Data Centers *with*
V-CLASS CHILLERS
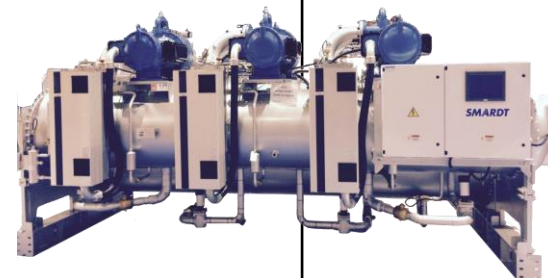
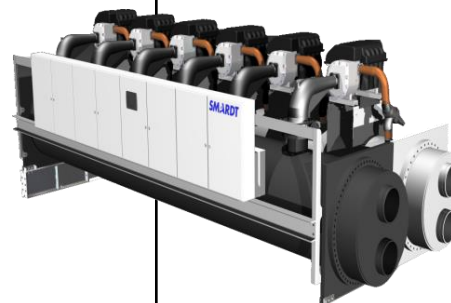**SMARDT**

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Water Cooled Chillers
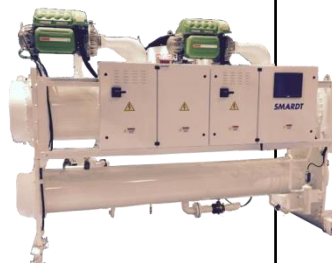
G Class Water
1 to 6 Centrifugal TG
DTC Compressors
80 – 530 TRs

V Class Water
1 to 6 Centrifugal VTT
DTC Compressors
350 – 2400 TRs

T Class Water
1 to 8 Centrifugal TT
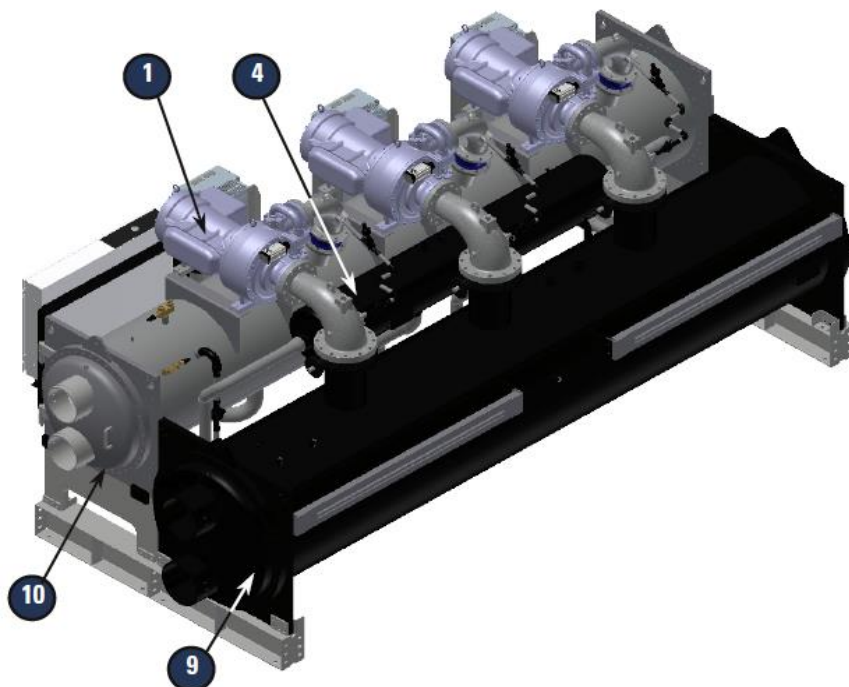**DTC Compressors**
60 – 1200 TRs

100   500   1000   1500   2000   **TRs**

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1	**Compressor**	**6**	**Control cabinet**
2	**Evaporator**	**7**	**Power supply box**
3	**Condenser**	**8**	**Compressor power module**
4	**Economizer**	**9**	**Evaporator water box**
5	**Chiller controller touch panel**	**10**	**Condenser water box**

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VTT Model	Nominal Capacity		Max. Press. Ratio	Weight kg [lbs]	Dimensions - mm [in]		
	Tons	KW			Length	Width	Height
VTT 700	200	703	3.4	n/a	n/a	n/a	n/a
VTT 800	250	879	3.0	n/a	n/a	n/a	n/a
VTT 880	250	879	3.4	n/a	n/a	n/a	n/a
VTT 1000	300	1054	3.4	n/a	n/a	n/a	n/a
VTT 1200	350	1230	3.0	440 [960]	1093 [43]	668 [26.3]	751 [29.5]

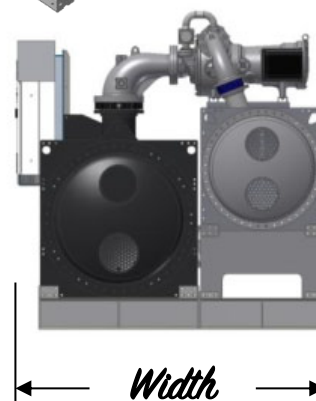| Power Module	KW	Compressor Model	Weight kg [lbs]	Dimensions - mm [in]		
				Height	Width	Depth
D2-N232	232	VTT 880,1000 and 1200	125 [275]	1041 [41]	432 [17]	381 [15]
D1-N165	165	VTT 700 and VTT800	62 [135]	838 [33]	330 [13]	381 [15]

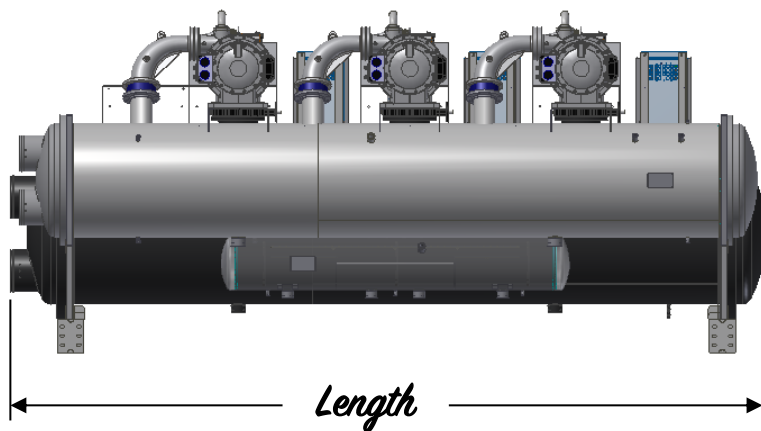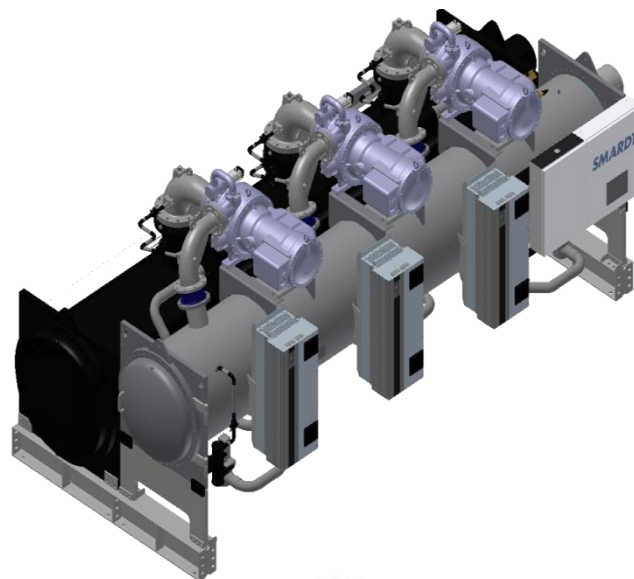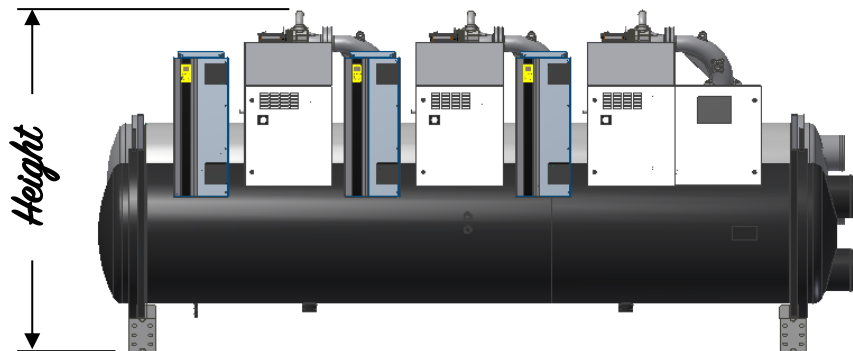*VTT800 and 880 models have the same design capacity but the 880 uses the larger drive to allow operation at higher pressure ratios.*

Refrigeration Capacity (in Tons)

VTT700 Up to 200 TR
VTT800 / VTT880 Up to 250 TR
VTT1000 Up to 300 TR
VTT1200 Up to 350 TR

intraflow valve
discharge flange
motor portion
motor cooling exit port
suction flange
economizer port
motor cooling inlet fitting
motor power terminal box

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| Total Length | 5776 mm | Total Width | 2680 mm | Total Height | 2502 mm |

3 **Primary Goals of Data Center HVAC**
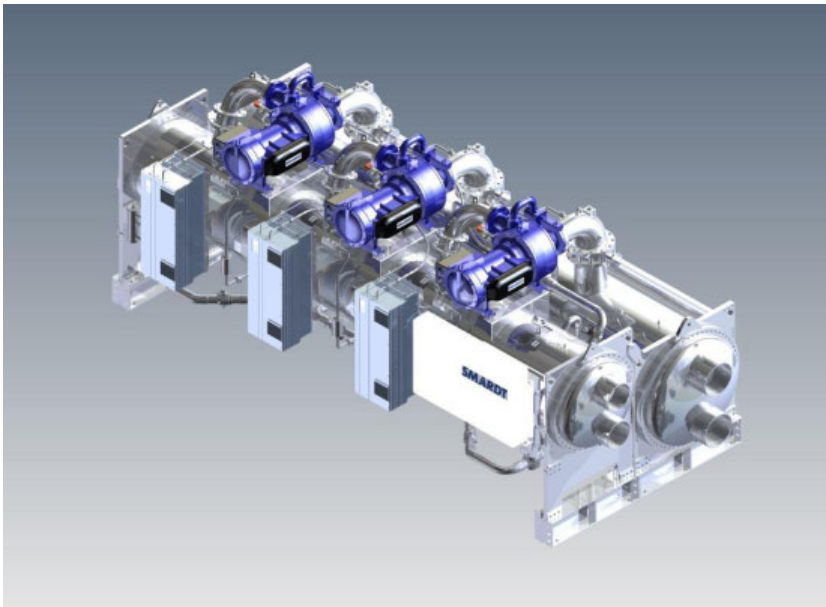
$ **To save money on ENERGY COSTS**

Minimize SYSTEM DOWNTIME

Reduce the company's CARBON FOOTPRINT

SMARDT

1

ENERGY CONSUMPTION COSTS

OIL LESS compressor

DUAL STAGE, centrifugal

High **EFFICIENCY** chiller

⚡🔋 **Full load:** 0.55 kW/ton
COP 6.4

⚡🔋 **IPLV:** 0.35 kW/ton
COP 10.06

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1 ENERGY CONSUMPTION COSTS
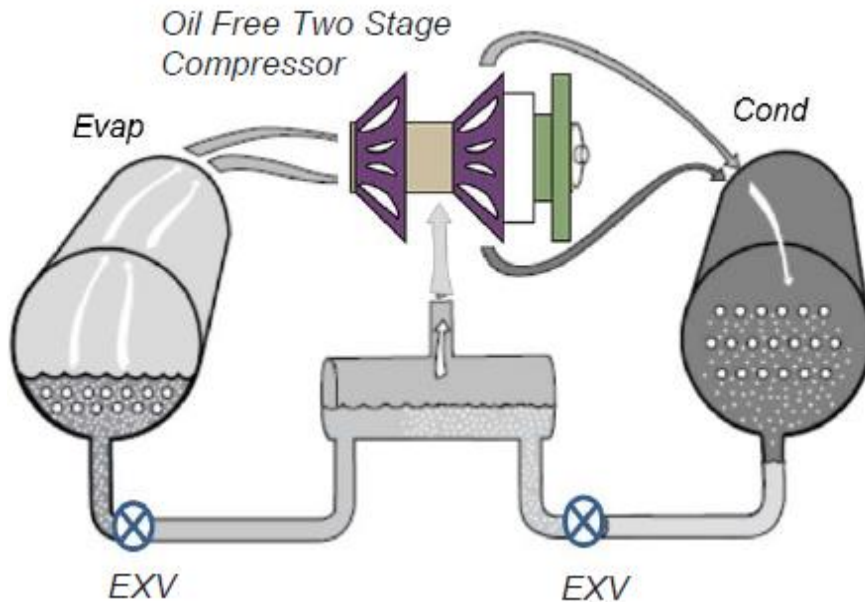
ECONOMIZER mode

FLASH TANK type

Up to **8% INCREASE** *in* **EFFICIENCY**

Oil Free Two Stage Compressor

Evap

Cond

EXV

EXV

discharge flange

intraflow valve

motor portion

motor cooling exit port

suction flange

economizer port

motor cooling inlet fitting

motor power terminal box

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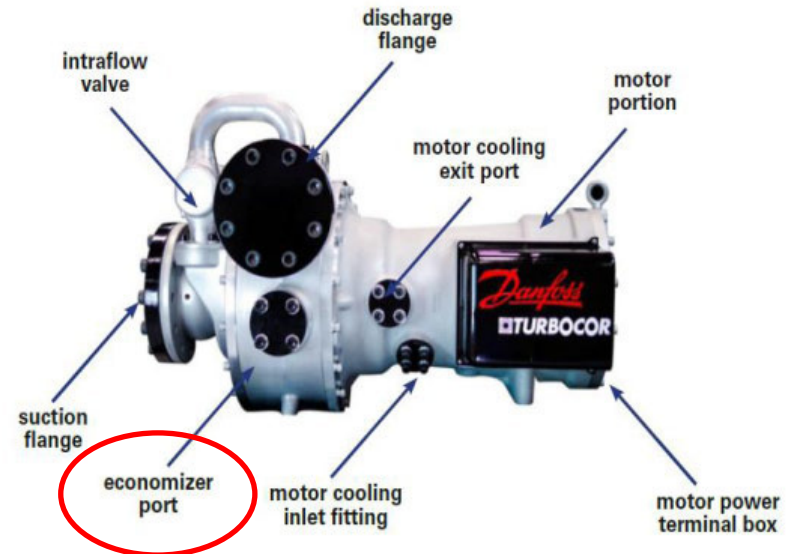
1 ENERGY CONSUMPTION COSTS
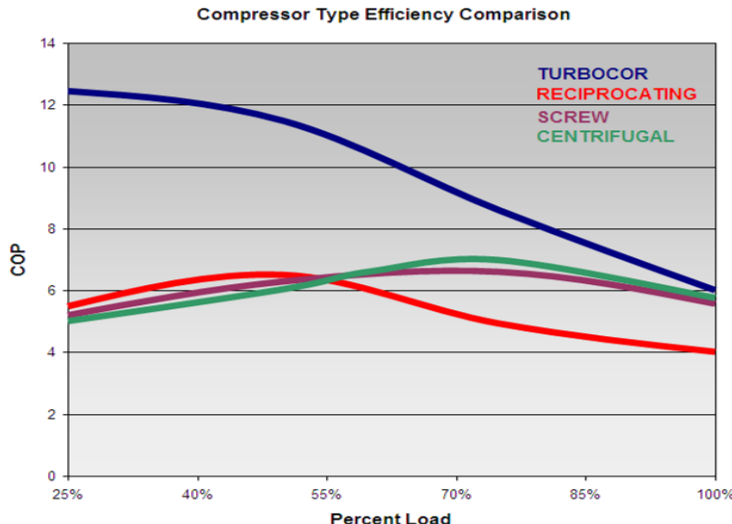
% ENHANCED **EFFICIENCY** *above* 70% LOAD

RUN *the* REDUNDANT CHILLERS

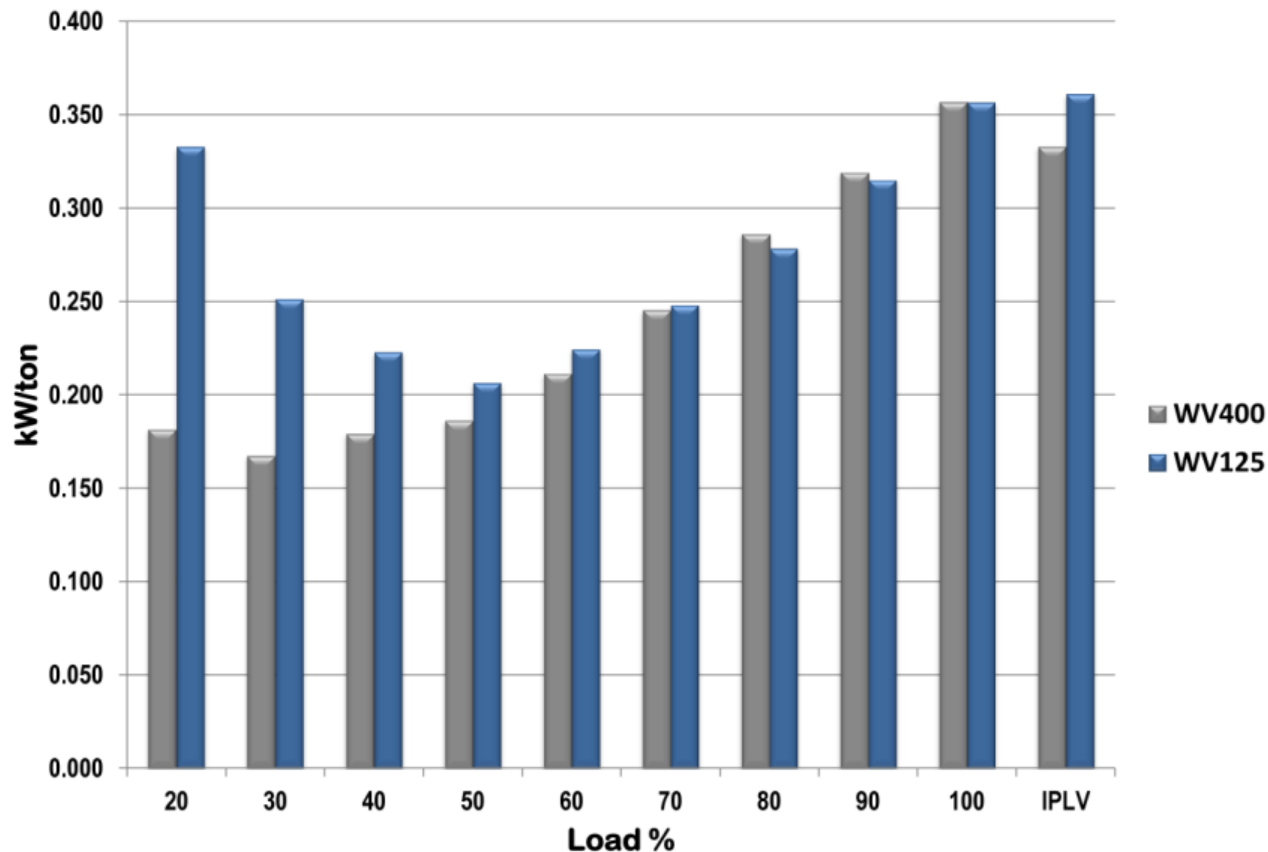**Chilled Water System** **EFFICIENCY** IMPROVES GREATLY *with* INCREASED **Data Center Capacity**

Design **the system to operate at HIGHER chilled water temperatures**

Compressor Type Efficiency Comparison

TURBOCOR
RECIPROCATING
SCREW
CENTRIFUGAL

COP

Percent Load

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kW/ton Comparison WV400 x WV125

LChW

17°C [62.6°F]

ECW (100%)

31°C [87.8°F]

Water Flow

Constant

SMARDT

kW/ton Comparison WV400 x WV125
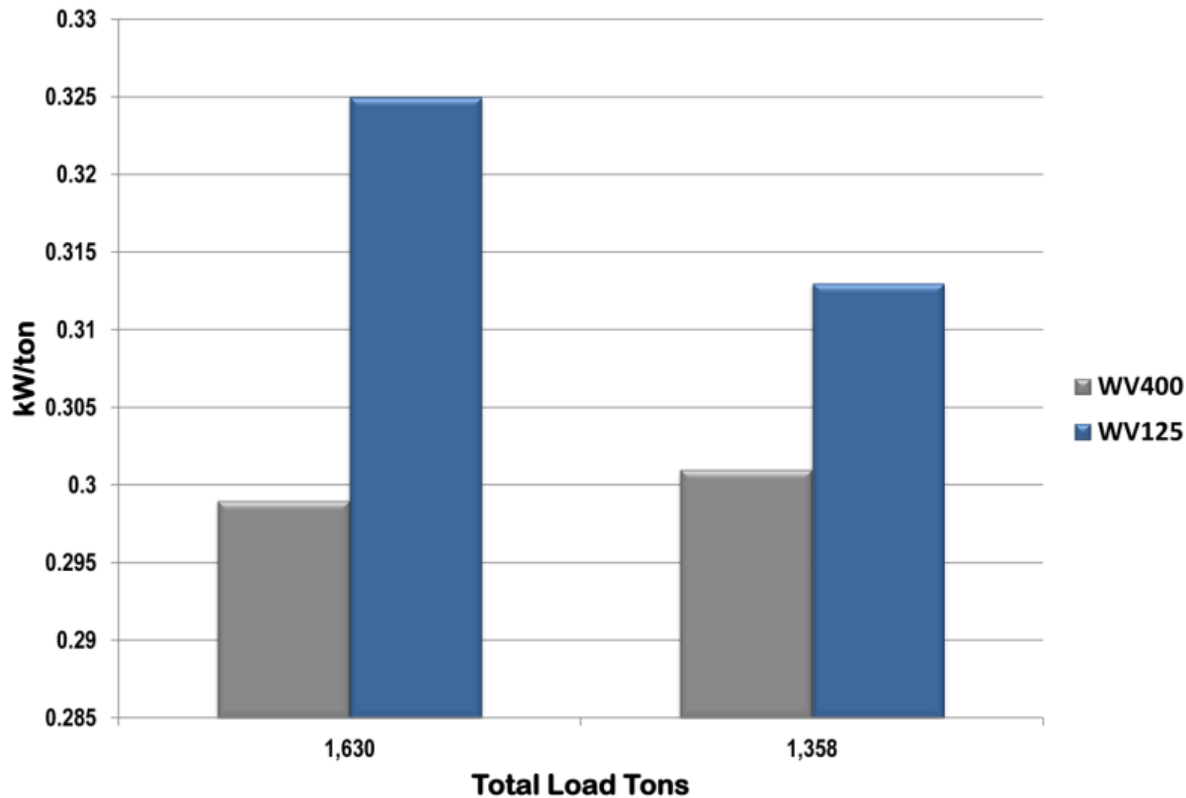
LChW

17◦C [62.6◦F]

ECW

31◦C [87.8◦F]

Water Flow

Constant

SMARDT

3 **Primary Goals of Data Center HVAC**

To save money on ENERGY COSTS

Minimize SYSTEM DOWNTIME

Reduce the company's CARBON FOOTPRINT

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2 SYSTEM DOWNTIME

ROBUST compressor

FAST RESTART *option*

Built in redundancy *reduces* **DOWNTIME**

CONTINUOUS OPERATION *during* **Maintenance**

Chilled Water Systems *Can Be* **ENGINEERED** *To Be* **EXTREMELY RELIABLE**

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3 **Primary Goals of Data Center HVAC**

To save money on ENERGY COSTS

Minimize SYSTEM DOWNTIME

Reduce the Company's CARBON FOOTPRINT

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3 CARBON FOOTPRINT

CO₂

HFC Refrigerant

HIGH **EFFICIENCY** chiller

Extremely LOW VIBRATION (no leaks)

ADVANCED CONTROLS

POWER monitored

BETTER BALANCE *in* power distribution *and* usage
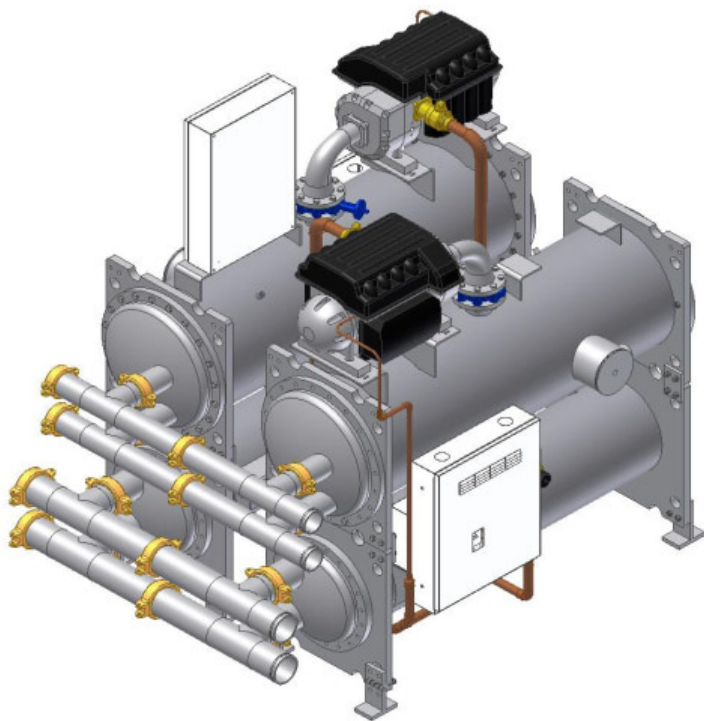
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Other Important Goals of Data Center HVAC

3

To save money on INITIAL COSTS

NOISE considerations

Integrated CONTROLS

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4 INITIAL COSTS

Lowest **LIFE CYCLE COST** in its class
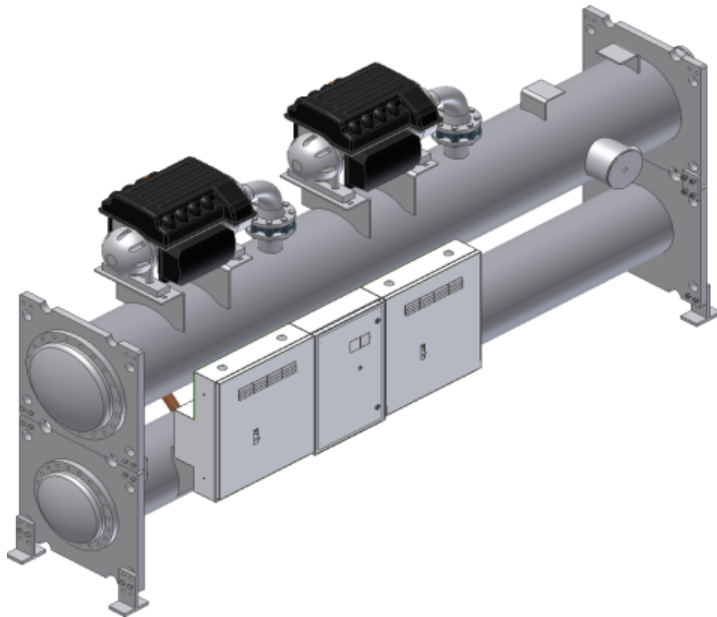
SIMPLE REPLACEMENT *for* **4,160 V chillers**

SMALLER footprint

UNIT READY *from* **factory**

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4 INITIAL COSTS

REDUCED COSTS *with* **water piping**

Chilled water piping loops are EASILY RUN very LONG DISTANCES and CAN SERVICE MANY IT ENVIRONMENTS (or the whole building) from one chiller plant

LESS PIPING compared to more chillers

LESS PUMPS, VALVES (more **EFFICIENT**)

Chilled water CRAH COST LESS, *contain* **FEWER PARTS,** *and have greater* **HEAT REMOVAL CAPACITY** *than* **CRAC units with the same footprint**

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3

Other Important Goals of Data Center HVAC

To save money on INITIAL COSTS
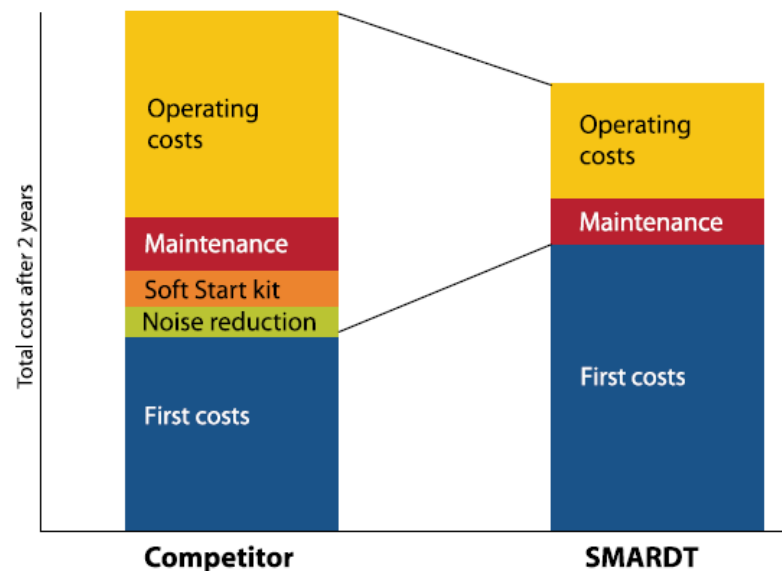
NOISE Reduction

Integrated CONTROLS

SMARDT

5 NOISE

SMALLEST NOISE LEVEL
for **its capacity**

Also **HELPS** *to* **REDUCE INITIAL COSTS**

Total cost after 2 years

Competitor:
- Operating costs
- Maintenance
- Soft Start kit
- Noise reduction
- First costs

SMARDT:
- Operating costs
- Maintenance
- First costs

SMARDT

Other Important Goals of Data Center HVAC

3

To save money on INITIAL COSTS

NOISE considerations

Integrated CONTROLS

SMARDT

6 CONTROLS

Proprietary CONTROL

BAS *Simple* **BAS INTEGRATION**

👍 **USER** *friendly*

📊 *Integrated* **VARIABLE SPEED**
Chilled Water Plants

💲 **CPECS** *optimizes* **TOTAL**
INTEGRATED ENERGY EFFICIENCY

SMARDT

CPECS

SMARDT

To save money on
ENERGY COSTS

Minimize
SYSTEM DOWNTIME

Reduce the Company's
CARBON FOOTPRINT

To save money on
INITIAL COSTS

NOISE
Reduction

Integrated
CONTROLS

SMARDT