



Daikin McQuay Magnitude™ Magnetic Bearing Centrifugal Chiller

Magnitude™ Chillers

- Two models, from 145 to 570 tons
- Magnetic bearing compressor system eliminates the efficiency losses inherent with traditional compressors
- McQuay was first in the chiller industry to utilize magnetic bearing technology, in 2004



Magnitude™ WMC



Magnitude™ WME

	Turbocor	Screw Compressor	Savings
IPLV kW/TR	0.38	0.63	0.25
Tons capacity	90.0	90.0	—
kW*	34.0	57.0	23.0
Annual operating days	240	240	—
Operating hours per day	12	12	—
Total annual kWh	97,920	164,160	66,240
Power cost (\$/kWh)	\$0.10	\$0.10	—
Annual operating cost	\$9,792.00	\$16,416.00	\$6,624.00
2-year cumulative savings			\$13,248.00
3-year cumulative savings			\$19,872.00
	Turbocor	Screw Compressor	CO₂ Savings
Annual CO₂ Emissions (lbs.)	74,224	114,052	39,828

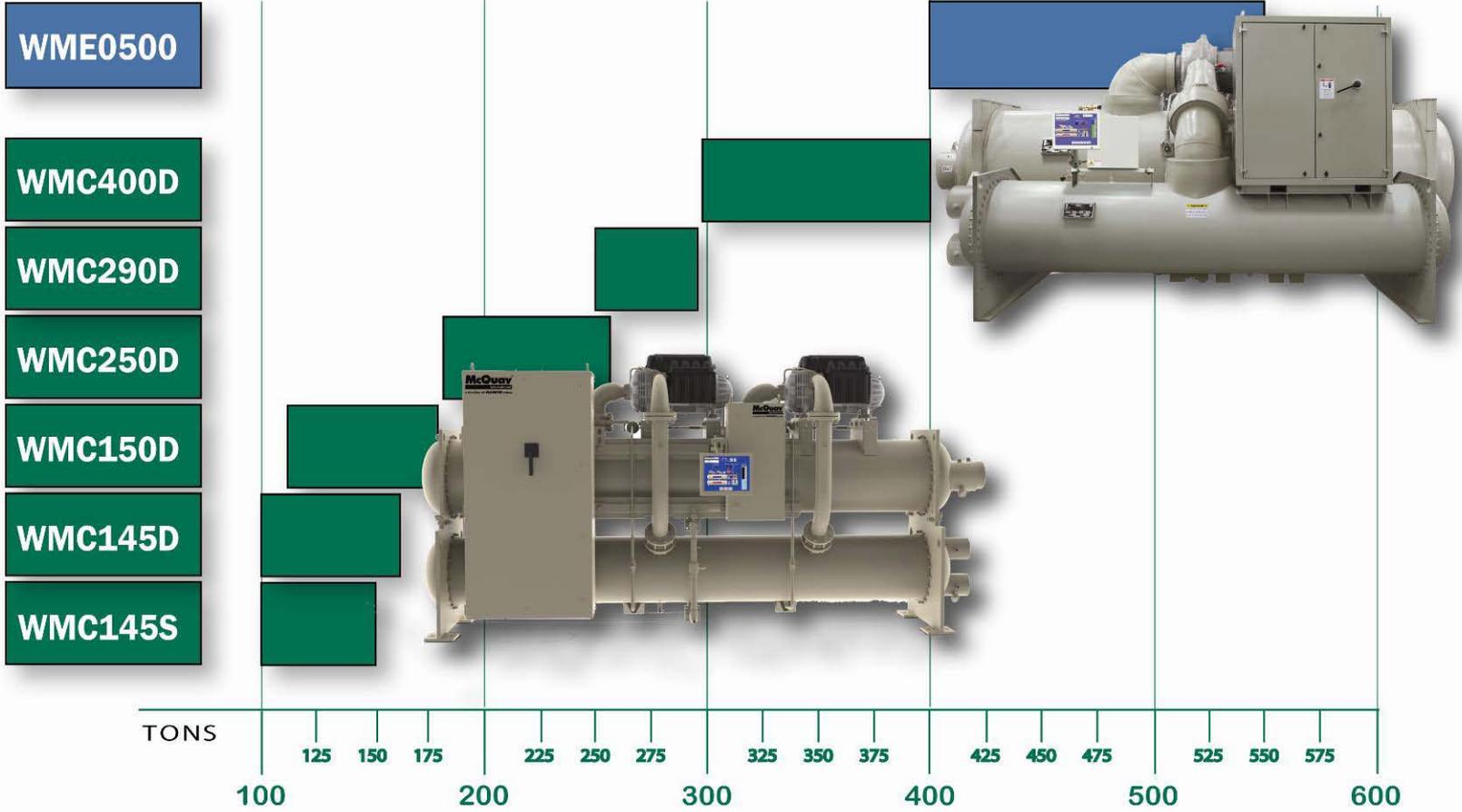
* Calculations based on average load of 60%

Savings add up economically and environmentally.

DAIKIN McQUAY™

MAGNITUDE™

Model:

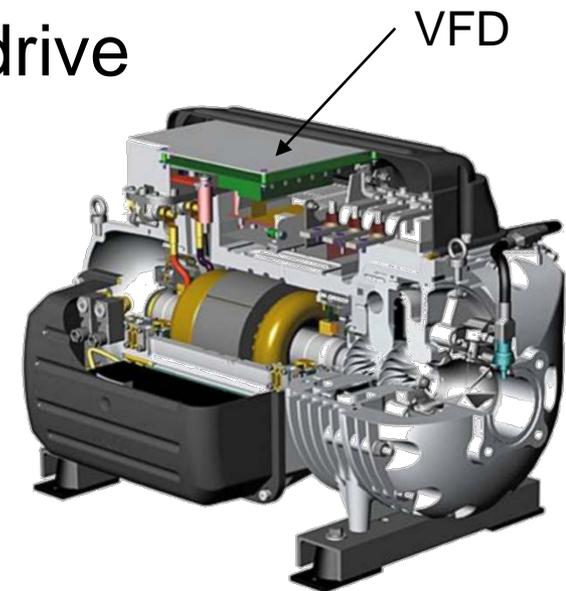


Innovative Compressor Design

- Magnetic bearings
 - No contact = No friction = Greater efficiency
- Oil-free design
 - No contact surfaces = No oil or oil handling equipment
- Integrated variable frequency drive



Magnitude™ WME Compressor



Magnitude™ WMC Compressor

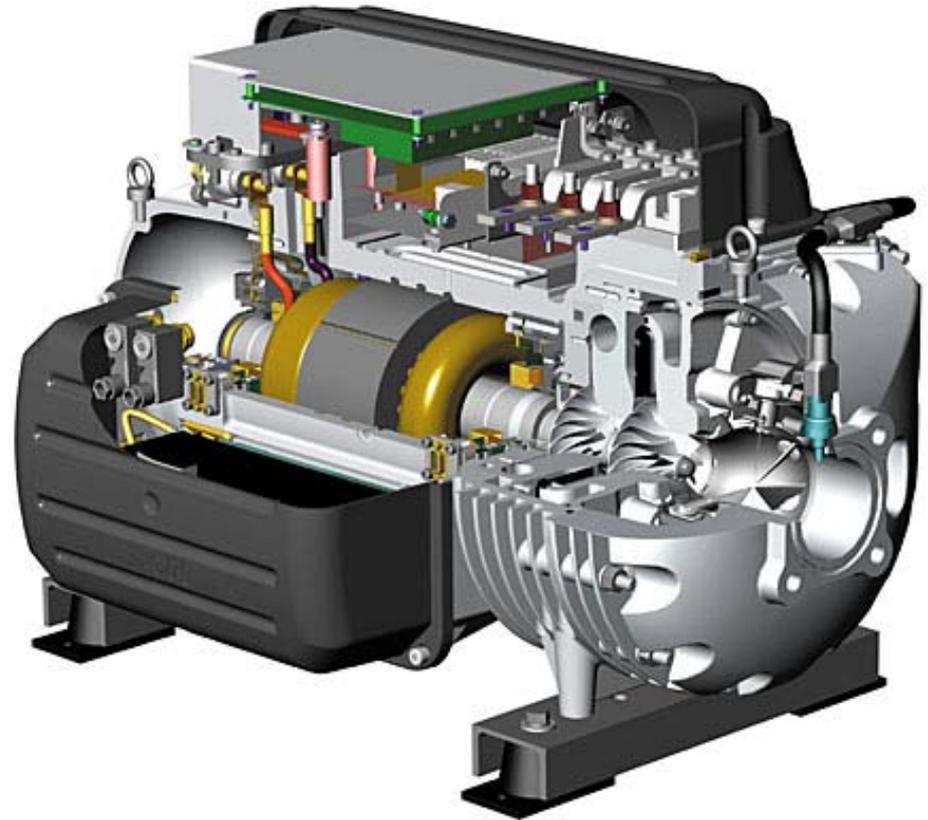


In addition to having a significant full and part load efficiency advantage and being Oil-Free, this compressor:

- Is so quiet, that with typical background noise, you can't hear it run.
- Redefines soft-start, pulling only 2 amps vs. the 500 to 600 amps of a typical screw compressor.
- Only weighs 1/5 that of a typical screw compressor
- Because of its Integrated Compressor Design (ICD), it inherently has a built in VFD - not one that is added on after the fact.

Why a Variable Speed Drive?

- To provide the extremely high part load efficiencies
- The compressor's speed ranges from 18,000 to 48,000 RPM.
- This compressor only draws 2 amps to start compared to 500 to 600 amps on a typical screw compressor



Why a Centrifugal Compressor?

- Centrifugals provide the industry's highest full load efficiency
- When coupled with a variable-speed drive, they also provide the very best part load efficiency
- Most owners would really rather have a centrifugal.
- Especially a centrifugal with only one major moving part

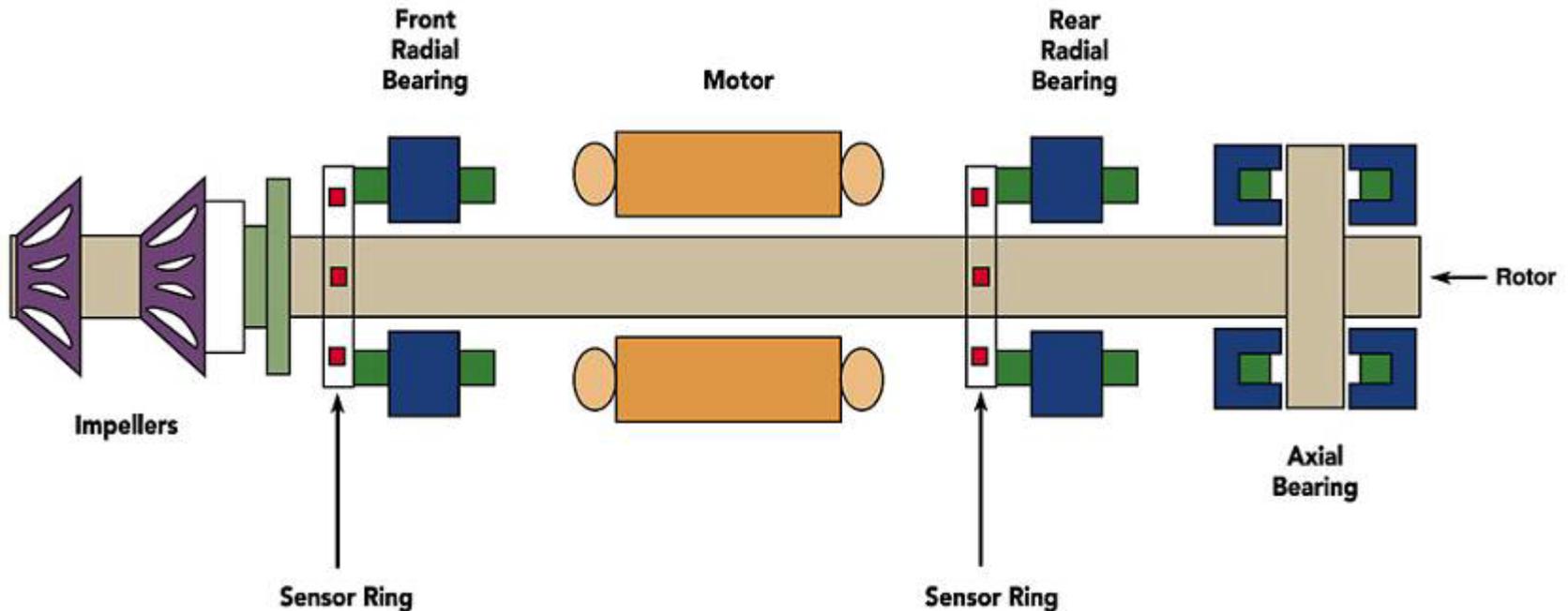


Why Magnetic Bearings?

- Eliminates the ability of the oil to contaminate the refrigerant (key to sustainability)
- Eliminates cost of oil management systems (hardware and controls)
- Increases equipment life through elimination of wear surfaces



Magnetic Bearing System



Magnetic bearings and sensors keep the shaft properly centered and positioned at all times.



R-134a Refrigerant

- No phase-out schedule, no ozone depletion potential
- Positive pressure refrigerant = reduced contaminant risk
- On-board refrigerant containment
- Simpler, more cost-effective solution
 - No purge system required
 - Units ship with refrigerant
 - No recovery system required
- Many Magnitude units earn 2 LEED® points for Category EAC 4, *Enhanced Refrigerant Management*

Industry-Leading Performance

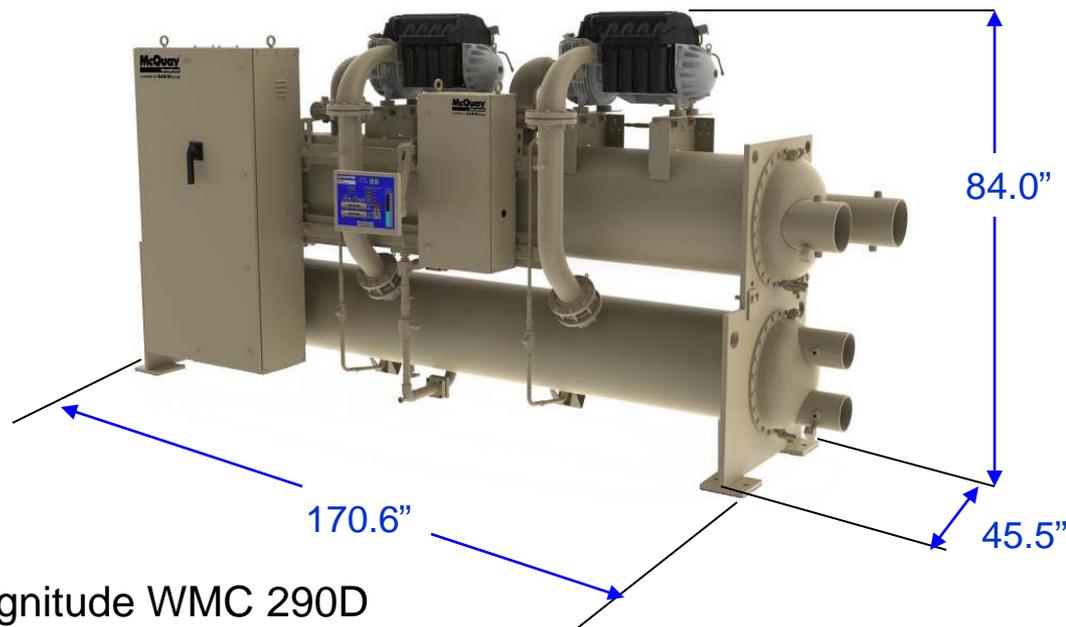
Model	Capacity tons	Full load, kW/ton	IPLV
WME500S	570	0.570	0.335
WME500S	500	0.532	0.312
WMC400D	390	0.604	0.330
WMC400D	360	0.576	0.327
WMC290D	290	0.634	0.328
WMC250D	250	0.633	0.357
WMC150D	150	0.619	0.358
WMC145D	145	0.638	0.370
WMC145S	145	0.668	0.364

← 14% Energy Savings Over Comparable Standard Centrifugal Chiller w/ VFD

39% Energy Savings Over Fixed Speed Centrifugal Chiller

Daikin McQuay Magnitude™ Chiller

- Ideal for renovation or replacement projects
- More space available for patient rooms



Reliable

- Magnitude chillers have proven their reliability in 1,000 installations around the world



Daikin McQuay Magnitude™ Chiller

- Easy to install
 - Less disruption for patients and staff
 - Faster occupancy of renovated or expanded space



Daikin McQuay Magnitude™ Chiller

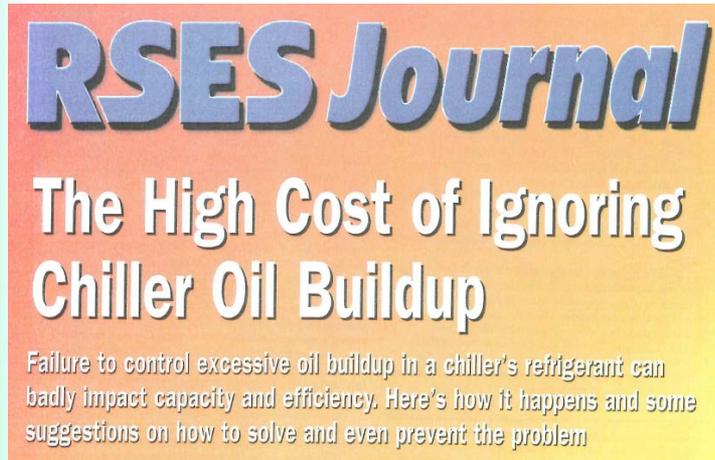
- Oil-free, magnetic bearing compressor eliminates the oil management system and associated service requirements
 - Helps manage your maintenance overhead costs
 - No oil contamination of refrigerant so efficiency can be sustained over the life of the chiller



Internal view of Magnitude WME chiller magnetic bearing compressor – frictionless, oil-free design

Oil-Free Magnitude™ Unit Offers Sustainable Performance

Positive pressure, oil-free design eliminates the performance degradation due to non-condensables and oil contamination of the refrigerant



RSES Journal
The High Cost of Ignoring Chiller Oil Buildup
Failure to control excessive oil buildup in a chiller's refrigerant can badly impact capacity and efficiency. Here's how it happens and some suggestions on how to solve and even prevent the problem



THE HVACR CONTRACTOR'S WEEKLY NEWSMAGAZINE SINCE 1926
Air Conditioning | Heating | Refrigeration
the NEWS
JUNE 5, 2006 WWW.ACHRNEWS.COM A BNP MEDIA PUBLICATION \$3.00
The High Cost of Oil Contamination

Oil Contamination

Oil In Evaporator	Performance Loss
1-2%	2-4%
3-4%	5-8%
5-6%	9-11%
7-8%	13-15%

Source: *The News*, 04/15/04, by Jack Sine

The Simplicity of Being Oil-Free

	<u>Standard Centrifugal</u>	<u>Magnetic Bearing Centrifugal</u>
Oil	YES	NO
+ Oil Heater	YES	NO
+ Oil Cooler	YES	NO
+ Oil Pump/Starter	YES	NO
+ Oil Reservoir	YES	NO
+ Oil Filter	YES	NO
+ Oil Piping/Valving	YES	NO
+ Oil Sensors/Controls	YES	NO
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	= More things to break, more maintenance, more \$	No concerns, no cost

Daikin McQuay Magnitude™ Chiller

Touch screen operator interface

- Standard on all Magnitude chillers
- Easy to learn, easy to use for facility staff
- Chiller status, trends and control setpoints available at your fingertips



Total Customer Care from McQuay

- Before it ships....
 - Factory run-tested to arrive at the job site ready to operate
- At initial start up...
 - McQuay Service will start up your unit
 - Faster start-up means faster building occupancy
- Through the life of your system....
 - McQuay Factory Service planned maintenance agreements available



Want to be a greener facility?

- Daikin McQuay Magnitude Chillers use HFC-134a refrigerant
 - No ozone depletion potential; no phase out schedule
- Magnitude Chiller performance can contribute to the following LEED® points:
 - Energy and Atmosphere Credit 1 1 to 19 points possible
 - Energy and Atmosphere Credit 4 2 points





Magnitude Chillers are a Great Choice for...

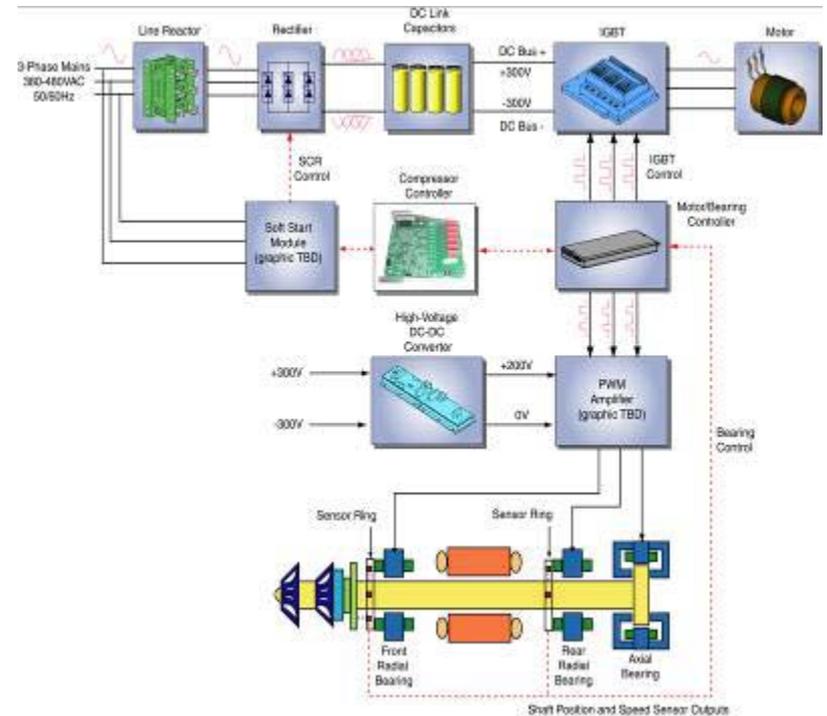
- Areas with high electric rates
 - Immediate savings and quick payback
- Sound-sensitive environments
 - It's the quietest chiller in its size range
- Buildings with high lease rates
 - Small footprint means smaller equipment rooms and more space available for leasing
- Limited space for moving or install units
 - WMC models fit through standard 4' wide doors

Integrated Compressor Design

The “right way” to design a cooling system

A Design that includes:

- Digitally controlled bearings,
- Digitally controlled power,
- A Digital control that integrates and optimizes the:
 - compressor
 - expansion valve(s)
 - w/chiller control
- A Digital control with up to 150 points of diagnostic information



Real Savings in Real Jobs



Florida Community College,
North Campus
Jacksonville, Florida

We installed a 300-ton Daikin McQuay frictionless centrifugal chillers as part of an upgrade to our campus chiller plant and BAS system. The North Campus reduced its electrical usage by 519,514 kWh in the first six months. This chiller contributes 30 to 40% of our energy savings for the entire system upgrade.

Mark Gandy, North Campus HVAC Facilities Manager

Real Savings in Real Jobs



One Crawford Condominiums
Portsmouth, Virginia

We saved 3,000 a month in electrical costs after replacing our old chillers with two Daikin McQuay frictionless centrifugal chillers. And the units are so quiet, the residents living directly below the chillers cannot hear them operate.

Charles Twine, Vice President of the Crawford Residents Association

Daikin McQuay Magnitude™ Chiller Facilities Solutions

Lowest Total Cost of Ownership

-  High efficiency for low operating costs
-  Reduced maintenance costs
-  Sustainability

