



# BROAD ELECTRIC CHILLER

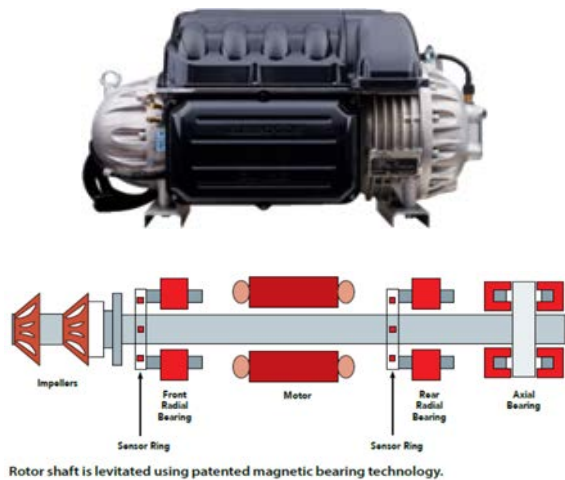
Oil Free MAG-LEV Centrifugal Chiller & Water Distribution System (Packaged)



# HIGHLY EFFICIENT

## Danfoss Turbocor Compressor

BROAD power efficient chiller is equipped with Danfoss Turbocor Magnetic Levitation Compressor, which will enhance the energy efficiency greatly.



## Electronic Expansion Valve

Control the liquid refrigerant spraying into the evaporator precisely. Also control the compressor, evaporator and condenser running at the optimum efficiency.

## Low Start-up Current

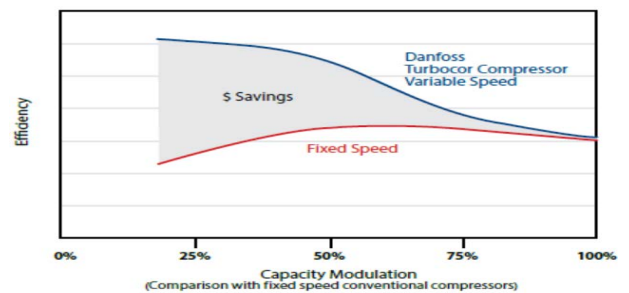
The size of BROAD oil free chiller impeller is much smaller than the conventional chiller because of adopting magnetic bearing and also, impellor is very small, thus when the system start up, only 2A current is necessary to suspend the axis, low starting torque, which results in low interference for electricity net. The normal chiller start current can reach 1500A.

## Low Consumption & High IPLV

Different type of chillers IPLV are different such as Screw chiller: 0.6~0.7kW/Ton, Centrifugal chiller: 0.65~0.75 kW/Ton, Normal oil free chiller: 0.35~0.4 kW/Ton **But BROAD take only : 0.3~0.37 kW/Ton**. BROAD oil free chiller IPLV can reach 11.5 (IPLV: integrated part-load value AHRI standards). This high IPLV can reduce energy consumption by 40% compared to traditional electric chillers. BROAD Packaged Water Distribution System named as pumpset can reduce electricity consumption up to 76% compared to conventional field-built systems.

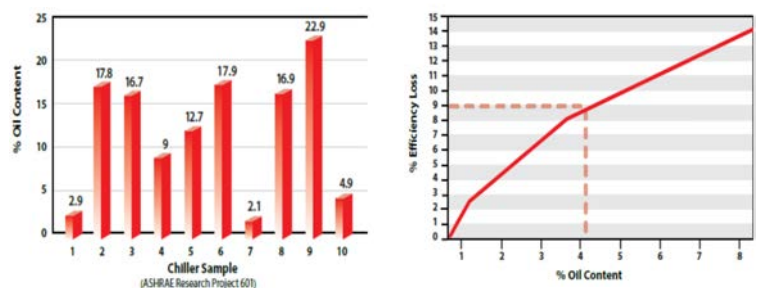
## Inverter Control

The inverter control centrifugal compressor adopts the integrated driving module. When the condensing temperature decreases or load reduces; lower the compressor revolution, then optimum the compressor energy efficiency with 10%~100% of rated load.



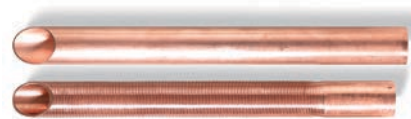
## Frictionless System

The digital magnetic bearing system will be suspended when compressor is running. The movement parts do not need oil, which avoid the oil film in the heat exchanger that lays on the pipe to reduce the heat exchanging efficiency. Thus it will ensure the Chiller has steady, reliable and outstanding performance in its operation period. The oil content of old type chiller is 9% on average, which will reduce the efficiency up to 15% to 20%. BROAD centrifugal chiller can enhance efficiency over 15% because of oil-free lubrication system.



## Superior Metallurgy

Enhanced copper tubes (99.99 %) in evaporator will improve refrigerant flow and thus enhance the heat exchange efficiency.



# SAVINGS

## Turbocor Compressor Savings

Conventional compressors have a bearing on which the shaft rests. This bearing requires constant maintenance. Danfoss Turbocor compressor utilizes magnetic levitation technique which makes bearings obsolete. Lubrication is also not needed which in turn helps avoid the refrigerant pollution and deration, thus saving both maintenance and operational costs.

## Chiller Operational Cost Saving

Compared with normal centrifugal chiller, BROAD Oil Free chiller can save cost up to 40%~50%. About 3 years BROAD oil free chiller can take back the initial investment.

## Packaged Pumpset Cost Saving

Compared with conventional machine room layout, BROAD packaged pumpset system reduces the rated power demand by 50~70%, and the operating electricity consumption by 70~85% (the electricity for pumpset only amounts to 2~5% of the rated cooling capacity.)

## Turbocor Technological Savings

Danfoss Turbocor Compressors come with best in class inline operational mag-lev technology which minimize the human effort and render the overall operation worry free as moving parts do not touch and electronic and bypass safeties ensure smooth operation. Moreover, chiller also caters the operational information displaying. Therefore saving much time, energy and cost.

Examples on power consumption comparison  
· BY50 (pumpset for 582kW/165Rt chillers)

Power consuming parts	Conventional machine room power demand	Packaged pumpset	
		power demand	Operating power consumption
Cooling water pump	30 kW	75 kW	2~75 KW
Cooling tower fan	11 kW	11 kW	3~11 KW
Chilled/heating W. pump	22 kW	75 kW	75 kW
Total electricity/cooling capacity	63 kW	26 kW	17 kW (annual)
	10.8%	4.47%	2.92%
Annual operating consumption	190 MWh	52 MWh (power saving rate 79%)	

Energy prices	Electricity price(USD/kWh) 0.1					Water price(USD/m3) 0.9						
	USA air cooled chiller					BROAD power-efficient chiller						
Load	Cooling capacity TR	kW	kW/TR	Operation hours	Chiller energy cost	Cooling capacity TR	kW	kW/Ton	Operation hours	Chiller energy cost	Water consumption	Water cost
100%	240	258.48	1.077	4	\$103.39	240	140	0.5833	4	\$56.00	1.5	5.4
93%	223.2	220.812	0.9893	225	\$4,968.26	223.2	126	0.5645	225	\$2,835.00	1.395	282.4875
87%	208.8	190.843	0.914	1889	\$36,050.28	208.8	112	0.5364	1889	\$21,156.80	1.305	2218.6305
80%	192	162.662	0.8472	1893	\$30,791.99	192	98	0.5104	1893	\$18,551.40	1.2	2044.44
73%	175.2	134.886	0.7699	702	\$9,469.03	175.2	84	0.4795	702	\$5,896.80	1.095	691.821
67%	160.8	118.397	0.7363	29	\$343.35	160.8	77	0.4789	29	\$223.30	1.005	26.2305
60%	144	98.9424	0.6871	1	\$9.89	144	63	0.4375	1	\$6.30	0.9	0.81
53%	127.2	82.0058	0.6447	0	\$0.00	127.2	56	0.4403	0	\$0.00	0.795	0
47%	112.8	69.4622	0.6158	0	\$0.00	112.8	49	0.4344	0	\$0.00	0.705	0
40%	96	58.2144	0.6064	0	\$0.00	96	42	0.4375	0	\$0.00	0.6	0
38%	91.2	53.3246	0.5847	1	\$5.33	91.2	39.2	0.4298	1	\$3.92	0.57	0.513
36%	86.4	49.2048	0.5695	1	\$4.92	86.4	36.4	0.4213	1	\$3.64	0.54	0.486
Annual electricity cost	\$81,746.46					\$48,733.16						
Annual cost saving	\$27,742.48											
Price idea	80,000~100,000					150,000~180,000						
Payback(years)	2.7											

## Maintenance Cost Saving

BROAD Chillers (other than compressor) incorporate best quality components with longer lifesapn compared to other brands thus it saves almost 90% of maintenance cost compared with traditional electric chillers.

## Space & Time Saving

Compared with the traditional electric chillers, BROAD packaged chiller reduces volume by 30~50% and weight by 30%. BROAD pumpset and stainless steel metal enclosures can be installed outside which reduces mechanical room footprint requirements. Thus reducing land cost and labor cost (by saving installation time).

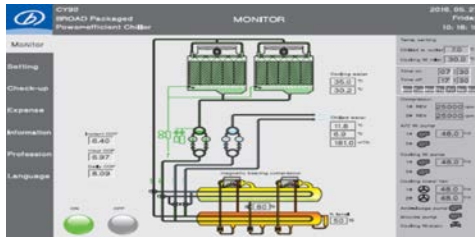
Maintenance content	Chiller type	centrifugal chiller R123	centrifugal chiller R-134a	BROAD Power-efficient chiller
Clean oil cooler, change oil		Once a year	Once a year	No need
Change oil and filter		Once a year	No Need	No need
Oil pump pressure and delay		Once per season	Once per season	No need
Oil quality test(Color, quality)		Once a week	Once a week	No need
Oil filter pressure test		Once a month	Once a month	No need
Compressor vibration test		Once a year	Once a year	No need
Motor winding check		Once a year	Once a year	No need
Contact and overload setting check		Once a year	Once a year	No need
Refrigerant cleanness check		Once a week	No need	No need
Change refrigerant filter		Once a season	No need	No need

# CONVENIENT & RELIABLE



## Online COP Calculations & Detailed Touch Screen

BROAD owns developed control system that makes the operation much convenient and reliable. BROAD is the only manufacturer that displays instant COP. All BROAD electric chillers are certified by AHRI which guarantees the capacity and COP.



## Online Monitoring & BMS

Since 1996, BROAD has created the online remote monitoring to the machine, fault alarming and performance monitoring – Free throughout the life span of chiller. BMS function can implement.

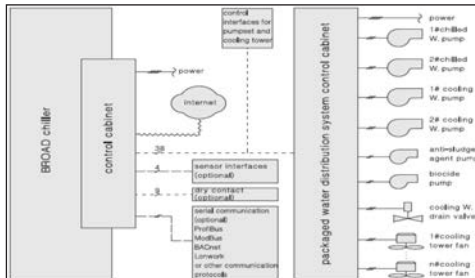


## Control System

BROAD Electric Chillers have Intelligent Control Systems (ICS). The chiller itself acts as the brain of system. BROAD packaged chiller control system includes interfaces for chiller, pumpset, cooling tower fan, internet, BMS etc. ICS can ensure the worry-free and operator-free to customers.

## Smart Anti-Surge Control

BROAD PLC "Smart anti-surge control" module insures the chiller always operate in a safe range.



## Long Life

BROAD Chillers are designed for a life span of 30 years.

## Packaged Design

Compared with other centrifugal chiller, BROAD oil free chiller comes with a S.S metal enclosure for open air installation with very low running noise, same as that of a telephone ring. Compact design makes it easy to transport and maintenance.



## Environment friendly Refrigerant

Danfoss Compressor is designed for HFC-134a which is green, safe, non-pollutant and has zero ozone depletion potential. The device has nearly no vibrations with running noise lower than 70dB(A), while the normal chiller's is higher than 85dB(A).



## Certifications

BROAD oil free chillers and packaged water distribution system are ISO, CE, ETL, ASME, AHRI certified. AHRI Certifications in particular guaranty the COP and Capacity of chiller.



# REFERENCES

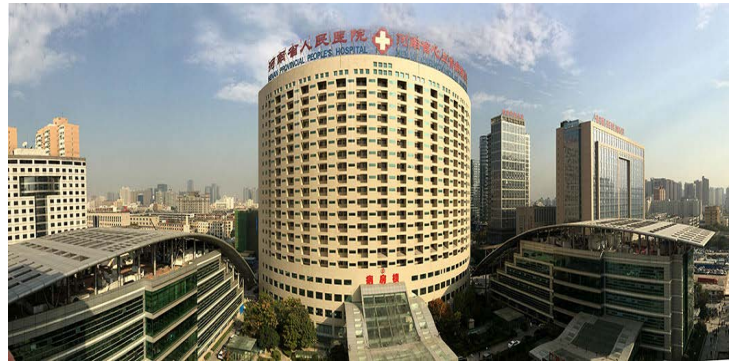
## **Henan Provincial People's Hospital (China)**

A sacred life hall with a history of more than 113 years, is located in the green city Zhengzhou along the bank of the Yellow River. In 2012, it was identified as a hospital established by the National Health and Family Planning Commission of the PRC and the Henan provincial government.

Chiller Model:

Electric Chiller (1 x Cy240) (800 USRT)

BROAD Absorption Chillers also installed.



## **Xiangya Hospital Central South University (China)**

Founded in 1906 and located in Changsha, Xiangya Hospital is a Class-A Grade-3 (top level in China) general hospital. An important center for clinical care, medical education and scientific and technological innovation in China.

Chiller Model:

Electric Chiller (1 x C360) (1200 USRT)

BROAD Absorption Chillers also installed.



## **The People's Hospital Laibin Xingbin (China)**

The People's Hospital of Laibin Xingbin District is a national public hospital approved by Laibin Municipal People's Government in 2009. It is a comprehensive secondary hospital integrating medical treatment, first aid, teaching, scientific research, prevention, health care and rehabilitation.

Chiller Model:

Electric Chiller (1 x C360 and 1 x C90) (1500 USRT)

BROAD Absorption Chillers also installed.



## **JiangLing Motors Group(China)**

Founded in 1947, JiangLing Motors Group Co., LTD. is one of the largest exporters of light diesel commercial vehicles and the export base of automobiles in China. It ranks No. 229 on China's Top 500 in 2020, No. 94 on China's Top 500 in Manufacturing, and No. 48 on China's leading strategic emerging industries.

Chiller Model:

Electric Chiller (3 x C720 and 1 x C90) (7500 USRT)

BROAD Absorption Chillers also installed.



# REFERENCES

## Gujing Wine Group (China)

Gujing Group Co., Ltd. is one of China's eight famous wine enterprises, one of China's top 500 manufacturing enterprises, and one of China's national large-scale enterprises.

Chiller Model:

Electric Chiller (1 x C45) (150 USRT)

BROAD Absorption Chillers also installed.



## Youth Olympic City, Nanjing (China)

China's largest and most advanced district energy projects. It held Youth Olympic opening ceremony in 2014 with tallest building of 300 meters height.

Chiller Model:

Electric Chiller (1 x C180) (600 USRT)

BROAD Absorption Chillers also installed.



## Merchant Marco Hotel (China)

Merchant Marco Hotel is a four-star business hotel with classic European style. Operated by Merchant Marco Hotel Management Co., Ltd., the hotel obtained many awards as "Best Quality Hotel", "Ten Best Star Hotel", "Tourists Satisfied Service Enterprise".

Chiller Model:

Electric Chiller (1 x C60) (200 USRT)

BROAD Absorption Chillers also installed.



## Radisson Blu Plaza Hotel (China)

The Radisson Blu Plaza Hotel Tianjin is situated near Tianjin's train station square, about a 20-minute drive from the airport. Guests will find such Tianjin attractions as the Ancient Culture Street and Jingyuan Garden within easy reach.

Chiller Model:

Electric Chiller (1 x C120) (400 USRT)

BROAD Absorption Chillers also installed.



# REFERENCES

## **Westin Shenzhen Nanshan Hotel (China)**

The Westin Shenzhen Nanshan is located at the business and leisure area of Nanshan district, which is within walking distance of the Window of the World, Happy Valley, China Folk Culture Villages and OCT area in Shenzhen.

Chiller Model:

Electric Chiller (1 x C90) (300 USRT)

BROAD Absorption Chillers also installed.



## **Foxconn Technology Group (China)**

Foxconn Technology Group is a high-tech enterprise of Taiwan Hon Hai Precision Industry Co., Ltd. The group was founded in Taipei, Taiwan province, China in 1974, and now has more than 1.2 million employees and the world's top customer base.

Chiller Model:

Electric Chiller (2 x CY90, 7 x C180 and 9 x C240) (12000 USRT)



## **Qlife Pharma (Qatar)**

Qlife Pharma is a flagship pharmaceutical company established in the state of Qatar, ensuring high quality products using world class advanced technology. It's engaged in the manufacturing of Semi Solid and Oral Liquid dosage forms.

Chiller Model:

Electric Chiller (1 x CY90) (300 USRT)

BROAD Absorption Chillers also installed.



## **Crane Resorts (Barbados)**

A local 5 star resort with over 130 years of history and the first resort in the caribbean region.

Chiller Model:

Electric Chiller (2 x C180) (1200 USRT)

BROAD Absorption Chillers also installed.



# REFERENCES

## **Lactasoy (Thailand)**

Established in 1950, Lactasoy is the most famous soy milk brand in Thailand, with annual production capacity of 800 million boxes, Lactasoy is widely selling in 45 countries around the world and enjoys international reputation.

Chiller Model:

Electric Chiller (1 x CY90) (300 USRT)

BROAD Absorption Chillers also installed.



## **LIV365 (Thailand)**

Chiang Mai Xinrui Home shopping center LIV365 in Thailand. Through BROAD Power Efficient Chiller, customer reduced the air conditioning operation cost significantly.

Chiller Model:

Electric Chiller (2 x C60) (400 USRT)



## **Grameenphone (Bangladesh)**

Grameenphone is the largest cellular operator in Bangladesh. It was the first company to introduce GSM technology in Bangladesh. Doctor Yunus, the Nobel Peace Prize Winner as one of the shareholder in Grameenphone

Chiller Model:

Electric Chiller (1 x C240) (800 USRT)

BROAD Absorption Chillers also installed.

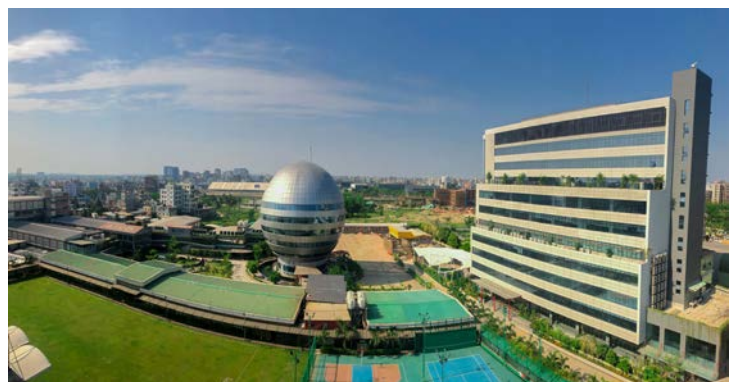


## **American International University (Bangladesh)**

The No.2 private university in Bangladesh. AIUB is committed to provide quality and excellent computer-based academic programs responsive to the emerging challenges of the time.

Chiller Model:

Electric Chiller (3 x CY135) (1340 USRT)







**BROAD Group**

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