**Sizing Active Harmonic Filter from Power Analyser Data**

The Graph below shows Harmonic Current Distortion in the form of %THDi. This is hovering between 20 and 25%. Ideally, it should be less than 10% and preferably less than 8% THDi.

![Graph showing Harmonic Current Distortion](image)

The highest value of average total harmonic distortion (%THDi) across three phases was calculated from raw data. This value is 24.19%THDi and was recorded at time shown.

![Timestamp showing 9/03/2016 12:08:00](image)

At the same time, average line current (Amps) across three phases was 516.83A.

**Analysis of Findings**

From data above, Highest Average %THDi = 24.19%

At the same time, Average $I_{RMS}$ across three phases was 516.83A.

Taking $X$ to be = fundamental frequency current

$$I_{RMS} = \sqrt{1^2 + 0.2419^2} \times x = 516.83A$$

$$1.02884 \times x = 516.83$$

$$x = \frac{516.83}{1.02884} = 502.34A$$
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Calculate harmonic current

\[ I_{\text{RMS}} = \sqrt{502.34^2 + \text{Harmonic Current}^2} = 516.83\text{A} \]

\[ 502.34^2 + \text{Harmonic Current}^2 = 267113 \]

\[ \text{Harmonic Current}^2 = 267113 - 252345 = 14767.8 \]

Thus Harmonic current = 121.52A

If %THDi = 8% (An appropriate value to satisfy electrical supply utilities)

\[ I_{\text{RMS}} = \sqrt{502.34^2 + (0.08 \times 502.34)^2} \]

\[ = \sqrt{252345 + 1615} \]

\[ = 503.94\text{A} \]

\[ I_{\text{RMS}} = \sqrt{502.34^2 + \text{Harmonic Current}^2} = 503.94\text{A} \]

\[ 502.34^2 + \text{Harmonic Current}^2 = 253955.5 \]

\[ \text{Harmonic Current}^2 = 253955.5 - 252345.5 = 1610 \]

Thus Harmonic current = 40.125A

THUS – To reduce %THDi at Incomer from 24.91% to 8% requires 81.4A of harmonic filtering (121.52-40.125). Schneider Electric PCS+ Active Harmonic filters come in sizes of 60A, 120A, 200A and 300A. To reduce %THDi to a level of 8% would require a 120A filter.

Check performance when filter installed.