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Digital inverter compressor for cool storage system

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ABSTRACT

The digital inverter compressor allows the speed of the compressor to be controlled so that it starts slowly,then it increases it speed once the desired temperature is reached then it can slowdown to maintain the desired temperature rather than turning off completely,so 85% wear and tear,in a compressor, occurs at startup by starting up slowly,digital inverter experience less wear and tear at starting up.A regular compressor runs either on/off so this model of research start-up slow speed to be control means less electricity is used i.e. 20-40 % less is commonly quoted because they slow down rather than stop when the desired temperature is reached .there is less temperature variation inside the refrigeration with the advent of variable frequency drive,so a way to turn a compressor to be able to control its speed of the compressor according to a present logic speed to be put place using digital electronic to be able to implement a variable frequency drive AC from the supply it's controlled this than to variable frequency compressor which runs as per the frequency been supplied the compressor to be able to achieve by doing this is that the compressor has near-zero starting current it can runs at 50% power or 49% at any capacity so a desired digital control runs the compressor only at a certain power required thereby saving power

I. INTRODUCTION

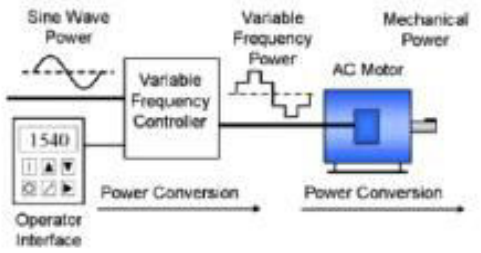
An inverter compressor is a gas compressor that is operated with an inverter in hematic type, scroll-type, or reciprocating type compressor this type of compressor uses a drive to control the compressor speed to modulate cooling capacity modulation in a way to match cooling capacity to cooling demand to application requirement.

modern cold storage and sophisticated cold chain warehouse have here lionized the process of food storage and seasoning which catalyzes the growth in seafood and other industries thanks to the thermodynamics cycles and chemical properties of refrigerant like ammonia and Freon,even after having many advantages,the industries are suffering from high cost due to installation,maintenance and effective monitoring of compressors system,which is the heart of refrigerator.Traditional on/off control of compressor results in poor temperature set points and affect the product compressor quality .the frequent startup of machine result in huge energy consumptions and affect the life of compressor .unpredictable compressor trips and maintenance duration affect the compressor standard which in turns affect the profit and business credibility .inefficient defrost affect the total cooling capacity of electric refrigeration system ,evaporator coils must be free of ice to minimize heat transfer .manual defrosting has many disadvantages improper start-up and integration of usually fans like oil ,cooling water evaporator fans heat

exchanger accessories will greatly affect the compressor safety and total refrigeration cycle efficiency unwanted working of these will shoot op energy consumption .suction temperature has a effect on compressor efficiency compressor power drop 2%-3% for each degree of temperature rise .traditional system do not account for the same for any control system you must turn it for the bumpless control of parameters. Hence also you need to adjust the thermal expansion valve for optimum performance

II. PROCEDURE FOR DIGITAL INVERTERCOMPRESSOR FOR COOL STORAGE

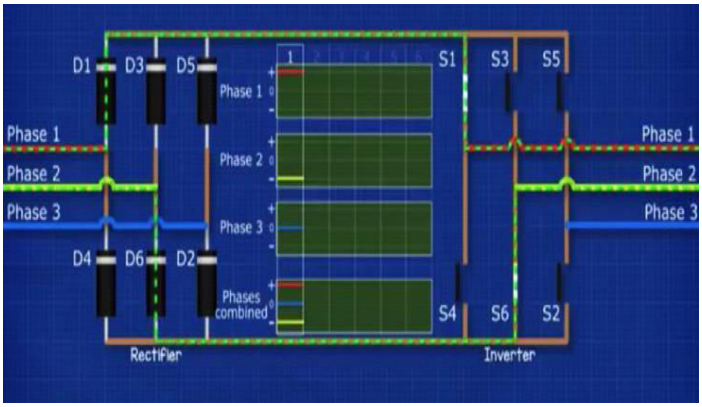
This research interest in inverter compressor for a cool storage system that changes the dc input to a variable frequency voltage output .the inverter compressor is also used in an application in which AC which a controllable frequency is required



The above mention strategy and operational issues can be overcome by our new industrial solution which monitor and analyst the performance of compressor and requirement,the temperature sensing on /off control mechanism is an inefficient method to control the cool storage system temperature for maintaining a smooth and steady temperature,we need to adopt suction pressure base digital control algorithms, the suction pressure of evaporator chamber is the direct induction of temperature demand the digital control output then control the compressor speed through a variable frequency drive is controlling the compressor to according to temperature demand. The digital controller is capable to immediately adjust the inverter compressor speed during rapid fluctuation result from increase and decreases in temperature of the evaporator,

III.MODEL DISTRIBUTION METHOD EMPLOYED

THE aim and objective of this research are to decrees the electricity combustion in a compressor of refrigeration system the frequent start-stop action of compressor affect its life by decreasing bearing durability which is, in turn, result in frequent maintenance activity proper and timely defrosting is another factor which determines heat transfer capacity of the system by new research system provided a temperature sensor based defrosting .the digital controller also indicate compressor mode and temperature the main attraction of digital inverter compressor solution large load cold storage system simultaneously operation and main stand by compressor our dedicated algorithms control compressor speed according to the load demand our system combines an effective combination of the different rated compressor to make the system energy efficient and operationally efficient. Speed controlled compressor according to temperature demand improper energy-efficient life and improper energy efficient



the microcontroller typically monitor the temperature in the space to be controlled and adjust the speed of the compressor to maintain the desired temperature the drive modulate inverter compressor speed and prevent from operating out of the compressor operating out of the compressor limit the inverter frequency drive need to use algorithms to developed specifically for cooling or refrigeration as the compressor rotational speed changes the amount of refrigerant oil flowing through the compressor increases or decreases the drive ensure that the compressor and bearing are optimally lubricated at all compressor speed and greater efficiency the model is built at the basic frequency and the map condition as the second-order function of condensation temperature d evaporation temperature and then it is corrected by the the compressor frequency as the second-order function of frequency and by actual operating condition as actual specific volume suction gas .this method is used to setup simulation model of compressor different speed and temperatures for refrigerant mass flow rate ,compressor power input and coefficient of performance respectively .

this model of digital invertible compressor for a cool storage system is suitable for the refrigeration system analysis based on the experimental data and simulation model, the frequency at zero mass flow rate and power input at zero frequency are discussed and the relation between the cop and compressor is analyzed

IV.PROCESS/COOL STORAGE SYSTEM

20 liter of cool storage space, temperature of atmosphere is 40 decrees, 1.5 hour will take cool a milk is 5 degrees with the insulation 3.0-inch, specific heat of capacity of milk 3930j/kg/k

0.35TR= 3.5/4=0.8KWt or Q= MCPDT,20*3.93*35
=2751KJ,2751/3600=0.8KWh

Rated Torque =9550*motor rated out power/rated motor speed

COP of cooling Qc/Win=o.8kwh/0.065kwh =12.3,

Energy efficiency rating of the system 11.79EER,=144,028.605BTU

1.Temperature sensor /controller 12voltage
2.speed sensor/controller 12 voltage

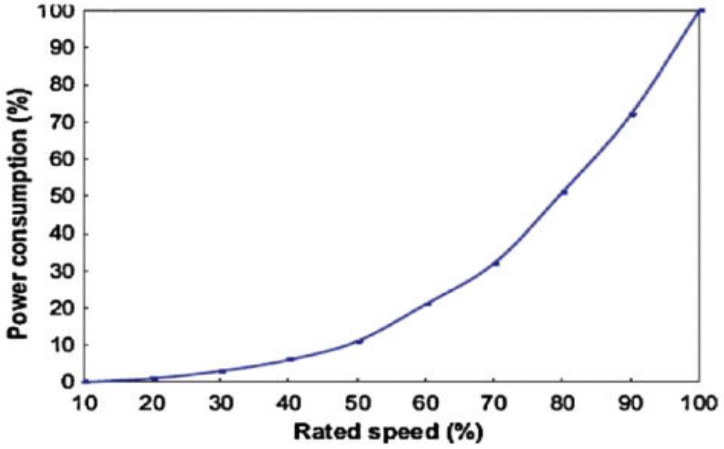
3.inverter compressor, 30-72HZ,65-130V, R600a

4.condeser,0.30TR

5.evaporator,0.35TR, O degree Celsius

6.capillary tube

NO OF SEP	SPEED	SPECIFIC VOLUME LIQUID	TEMPERATURE	PRESSURE	TORQUE	POWER in	POWER out	SPECIFIC VOLUME VAPOR
	RMP	volume/kg	Degree Celsius	Bar	N/m	KW	KW	Volume/kg
1.	600	1.717	0	1.578	72.89	62.8	274.7	0.2347
2	950	1.730	4	1.815	46.04	99.4	274.8	0.2058
3	1305	1.730	10	2.220	33.50	136.6	274.6	0.1701
4	1750	1.771	16	2.690	24.90	183.2	274.7	0.1417
5	2000	1.817	28	3.854	21.86	209.4	274.70	0.1004
6	2500	1.843	34	4.561	17.49	261.79	274,73	0.0852
7	3000	1.870	40	5.361	14.57	314.0	2774.63	0.0726



CONCLUSION/RESULT

The digital inverter compressor for cool storage system has near a 0 starting current it can runs at 50% power in any capacity runs the compressor only at a certain power required thereby saving power,the energy consumptions during the operation of the compressor is minimized to about 49%,the demand of energy is increases daily and the demand of electricity increases so that the digital inverter technology help to impact the society

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