AMNYK INDIA

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Energy Saving Report for 4.0 TR AC Packaged unit – Godrej Industries, Ambarnath

1. Equipment : Daikin Make 4.0 TR AC Packaged Units x 2 No
2. Refrigerant : R 22
3. Data Logger Installation date : 22nd August 2016
4. Pre MAXR 100 installation data recording started on 22/08/16 (from 15.57 Hours) to 25/08/2016 (15.47 Hours
5. MAXR 100 installed on 25/08/2016 @ 16.00 Hours
6. From 25/08/16 to 08/08/16 (which is a mandatory clean up period, hence the data not taken in to consideration for calculating the energy savings as per the test protocol)
7. Post MAXR 100 installation data recorded from 09/09/16 to 13/08/16.

Note:

A. We have considered the data only during the AC units running on loads.
B. All the supporting data in excel sheets is enclosed for your ready reference

DATA LAOGGER INSTALLATION FOR RECORDING THE DATA

SUMMARY - PRE MAXR 100 INSTALATION DATA (22/8/16 TO 25/8/16)

S.No	Date	TRH	VLL	VLN	AMPS	Deg C		Total KWH	Kwh/Hr
						AMB	INSIDE		
1	22-08-2016	8.0	420.04	242.5747	8.580	30.00	22	36.59	4.5736
2	23-08-2016	23.8	418.68	241.734	8.579	30.00	22	109.00	4.5741
3	24-08-2016	16.0	418.98	241.902	8.559	31.40	22	73.78	4.6113
4	25-08-2016	15.7	420.31	242.673	8.686	31.00	22	75.05	4.7925
	Total	63.49						294.42	
	Average		419.2358	242.0702	8.601	30.6	22	4.637265711	

SUMMARY – POST MAXR100 INSTALLATION DATA (9/9/16 TO 13/9/16)

S.No	Date	TRH	VLL	VLN	AMPS	Deg C		Total KWH	Kwh/Hr
						AMB	INSIDE		
1	09-09-2016	23.83	422.567	243.974	8.558	36.0	22	107.983	4.530762
2	10-09-2016	23.83	421.256	243.224	8.521	35.4	22	108.700	4.560846
3	11-09-2016	23.83	423.276	244.383	5.744	35.4	22	70.629	2.963459
4	12-09-2016	23.83	421.396	243.306	7.401	35.4	22	95.700	4.01539
5	13-09-2016	11.83	420.502	242.772	7.856	33.4	22	46.190	3.903391
Total		107.17						429.202	
Average			421.625	243.432	7.720	35.1	22	4.005001563	

SUMMARY – PRE & POST MAXR100 INSTALLATION DATA COMPARISON

S.NO	PARAMETERS	PRE	POST
1	Total Running Hours	63.49	107.17
2	Total Energy Consumption in KWH	294.42	429.202
3	**Average Energy Consumption/ Hour in KWH**	**4.63727**	**4.00500**
4	**Average Ambient Temperature in Deg C**	**30.6**	**35.1**
5	Average inside room set Temperature	22	22
6	Average Voltage VLL	419.2	421.625
7	Average Voltage VLN	242.1	243.432
8	**Average current in Amps**	**8.601**	**7.72**

Conclusions	
Improvement in KWH consumption / hour	
Average energy Consumption / Hour in KWH without MAXR100	**4.637265711**
Average energy Consumption / Hour in KWH with MAXR100	**4.005001563**
Difference in KWH/ Hour	**0.632264148**
Energy savings with MAXR100 in %	**13.6344**
Improvement in Current in Amps	
Average current without MAXR100 in Amps	8.601
Average Current with MAXR100 in Amps	7.720
Difference in Amps	0.881
Improvement Current (Amps) %	**10.24**

IV) Actual Energy Savings Considering the change in average Ambient Temperatures post MAXR100 installation period.

- For calculating the actual savings we need to consider the change in ambient temperatures of pre data period with the post data period, which is 4.5 Deg C. Any increase in the ambient temperature will affect the energy consumption of the AC unit. Hence for calculating the actual savings we need to consider COP- Coefficient of Performance principle which is most commonly used method.

- COP- is the ratio of heat removed from a system to the energy required to remove the heat. The theoretical maximum is equal to the coldest temperatures of the refrigerant divided by the difference between its coldest and hottest temperatures are expressed in Kelvins. Even the perfect system decreases efficiency with increased outside temperatures, dropping about 2% per Deg C.

- Considering 4.5 Deg C increase in the ambient Temperatures for the post MAXR 100 installation period the energy consumption has increased by 9.0 % during the period.

Considering the above we have calculated the actual energy consumption during the post MAXR100 installation period.

- Total Energy consumption in KWH : 429.202 Kwh
- Increase in Energy consumption due to rise in ambient temperature in % : 9.0 %

- Actual Energy Consumption in KWH : (429.202 x 9.0)/100 = 38.6281 KWH

  429.202 – 38.6281 = 390.5739 kWh

- Actual average Energy Consumption / Hour on kWh : 390.5739/ 107.17 = 3.6444 kWh/Hour
- **Actual % of Energy Savings with MAXR100 : (4.6372 – 3.6444) = 0.9928 Kwh/ Hour**

  (0.9928/4.6372) x 100 = 21.4094 %