

AQUA

AQUA Air Conditioning



AQUA CAC - Vietnam **A Smart and Healthy Air Provider**

2020.12

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New Solutions for 2021

【LCAC】



Inverter Solution

18k 24k 36k 48K 96K



Standard non-inverter

【MRV】



MRV S^{II}

4HP 6HP



MRV 5

8HP 26HP 104HP



【Chiller】



Oil Free Centrifugal Chiller

100RT 600RT 1000RT 2000RT




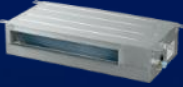
Screw Chiller

LCAC Solution

- 1 **LINEUP**
- 2 **INVERTER OUTDOOR FEATURES**
- 3 **NEW CASSETTE FEATURES**
- 4 **BENCHMARK**
- 5 **MULTI FEATURES**
- 6 **BENCHMARK**



LCAC Product lineup-SCAC

Power supply		220V/50Hz				380V/50Hz			
Capacity(Btu/h)		18K	24K	30K	36K	40K	48K	55K	96K
Inverter	Cassette  R32	●	●	●	●	●	●		
	Duct  R32	●	●	●	●	●	●		●
	Floor Standing 						●		●
Non-inverter	Cassette 	●	●	●	●	●	●	●	
	Duct 	●	●	●	●	●	●	●	
	Floor Standing 						●		

LCAC Product lineup-Multi

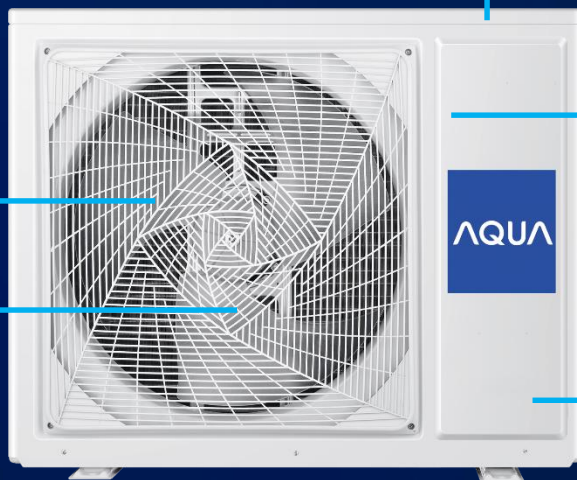
OUTDOOR UNITS	Unit KW	5.0	5.5	7.0	7.5	8.5	9	10
								
INDOOR UNITS		2.5	3.5	5.0	7.1			
HIGH WALL								
COMPACT CASSETTE								
ROUND WAY CASSETTE								
SLIM LOW ESP DUCT								
MED ESP DUCT								

R32 Inverter ODU Features

- Full DC frequency conversion, high efficiency and energy saving, easy installation
- High efficiency with CSPF above 20



- ◆ 550mm Larger Diameter Fan
- Sound level reduced to 48dB(A);



- ◆ Easy to install & maintain

- Heat exchanger is all copper structure, easy to install and maintain;

- ◆ stable and reliable

- PCB computer protection coating, insect - proof, waterproof, suitable for southeast Asia



- ◆ 5-step speed DC fan motor
- Power input reduced by 38% comparing with AC fan motor



- DC inverter compressor
- Increasing energy efficiency

R32 Inverter Cassette Features

■ Design Flexibility

◆ Flap is closed when air conditioner off

There is no crack from the flap and the panel when the air conditioner off. More elegance.



◆ Hidden LCD display

The 360° smart flow cassette has a particular hidden LCD display design. Green display for cooling, red display for heating; it is very easy to identify by opening mode.



◆ ABS material panel

ABS material makes the panel “piano white”, different from “dark white” PS material color. The panel and flap are the same material. After 10 years, the panel color won’t change to yellow color because the ABS material prevents discoloration against light rays.



R32 Inverter Cassette Features

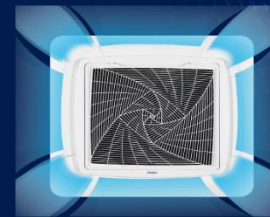
■ Comfort Airflow

◆ Round way air supply

Round way air supply without blind spot.



4 way airflow



Unique round way air flow design

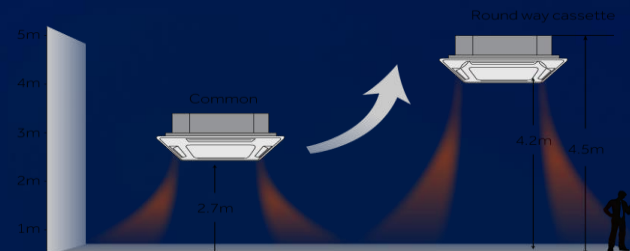
◆ Individual flap control

The four flaps can be controlled individually according to end users by controller, providing maximum comfort throughout the room, it is a good solution to avoid "air conditioning disease".



◆ High ceiling mode

Lots of shops are 5 meters high ceiling. This model can be installed in 4.5 metres height. The best solution for high ceiling shop.

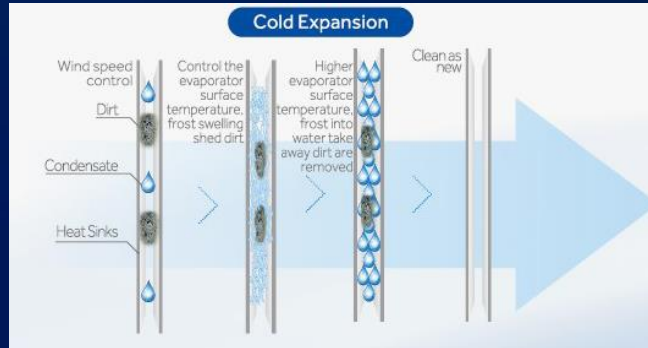
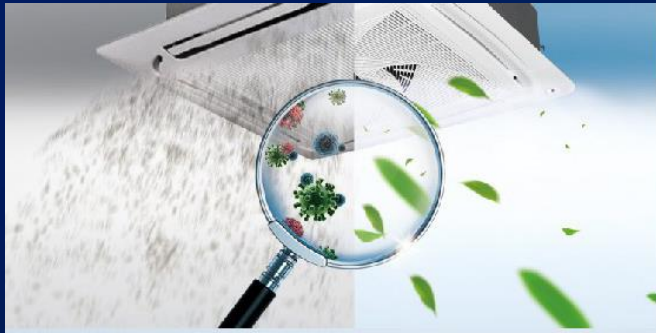


R32 Inverter Cassette Features

■ More health

Self clean function

Self cleaning technology clean the dust and kill the bacteria in the heat exchanger , ensure the air outlet the AC is clean and healthy (Haier special)

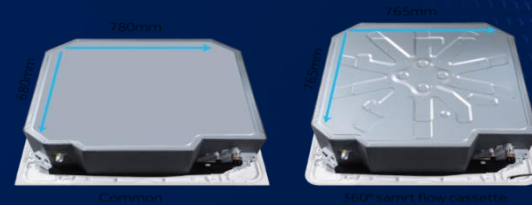


R32 Inverter Cassette Features

■ Easy Installation

◆ Square hanger

Innovative square hanger, flexible direction adjustment, avoid second try installation.



◆ High lift-up drain pump

It can lift condensed water up to 1000mm, which is more flexible to install the duct according to the layout.



◆ Convenient clip

There is clip to lock the panel. Just one installer can finish the screwing for panel. Save manpower and easy installation.



◆ Undoing only one screw

Installer can finish wiring by undoing one screw.



R32 Inverter Cassette Features

Key points	Outlook	Refrigerant	Capacity range (K Btu/h)	Efficiency EER (25K)	Comfort	Health	Durability	Convenience	Easy installation
AQUA		R32	18/24/30/36/40/48	3.50	1.Roundway airflow 2.Individual airflow blade control 3.Presence sensor (optional)	Self cleaning to clean the dust and bacteria	1.100% Copper 2.Coated PCB protection 3. ABS material to keep the panel anti-decolor for long term	1.5 Step fan speed 2.High ceiling mode 4.5m height 3.3.Self diagnose show error code“88”(ODU & IDU)	1.Compact ODU design 2.Easy PCB access and maintenance 3.Drain up height max 1000mm
D Brand		R32	17/20/24/34/40/48K	3.68	1.Roundway airflow with even cooling distribution 2.Individual airflow blade control 3.Presence sensor (optional)	1.Silver ion anti-bacteria drain pan 2.Filter has anti-mould and anti-bacteria treatment	1.Overvoltage PCB (RZF series only) 2. Microchannel heat exchanger 3.Coated PCB protection	1. 5 Step fan speed selection 2. High ceiling mode up to 4.2m height 3.Self diagnose error	1.Compact ODU size 2.Easy to take panel off
L Brand		R410a	18/24/30/36/48	3.24	Normal 4 way cassette	Coanda design to avoid direct airflow to ceiling , prevent ceiling pollution	1.100% copper + gold fin 2.PCB 1+1 Year warranty	High ceiling mode up to 4.2 m height	No mention
P Brand		R410a	12/18/24/34/43/50	3.31					Drain up height max 750mm
	Aqua special Spiral design is more attractive to end user	More Environment friendly refrigerant	Wider range to min 12K	AQUA Same with D brand, better than others	AQUA Round way airflow make more comfort to users	AQUA Self cleaning exclusive function in the market	AQUA have more durability design to maintain long operation	AQUA better performance than other brand	AQUA installation design friendly to installers

R32 Multi Features

High Efficiency



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Model name	Design capacity(Kw) Cooling/ Heating -10	SEER/ SCOP	Energy Label	Nominal capacity(Kw) Cooling/ Heating -10	EER/COP	Energy label
3U50S2SR3FA+ 3*09 high wall	5.0/4.2	8.5/4.0	A+++ / A+	5.0/6.0	4.0/4.4	A/A
3U55S2SR3FA+ 3*09 high wall	5.5/4.7	7.5/4.0	A++ / A+	5.5/6.8	4.0/4.4	A/A
3U70S2SR3FA+ 3*09 high wall	7.0/6	7.5/4.2	A++ / A+	7.0/7.6	4.0/4.2	A/A
4U75S2SR3FA+ 4*09 high wall	7.5/6.3	7.0/4.0	A++ / A+	7.5/6.3	3.8/4.0	A/A
4U85S2SR3FA+ 3*09+1*12 high wall	8.5/7.0	7.0/4.0	A++ / A+	8.5/9.6	3.4/4.0	A/A
5U90S2SS3FA 2*09+12+18 high wall	9/7.2	7.0/4.0	A++ / A+	9/10.4	3.23/3.73	A/A
5U105S2SS3FA 2*09+12+18 high wall	10/8	7.0/4.0	A++ / A+	10/10.5	3/3.8	A/A

R32 Multi Features

High Efficiency

➤ Low Standby Power

- New PCB design , shut off the outdoor unit power module and the power consumption in low standby mode, SEER improve 0.2-0.4 ;

➤ Full DC Technology Improving The Efficiency

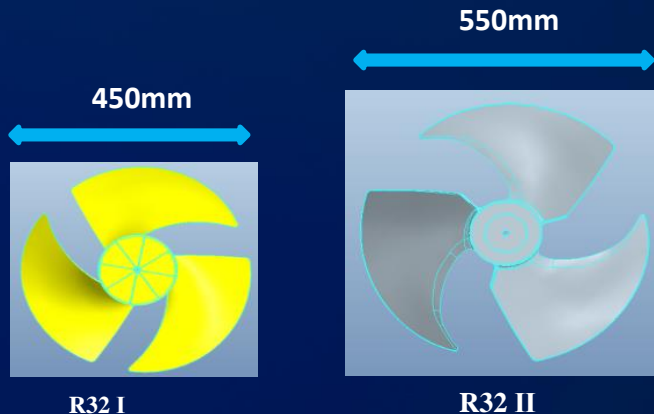
- DC inverter compressor
- IDUs and ODUs with DC fan motor



Lower noise design

➤ Enlarged Fan

- Sound level reduced 3dB than R32 I (first generation) owing to fan diameter enlarged to 550mm and lower rotation speed;



➤ Reinforced Fan Motor Bracket

- To make sure the unit vibration slowdown and lower the noise level;

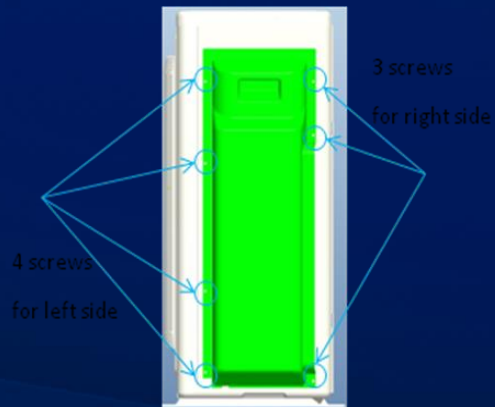


R32 Multi Features

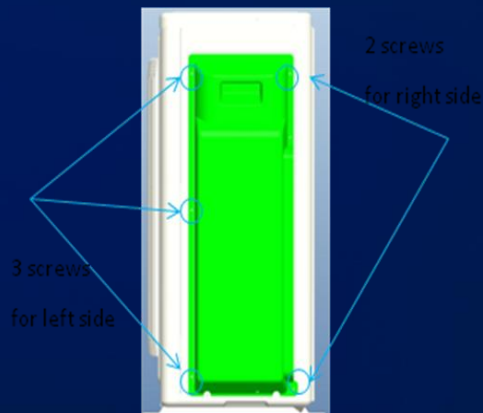
Easy installation and maintenance

➤ Only One Screw For Wiring

- The installer only needs to discharge **1** screw to open the valve cover for wiring, which is great benefit for them. The following comparison will leave a strong image in your mind;



7 screws (R410a)



5 screws (R32 I)



ONLY 1 SCREW (R32II)

Easy installation and maintenance

➤ Easy to Vacuum

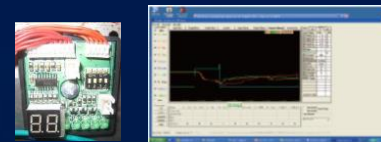
- General stop valve vacuum every indoor unit from one valve only to save time;



General stop
valve

➤ Easy Start-up & Maintenance

- “88” screen shows compressor frequency or failure code;
- All running data can be checked by on-site testing software ;
- These two tools make easy start-up & maintenance ;

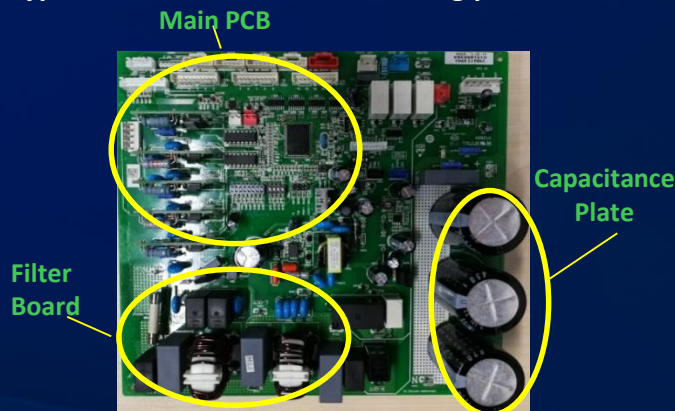


“88” screen on site testing
software

HIGH Reliability

➤ Brand-new Design of 3 in 1 PCB :

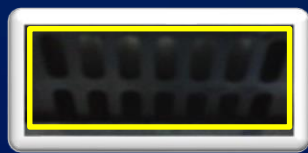
- Integrating Main PCB, Filter Board and Capacitance Plate into One PCB module to reduce the inner space, enhance the reliability and maintain more convenient.
- Because R32 refrigerant are lightly flammable , The PCB takes new design , use the reliable parts , keep high reliability for the system ;
- Security fuse : The security fuse is protected from ceramics. Even when the fuse is burned because of the overload current , the ceramics will seal the fuse from the air, so it won't cause the flame even leakage of R32 happens;
- Security relay : The relay is the enclosed type , when it works , the working parts won't touch the air , so it won't cause the flame even leakage of R32 happens;



HIGH Reliability

➤ Electrical Box Ventilation Design

- The Electrical box is not only equipped with ventilation holes, but also with the channel to lower the component working temperature of electrical box and prolong the service life;



Ventilation Holes

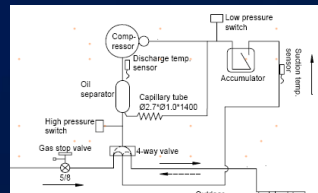


Channel



➤ Oil Separator

- The oil separator separates the oil from the refrigerant in time and send oil back to compressor, which guarantees the compressor running with oil , boost the compressor stability.



System Diagram

R32 Multi Features

Solution Supplier

➤ Cooling Only/Heating Only

- Cooling only /heating only function for special requirement ;
(SW5-1 ON cooling only ; SW5-1&2 ON heating only;)

➤ Central Control/BMS Control

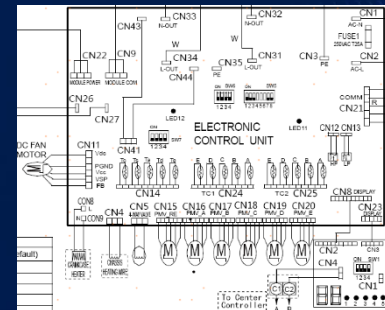
- Central control / BMS control function meet the various needs for designer ;
(SW7-1&4 OFF central control , ON BMS control ;)

➤ Power Limitation Function

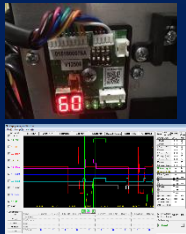










- We have the power input limitation function , with maximum 2.5kW power input .
- It meet the 3.3kW total power input requirement for all electrical appliances in some countries;

(SW5-3 ON limitation on maximum current 10.5A ;)

* Note: the maximum capacity will reduce when you use this function;



R32 Multi Benchmark

Key points	Refrigerant	Capacity range (KW)	Efficiency EER (7Kw)	Intelligence	Durability	Comfort- fan design	Easy installation
AQUA	R32	5.0/5.5/7.0/7.5/8.5/9/10	3.81		<p>Top</p>  <p>Front</p> 	 <p>Diameter ϕ550mm, wt 0.86KG</p>	 <p>COVERED</p>  <p>OPEN</p>
D Brand	R32	5.2/6.8/8.0/10	4.07	/	<p>Top</p>  <p>Front</p> 	 <p>Diameter ϕ510mm, wt 1.3KG</p>	 <p>COVERED</p>  <p>OPEN</p>
L Brand	R410a	5.0/7.0/8.8/10.5/14.1	3.28	/	Not mention	Not mention	Not mention
Conclusion	More Environment friendly refrigerant	AQUA and D brand same capacity , L Brand capacity bigger	AQUA Efficiency same level as D brand, better than L Brand	"88" LED display can show error code , and with access to monitor and BMS control Which can show and output the fault record, frequency, protocol etc parameter data for reference , only available for AQUA multi,	AQUA design of electric control box performs better of sealing effect of duct-proof , anti-bugs, and guarantees longer service life of the electric parts	under same airflow output, AQUA rotation is less than D-brand, which mean AQUA Performs higher efficiency and better heat exchange	AQUA only 2 screw is needed to open the box, while D brand need 5 screw

MRV Solution

- 1 **MRV LINEUP**
- 2 **MRV 5 FEATURES**
- 3 **BENCHMARK**



MRV 5 Features- Leadership in technology

【Maximum single module 26HP maximum combination 104HP】

With large capacity full DC inverter compressors, MRV 5 can reach single module 26HP, maximum combination 104HP.



【 Super efficiency with full DC inverter compressors 】

Optimized design, intelligent control with full DC inverter compressors, DC fan motors and high efficiency heat exchanger give MRV 5 much higher efficiency in cooling and heating. EER up to 4.5(8HP)



【 Max. total pipe length 1000m, height drop 110m 】

Longer piping length and higher level differences allow for more flexible design with little limitations.



MRV 5 Features- Installation friendly

【 Zigbee communication tech 】

No. Leading Zigbee communication technology
Free the communication wire between the ODU and IDU



【 Auto addressing indoor units 】

Outdoor units can address indoor units automatically, greatly reducing labor.



【 Easy access service door 】

When maintenance is needed, the front panel can be pulled out like a door instead of being pulled down, by which the screws are remarkably reduced, saving much labor.



【 Automatic oil balancing 】

Without oil balancing pipe, the oil is balanced automatically. This simplifies system design and improves reliability.

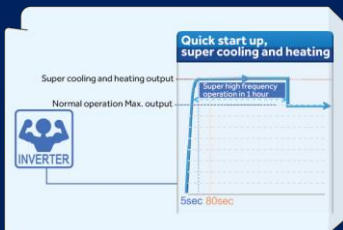


MRV 5 Features- Super Comfort

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Inspired Living

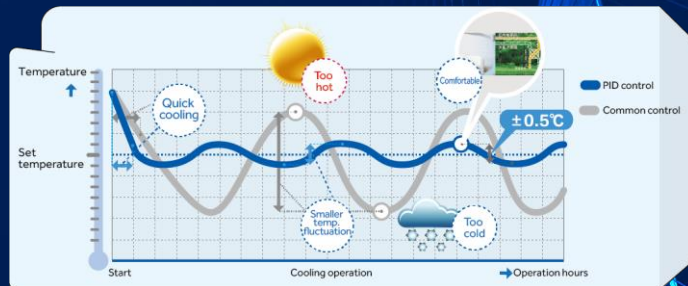
【 Quick cooling and heating 】

Startup and reaching maximum output in short time, realizing quick cooling and heating.



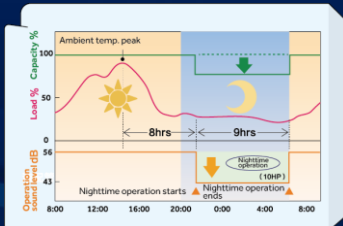
【 Precise temperature control at $\pm 0.5^{\circ}\text{C}$ 】

With twin pressure sensors and twin EEVs, the refrigerant volume can be adjusted automatically to realize precise temperature control, improving indoor comfort.



【 Nighttime quiet operation at 10dB(A) reduced sound level 】

When quiet operation is required, this function can be configured by outdoor PCB to greatly reduce sound level.



【 Intelligent defrosting technology 】






According to system status to intelligently judge if defrosting is required, improving indoor comfort.



MRV 5 Benchmark

Conclusion:

- MRV 5 makes a leading position in Capacity, space saving, and efficiency
- Biggest capacity 26HP single module, combination 104 HP is No. 1 in the market

No.	Item	Brands					Result
		AQUA MRV 5	Dk V4	ME City M	PANA FSV	GR GMV5	
1	Outlook						Special and fashion outlook design
2	Space (26HP)	1690*1410*750	1657*2170*765	1650*2140*740	1758*1830*930	1340*3345*765	35-50% footprint space saved !!
3	Max Single Module Capacity	26HP	20HP	20HP	20HP	22HP	Biggest capacity for single module in the market!!!
4	Capacity Range (HP)	8-104 4 Combination	6-60 3 Combination	8-60 3 Combination	8-60 3 Combination	8-88 4 Combination	Max 4 Combination Biggest capacity UP to 104HP
5	Average EER	3.9	3.6	3.6	3.5	3.8	Highest efficiency level!!!
6	Average COP	4.6	4.2	4	4.2	4.1	Highest efficiency level!!!

MRV 5 Features- Super Comfort

Conclusion:

- MRV 5 applied the Zigbee communication technology , only available for AQUA MRV product, pioneered in the industry!
- highest ESP & high air flow, AQUA MRV 5 is much easier to design, install & maintain.
- Application temp and installation piping maintains high range in the market

No.	Item	Brands					Result
		AQUA MRV 5	Dk V4	ME City M	PANA FSV	GR GMV5	
7	Communiation	Zigbee	Wire	Wire	Wire	Wire	Pioneered Zigbee on VRF, AQUA ONLY!
8	ESP (Pa)	110Pa	78	/	80	82	AQUA MRV 5 has the highest ESP
9	Max. air flow (m ³ /h)	19000	15660	21600	16960	/	AQUA > MD > DK
10	Average sound level (dBA)	59	62	62	63	62	AQUA MRV 5 make sound level the lowest
11	Total pipe length (m)	1000	1000	1000	1000	1000	Same
12	Max. height drop (m)	110	110	50	110	90	AQUA > ME > GR
13	Cooling range(°C)	-10~50	-5~43	-5~52	-10~46	-5~52	AQUA MRV 5 has the widest cooling and heating range
	Heating range(°C)	-20~27	-20~15.5	-20~15.5	-25~15	-20~24	

Chiller Solution

- 1 **LINEUP**
- 2 **Oil Free Centrifugal Chiller**
- 3 **BENCHMARK**



Chiller Lineup



Water-cooled series

90~142RT



R134a modular oil free centrifugal chiller



R134a oil free centrifugal chiller,
High efficiency with IPLV 11.98

125~2000RT

90~590RT



R134a screw chiller, heat recovery optional
higher efficiency up to COP 5.83

Cooling Capacity (RT)

0RT

500RT

1000RT

1500RT

2000RT

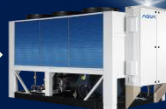
Air-cooled series

35~140KW



R410a modular chiller
35/70/100/130/140KW module, heat recovery function optional

360~1760kW



R134a high efficient screw chiller
360KW/480KW/620KW module
High efficiency. Full series COP over 3.15

350~1760kW



R134a oil free centrifugal chiller,
High efficiency. COP up to 3.65

Cooling Capacity (Kw)

0kW

1000Kw

2000Kw

3000Kw

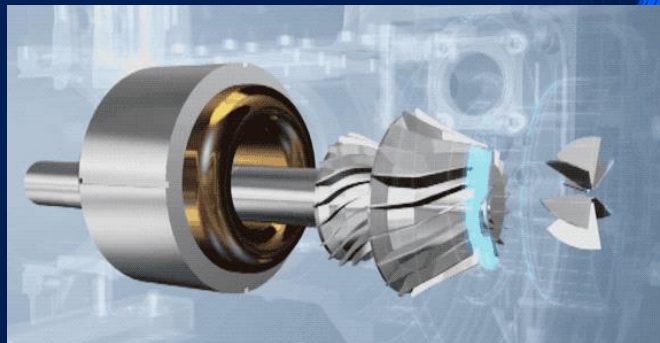
Oil Free Centrifugal Chiller

High efficiency

50% Energy saving than conventional chiller



Normal Centrifugal Chiller

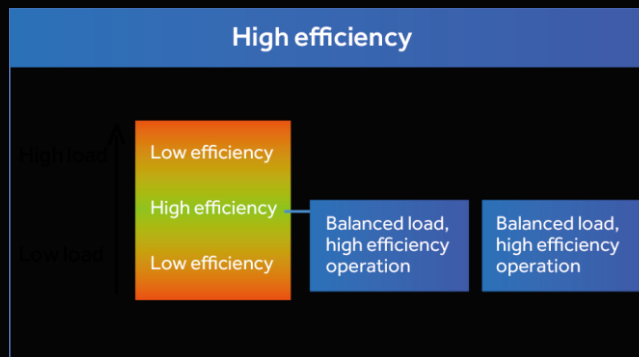
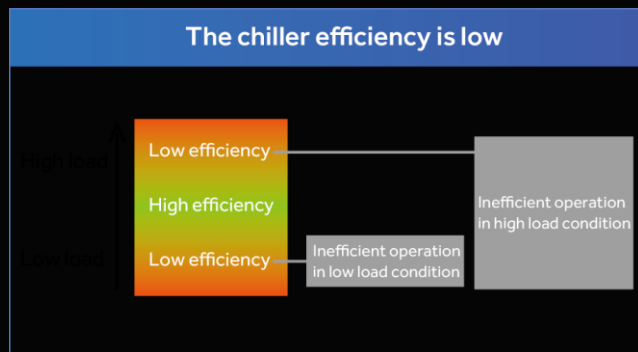


Oil Free Centrifugal Chiller

◆ IPLV can be **11.98**

➤ Load sharing strategies in multi-compressor refrigeration system

The control technology of load sharing strategies in multi-compressor refrigeration system can make every compressor operate in equilibrium load value, by which the unit can keep the optimal operation performance.

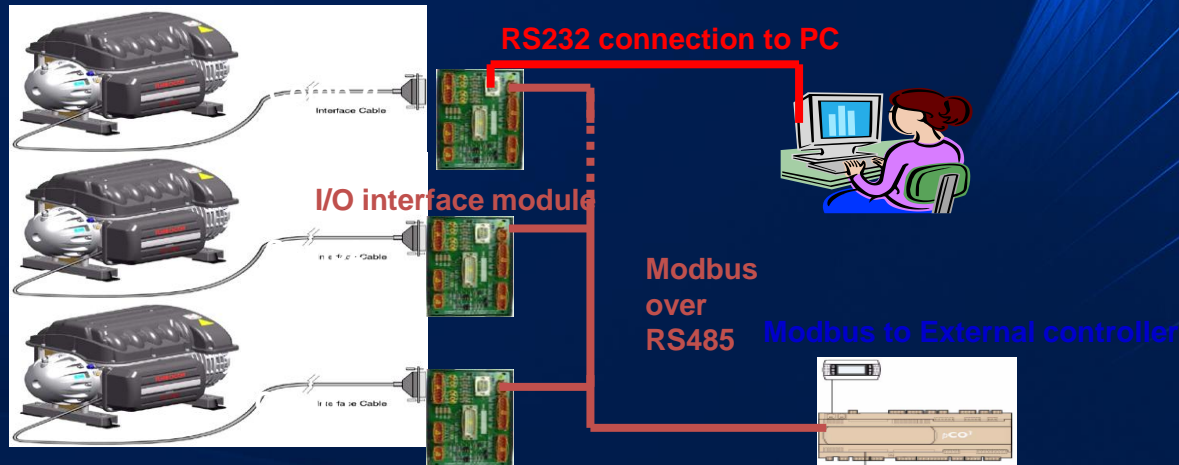


Oil Free Centrifugal Chiller

- PLC control
- Touch screen
- BMS function



The unit can realize BMS function with Modbus, BACnet. Meanwhile, remote control function can be combined with interlock function and timer running function, realizing non-person control.

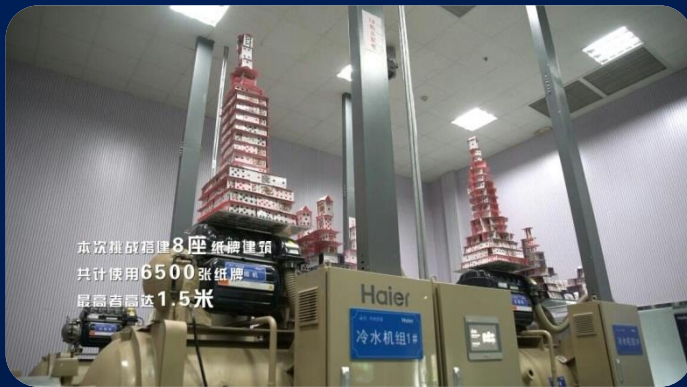


Oil Free Centrifugal Chiller

➤ Low noise and less vibration

Water-cooled chiller's running noise is **70 dB(A)**, while the conventional chiller is higher than 85dB(A).

Because of fully frictionless operation, the device vibration is **close to zero**.



8 Cards Tower

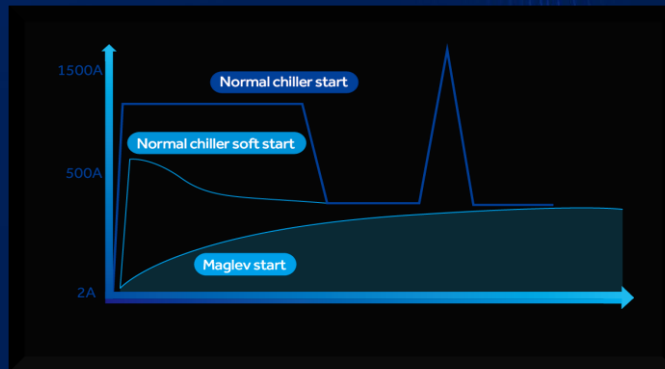
6500 Cards

Max **1.5** m

Oil Free Centrifugal Chiller

➤ 2A starting current

Only 2 Ampere starting current
avoids interference for electricity net.



➤ Cloud services center

Intelligent control



Cloud services center

Cloud platform & Big data



Oil Free Centrifugal Chiller



The industry's first CAC intelligent cloud platform

Cloud services is standard part of AQUA oil free centrifugal chiller

Long-distance detection

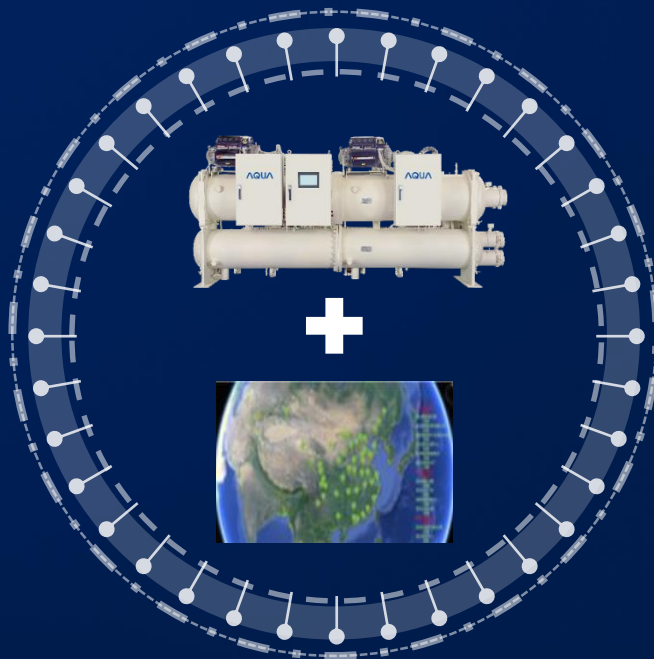
Save both time and labor

Detecting unit operation on real time

Intelligent maintenance

Keep the best condition

Smart reminder of maintenance



Default warning

Avoid unit default

Automatically alarm of unit default

Energy-saving service

Ensure the best operation

Automatic analysis with big data, provide the best energy-saving operation solution.

Oil Free Centrifugal Chiller Benchmark



AQUA
Multi-compressor design

Multi-compressor design

- Every compressor is standby for each other. When one compressor breaks down or is inspected for repair, the other compressor can continue to run for non-shutdown maintenance.
- The system with multi-compressor design can get better operating condition by turning off the compressor when running under low load, and avoid surging phenomenon.

VS

Single-compressor design

- Any failure of the compressor will cause the chiller to be unusable, and users will complain about it.



G brand
Single-compressor design



Y brand
Single-compressor design

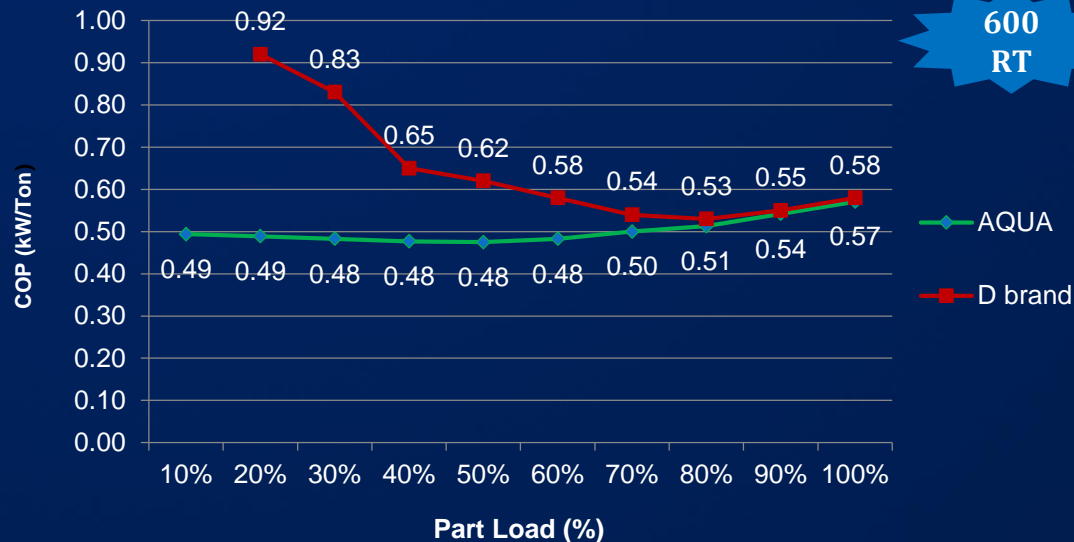


T brand
Single-compressor design



D brand
Single-compressor design

Oil Free Centrifugal Chiller Benchmark



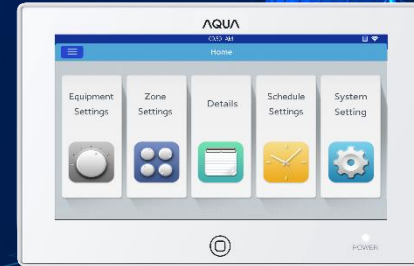
D brand – D brand compressor*1
AQUA - Danfoss compressors*4

- Evaporator water inlet/outlet temp.: 12/7°C
- Condenser water inlet/outlet temp.: 29/33.83°C
- Constant flow

Source: Project bidding data

- AQUA best COP is distributed in 30%~60%
- D brand COP performs worse when the load is below 70%
- $IPLV \text{ or } NPLV = 0.01A + 0.42B + 0.45C + 0.12D$
 - A = COP R or EER at 100% load
 - B = COP R or EER at 75% load
 - C = COP R or EER at 50% load
 - D = COP R or EER at 25% load

Controller Solution



Oil Free Centrifugal Chiller Benchmark

Long Distance Control

Centralized Controller



- Multiple groups control
- Maximum up to 256 indoor units

BMS



- Local version (PC), Modbus, BACnet, Lonworks

Intelligent



- Cloud Service, Wifi control,

Infrared Controller



- Single unit control

Wired Controller



- Single group control
- Maximum 16 indoor units

Individual Control

Global reference project



Home & Apartment Solution

Location: the United States

Project Name: Riverside Village



Office Solution

Location: Nymburk, Czech Republic

Project Name: Radnice Nymburk



Hotel Solution

Location: Rome, Italy

Project Name: Pantheon Hotel



Shop & Showroom Solution

Location: Ivano-Frankivsk, Ukraine

Project Name: children's entertainment center
"Chubi-Boom"

A smart and healthy air provider, Serving different industry

AQUA Vietnam reference project



Education Solution

Location: Lahore, Pakistan

Project Name: Lecole School



Hospital Solution

Location: Madrid, Spain

Project Name: Guardia Hospital Niño
Jesús



Convention & Arena Solution

Location: Gujrat, Pakistan

Project Name: Asghar Marquee

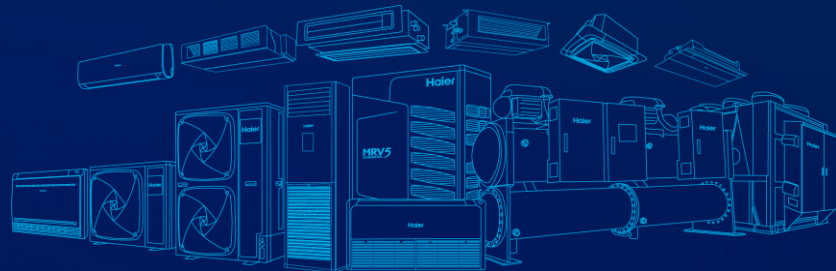


Industrial Solution

Location: Faisalabad Lahore

Project Name: Interloop HD-2

A smart and healthy air provider, Serving different industry



Thanks!