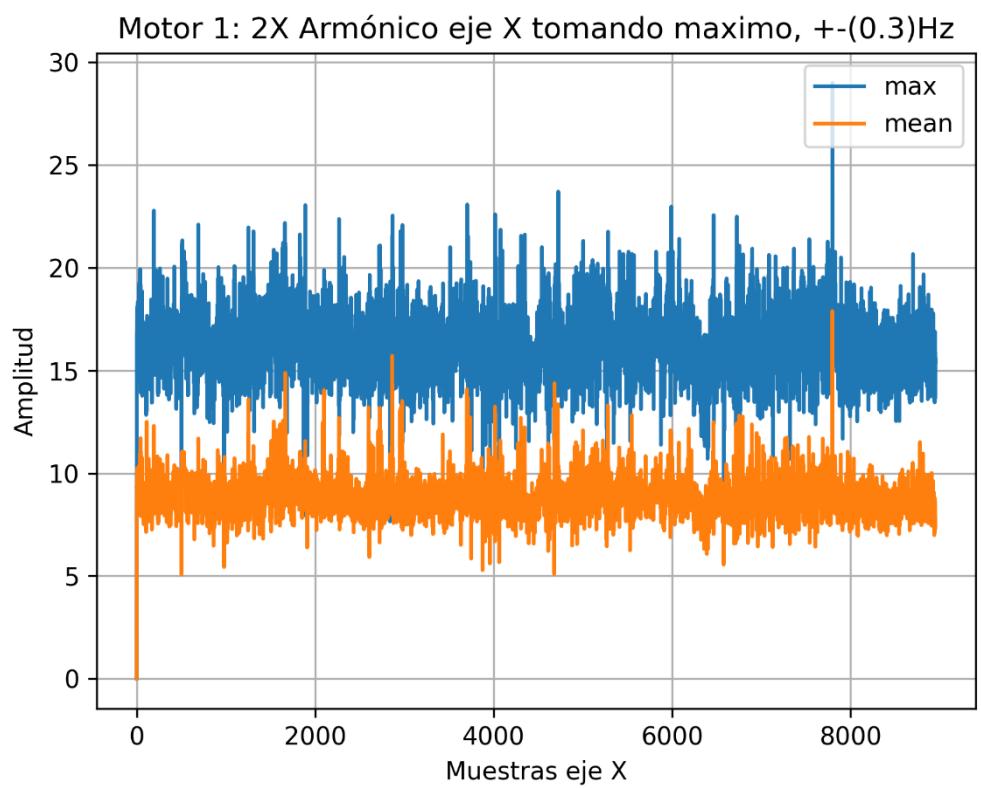
Se presentan los resultados a continuación, para cada tipo de fallo las graficas de cada eje en orden 1X,2X,3X. La desviación en cada grafica puede ser distinta, viene indicada en el título de la grafica y siempre es la que otorgó el resultado mas representativo para ese pico.

Motor 1

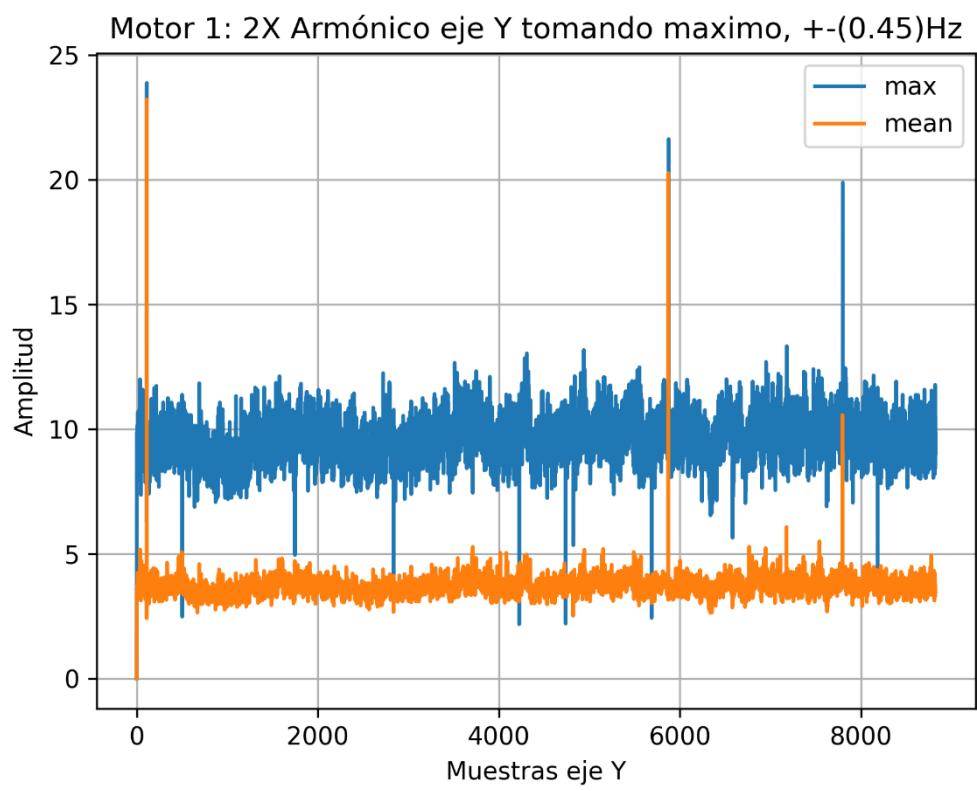
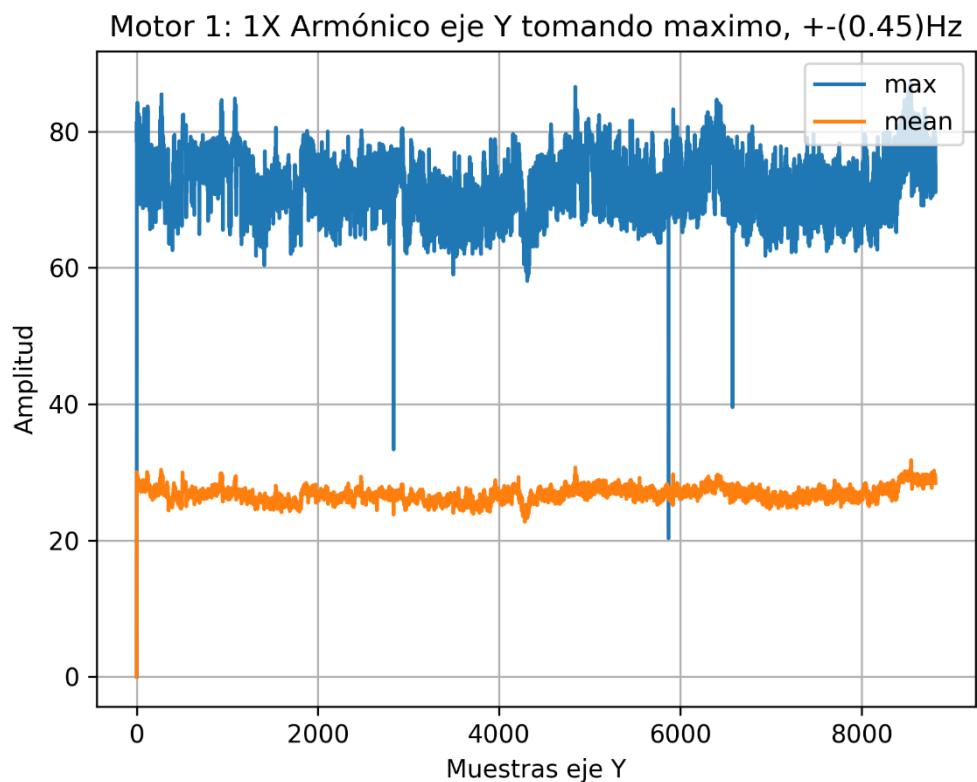
Velocidad de giro nominal

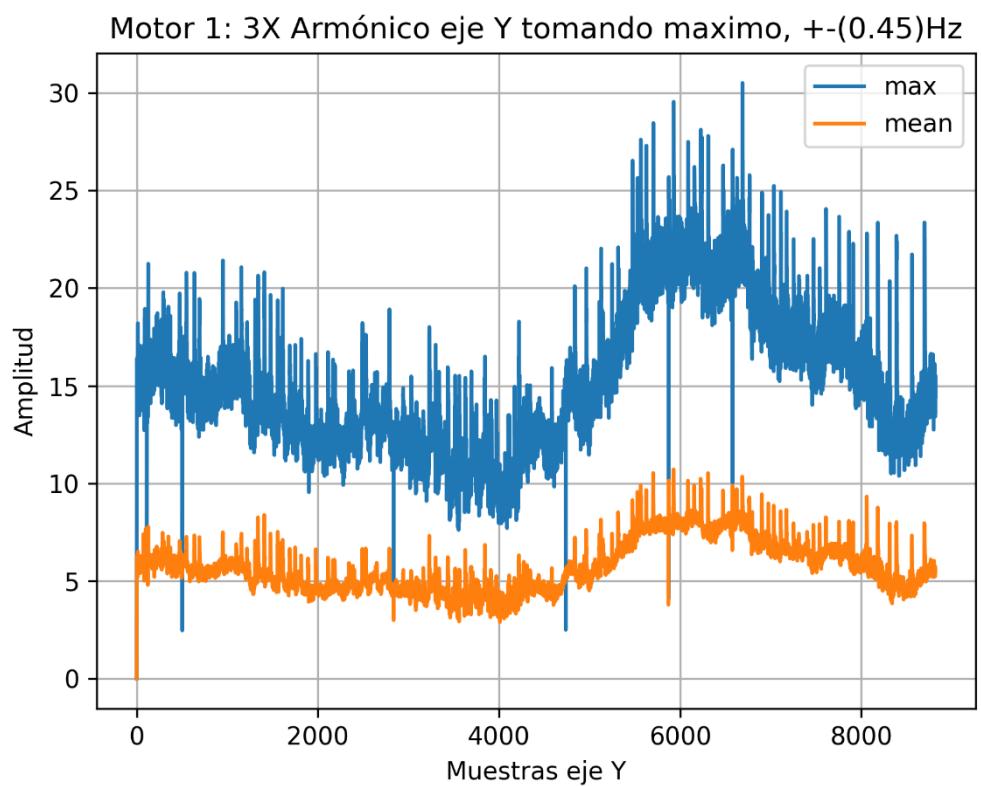
Axe X:



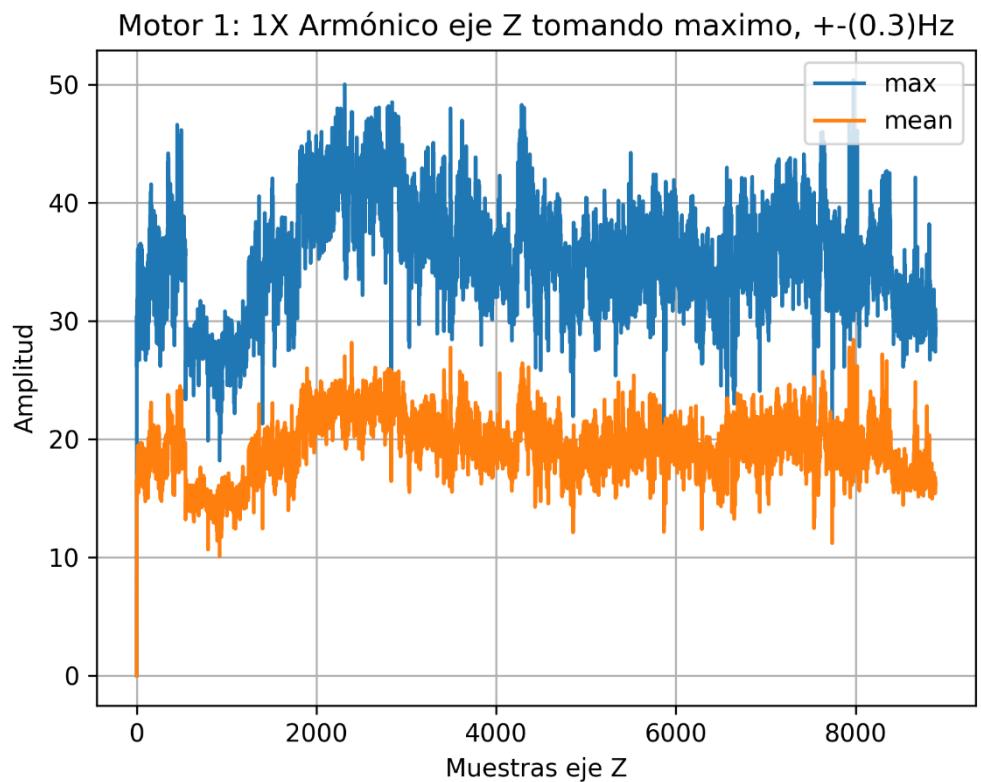


Axe Y:

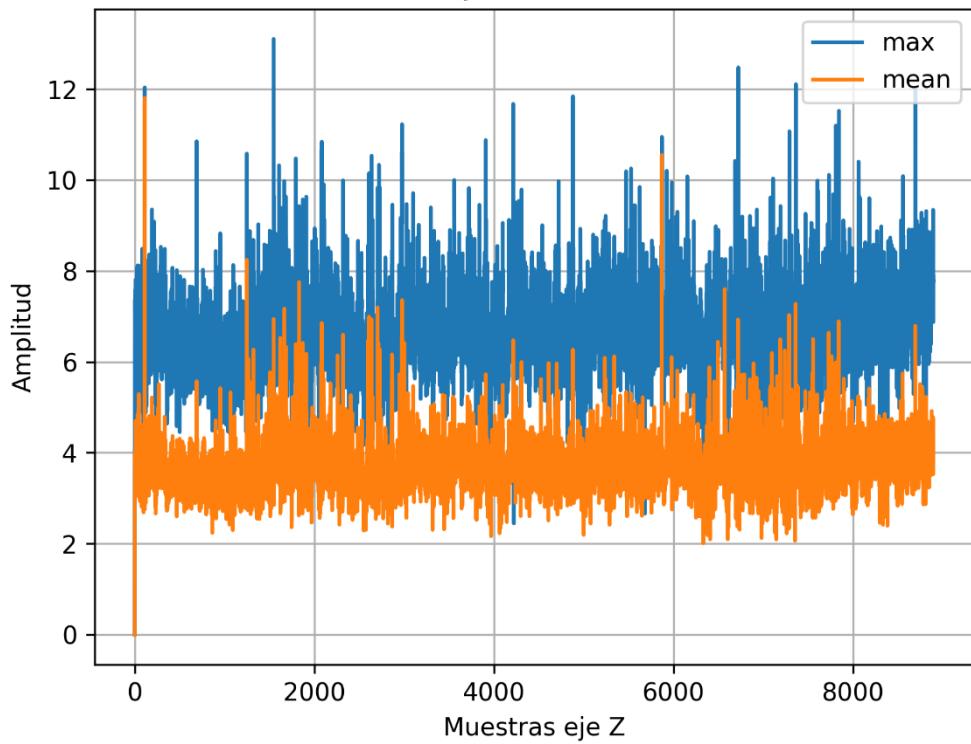




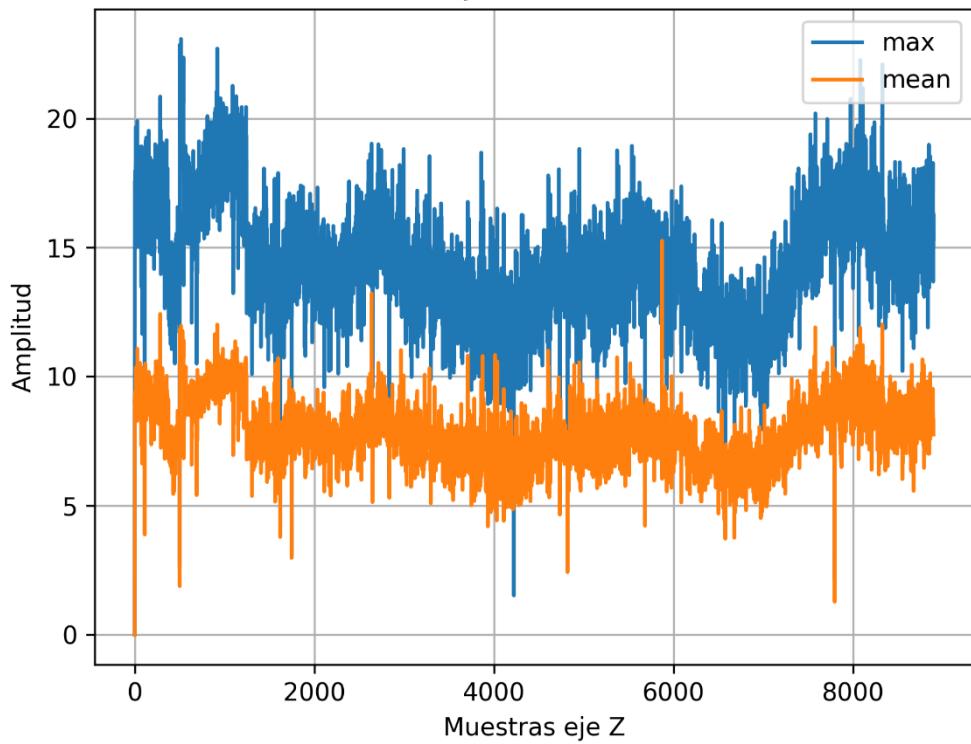
Axe Z:



Motor 1: 2X Armónico eje Z tomando maximo, +- (0.3)Hz

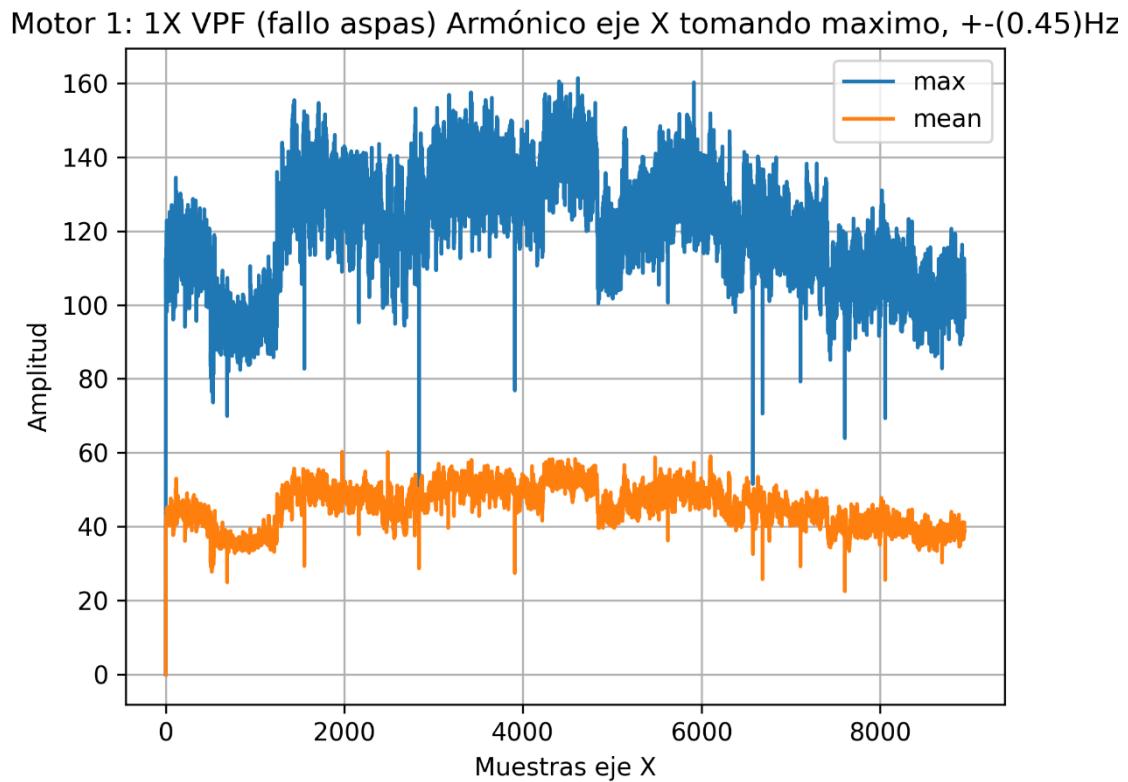


Motor 1: 3X Armónico eje Z tomando maximo, +- (0.3)Hz

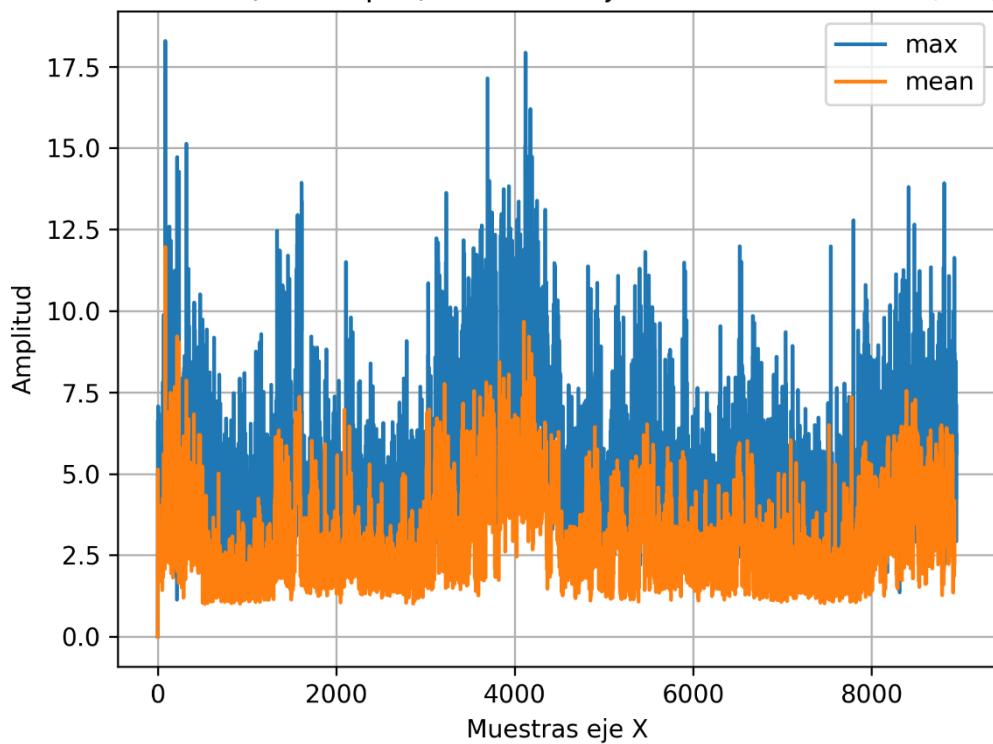


Fallo en aspas: VPF

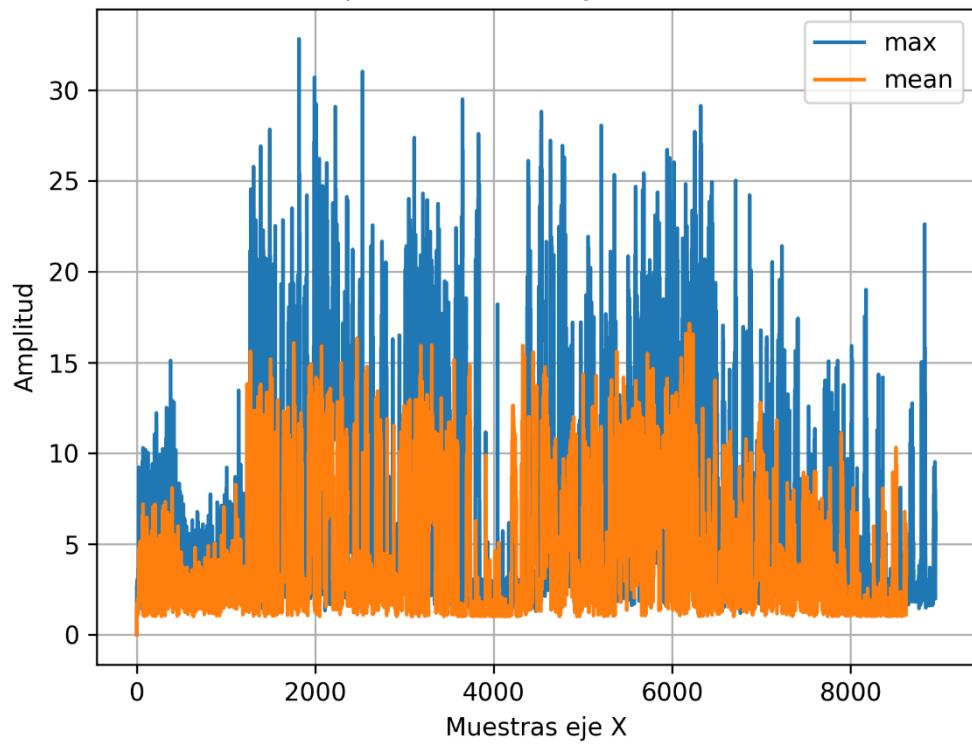
Axe X:



Motor 1: 2X VPF (fallo aspas) Armónico eje X tomando maximo, +- (0.45)Hz

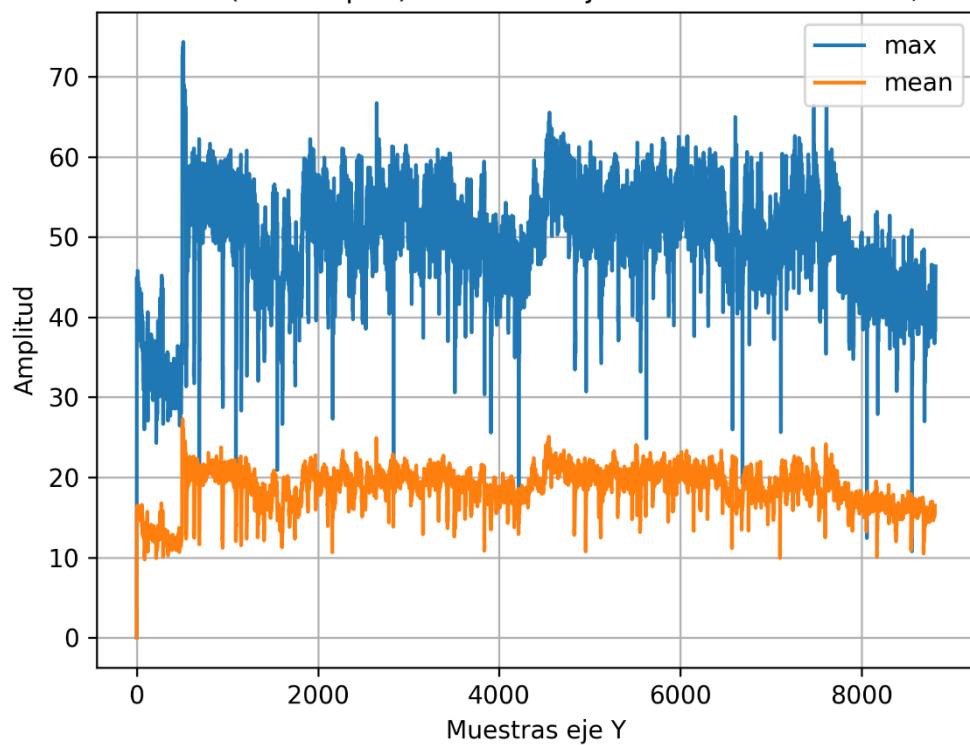


Motor 1: 3X VPF (fallo aspas) Armónico eje X tomando maximo, +- (0.45)Hz

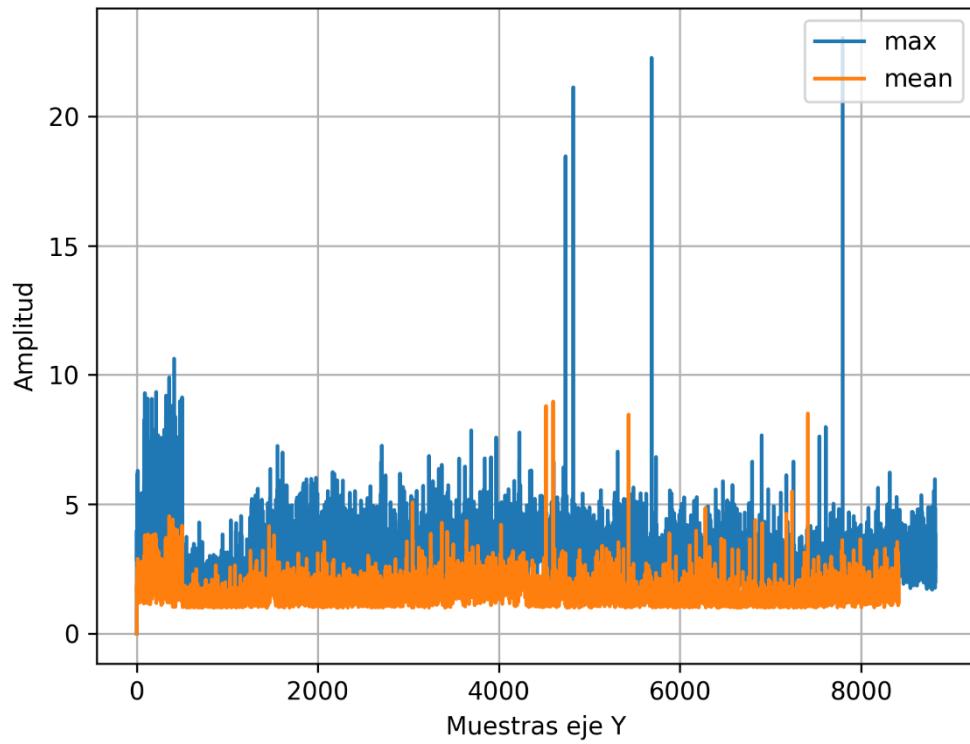


Axe Y:

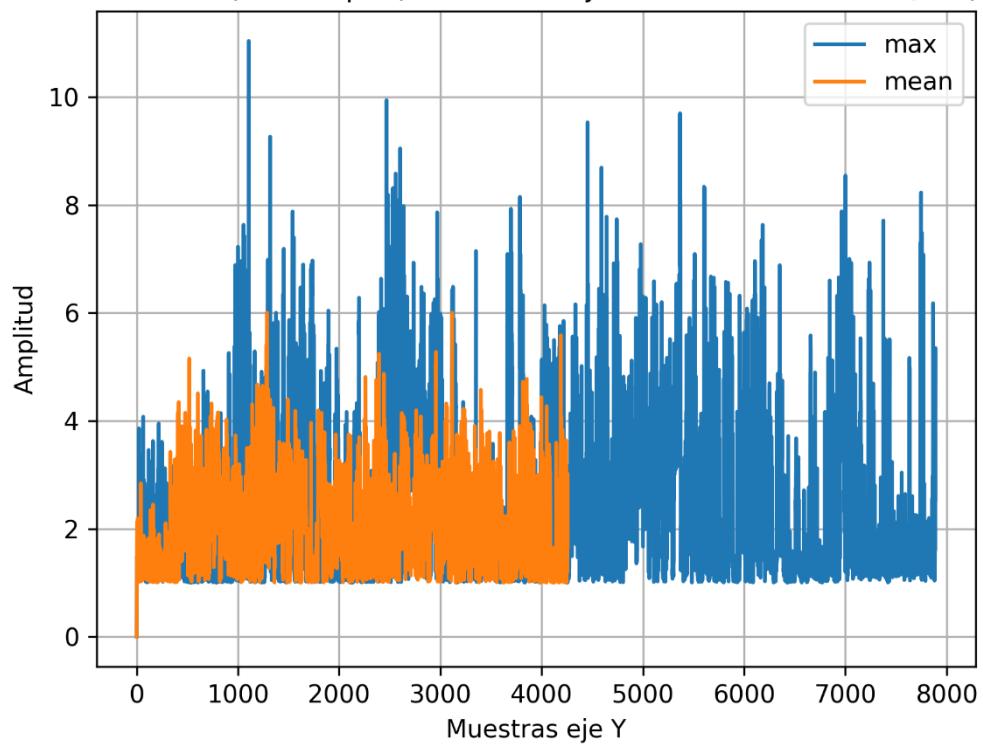
Motor 1: 1X VPF (fallo aspas) Armónico eje Y tomando maximo, +- (0.45)Hz



Motor 1: 2X VPF (fallo aspas) Armónico eje Y tomando maximo, +- (0.45)Hz

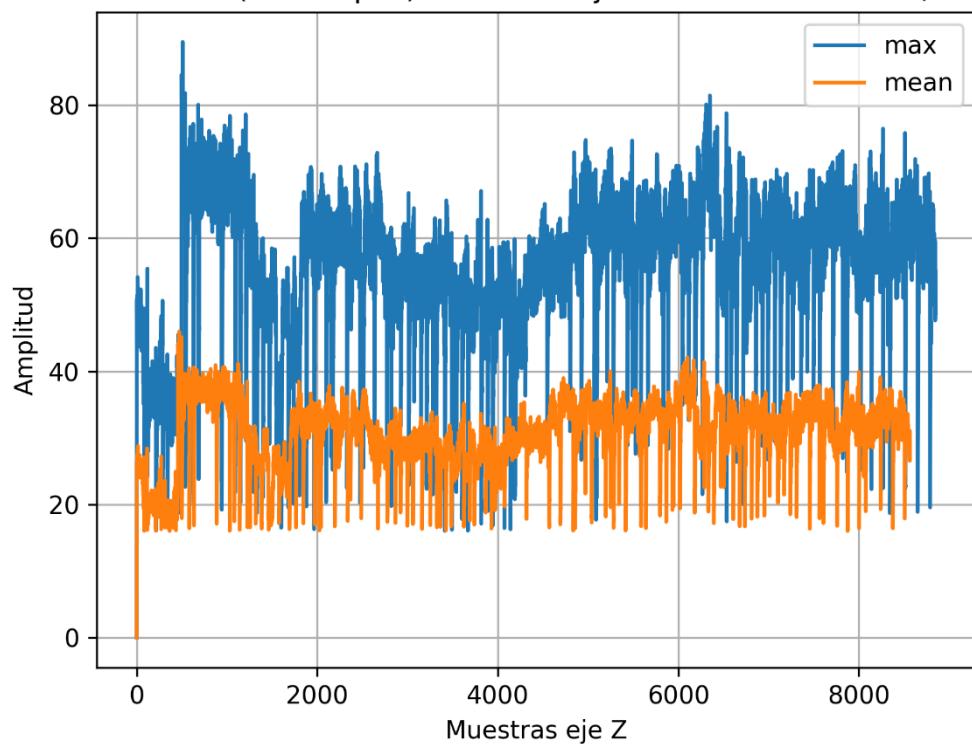


Motor 1: 3X VPF (fallo aspas) Armónico eje Y tomando maximo, +- (0.45)Hz

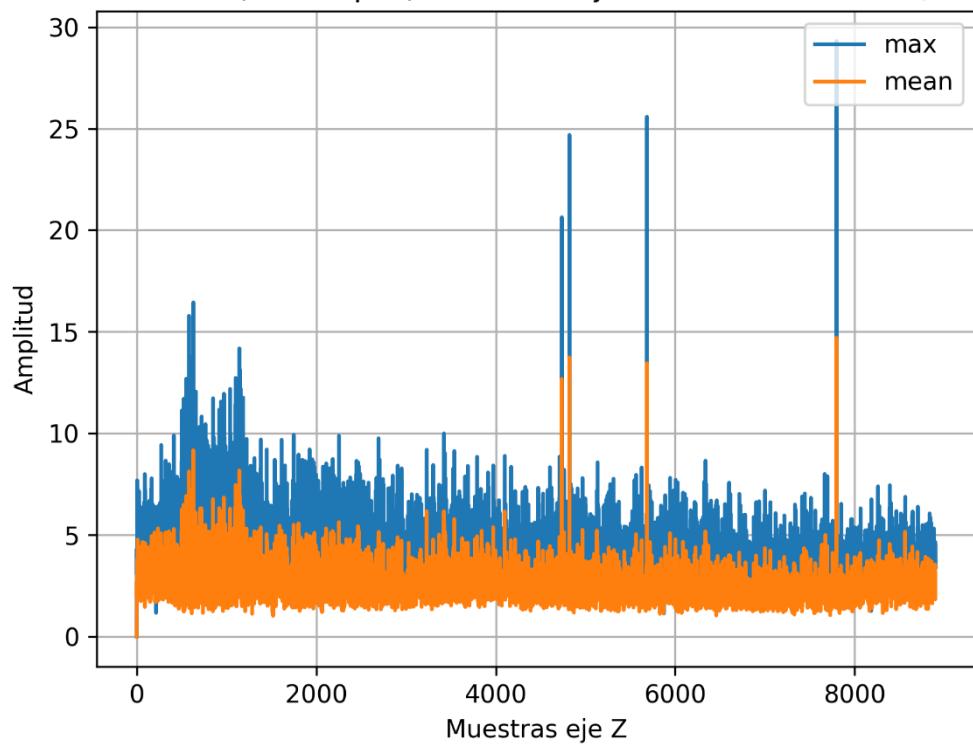


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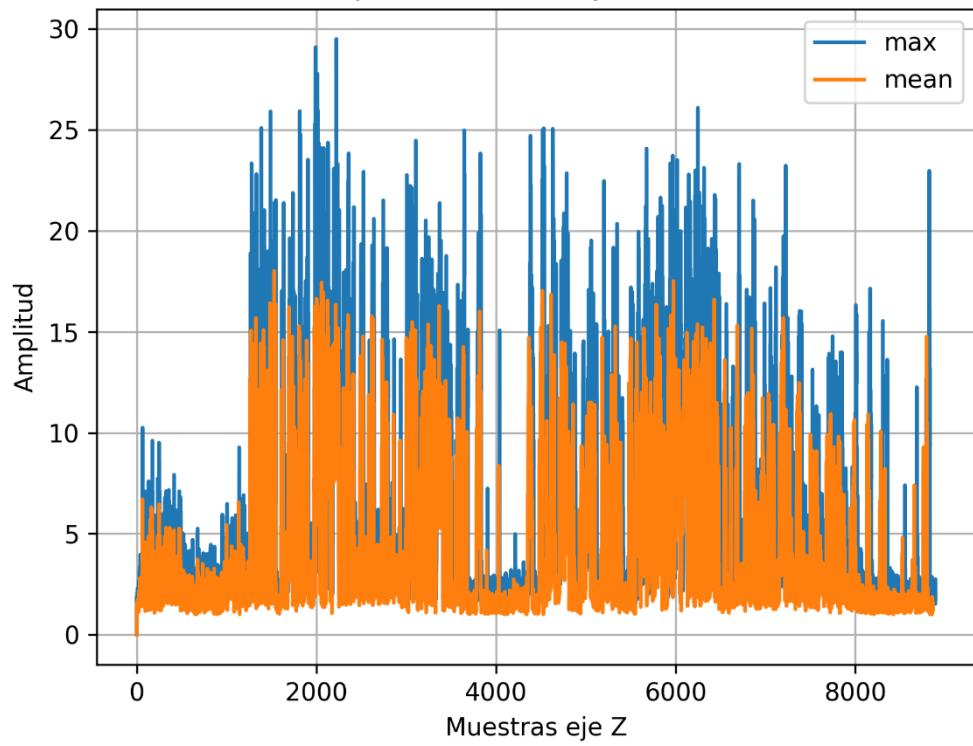
Motor 1: 1X VPF (fallo aspas) Armónico eje Z tomando maximo, +- (0.3)Hz



Motor 1: 2X VPF (fallo aspas) Armónico eje Z tomando maximo, +- (0.3)Hz

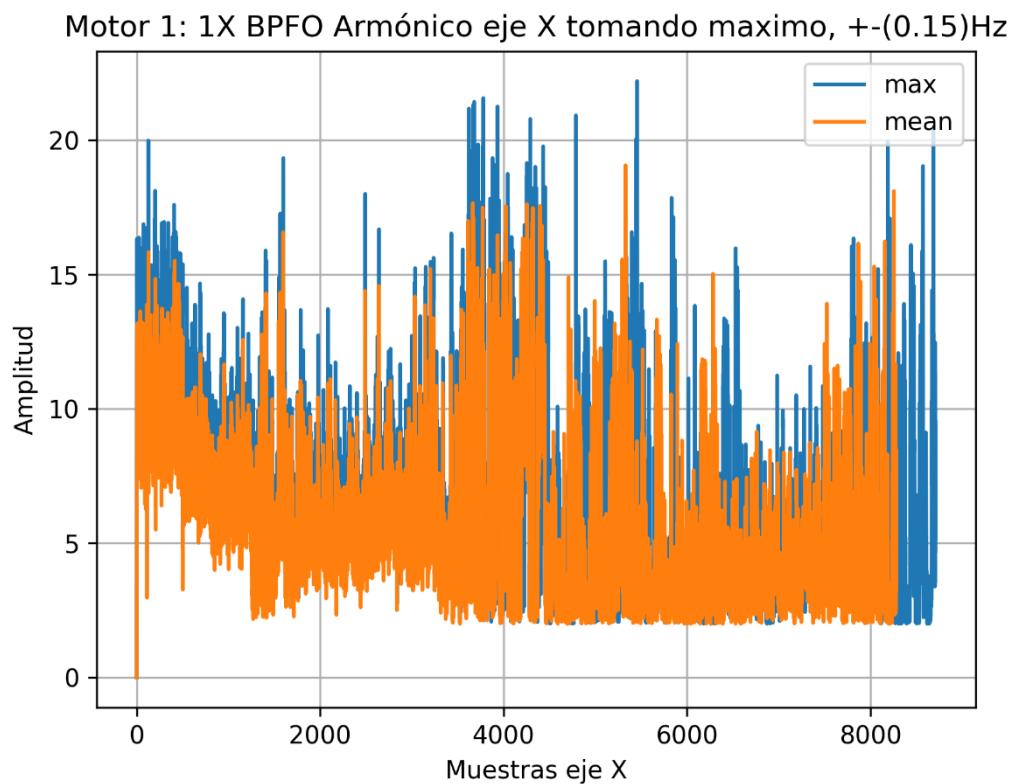


Motor 1: 3X VPF (fallo aspas) Armónico eje Z tomando maximo, +- (0.3)Hz

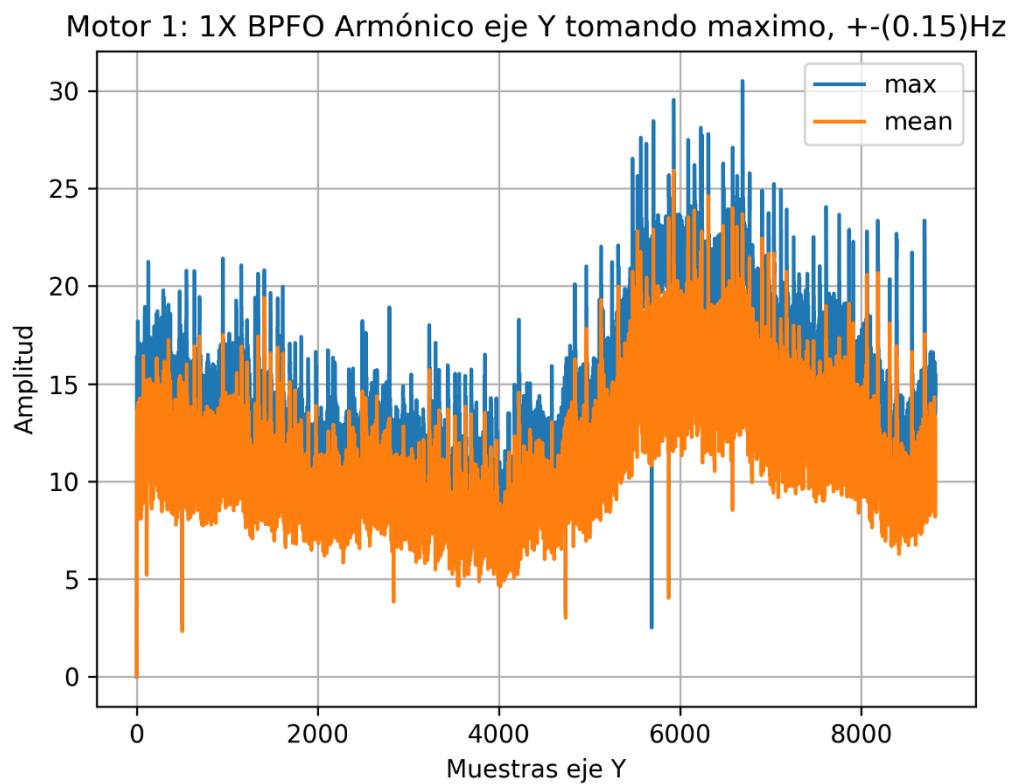


Fallo rodamientos: BPFO

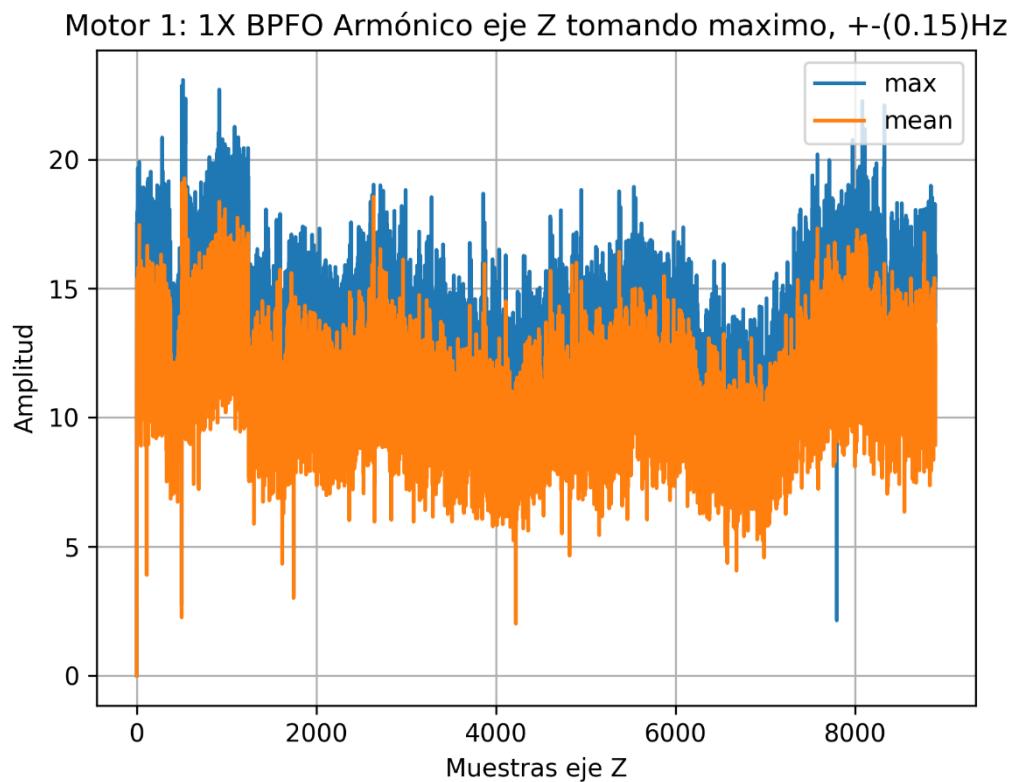
Axe X:



Axe Y:

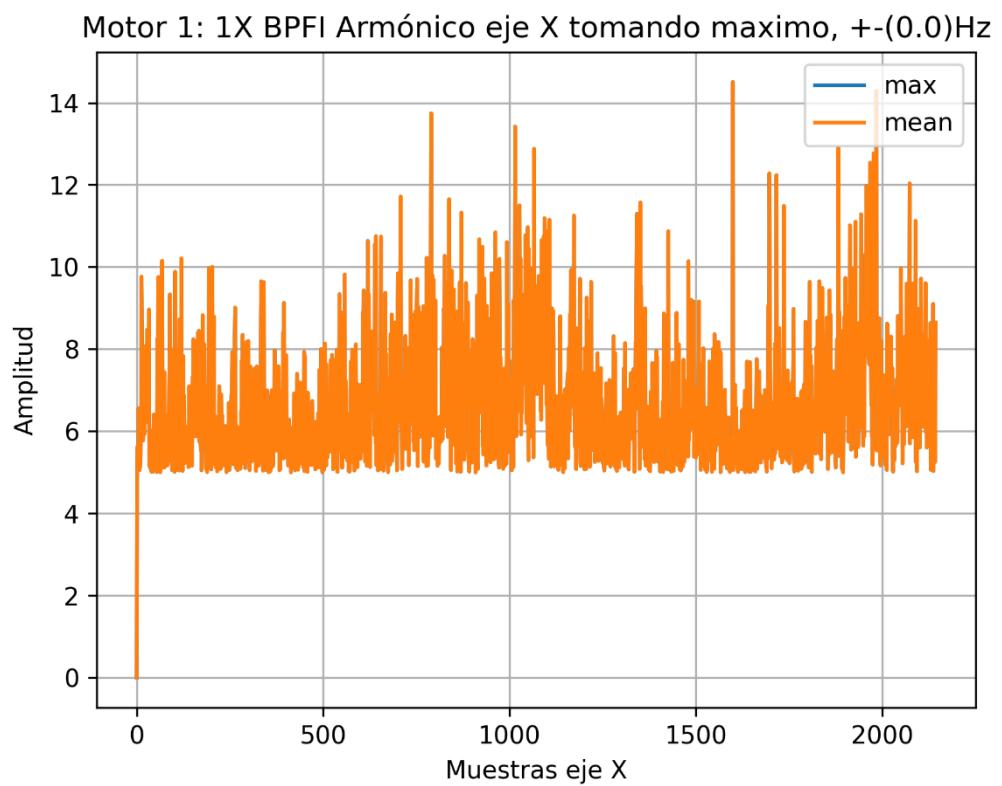


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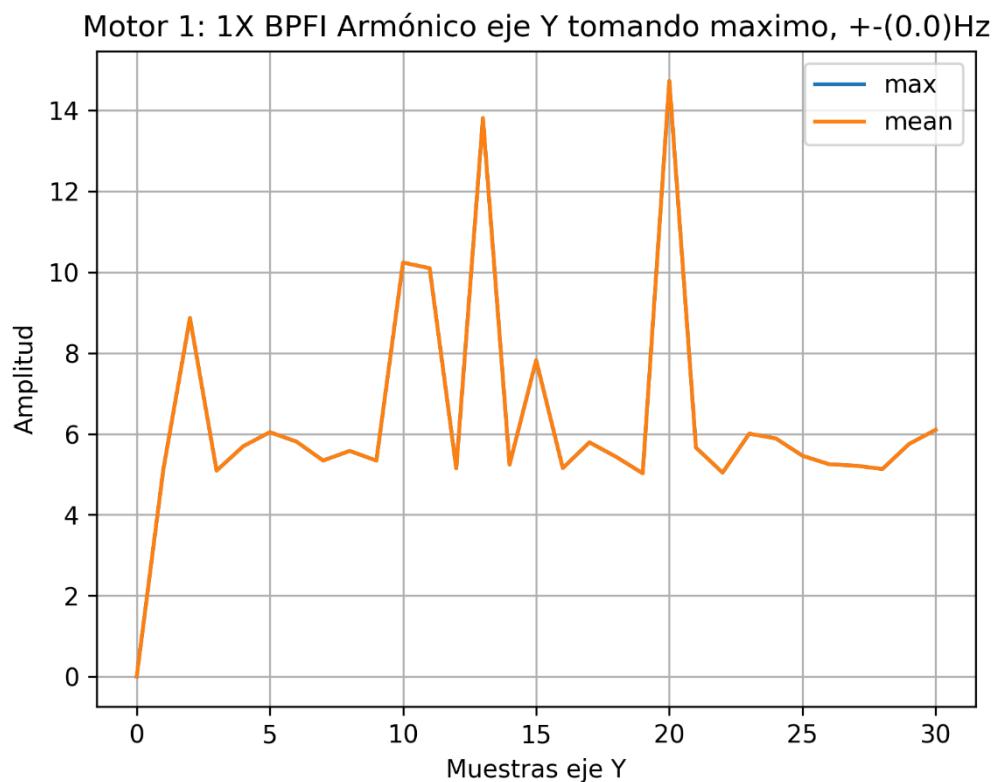


Fallo rodamientos: BPFI

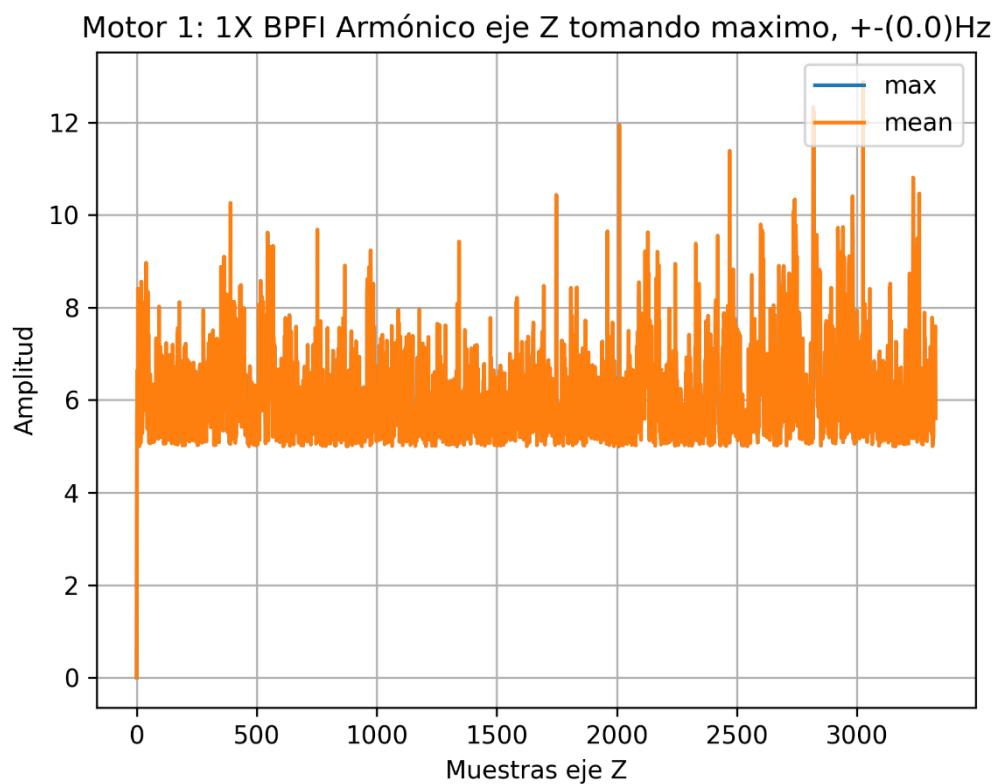
Axe X:



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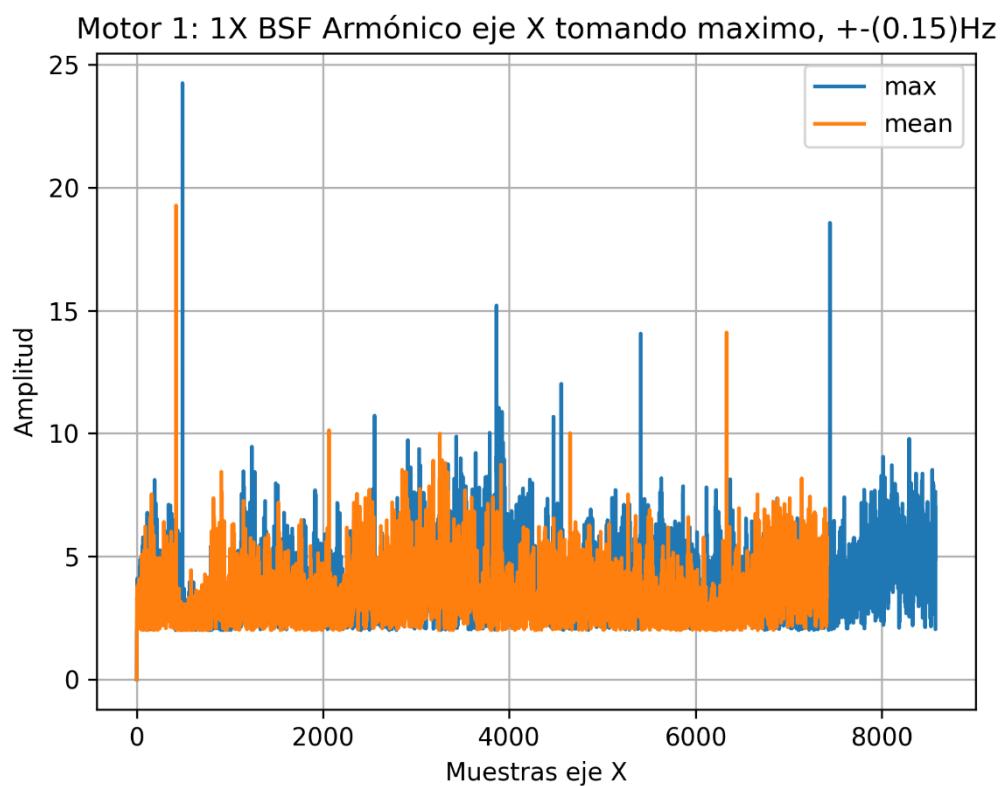


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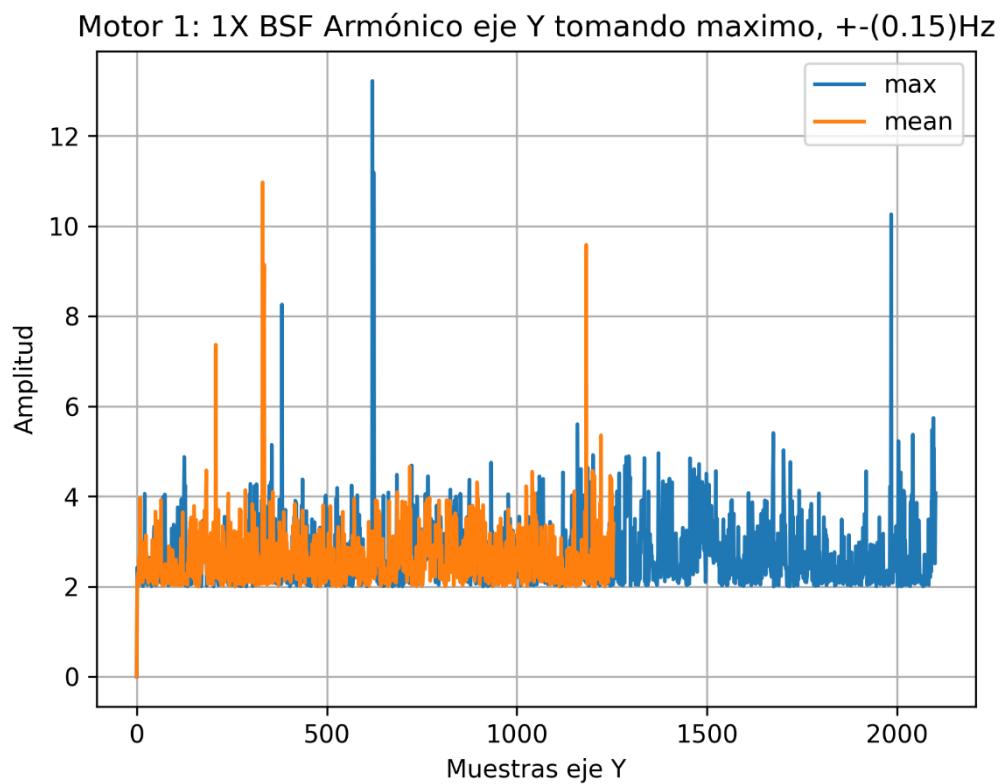


Fallo rodamientos: BSF

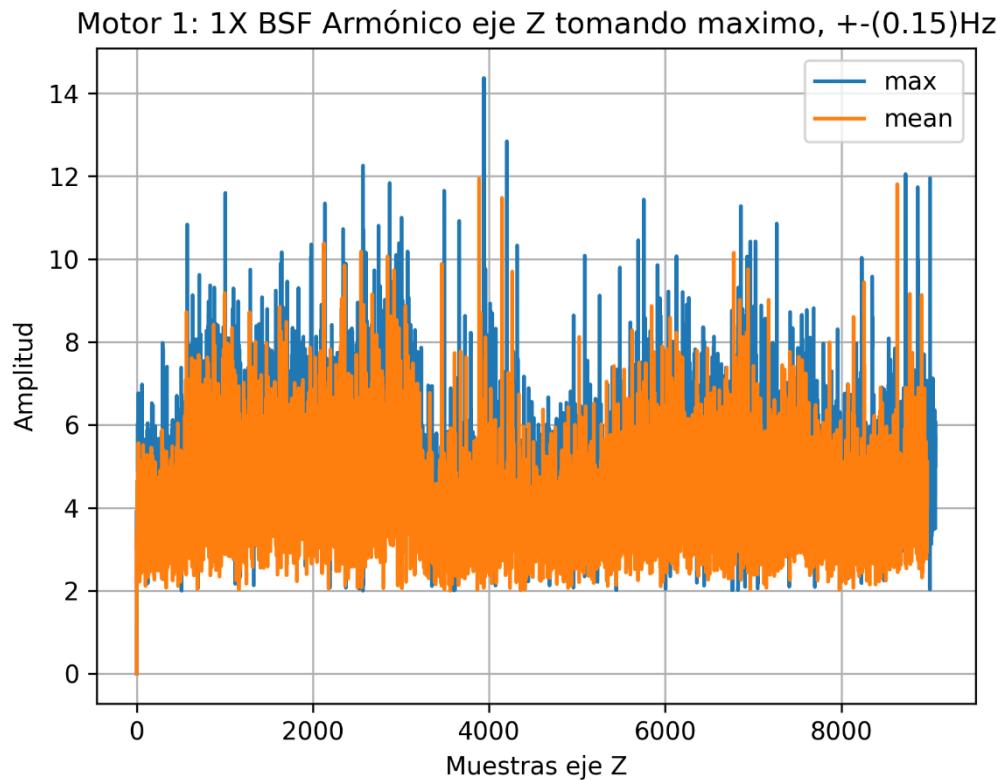
Axe X:



Axe Y:

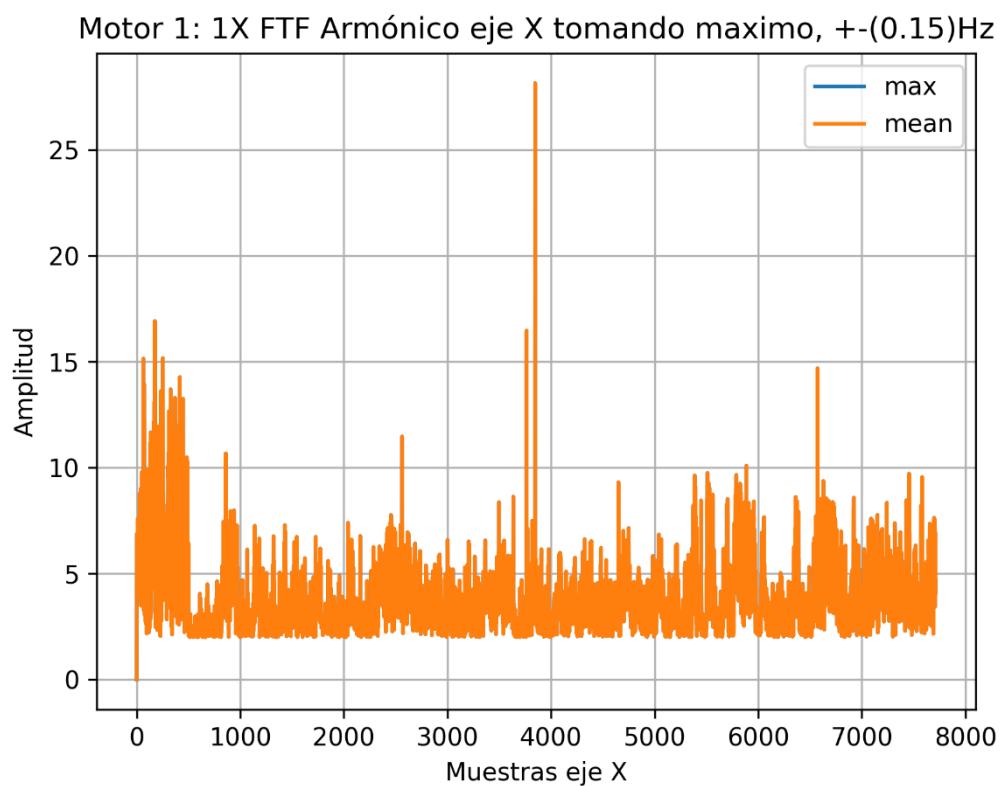


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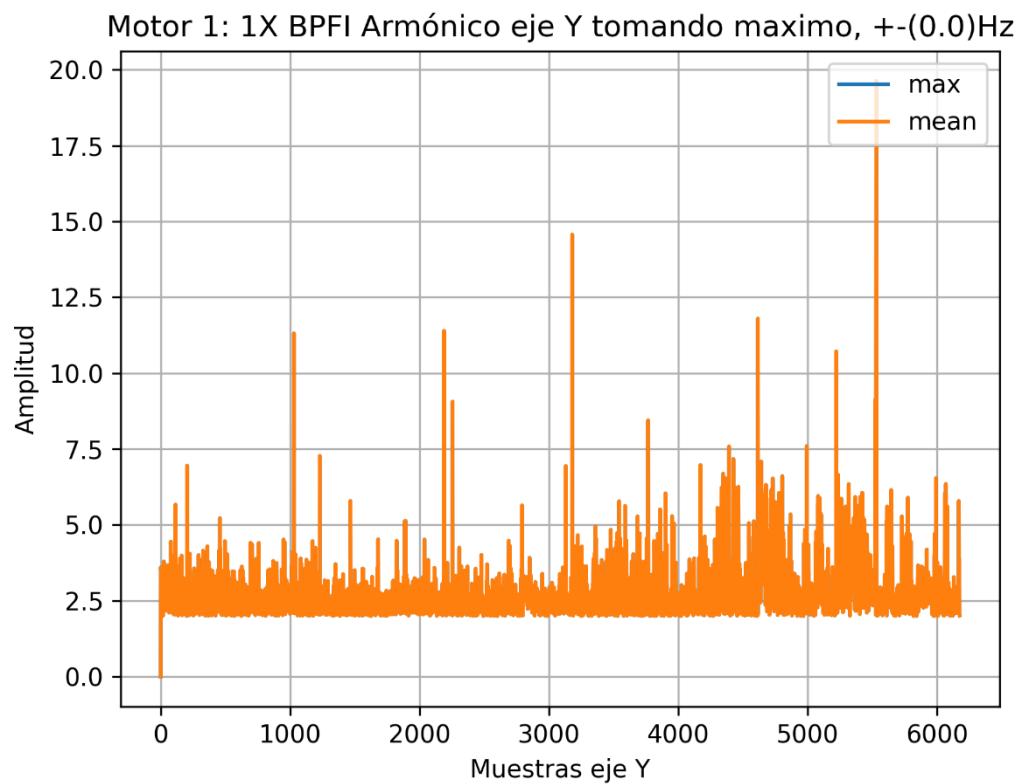


Fallo rodamientos: FTF

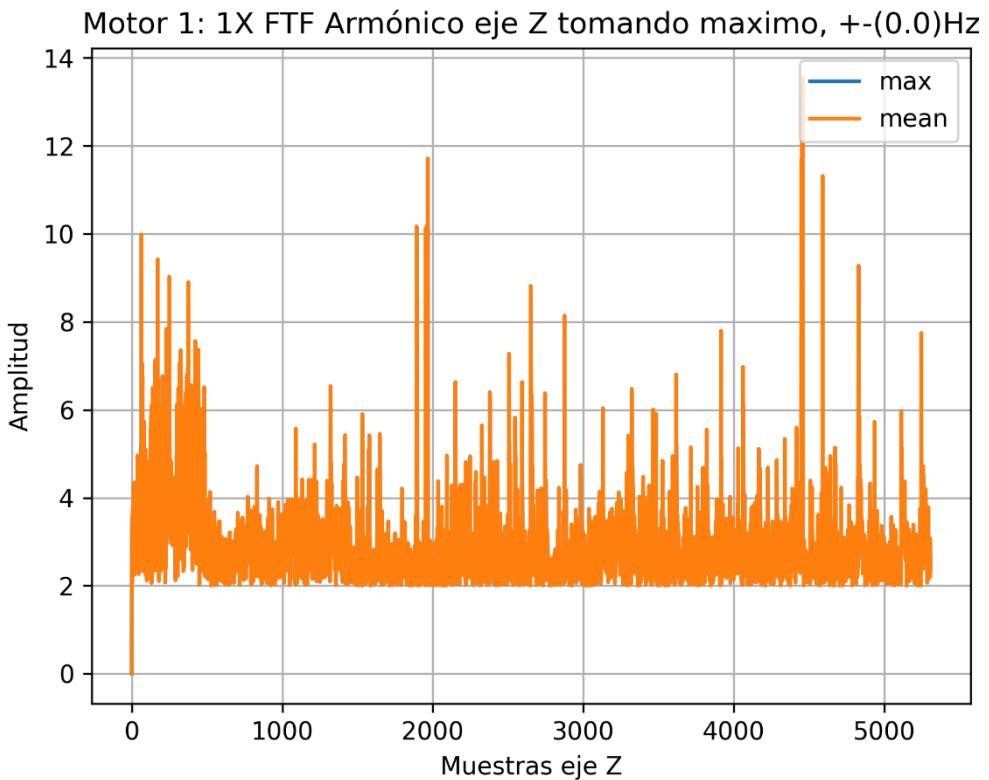
Axe X:



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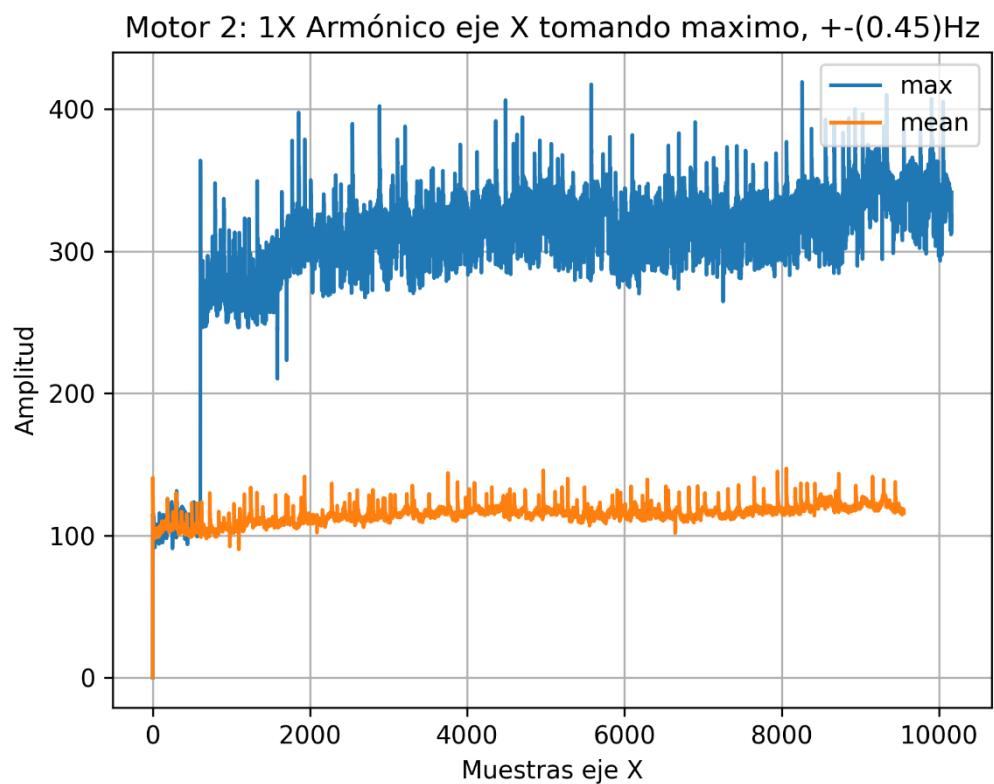
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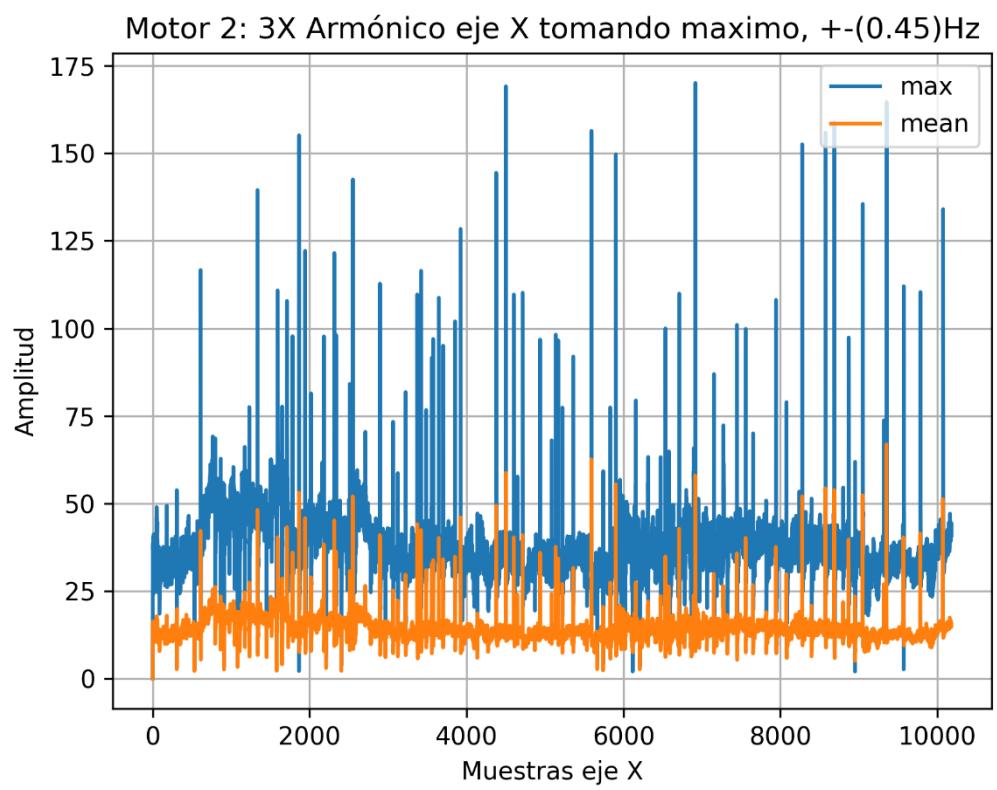
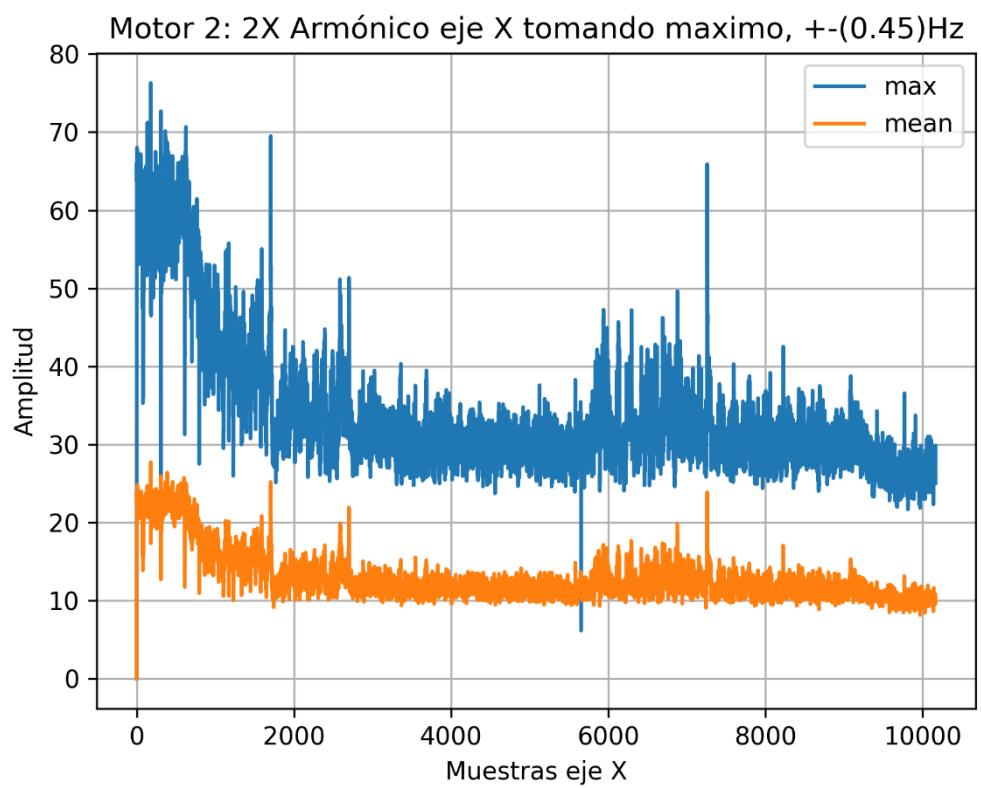


Motor 2

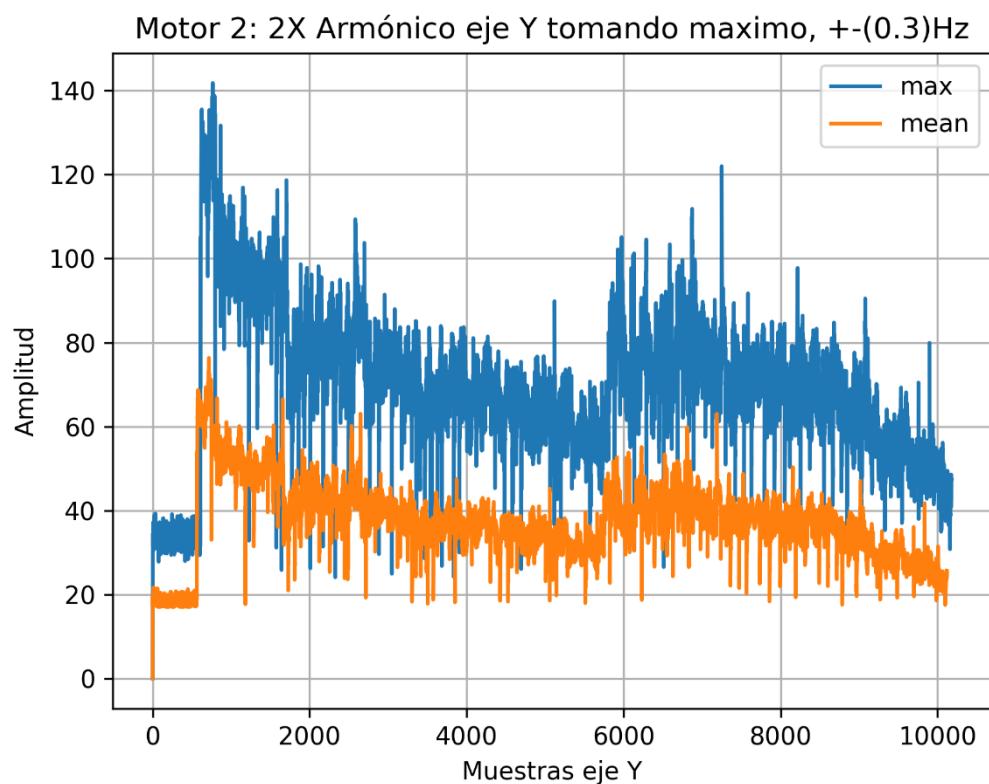
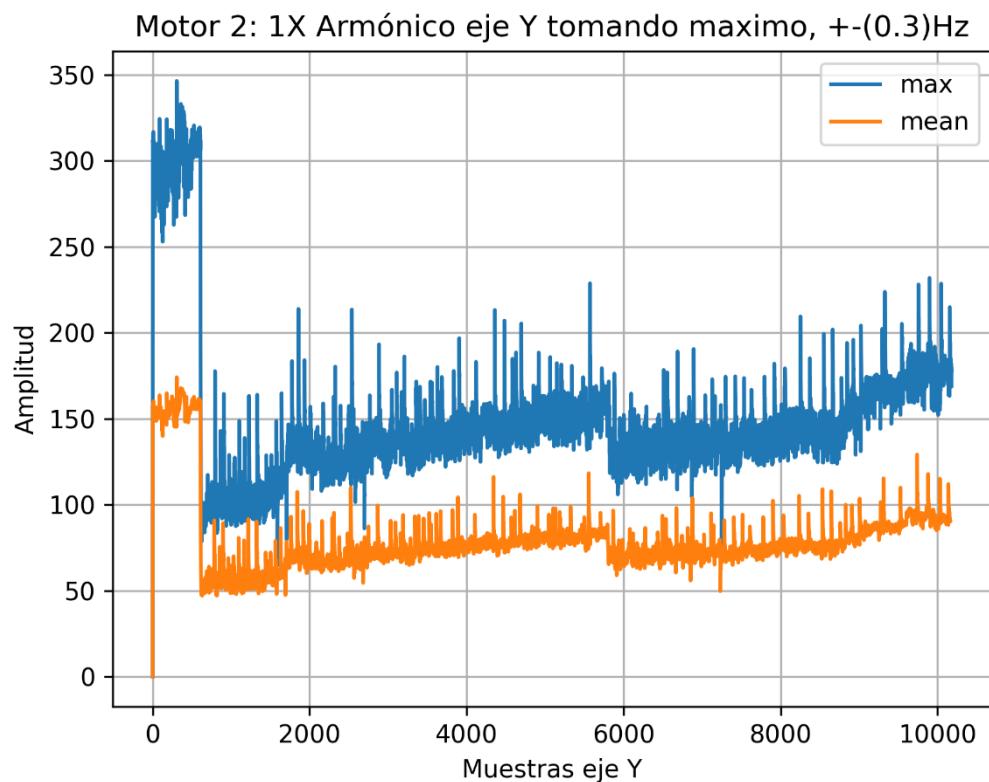
Velocidad de giro nominal

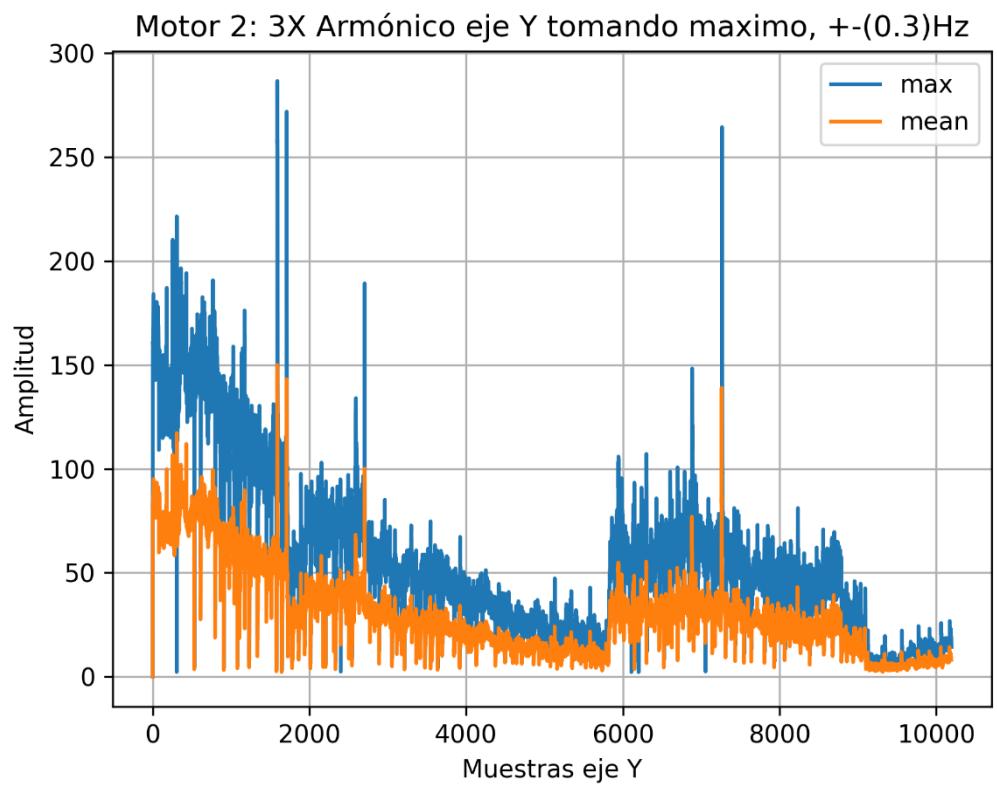
Axe X:



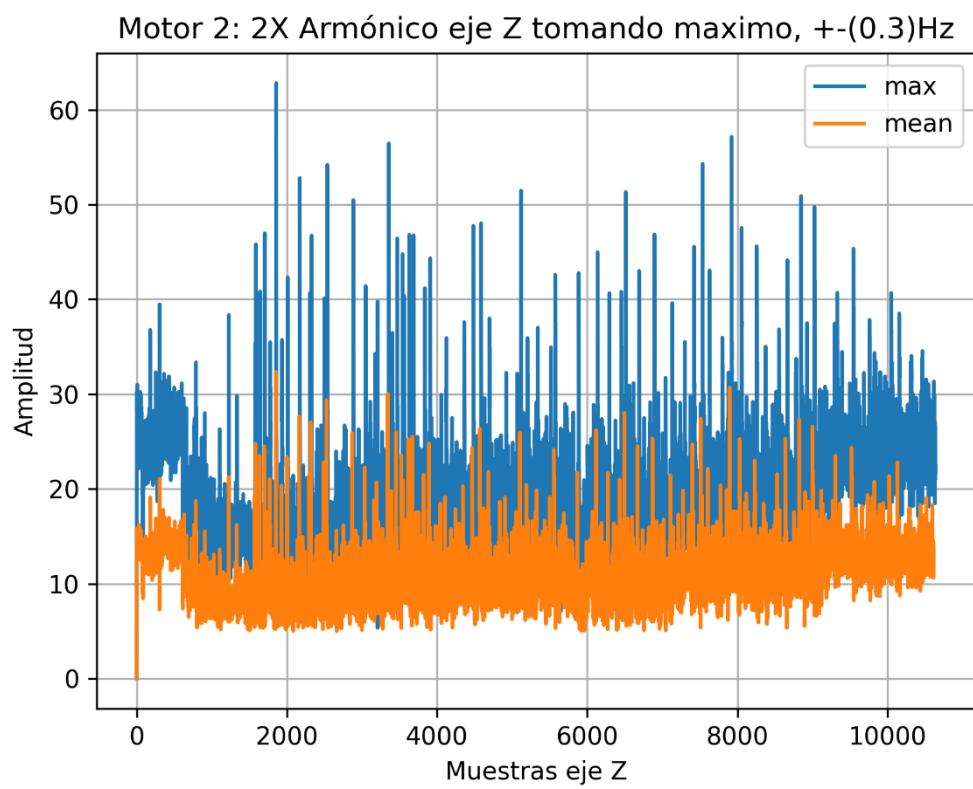
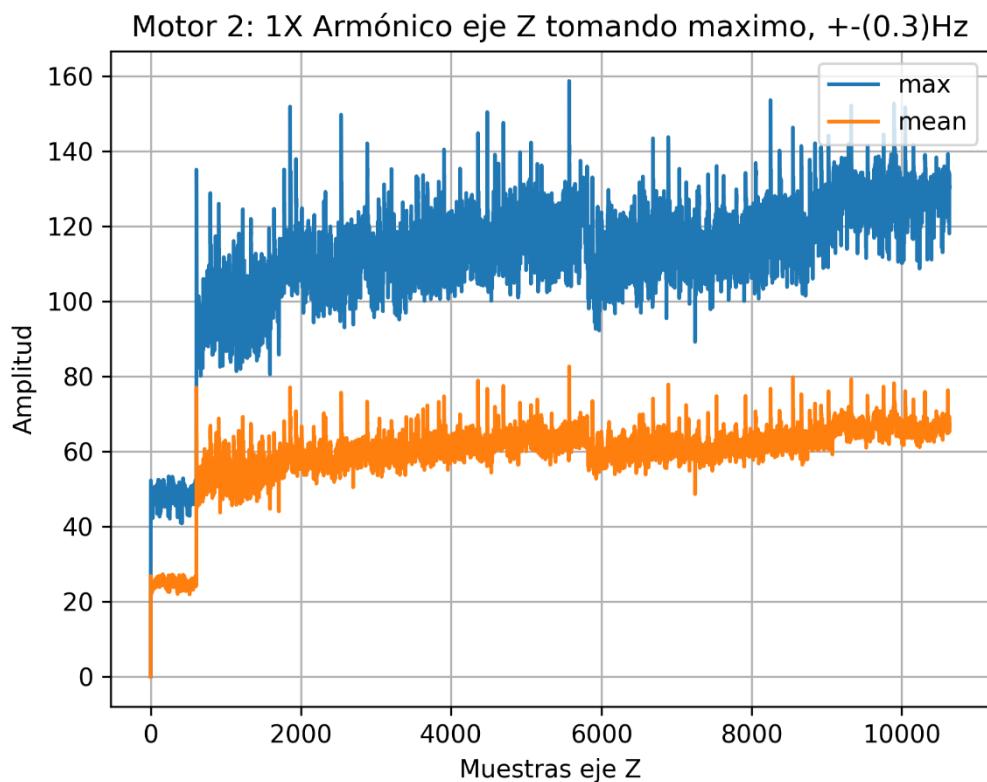


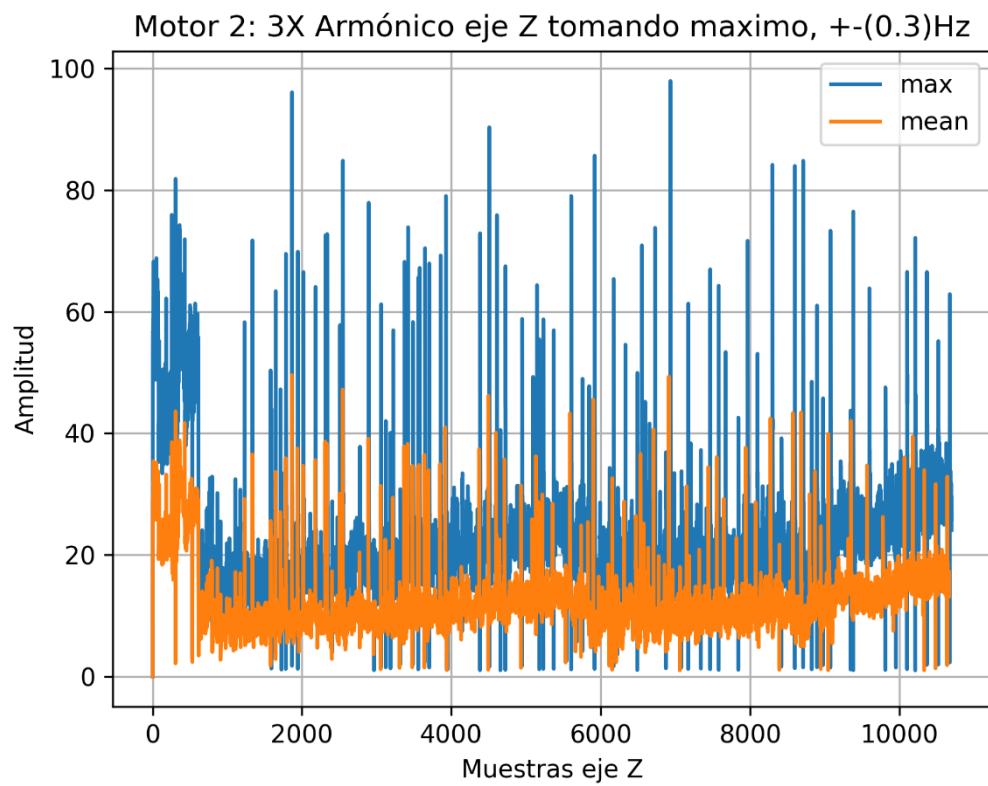
Axe Y:





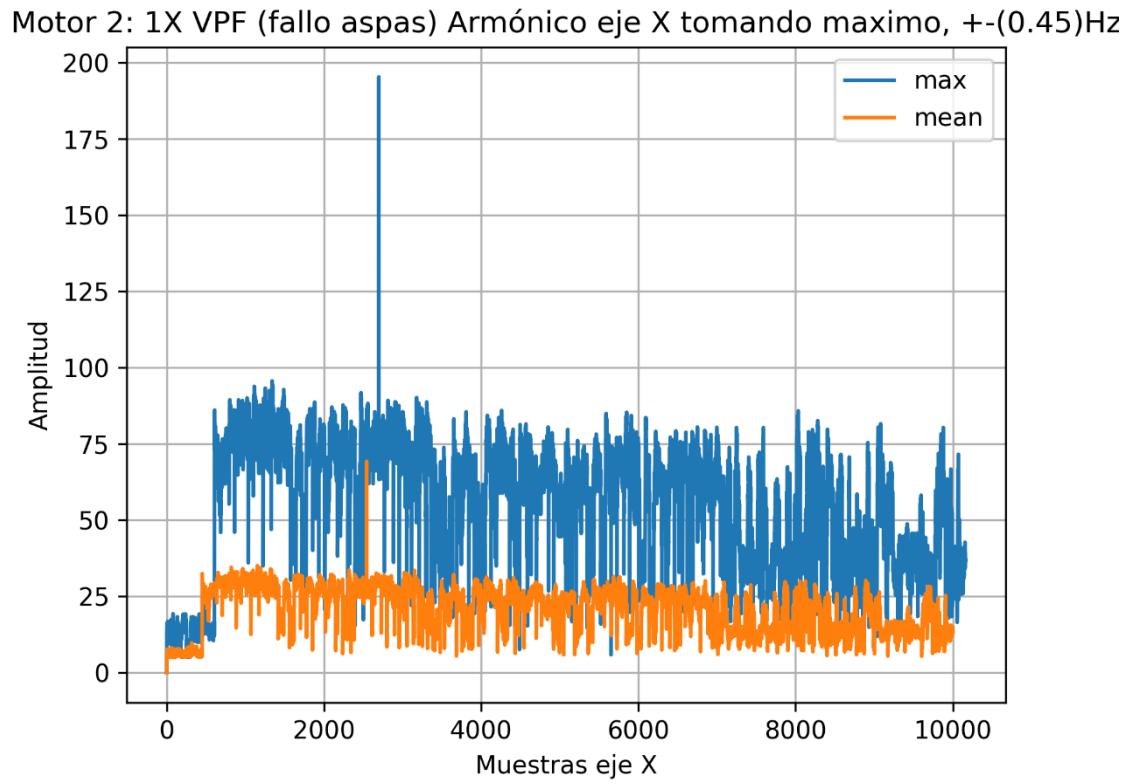
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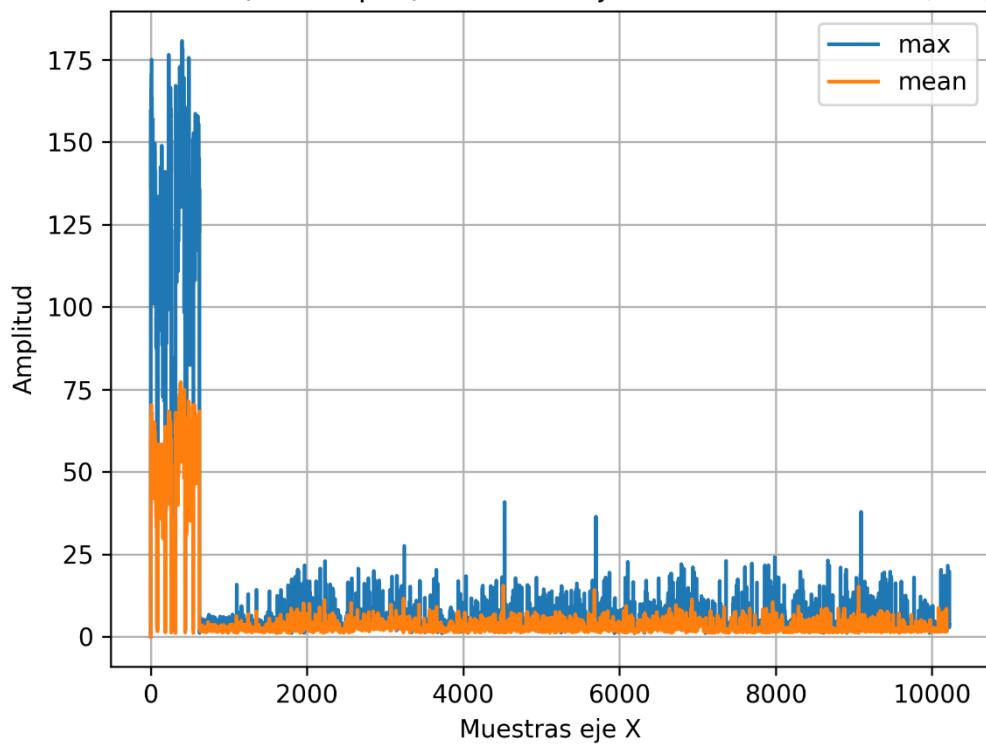


Fallo en aspas: VPF

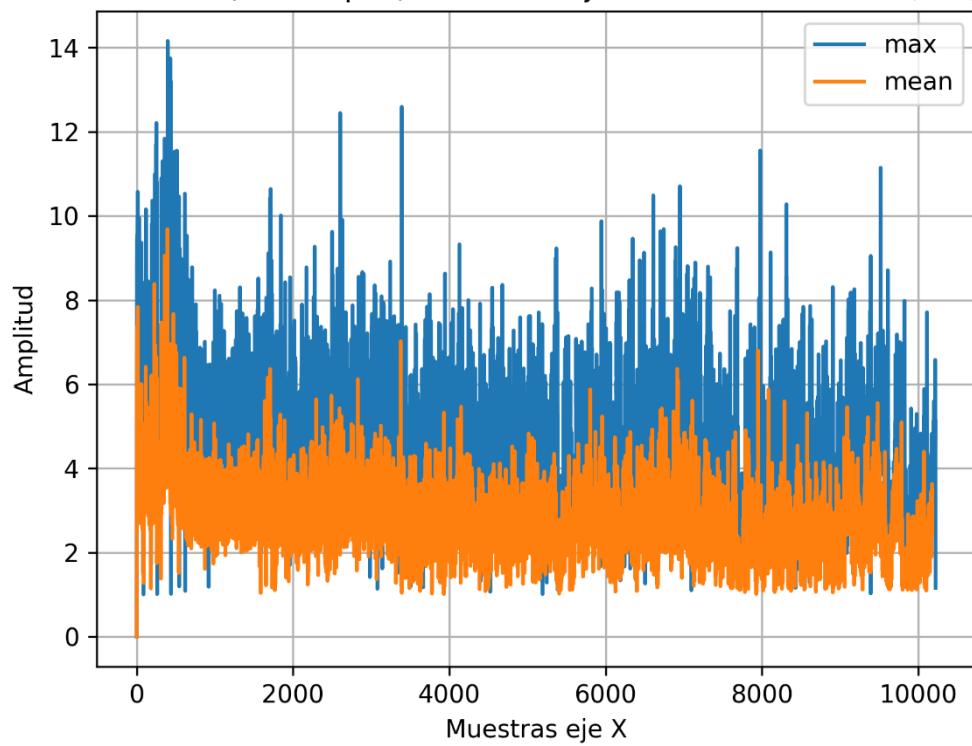
Axe X:



Motor 2: 2X VPF (fallo aspas) Armónico eje X tomando maximo, +- (0.45)Hz

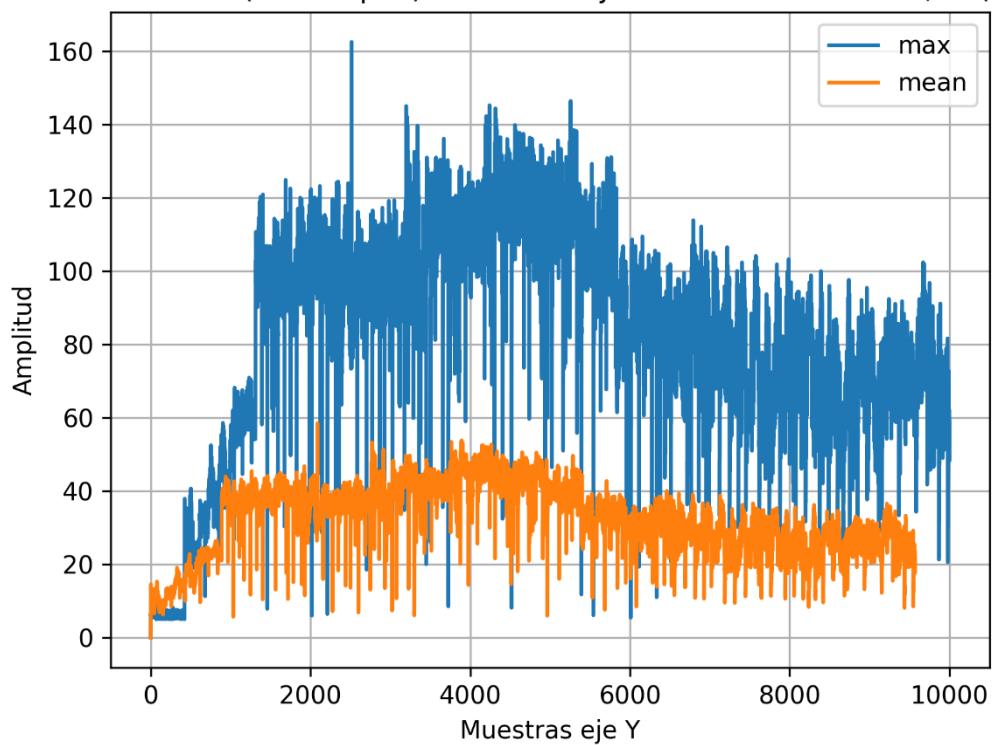


Motor 2: 3X VPF (fallo aspas) Armónico eje X tomando maximo, +- (0.45)Hz

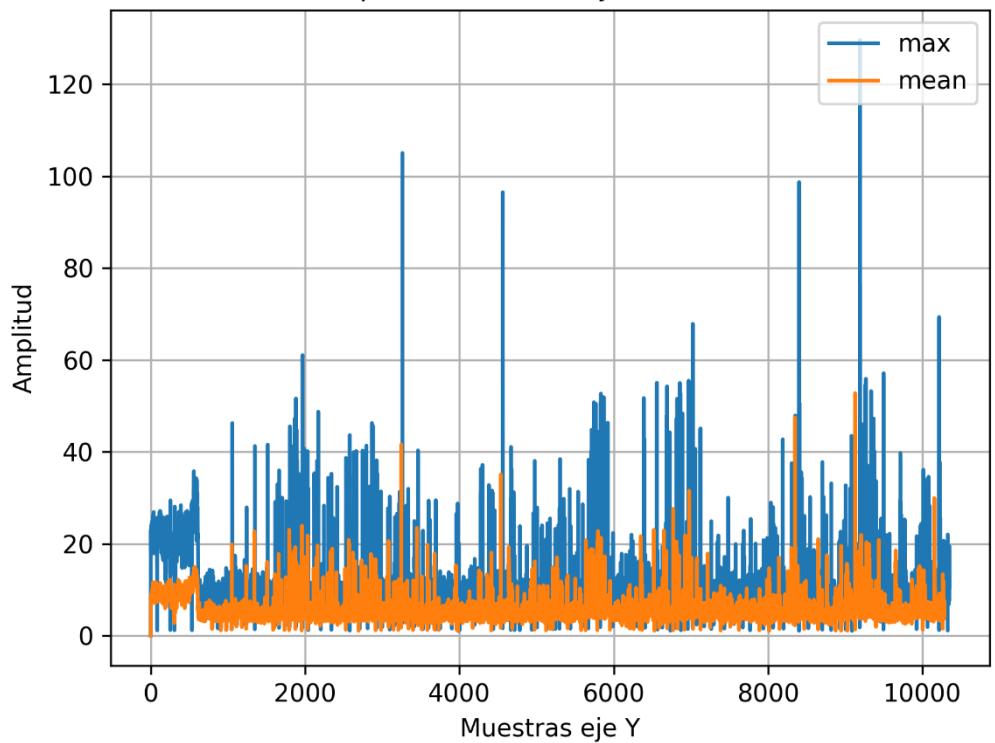


Axe Y:

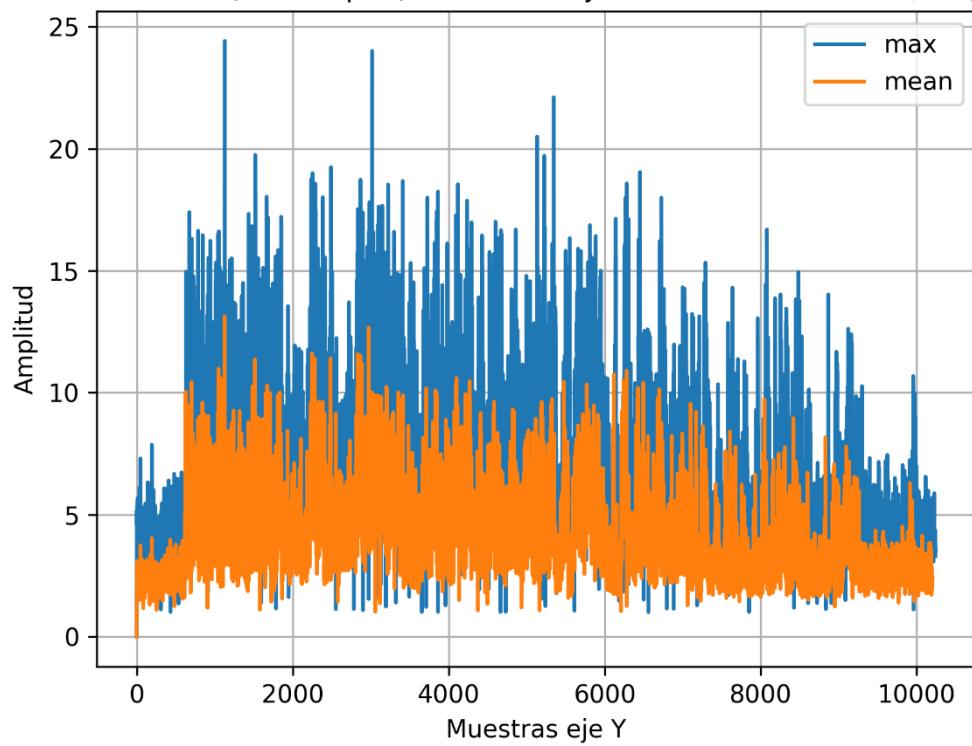
Motor 2: 1X VPF (fallo aspas) Armónico eje Y tomando maximo, +- (0.45)Hz



Motor 2: 2X VPF (fallo aspas) Armónico eje Y tomando maximo, +- (0.45)Hz

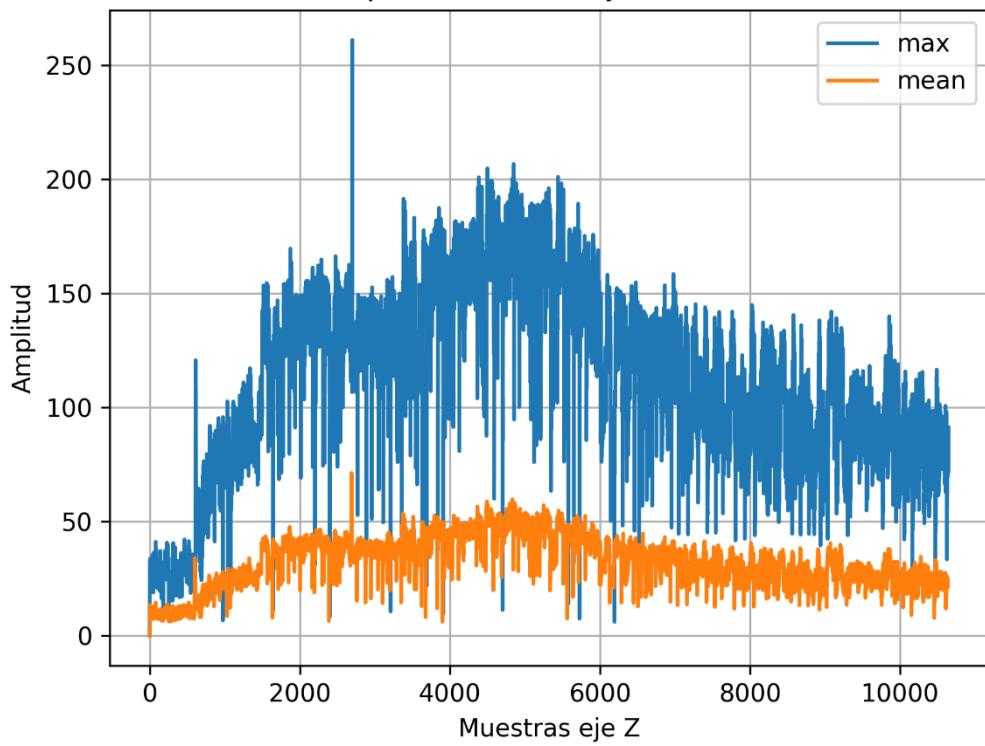


Motor 2: 3X VPF (fallo aspas) Armónico eje Y tomando maximo, +- (0.45)Hz

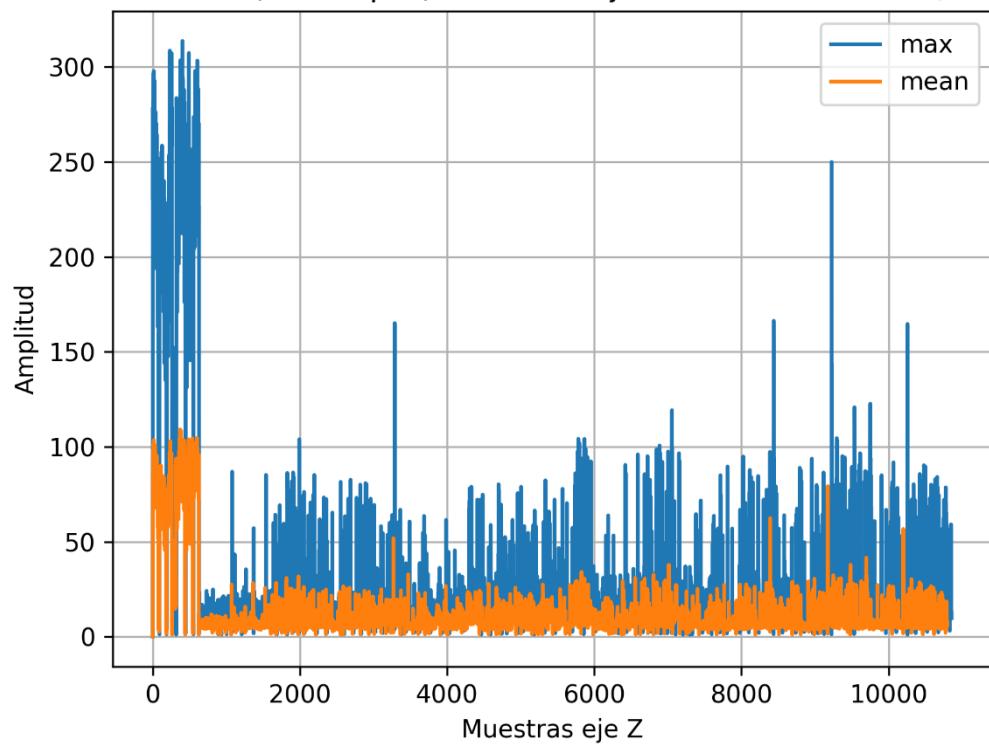


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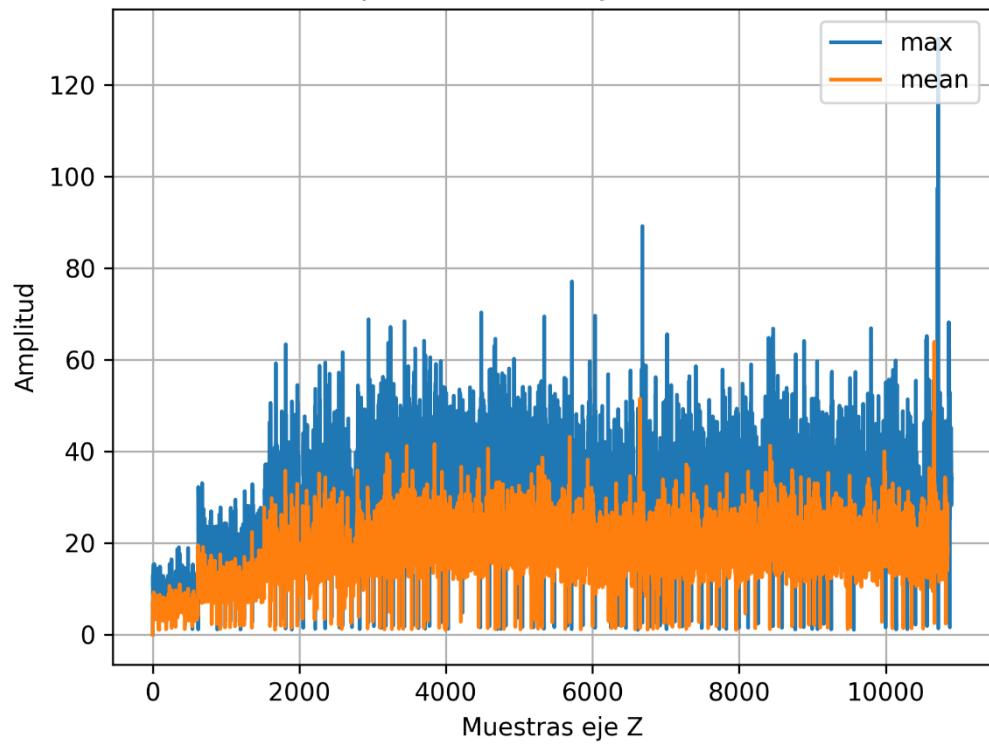
Motor 2: 1X VPF (fallo aspas) Armónico eje Z tomando maximo, +- (0.6)Hz



Motor 2: 2X VPF (fallo aspas) Armónico eje Z tomando maximo, +- (0.6)Hz

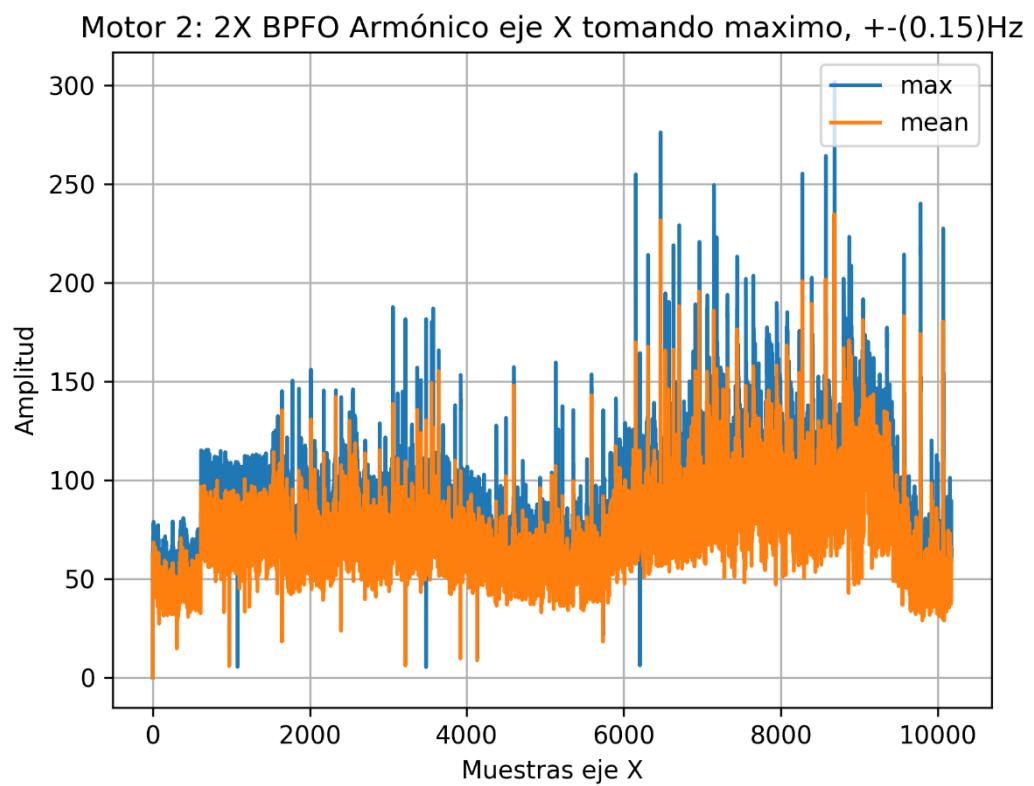
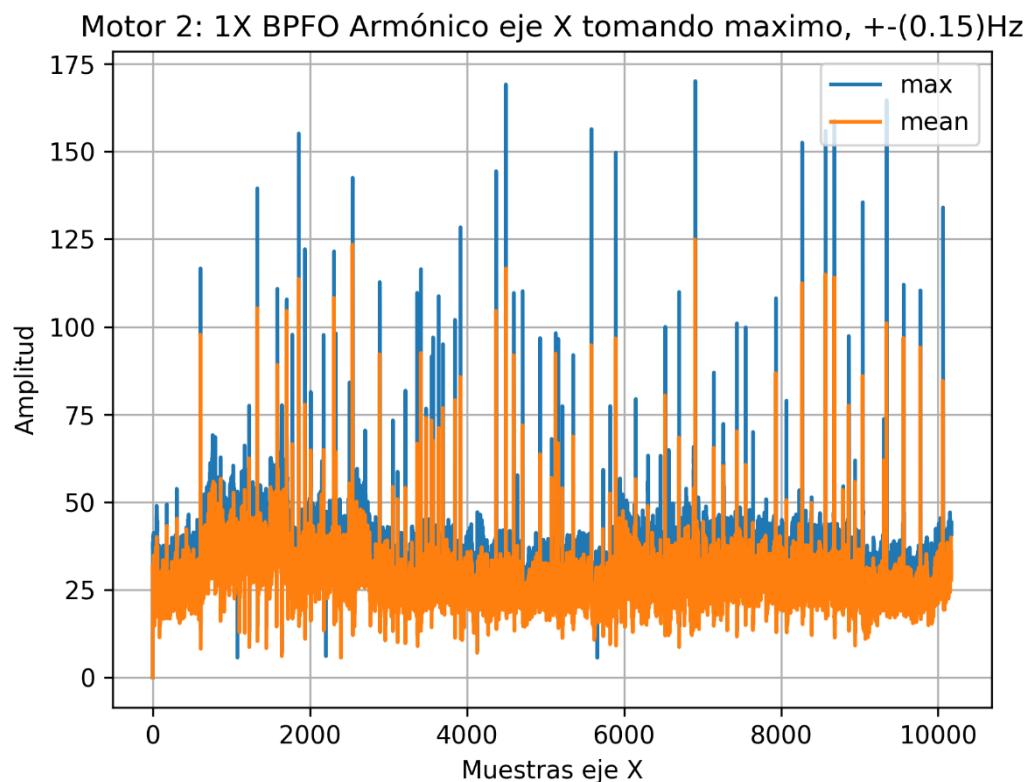


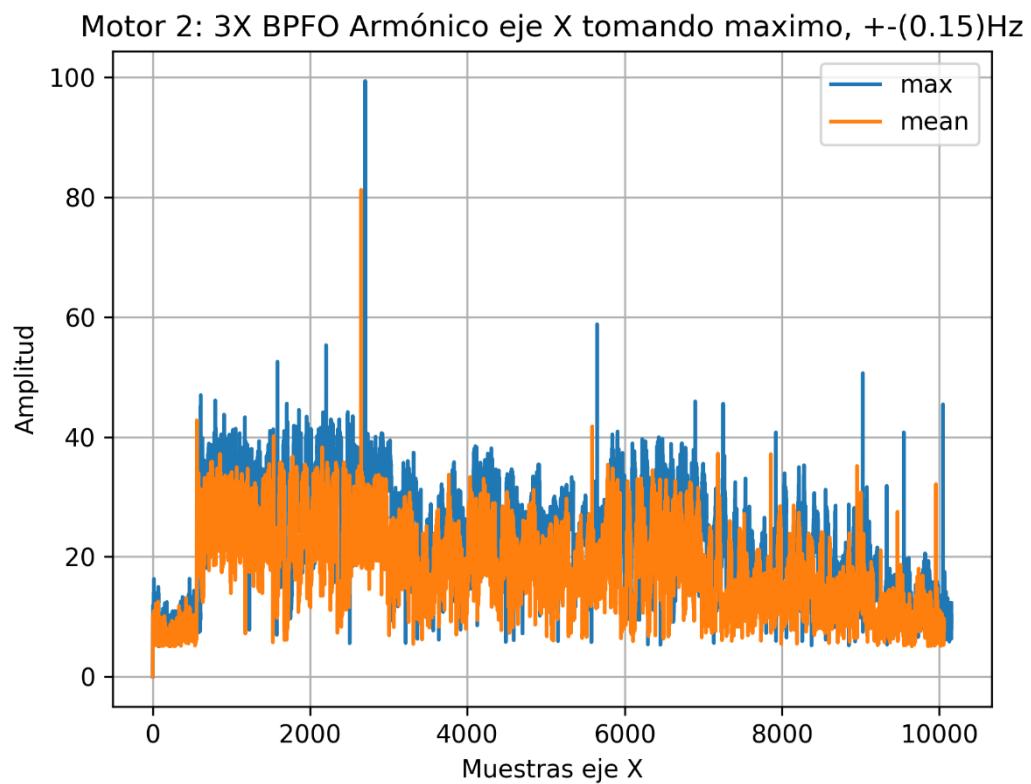
Motor 2: 3X VPF (fallo aspas) Armónico eje Z tomando maximo, +- (0.45)Hz



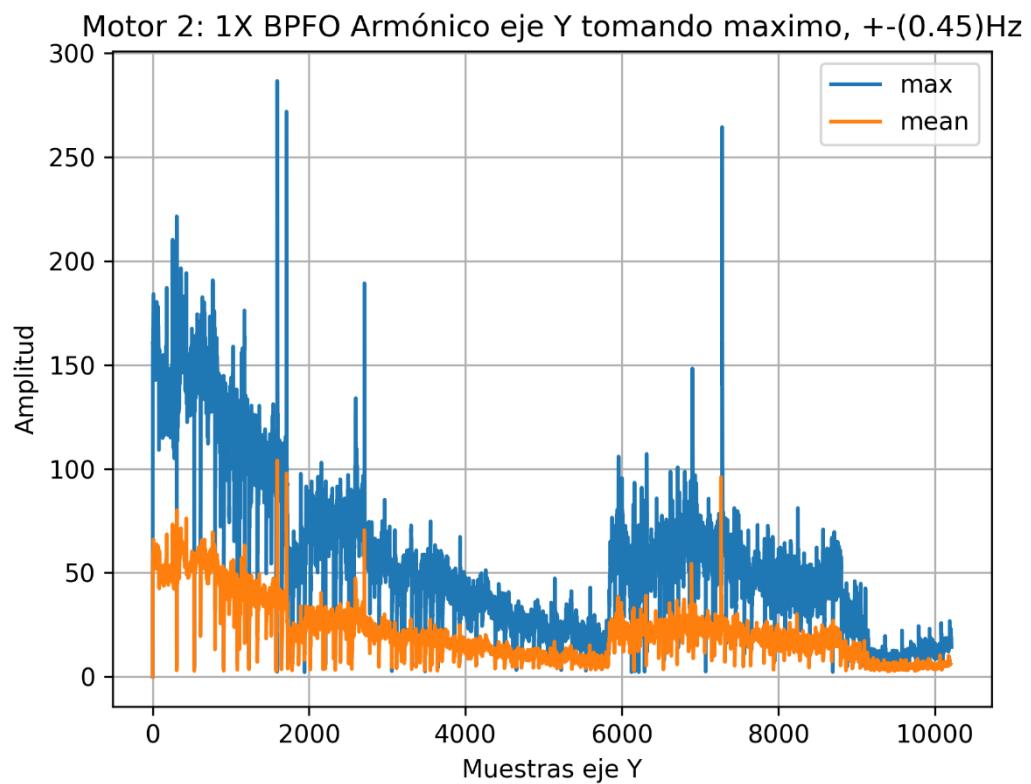
Fallo rodamientos: BPFO

Axe X:

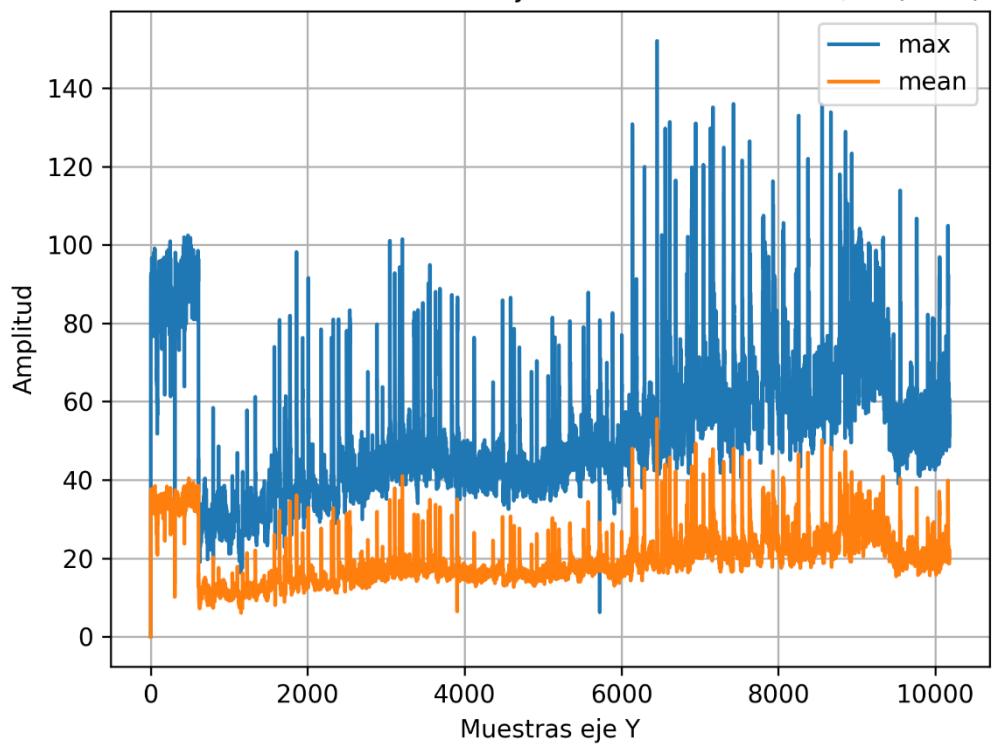




Axe Y:

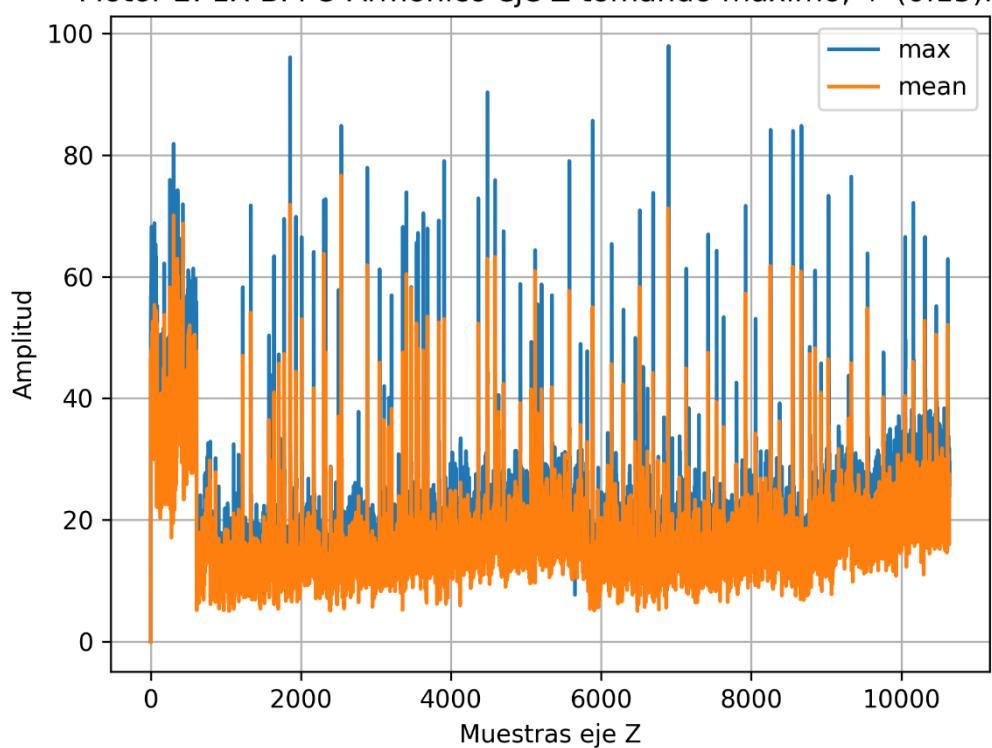


Motor 2: 2X BPFO Armónico eje Y tomando maximo, +- (0.45)Hz

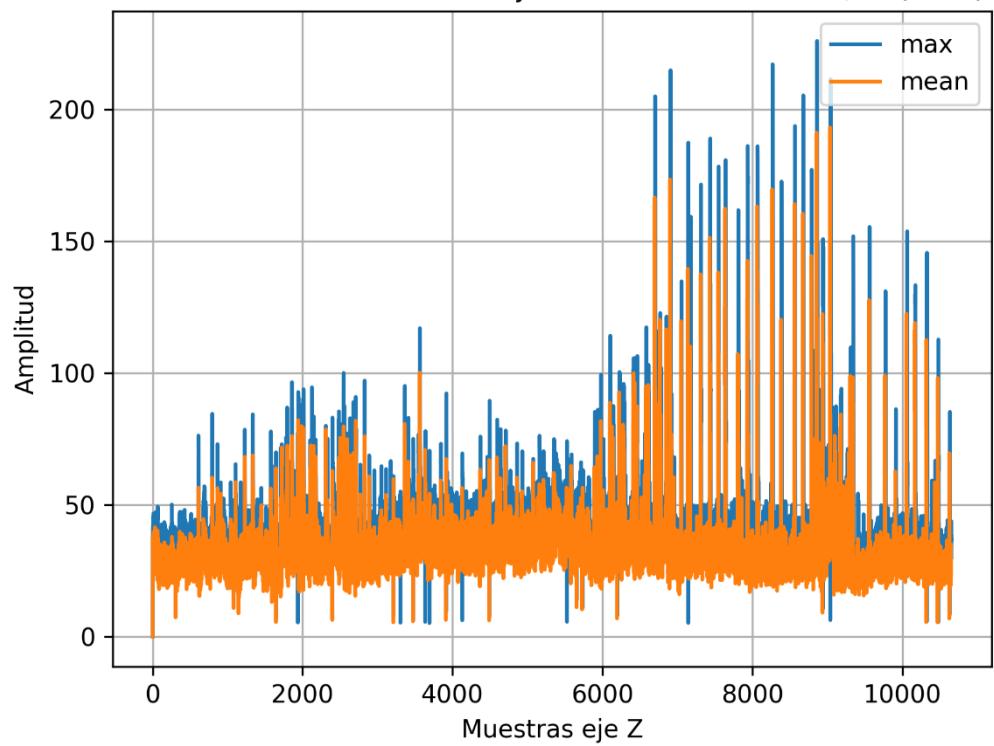


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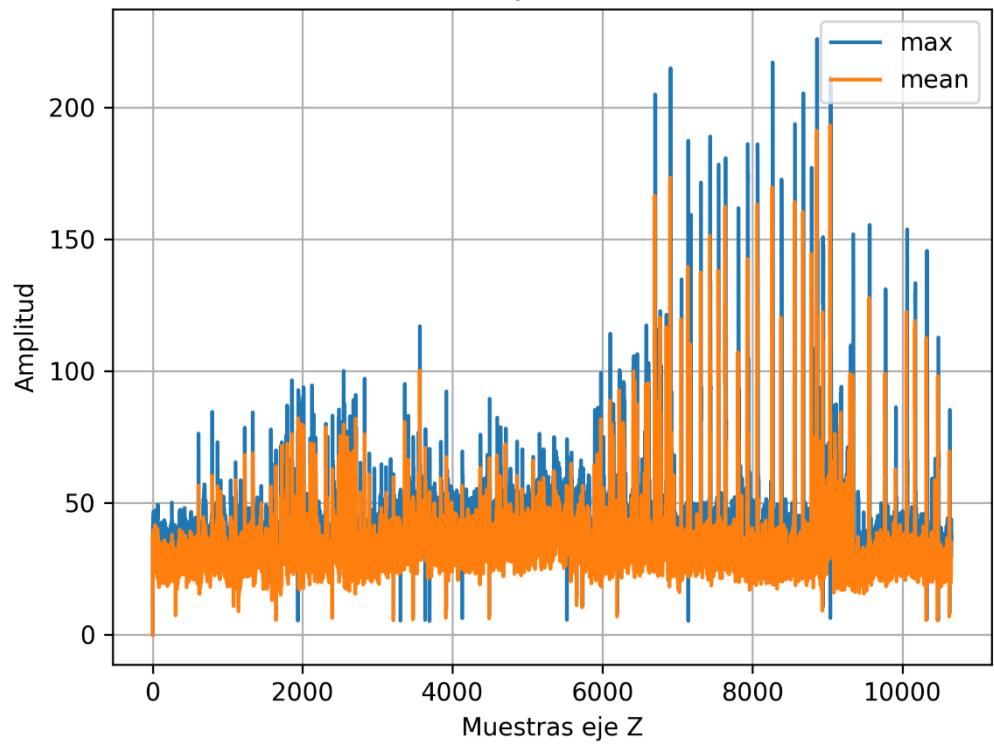
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Motor 2: 2X BPFO Armónico eje Z tomando maximo, +- (0.15)Hz

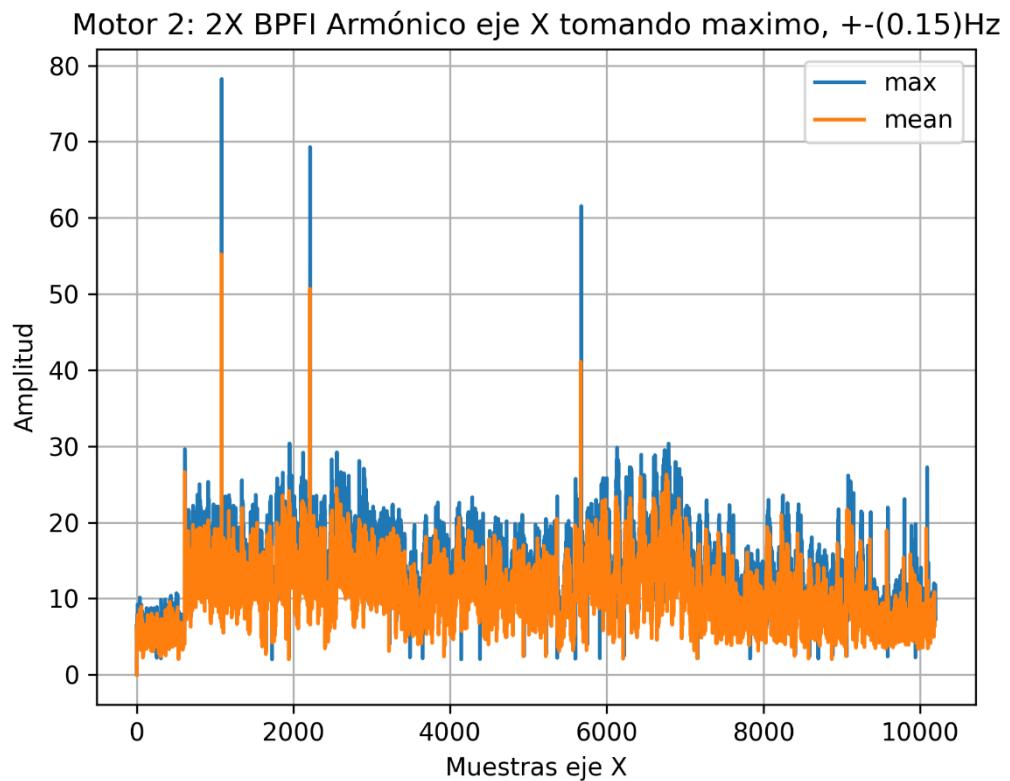
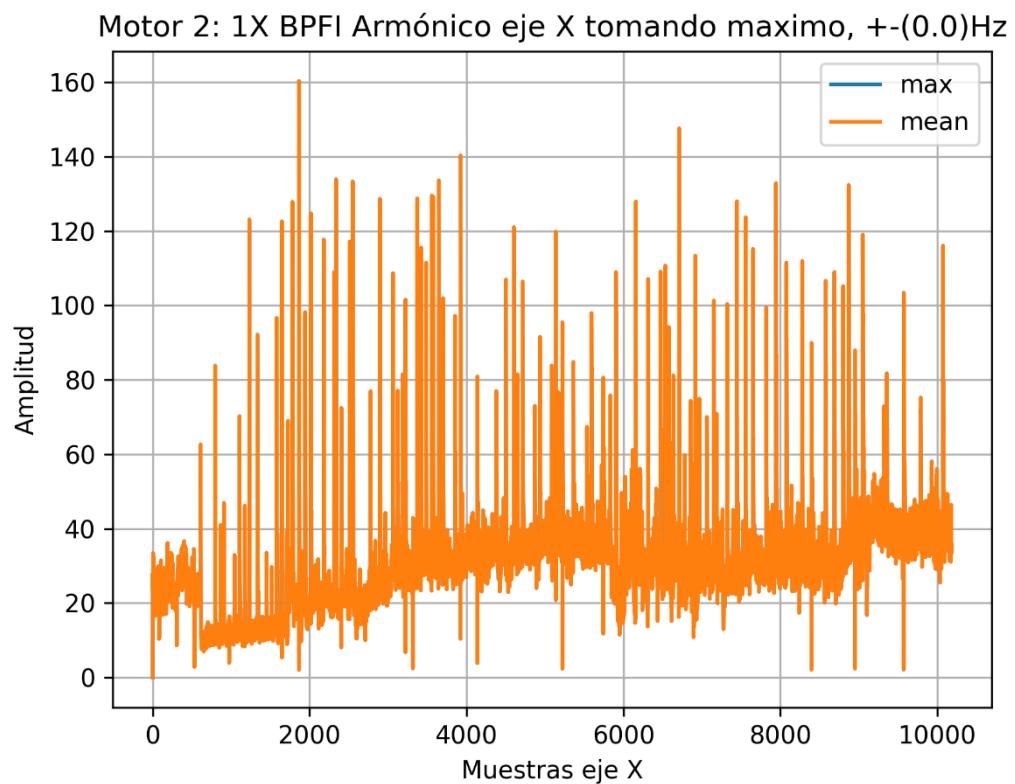


Motor 2: 3X BPFO Armónico eje Z tomando maximo, +- (0.15)Hz



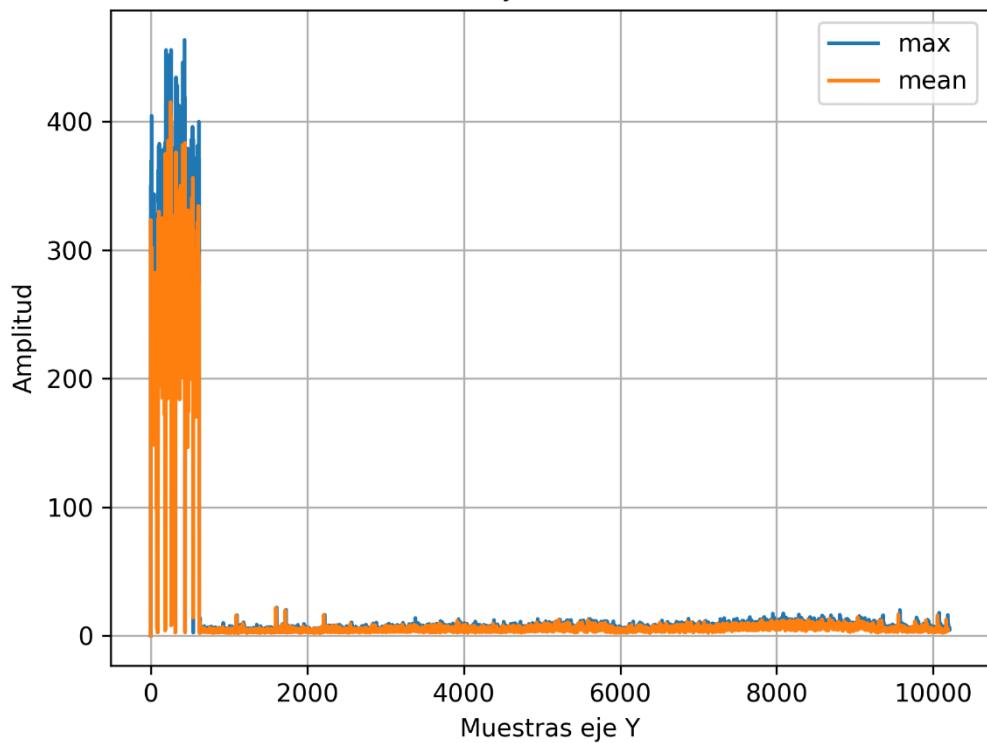
Fallo rodamientos: BPFI

Axe X:

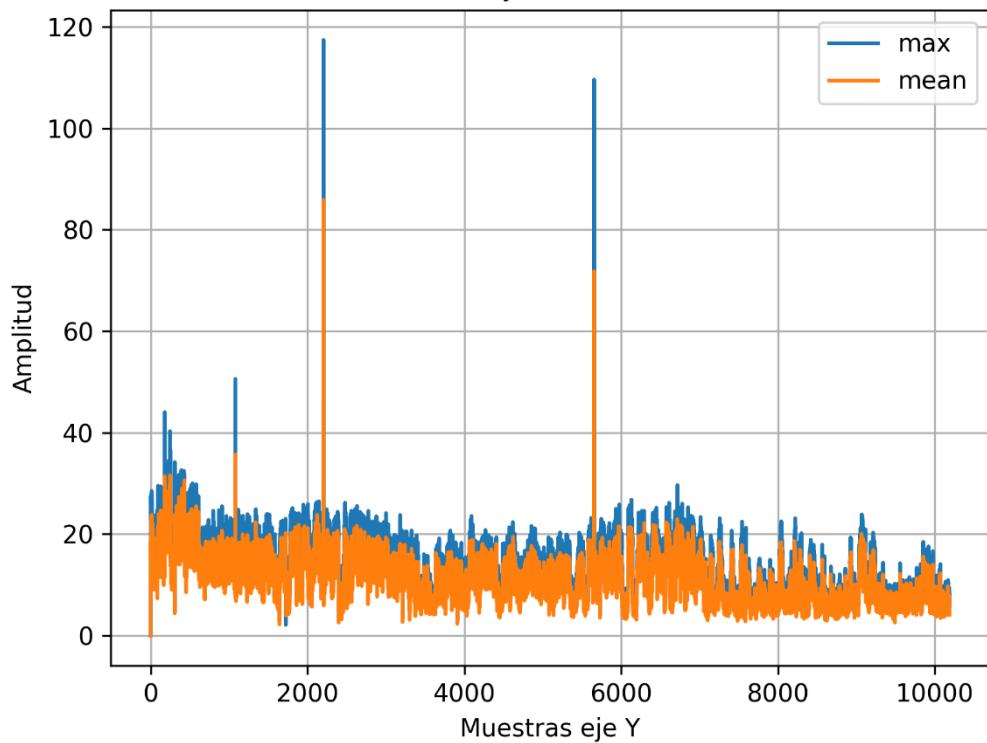


Axe Y:

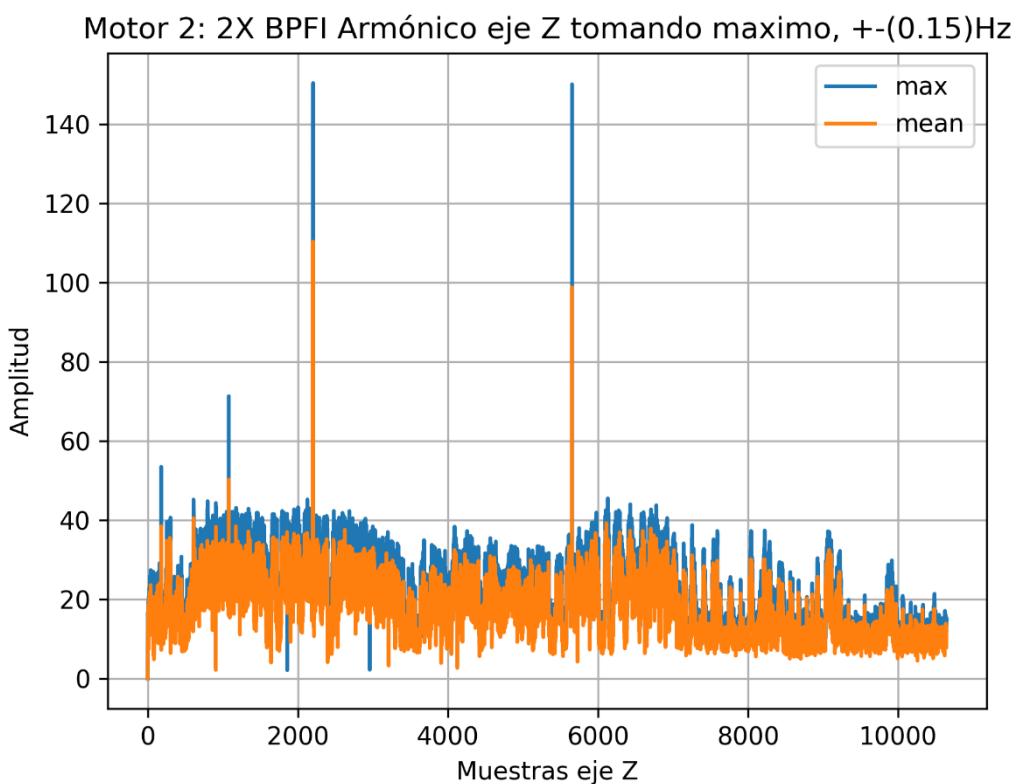
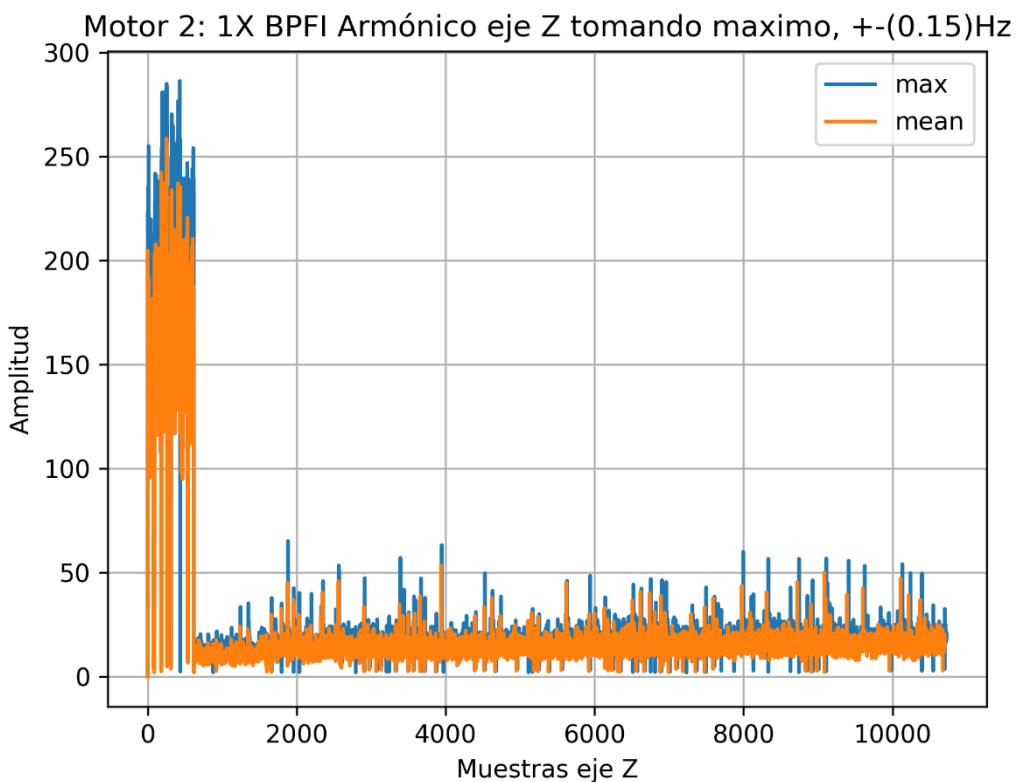
Motor 2:1X BPFI Armónico eje Y tomando maximo, +- (0.15)Hz



Motor 2:2X BPFI Armónico eje Y tomando maximo, +- (0.15)Hz

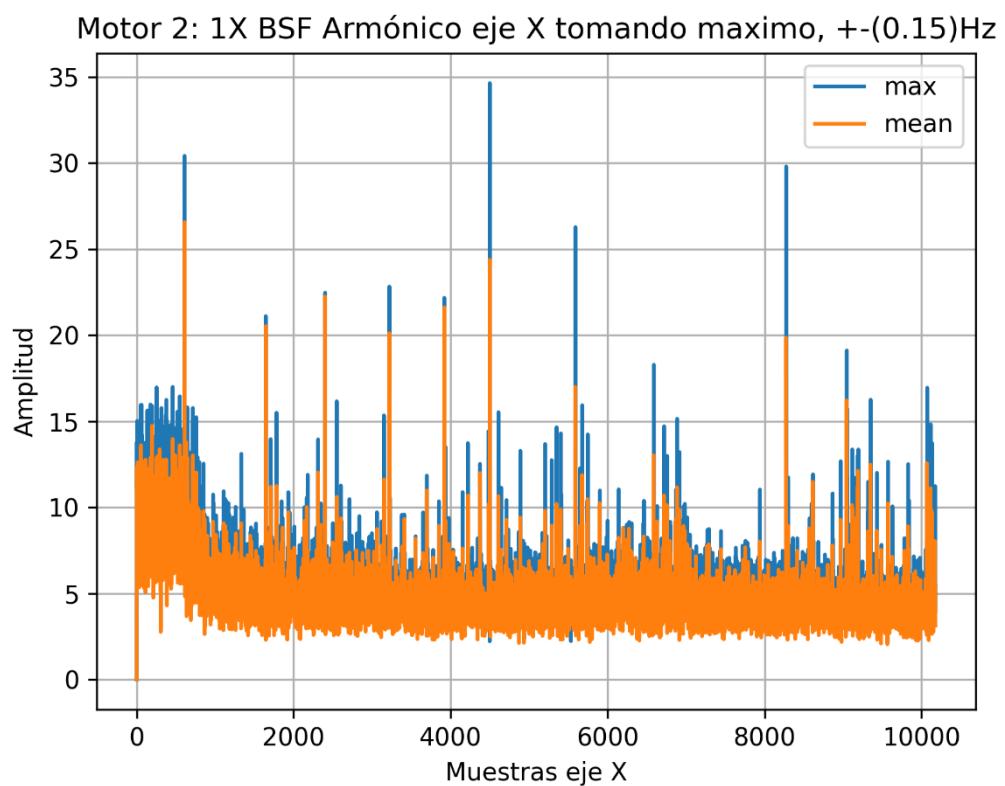


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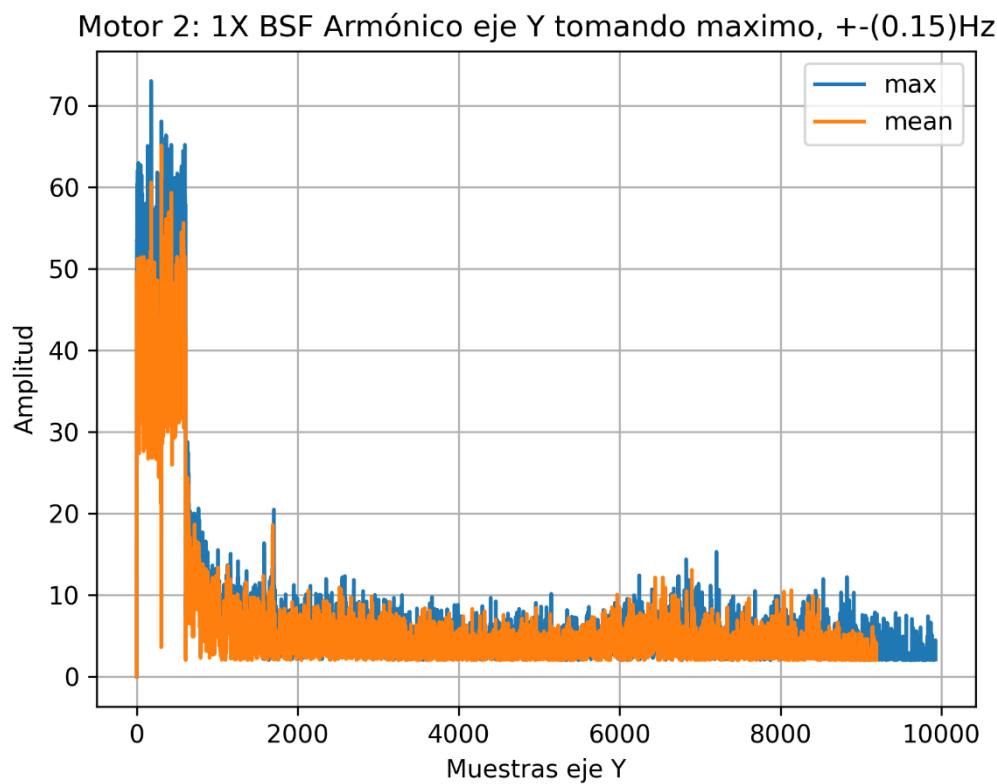


Fallo rodamientos: BSF

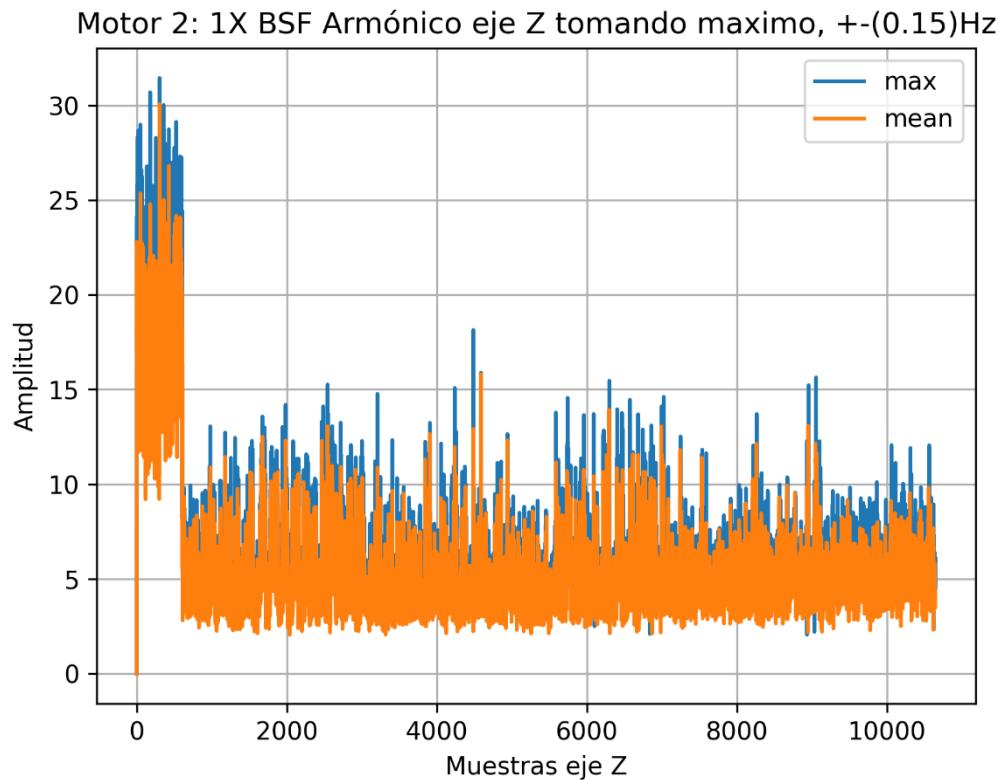
Axe X:



Axe Y:

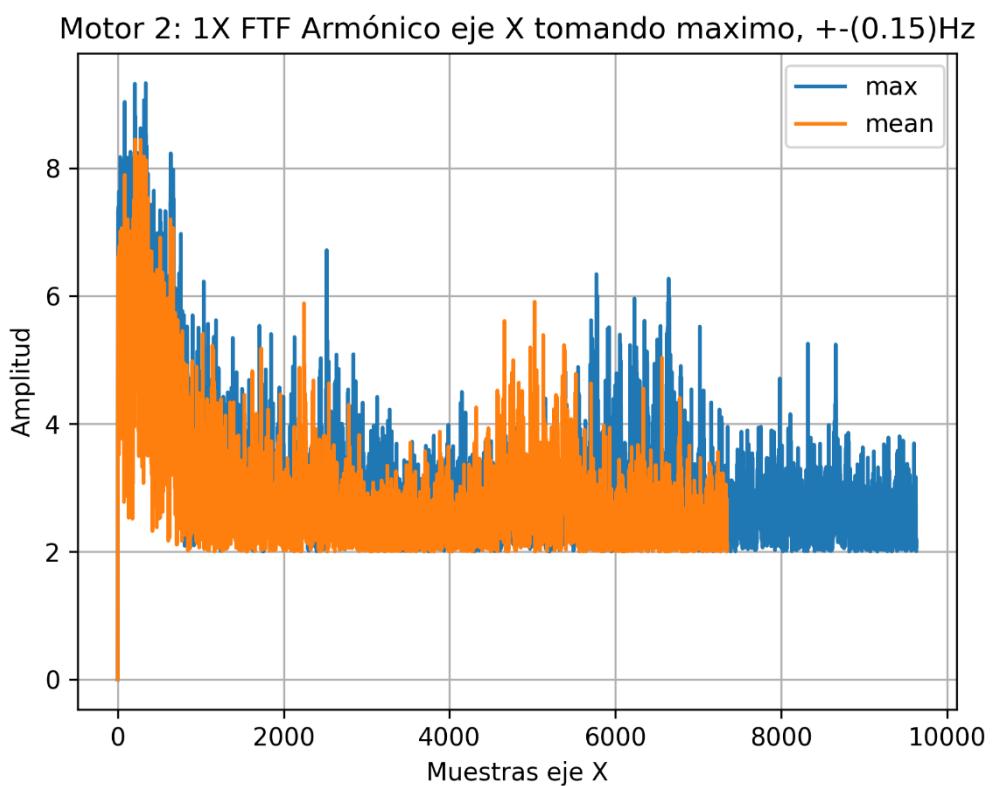


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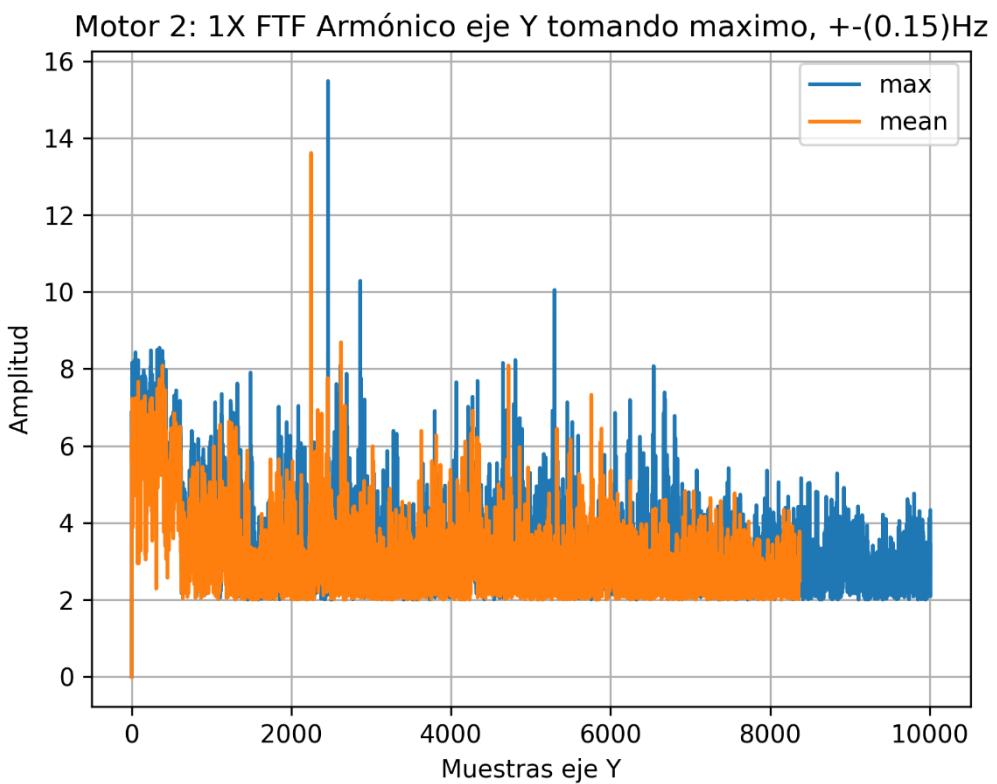


Fallo rodamientos: FTF

Axe X:



Axe Y:



Axe Z:

