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ANALYSIS OF HARMONICS AND DELTA T RELATIONSHIP AT THE TEMPERATURE SETTING FOR AIR CONDITIONER A THREE PHASE VRV TYPE RESULTING EQUATION USINGS A SIMPLE LINEAR REGRESSION LINES

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ABSTRACT
Based on the analysis of the study on which the total harmonics distortion results from three-fasa type vrv, thd maximum 68.56%, 48%, and an 18.52%, 8.98%, ihd maximum by 9.26%, tkdd by 12.92% and thdf by 0.68%. Where the volume of room w 19.6 m i 15 m m, h 4.5M, totaling 1,310 m², i 10 and e 16. Air conditioning capacity measures up to 125,000 btu /h(14 pk) and 13.3 k.w. The company's net profit in the first half of 2007 rose to rp32.3A trillion from the same period a year earlier. It could be suggested (derating) new air conditioning capacity based on the highest thd. The planned ac capacity was 89,446 btu /h(9.9 pk) and 9.6 k.w. The estimated capacity of ac is increased and the projected capacity by 35% and 3.14%. As for the relationship anthd (totalharmonicdistortion) and distortion, where the two variables can get a linear parallel of the correlation (kasaul) both variables so as to get a € error or random error through a simple linear regression line scheme has an average value. Y = 22,449 + 0. 87x. The increased use of ac would therefore need to limit the setting temperature of ac 21 measures -24 centimeters Celsius as well as the reliability of the harmonisa system measures on the industrial load with a € error not exceeding 1.

Keywords: variable THD and ΔT parent, linear regression

INTRODUCTION

Harmonisa isa frequent malfunction of the electrical system asa result of distortion of the current and voltage, resulting in a worsening of the waves at a basic frequency. Fundamental represents the resulting harmonisa at frequencies with bizarre multiples and multiples. The source of harmonisa comes from non-linear charges with non-linear imfinancing not constants so the electrical current generated is not directly proportional to the voltage. The conditioner conditioner used by the people industry is the compresvrv conditioner (variables of volume) for smoothing the volume on cold blood in a room with a refrigerant system system with fluctuating characteristics furnished with prossesing technology units to serve in an outdoor unit to more than two indoor. As for the cost-efficient use of electrical energy. Temperature goes to the main part of performance on air-conditioner. The indoor temperature Settings really affect external temperature. But parameters are used in the process of acquisition of data and changing the quantity of temperature obtained from nature analog and into a quantity processed through a digital measuring instrument for access to temperature results So it's a zero-factor factor factor factor setting limit. The electricity burden on the air-conditioner in its industry continues to increase and the cost of the electricity used will increase. Need to anticipate the interference and loss of existing electrical power, It can guide the temperature Settings on air-conditioned water. three-fasa type VRV conditions that have been determined on the manual book acid. as for external temperature differences with the interior temperature Settings, it can link random error with the total harmonic distortion (THD) to form a random error or (error) in the statistic line to form one match using a simple linear regression line. Where a euro error would answer a false level at the time of measuring on a common electrical system. Hence, the study contained a combination of previous methods. So, asa combination of the two total harmonic distortion (THD) and differences of temperature can also get additional options to set the conditions for conditions on air-conditioner, then the result between THD and conditioned will make a better model of the

electricity grid system to weight with standards, quality and reliable. The static content of the harmonic is generated by a nonlinear load of power systems produced by eloxtronic equipment and produced a semiconductor component like an inverter. Speed regulator (adjustable-speed driver) is used on heating. Heating vents, air conditioning, and elevators and electronic equipment and industry engines, converters on three fasa power (threephase power converters) correspond to a composed saturation device. The heat of the wire installment, the effect of wire wire losses through electric current, which are larger, and higher resistance to copper, the frequency generated is higher ata doubling of the base frequency because of harmonies on electrical appliances.

METHOD/DESIGN RESEARCH

2.1 harmonic criteria

There are two criteria used to evaluate harmonic distortion with standards and harmonic currents and stresses, determined by isc/il ratios. Isc is a short connecting current on PCC (point of common coupling) and il is a fundamental load current. Standard used from (ieee STD. 519-1992ieee-519) on electrical equipment.

Table 2.1 on the distortion harmonisa voltage
Source : (IEE STD-519-1992, IEEE-51)

Bus Voltage at PCC	IHDy (%)	THDy (%)
69 kV and below	3,0	5,0
69.001 kV through	1,5	2,5
161 Kv	1,0	1,5

For 69 kv's harmonic capacity, a minimum 3.0% on balance, a total of harmonies (5.0%, a capacity of 69,001 kv through harmonic distortion 2.5% and 161 kv capacity, the balance of harmonic distortion 1.0%

Table 2.2 limit on the distortion of the current

Isc/IL	n<11	11<n<17	17<n<23	23<n<35	35>n	TDD
<20	4,0	2,0	1,5	9,6	0,3	5,0
20<50	7,0	3,5	2,5	1,0	0,5	8,0
50<100	10,0	4,5	4,0	1,5	0,7	12,0
100<1000	12,0	5,5	5,0	2,0	1,0	15,0
>1000	15,0	7,0	6,0	2,5	1,4	20,0

Based on a chart above minimum and maximum value on harmonisa individually in an odd order from 1.4% - 20% standard by ieee-519 maximum odd-harmonics current distortion (%). The value subtansil in harmonisa corresponds to % by electricity conductor and Max distartion (total deman distartion) through a maximum stream rate of 5% - 20 % where the value is applied to six levels of motor movement in conditioner (ac) three levels of VRV variable variable volume.

The total harmonic distortion tegngan and the total harmonic distortion stream are equations:

$$THDv = \sqrt{\sum_{h=2}^{\infty}[\frac{(Vh)2}{Vh}]} \quad (1)$$

$$THDi = \sqrt{\sum_{h=2}^{\infty}[\frac{(Ih)2}{Ih}]} \quad (2)$$

$$\frac{Vh}{V1} \; and \; \frac{Ih}{I1} \quad (3)$$

The process of relays governing a power system with fixed conditions with fixed conditions with unsubstantiated currents across inaccurately distances and time, would be fueled by harmonisa. By going

through the number individually. Thus producing a clear sine stream the relationship between THD and ihd is known in the following equations:

$$THD = (IHD2^2 + IHD3^2 + IHD4^2 + \ldots IHD^2) \quad (4)$$

To evaluate the harmonic through a PCC brief interface with a fundamental load anchored by the isc/il ratio. Isc and il are undertow.

Individual harmonic distortion (ihd) isa comparison between nili RMS from harmonisa individual and the value of the RMS from the fundamental ihd formula as follows:

$$IHD = \sqrt{\left(\frac{Isn}{Is1}\right)^2} \text{ x } 100\ \% \quad (5)$$

As a result of a distortion of the value of the LPG (individual harmonisa distortion) as for the RMS value of the individual on the RMS of the fundamental value of LSX and current on the order of the h formula as follows:

$$\frac{Vh}{V1}\ x\ 100\ \%\ dan\ \frac{Ih}{I1}\ x\ 100\ \% \quad (6)$$

To know the value of TDD can be defined through the equations that this.

$$TDD = \frac{\sqrt{\sum_{h=2}^{hmax} I_h^2}}{Il}\ x\ 100\ \% \quad (7)$$

$$IL = \frac{kW}{PF\ \sqrt{3kV}}\ A \quad (8)$$

To find out that the isc briefly links three phasons to the PCC, it is determined by the following equations:

$$Isc = \frac{1000\ x\ MVA}{\sqrt{3kV}}\ A \quad (9)$$

Where the mva and kv represent a short three-fasa capacity with the megavolt amper value on the line to line PCC voltage. The cost of transformer power resulting from harmonisa where load loss (PLL) of transformers in per unit will be defined by the following equations:

$$P_{LL} = \sum I_h^2 + \left(\sum I_{h\ x\ h^2}^2\right).P_{EC-R\ (P.U)} \quad (10)$$

THDF value is determined to use the following formula:

$$THDF = \frac{1.414\ x\ (\ momentarily\ current\ rms\ )}{(\ peak\ current\ fasa\ momenntarily\ )}\ x\ 100\ \% \quad (11)$$

2.2 Outdoor and indoor temperatures

Improved temperature measurement one of the researchers could take an outdoor temperature data and in a room using an electronic analogck (taffware clock/ temperature htc-2), which would provide an in-depth depth of temperature in the building while an external temperature and time and humidity (rh %). For a rate of measurement taken at 7 hours per day, the data taken from August 25 to 28, 2020. The results of temperature measurements would determine temperature scores can be calculated through these equations.

$$\Delta T = T1 - T2 \quad (12)$$

2.3 THD relationship and affint

Relationships (THD) and inequality, both variables based on functional connections or causal /sebap resulting from a correlation between variables and variables of variables can produce a linear parallel through simple linear regression scheme. Be known through the grimy grimy schematic of the two variables produced a €or random error linked to the following equations:

$$\bar{y} = \alpha + bx \quad (13)$$

To determine a €error where the regression line is at least square between a and b or THD and anonymt produced a minimum error using the following mathematical formula:

$$€ = y - \hat{y} \quad (14)$$

The fine regression line USES the smallest number of squares (least square).

$$SSE = \sum €^2 = \sum (y - \hat{y})^2 \quad (15)$$

Ss = sum of square; Y 'know and x minus equals average

So the value a and b with the value of the value (x) and the average value on both variables between THD and phratt through the following formula:

$$\alpha = \frac{(\sum Y_i)(\sum X_i^2) - (\sum X_i)\left(\sum X_{i\,Y_i}\right)}{n\sum {X_1}^2 - (\sum X_i)^2} \quad (16)$$

$$b = \frac{\sum X_i\ Y_i - (\sum X_i)(\sum Y_i)}{n\sum X_1^2 - (\sum X_i)^2} \quad (17)$$

Here is a diagram of the flow of research:

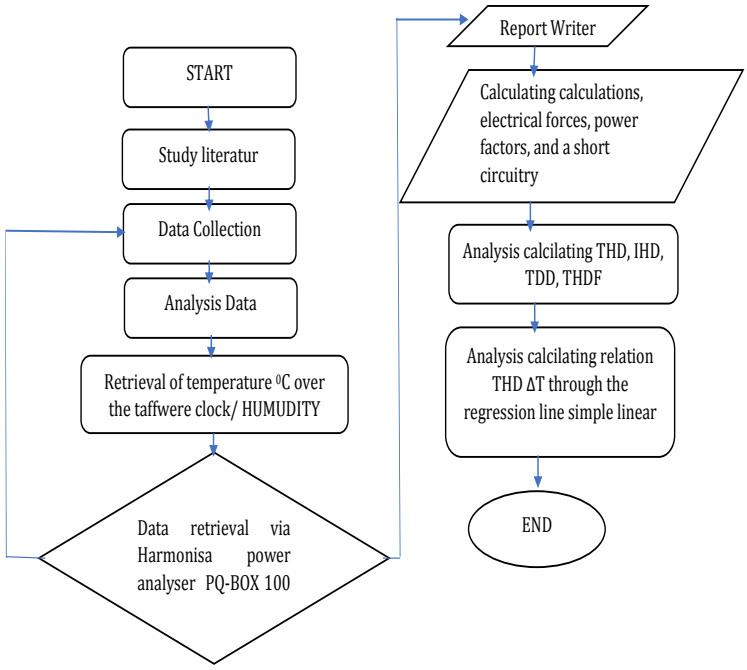

Figure 1. Study channel diagram

RESULTS AND DISCUSSIONS

3.1 schematic of results

Table 1. It explains the date, the clock of external and indoor testing, and the current and tension weighed down by air-conditioner the three VRV types (variable refigerant volume) of the industry.

Table 1. Air-conditioner conditioner on.

Tanggal	Jam	Temperatur		Delta	Arus	Tegangan
		Luar ℃	Dalam ℃	(T)	Ampere	Volt
29-Aug-20	6,00	22,3	21,1	1,2	21,10	396
	8,00	24,1	23,1	1,0	22,30	398
	10,00	25,1	24	1,1	23,52	397
	12,00	27,8	25,2	2,6	23,02	388
	14,00	30,3	27,4	2,9	23,50	388
	16,00	29,9	26,6	3,3	20,94	395
30-Aug-20	6,00	21,3	18,6	2,7	19,58	375
	8,00	24,6	20,2	4,4	17,78	392
	10,00	29,8	25,2	4,6	20,63	386

	12,00	31,8	27,5	4,3	20,94	397
	14,00	28,4	24,7	3,7	24,31	399
	16,00	26,2	22,9	3,3	24,14	395
31-Aug-20	6,00	24,2	22,1	2,1	14,19	388
	8,00	28,2	26,7	1,5	11,84	386
	10,00	30,2	28,2	2	10,84	397
	12,00	34,5	29,2	5,3	18,36	396
	14,00	34,7	29,7	5	15,62	389
	16,00	29,4	27,9	1,5	14,61	386
1-Sep-20	6,00	23,4	22,9	0,5	14,10	388
	8,00	26,7	24,5	2,2	10,84	388
	10,00	35,1	31,9	3,2	20,63	397
	12,00	34,6	29,2	5,4	18,50	396
	14,00	33,8	28,5	5,3	15,62	389
	16,00	33,3	28,1	5,2	14,61	386

Table 1. Above description the results of the measurement of the outdoor temperature meters and in the room the condition of the air-conditioned conditions on, measuring has been used to test for a hypothesis whether or not the impact of the temperature on the air-conditioner conditioner performance of the three indoor VRV types. The result of the rise above the highest reting of outdoor temperatures is an average of 30.2 levels Celsius - 35.1 levels Celsius and in a high room of 29.7 centimeters Celsius The highest elevation was 5.4k and 0.5k lows, 24.30 amps high, 399 volts and a low of 14.1 amps.

Table 2. The THD spectrum

Jam	Temperatur		Setting suhu	Delta	THDV	THDI	Arus	Tegangan
	Luar ℃	Dalam ℃	℃	(T)	%	%	Ampere	Volt
6,00	22,3	21,1	18	1,2	2,99	18,52	21,10	396
8,00	24,1	23,1	19	1,0	3,0	19,4	22,30	398
10,00	25,1	24	20	1,1	2,89	19,89	23,52	397
12,00	27,8	25,2	21	2,6	2,96	20,55	23,02	388
14,00	30,3	27,4	22	2,9	2,98	20,35	23,50	388
16,00	29,9	26,6	23	3,3	2,99	20,75	20,94	395
18,00	21,3	18,6	24	2,7	2,91	20,71	19,58	375
20,00	24,6	20,2	25	4,4	2,99	20,84	17,78	392
22,00	29,8	25,2	26	4,6	2,91	20,41	20,63	386
0,00	31,8	27,5	27	4,3	2,53	68,52	20,94	397
0.2,00	28,4	24,7	28	3,7	2,56	69,33	24,31	399
0.5,00	26,2	22,9	29	3,3	2,6	71,03	24,14	395
0.7,00	24,2	22,1	30	2,1	2,68	71,48	14,19	388

Table 2. Rather than clarify the temperature parameters, delta,THDV, thdi, air-conditioner conditions on, and temperature Settings 18 centigrade Celsius. Where the highest external temperatures were expected to be at 11.8 percent Celsius, with a minimum of 21.3 fixed Celsius and a maximum of 27.5 fixed Celsius at a minimum of 20.2 fixed Celsius, a maximum of 4.6k and lowest 1.0k. As for harmonic distortion, a maximum voltage of 3.0% at a minimum of 2.53% and a total of harmonic distortion of a maximum current of 71.48%

at a minimum of 18.52%. The highest level of current electricity is 24.31 a (amps) minimum minimum for 14.19 a (amps), average voltage 386 volt-399 volts.

3.2 Simple linear regression line

A simple linear regression line called regression equation. The model of the regression line is a mathematical equation that may allow in the form of fortune-telling of the nila which is defined as a deboard variable which is one or more called a free variable. As for the study of influence of 1 free variable the variable is pronounced regression simple, if there are 2 or more free variables or multiple regressions. If otherwise independent variables. Then y = a + bx. Where y = dependent varabel, x = independent variable.

Table 3. Determining gari regression (least square)

THD %	18,5	19,4	19,8	20,5	20,3	20,7	20,7	20,8	20,4
ΔT	1,2	0,1	1,1	2,6	2,9	3,3	2,7	4,4	4,6

Table 3. Above explain the meter constants in both variables called THD variables and independent variables. The two constants of approximately 18.5% and a high of 20.8% and a corresponding low of 0.1k and 4.6k. So the two variables have a correlation of the shape of an equation through a simple linear regression line.

Regression and aligning relationships

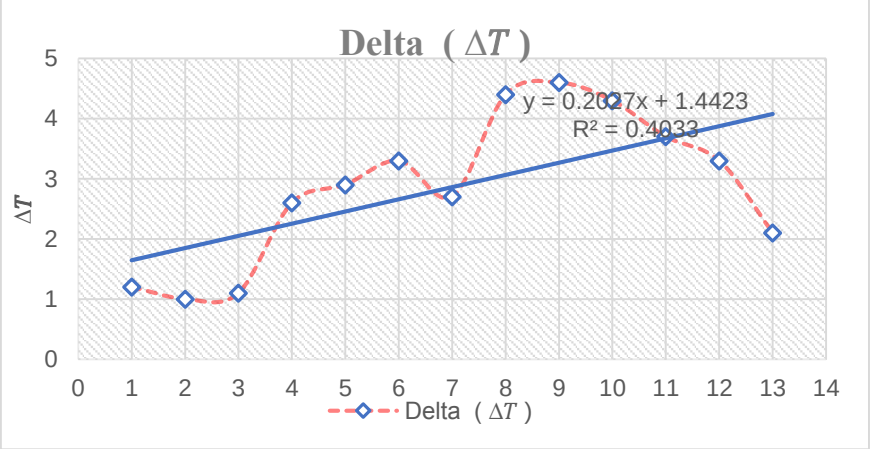

Figure 2. Linear and linear rgresi lines

A delta link with linear lines can form into a linear regression equation and provide a satellite link by forming the bottom line of y = 0.2027 x + 1.4423 and r boils = 0.4033.

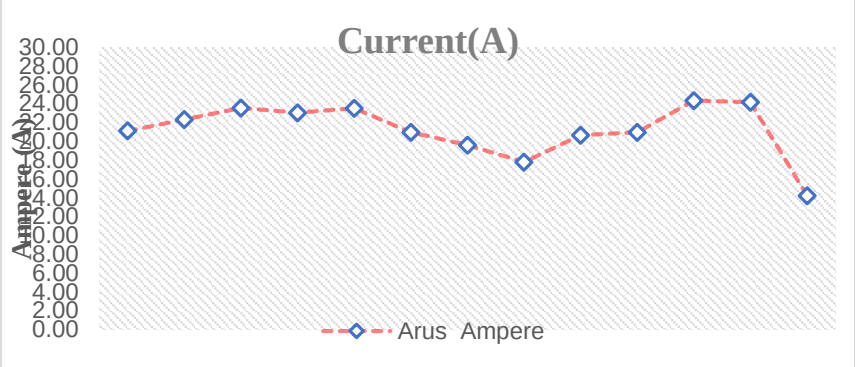

Figure 3. Form the current wave.

Current charts generated at the time are weighed down by variable 3 FRV (variable refigerant volume). Where a high current of 24.31a (amps) and a low of 14.19a (amps).

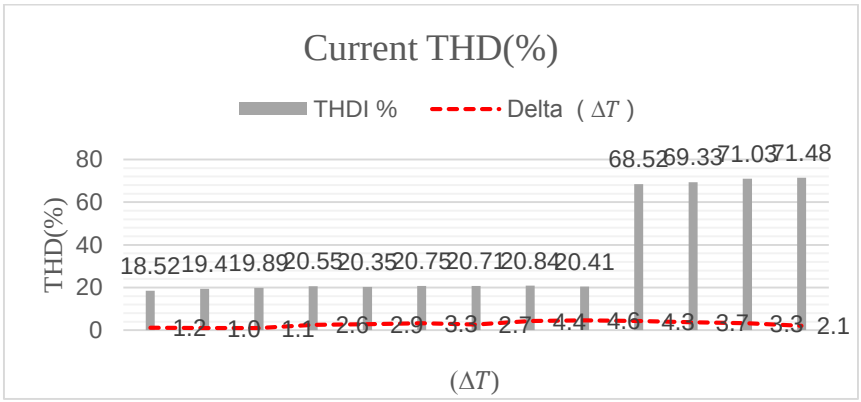

Figure 4. THD chart and citt links

Measuring on the total harmonic distortion of the delta. The distortion of a total of 18.52% and a height of 20.41%, an equivalent of 1.0 seckon and a height of 4.6 seckon. If the balance of the harmonic distortion exceeds 68.52% and 71.48% higher, 2.1 seckon anda height of 4.3 seckon.

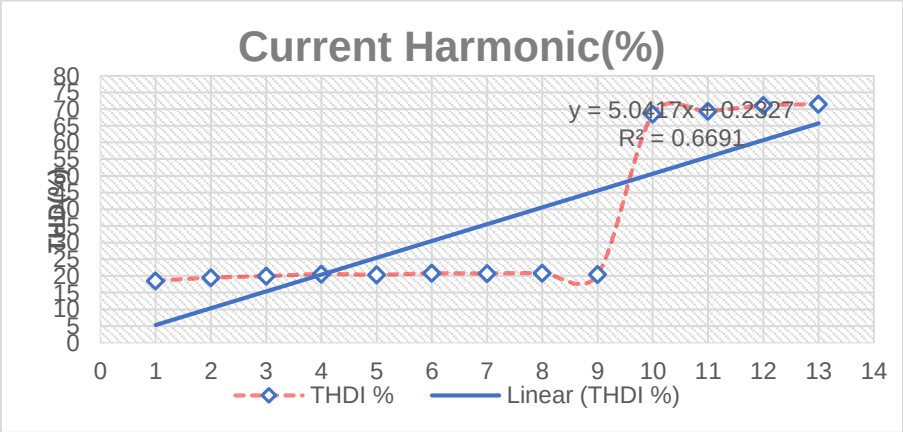

Figure 5. THD connection and the regression line

A total alignment of harmonisa distortion (THD) of the rank regression line and low content of harmonisa if connected with the linear regression line, the harmonic wave is generated. Forms a parabolic equation, with a harmonisa wave form an open line up that is y = 5,044 + 0.2327 and r 6691.

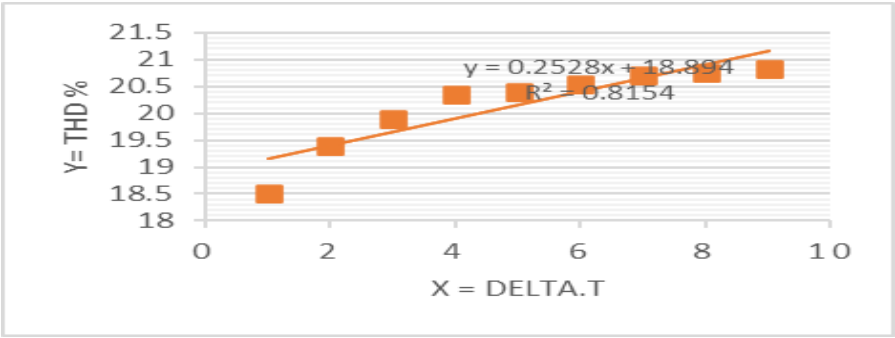

Image 6. The chart of regression line equations

The chart of a simple linear regression line connected between the y (THD) axis and x (sustained t) may be called regression equations, in which y (THD) is called variable and x (advanced t) and the regression line stated y = 0.2528x + 1894 and r damages = 0.8154.

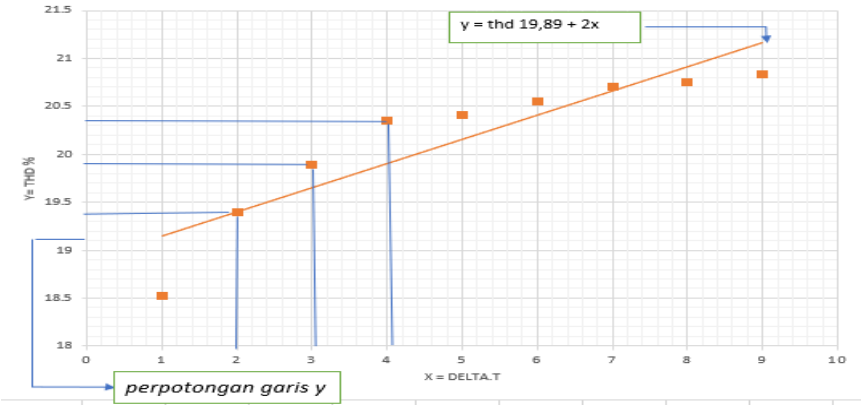

Figure 7. Regression line 2 vaiabel THD and Δ t

Figure 7 above describes the chart for a relationship between y = THD and x = creates a 23 percent lower harmonic high by 25.5%, x represents delta coephesian DNA from 10-10. To generate a THD link with sustained t through a simple linear regression line on both variables. A simple linear regression line of y = THD by 19.89 + 2 x is assumed that the regression line on the y axis with a 19.89% content and intersect with an x axis with a coefficient of 2k. So the population parameters for relationships x and y or finite and THD where compounds equals $\hat{Y} = \alpha + bx + Є$ compounds for a and b are the estimated value. Regression analysis data using a flexible data that produces random error or called error gelad (Є).

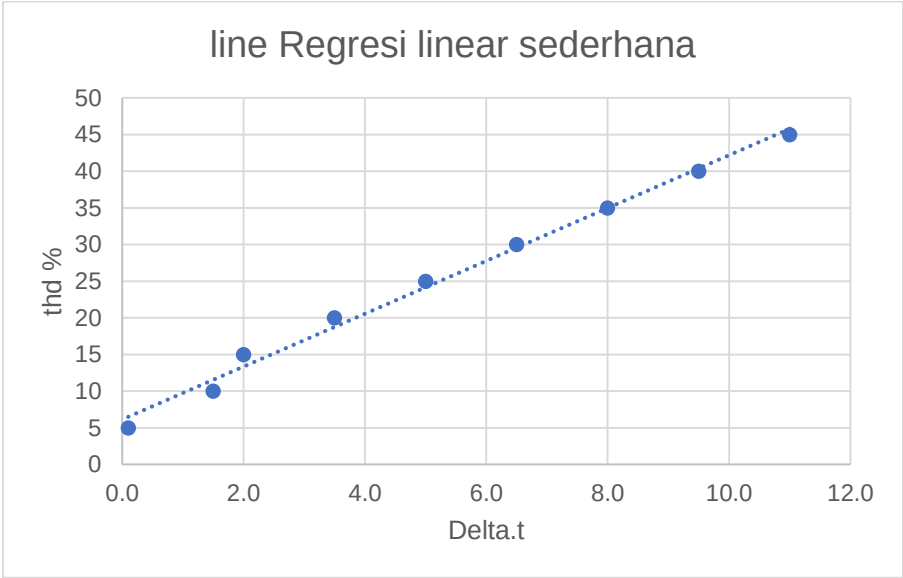

Figure 8. A simple linear regression line graph

Simple linear regression line graph, where the y axis is stated to be modified. To determine the correct regression line when used with the least square method or the smallest amount of cavalry. In the research this generated a line of least square with THD and error represents the number of minimum errors which is THD 6% and sustained t with a coefficient 0.1k.

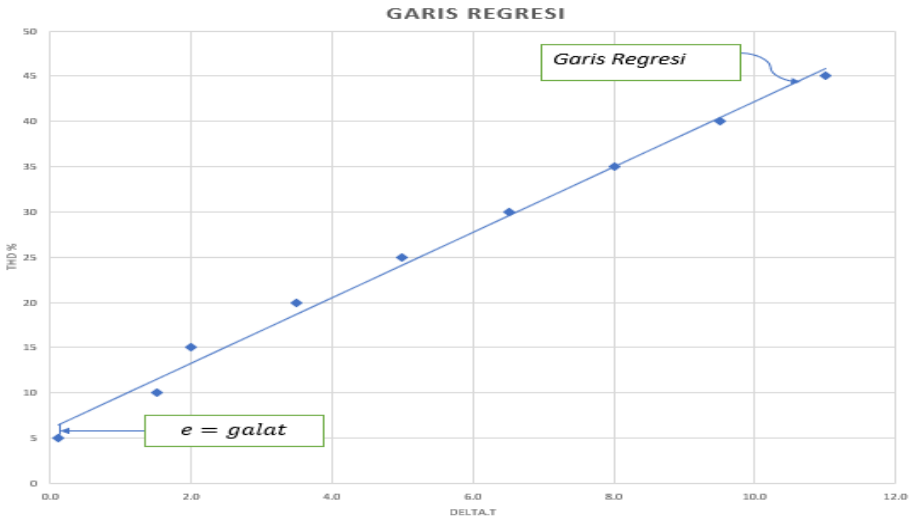

Figure 9. Chart of regression line relationship and error

A simple linear regression line graph of THD and lacert links. Where a €error discrete between the regression line with THD and error t, a €error or random error where the lowest THD was 0% to 50% the value of the minimum error. Assembled on the images above the lowest 0.0k to 12k is also called as a nilia coefficient corasi acclaimed r signature. To be able to determine the value of random error or €error. Through simple linear regression analysis calculations.

3.3 ANALYZE THD, THDI AND THDV

Analysis of the THD (total harmonic distortion) and TDD (total deman distori) on air-conditioner conditioner three-fasa type VRV. As follows:

THD = (IHD2 + IHD3 + IHD4……IHD)^2

= (39.73 + 40.52 + 51.22)^2
= (131,470)

So the value of the individual harmonic stream is weighed down by conditioner three types of VRV, harmonisa content at 131.470%. For a thdi count (total harmonisa distori current) on ac three-fasa VRV type as follows:

$$THDi = \sqrt{\sum_{h=2}^{\infty}[\frac{(Ih)2}{Ih}]} = \frac{131,470}{2,423} = 54,26\%$$

The results of the total harmonisa distortion of current (thdi) are weighed down by air-conditioner conditioner 3 fasa VRV types of 54.26%. Analysis of the THDV (total harmonic distortion voltage) and total demand distortion (TDD) is loaded with three fasa VRV types of water as berate:

THDV = (VHD2 + VHD3 + VHD4…….VHD)^2
= (2.65 + 2.59 + 2.68)^2
= (7.92)

$$THDv = \sqrt{\sum_{h=2}^{\infty}[\frac{(Vh)2}{Vh}]} \quad = \frac{7.92}{399} = 0.2\ \%$$

So the result isa THDV (a total harmonisa distortion of tension weighed down by air-conditioner conditioner 3 fasa VRV type 0.2%. Distortion (ihd) is harmonisa voltage and the next value stream as follows:

$\frac{Vh}{V1}\ x\ 100\ \%\ and\ \frac{Ih}{I1}\ x\ 100\ \%$
$= \frac{399}{415}\ x\ 100\ \% = 96\ and + \frac{131{,}470}{1.732}\ x\ 100\ \% = 7{,}59\ \%$

The results of the individual harmonisa voltage (vh) by = 96 % and the harmonic current (ih) by 7.59 %. For the total supdistortion (TDD), as follows:

$$= \frac{7{,}59^2}{2{,}423}\ x\ 100\% = \frac{313{,}25}{2{,}423} x\ 100\% = (\ 12{,}92\ \%\ )$$

So the results of the individual harmonisa are weighed down by three types of VRV, where harmonisa vh measures 96%, as well as 7.59% and TDD (total demand distortion) by 12.92%. The total electrical discharge on the harmonic distortion results by 71.48% according to harmonic testing data, there must be power losses used by calculations that this is.

S = 1.9 kVA
Average Cos Q = 0.8
$Load\ fase\ P\ = \frac{S.\ average\ CosQ}{\sqrt{3}} = \frac{1.9\ kVA\ x\ 0.8}{1.732} = 0{,}87\ kW$
P $Load\ three\ fase\ p = S\ x\ \ average\ CosQ\ = 3{,}93\ kVA\ x\ 0{,}8 = 1{,}52\ kW$

Total ities on water conditioner when turned on (on) in the room on the industry is: non-burden by 0.8 kw + losses due to harmonisa by 1.52 kw = 0.8 kw + 1.52 kw = 2.32 k.w. So total levels of electricity weighed down by air-conditioner conditioner three FRV types on an industry of 2.32 k.w. Derating on air-conditioner conditioner three types of VRV, where the total harmonic drive factor (THDF) sets the value of the new drive for btu /h air-conditioner and (new kw), derating calculations based on the size of 71.48%, can be defined by the following calculations:

$$THDF = \frac{1{,}414\ (\ \frac{1}{3}\ x\ (\ 1.311 + 1.306 + 1.254\ ))}{\frac{1}{3}\ x\ (\ 2.708 + 2.788 + 2.564\ )}\ x\ 100\ \%$$
$= 0.93\ \%$

Conditioner capacity attached 125,000 btu /h power 13.3 kw minus the new conditioner capacity btu /h or kw used.

= 13.3 kW – 10,98 kW = 2,32 kW
= 10,98 kW

Derating electrical power weighed down by air-conditioner conditioner three fasa VRV type forms % which is:

$$= \frac{10{,}98\ \ kW}{13{,}3\ kW}\ x\ 100\ \%$$
$= 82.5\ \%$

The condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition is based on the condition of the condition.

= 10,98 kW + 0,8 kW
= 11,78 kW

So, it needs to be designed for air-conditioned water, three-fasa types of VRV types to be installed in the industrial w 19.6 m, I 15.6 m, I 10 and e 16 should be 89.446 btu /h (9.9 of f) and 11.78 kw based on the analysis of the larger balance on the balance of harmonisa distori (THD) of 71.48%.

Step for counting accuracy a and b:

Step one, Counting test $\sum x$, $\sum y$, X, $\bar{y}$

y = α + bx
THD = 181.1 where the number $\bar{y} = \sum y/n$ = 181.1 / 9 = 20.1
ΔT = 22.9 where the number $\bar{x} = \sum x/n$ = 22.9 / 9 = 2.54

Step 2 counting, calcified $\sum xy$ dan $\sum x^2$
$\sum xy$ = 204 dan $\sum x^2$ = 524.4

Step 3 calculates SS_{xy} dan SS_{xx}
$SS_{xy} = \sum xy - \frac{(\sum x)(\sum y)}{n}$ = 204 - $\frac{(22.9)(181.1)}{9}$ = - 256,79
$SS_{xx} = \sum x^2 - \frac{\sum x)^2}{n}$ = 524.41 - $\frac{(22.9)^2}{9}$ = 466.1

Step 4 calculates the plate a and b
b = $\frac{SS_{XY}}{SS_{xx}} = \frac{-256.79}{466.1}$ = - 0,55 dan α = $\bar{y}$ - b$\bar{x}$ = 20.1- (- 0.55) (2.54) = 21.49
So that the regression model of the y reliability $\hat{y}$ = α + bx adalah $\hat{y}$ = 21.49 + (- 0.55x)

For grades added a and b is:
$\alpha = \frac{(204)(524.41) - (2.54)(22.9 \,.\, 20.1)}{9(524.41) - (2.54)^2}$
$= \frac{105.810.50}{4.713.238}$ = 22.449
$b = \frac{18(22.9 \,.\, 20.1) - (2.54)(20.1)}{18(524.41) - (2.54)^2}$
$= \frac{8.234.166}{9.432.928}$ = 0.87

So cycles of THD and durt have an average value of y = 22,449 + 0. 87x

CONCLUSION AND ADVICE

Based on the results of studies consistent with the title of the thesis, external and domestic conditions would have a range of difference with the highest reting rate of 5.0k lowest 1.4k, harmonisa tests weighed down by three fasa VRV types, a total ratio of harmonisa distori (THD) of 68. As for the electric power loss on which the 2-3a short circuitry was high and the 1.2a low, the total power surges caused by 2.32 k.w. The individual on the distortion (ihd) by 9.26% and the total supdistortion (TDD) by 12.92%. And it can be determined that the temperature Settings on water conditioner are ata minimum of 18 conditionals Celsius and a maximum of 21 stages Celsius - 25 centimeters Celsius in the industry. Because the total harmonic distortion factor (THDF) of 0.68%. 2.32 kw, and air-conditioner capacity, 35,554 btu /h (4), pk, industry. To cut back on the losses, it should be considered that the new ac capacity should be installed by 89.446 btu /h (9.9 of pec) and a 9.6 kw electricity stand. the estimated capacity of ac was 35% and 3.14%. Total harmonies and distortions (THD) and polyp are both variables that have a causal /sebap due to similarities with the coepage or correlation. As for the difference between the two variables of dependant and the independent variable through the simple linear regression line can be to determine a €error or random error, which results in a margin of error during the testing. Statistica with a 20.84%, an 18.52% low and a 4.6k low 0.1k. Then the euro error produced by 0.87. The vaiabel THD (ieds) cycle and advanced variables (independent) has an average value of y = 22,449 + 0.87x.

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