SEELEY INTERNATIONAL

IV International distributor conference

Venice, 18th-20th February 2016

Breezair Climate Wizard convair Coolerado

AUSTRALIAN MADE & OWNED

SEELEY INTERNATIONAL

Our Vision:

To lead the world in creating
climate control solutions
which continue to be highly innovative,
of premium quality and inspirational
in their delivery of energy- efficiency.

AUSTRALIAN MADE & OWNED

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Breezair
NUMBER ONE IN NATURAL COOLING

Braemar
HEATING COOLING

Climate Wizard
HYPER-EFFICIENT COOLING

convair

coolair

Braemar
Tudor Romeo

Coolerado

AUSTRALIAN MADE & OWNED

'Complete Climate Control Solutions'

SEELEY INTERNATIONAL

More than 40.000 units installed every year!

INDUSTRIAL & MFG

Kellogg's

Cummins

Coca-Cola

LALA

Nestlé

BIMBO

DATA CENTERS

at&t

NSIDC
National Snow and Ice Data Center

Green House Data
an economically responsible data center

eTb Inspírate

UNIVERSIDAD IBEROAMERICANA
CIUDAD DE MÉXICO

AISO.net
WEB HOSTING AS NATURE INTENDED

HEALTH CARE

Intermountain Healthcare

Banner Health

UNIVERSITEIT STELLENBOSCH UNIVERSITY

Charles Sturt University

Genentech
IN BUSINESS FOR LIFE

RESTAURANTS

CHIPOTLE
MEXICAN GRILL

McDonald's

Juicy Lucy's STEAKHOUSE
The hottest grill in town!

famous brands

BURGER KING

HOUSTON'S

MILITARY

U.S.ARMY

DEPARTMENT OF THE NAVY
UNITED STATES OF AMERICA

U.S. AIR FORCE

AUSTRALIAN DEFENCE FORCE

COMMERCIAL

STAPLES

THE HOME DEPOT

Office DEPOT

ENGEN

BANORTE

ixe

National Bank
OF ARIZONA

Walmart

San Pablo
FARMACIA

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PART 1

PART 2

PART 3

PART 4

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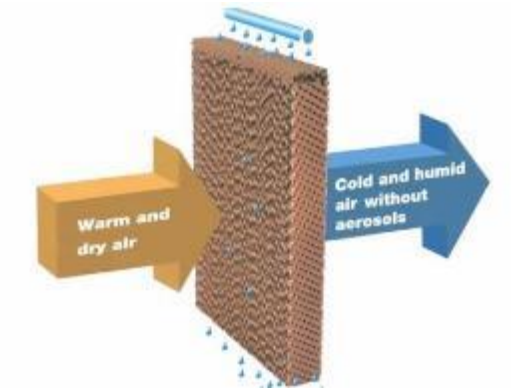
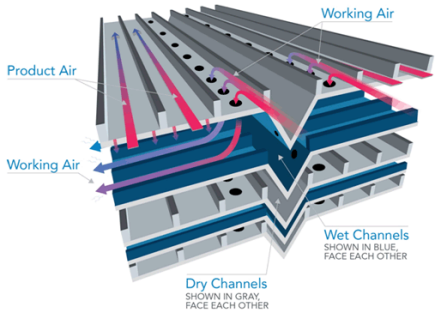
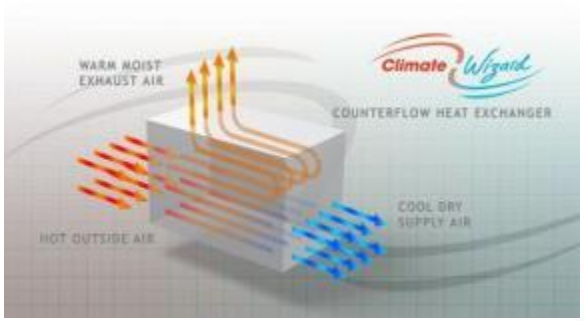
EVAPORATIVE COOLING : Direct / Indirect





Coolerado HMX



Climate Wizard core

Breezair
direct evaporative

Indirect evaporative
coolers cores

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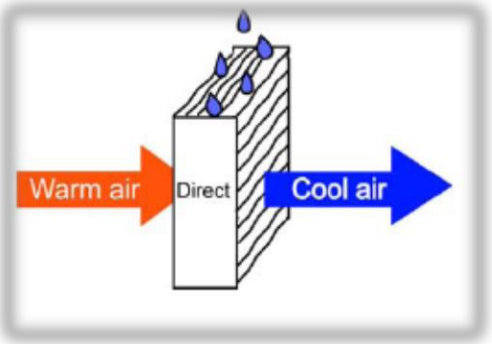
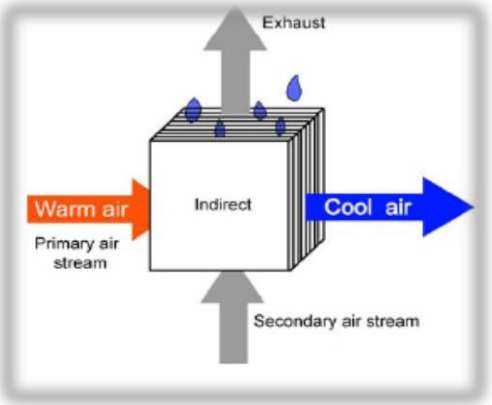
Definitions

- **Direct evaporative air cooler**
  - an evaporative air cooler in which the primary supply air is cooled and delivered directly onto the building
  - the cooled air has increased moisture content
  - Breezair coolers are all Direct Coolers.
- **Indirect evaporative Cooling**
  - indirect evaporative air coolers have two air circuits, primary and secondary. The secondary air (ambient) is cooled and passed through a heat exchanger and exhausted to atmosphere. The primary air is passed through the other side of the heat exchanger where it is cooled and delivered back to the room with no increase in moisture content.





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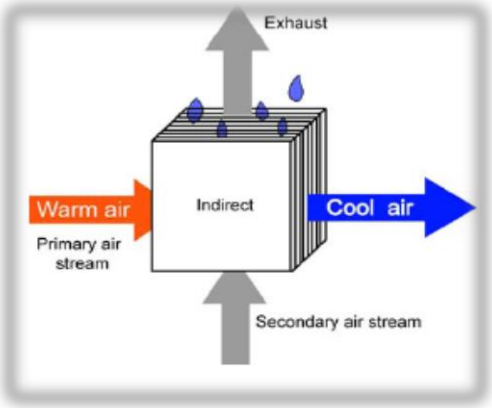
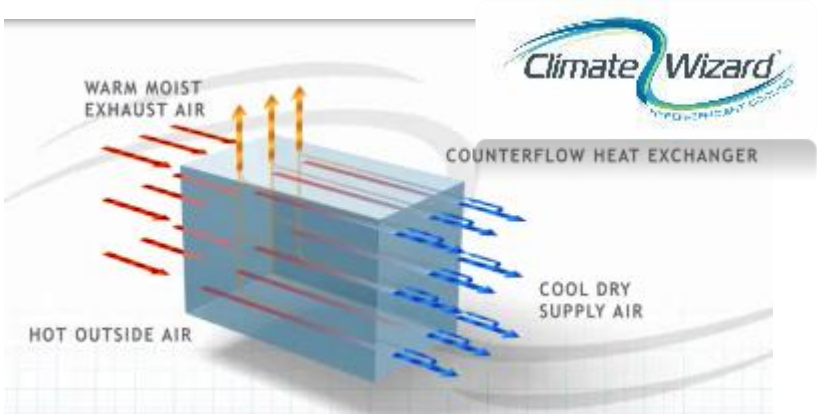
Definitions

- Maisotsenko first to patent the counterflow heat exchange in 1976.
- Using this design, demonstrated there was a possibility to cool below Wb temperature.
- Temperatures reached were below the Wb temp towards the Dp temp.
- Seeley used the principles and took many years to develop a working model.
- Seeley's working model could achieve Super Cooling.
- Applications available now, Pre-Cooling, Stand Alone Cooling, Supplementary Cooling, Hybrid Cooling and Heating, and Customised Cooling systems





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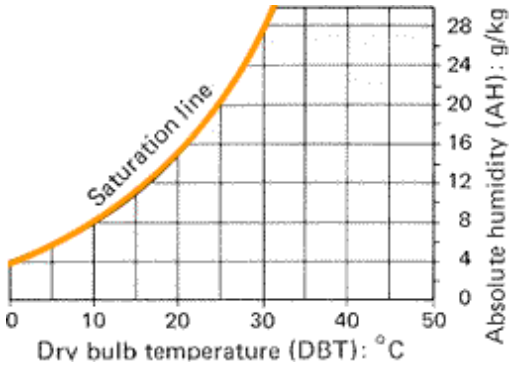
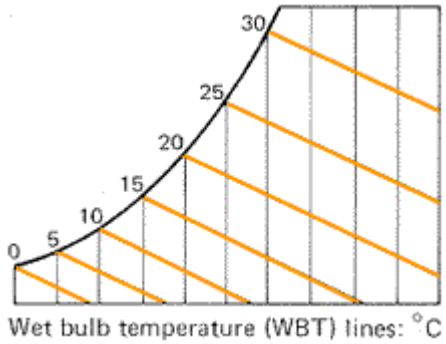
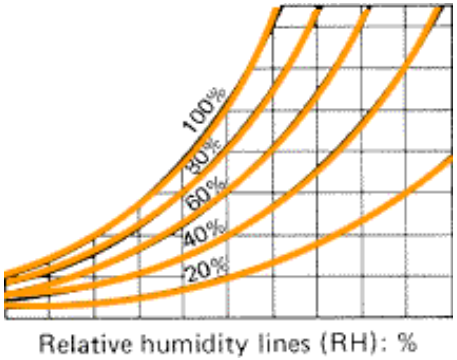
Definitions

- **Psychrometrics**
  - **Psychrometrics** is the field of engineering concerned with the determination of physical and thermodynamic properties of gas-vapor mixtures.
  - The **Psychrometric Chart** is a graph of the physical properties of moist air at a constant pressure (often equated to an elevation relative to sea level). The chart graphically expresses how various properties relate to each other. The thermophysical properties found on most psychrometric charts are:
    - dry-bulb temperature
    - wet-bulb temperature
    - dew point temperature
    - relative humidity %
    - humidity ratio







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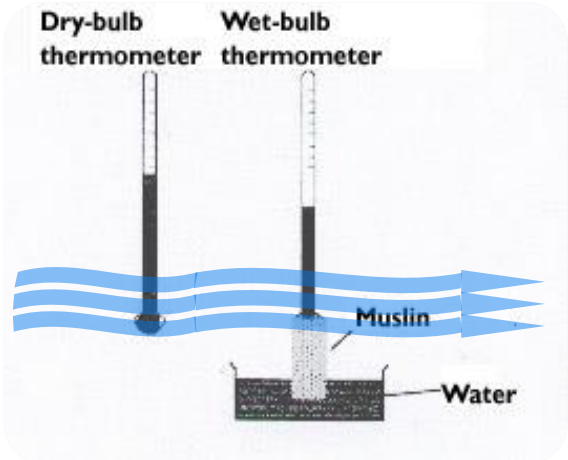
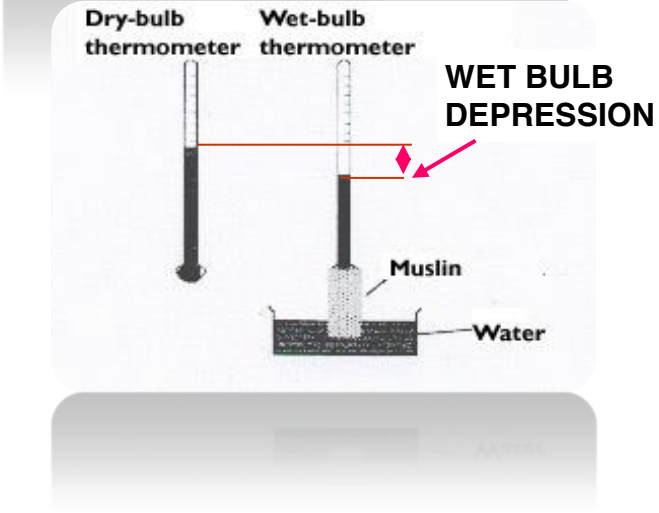
Definitions

- **Wet-bulb temperature**
  - the temperature of air measured with a thermometer having a wetted sock over the bulb. When moved rapidly in the air, evaporation lowers the temperature of the sock and the thermometer reading. Temperature reading is proportional to amount of moisture in the air.
- **Wet-bulb depression**
  - difference between dry-bulb and wet-bulb temperatures (WBD). The WBD can be translated directly into Relative Humidity.





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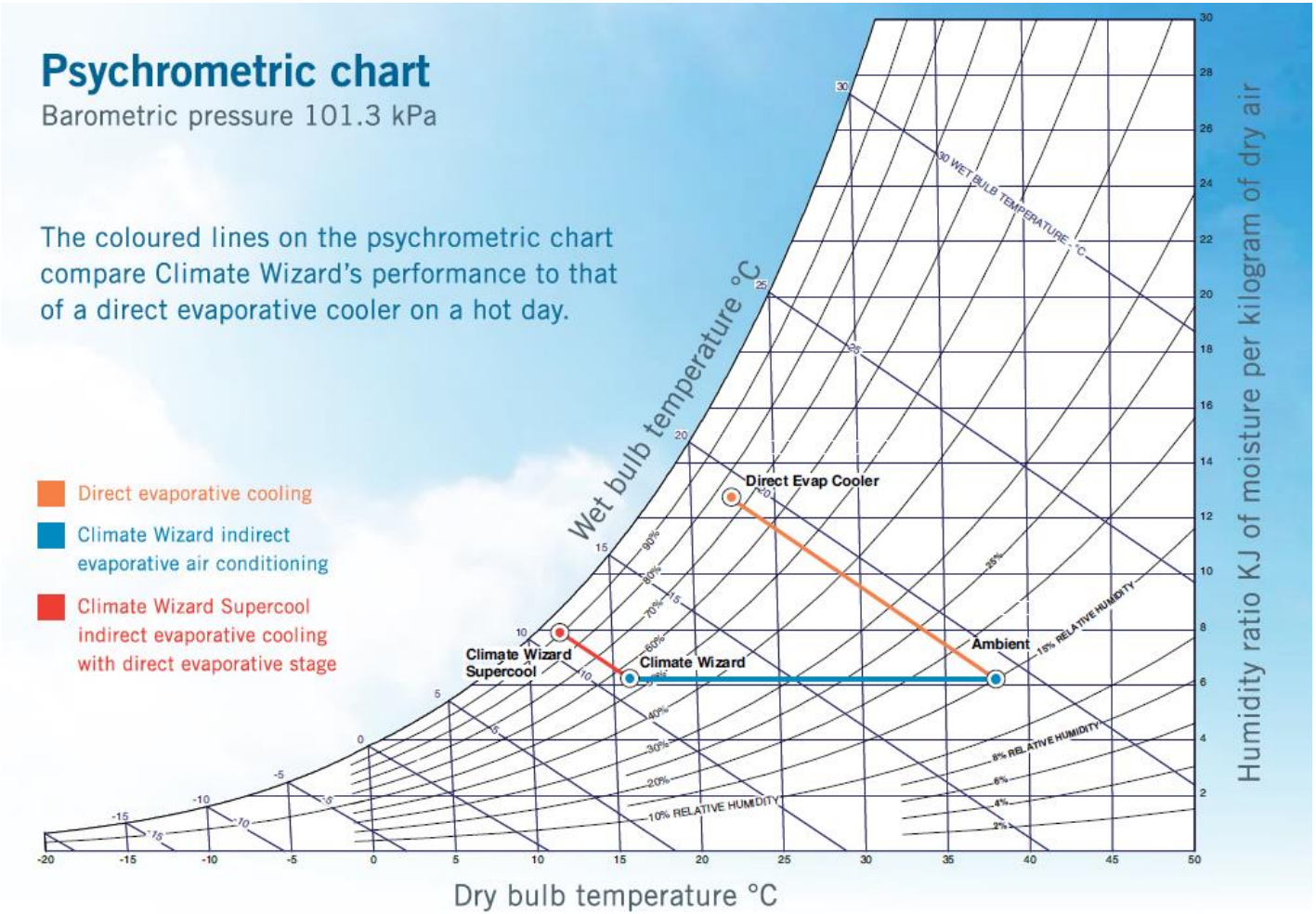
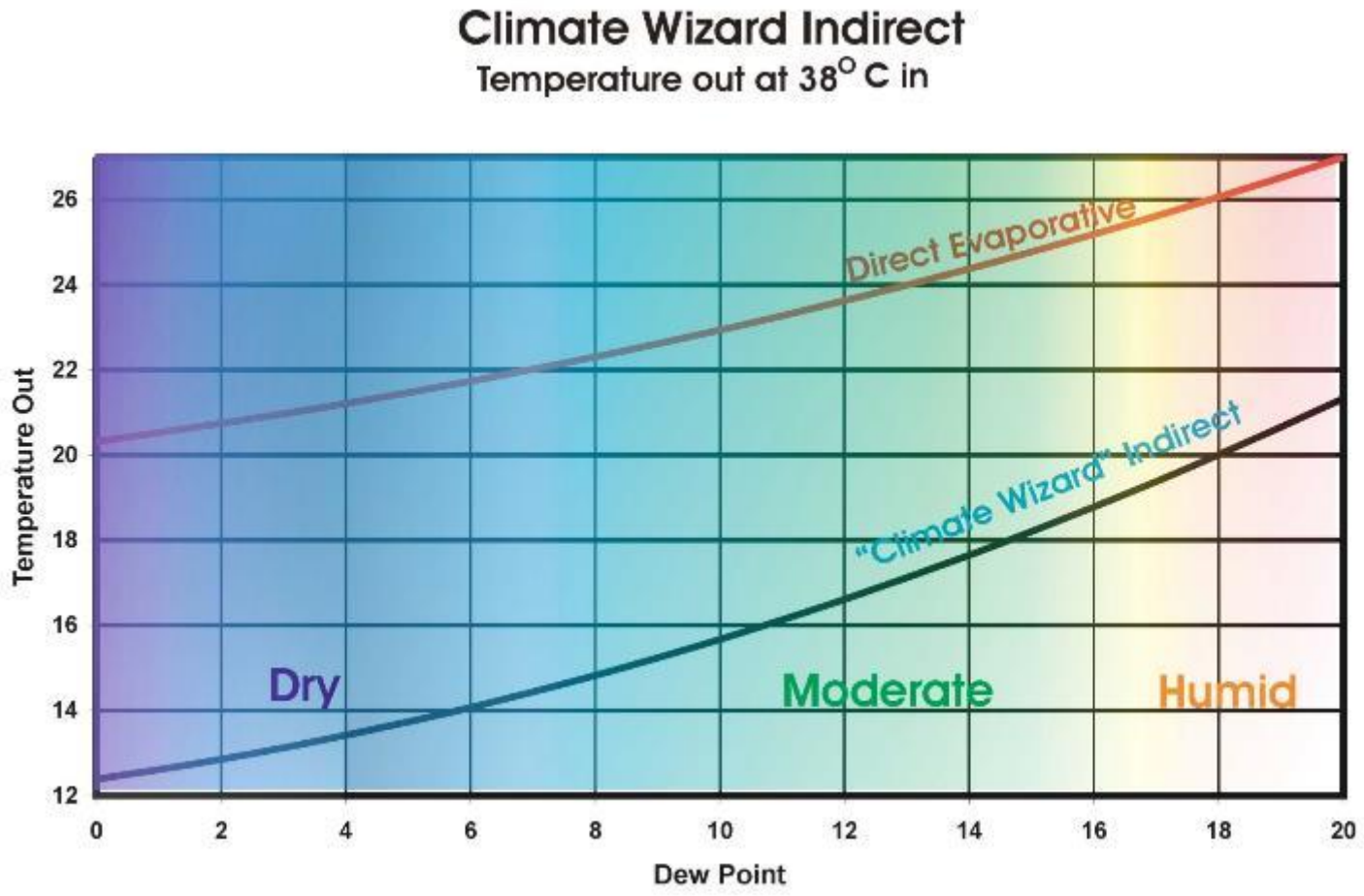
Comparison between indirect and direct evaporative cooling



Comparison between indirect and direct evaporative cooling



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BREEZAIR … What else?

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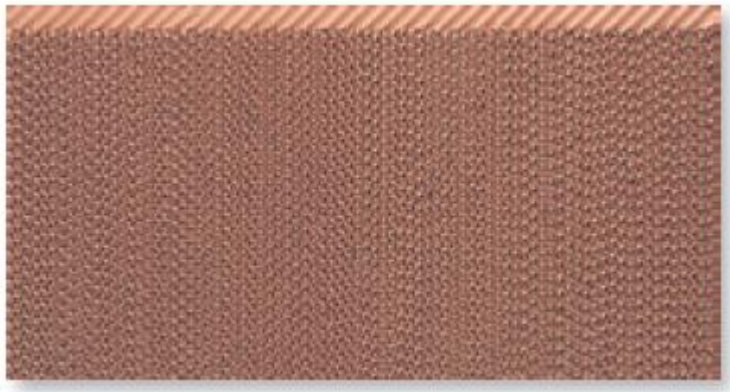
BREEZAIR TBA & ICON RANGE

ROBUST AND NO CORROSION

Permatuf™ corrosion-proof cabinet

The Breezair cabinet will not corrode or rust. The UV stabilised structural polymer material is the same type used to make acid baths, battery cases and some space satellite components. Plus, it's designed to blend with any property.



COLDER TEMPERATURES

Chillcel™ high efficiency pads

With strong, long-lasting Chillcel pads that last for up to seven years, maintenance is easy. Chillcel pads are made from organic paper materials, cleverly manufactured into honeycomb panels that have excellent structural and cooling strength. They are easy to clean and replace when necessary. Seeley International has been using Chillcel pads in our products for decades, so they have a proven track record.

25 Years	10 Years	2 Years
Corrosion-free cabinets guarantee	Structural components guarantee	Pump, motor & electronic control module guarantee

SEELEY INTERNATIONAL

BREEZAIR TBA & ICON RANGE

Tornado® water pump

The perfect pump for the job! The Tornado pump is built to last. Designed, manufactured and tested by Seeley International, the Tornado pump epitomises reliability. It features very safe material choices, an encapsulated motor with overload cut-out, stainless steel shafts and bearings fully protected from water. Plus, it has a clever impact-start feature that will overcome any tendency for the pump to become locked up with residue during prolonged off periods. The strong synchronous motor has constant speed, independent of voltage fluctuations, and runs very cool.

Clean and dry function

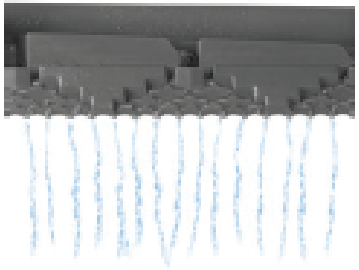
The cooler drains automatically when it's not in use, preventing algae growth and maintaining a clean cooler.

SEELEY INTERNATIONAL

BREEZAIR TBA & ICON RANGE

Non-clogging water distribution system

Breezair's non-clogging water distribution is one of the things that make it unique. The water distributor maximises cooling efficiency by supplying a continuous and balanced flow of water across the cooling pads. This is different to any other brand of evaporative coolers, which are subject to water flow variations for a number of reasons. Breezair's balanced flow ensures highest evaporation efficiency and maximum cooling.



AQUAflow™ : non clogging, balanced and constant water distribution. BREEZAIR innovative design, the AQUAflow maximises cooling efficiency by distributing a continuous and uniform flow of water across the cooling pads. The very clever design eliminates clogging.

WATERManager™ system

The Breezair WATERManager ensures optimum machine life with minimum maintenance by constantly checking water quality. As the water in the cooler evaporates, it leaves behind impurities and salts, which then become deposited on the cooling pads and cause the cooling power to fall. The WATERManager system senses water quality with a probe that sends a signal back to the electronic module, which then ejects some dirty water and allows fresh water to enter.

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BREEZAIR TBA & ICON RANGE

Industrial wall control (optional accessory)

The IWC can handle up to 10 smart hubs and control up to 41 Breezair coolers. The IWC identifies any faulty cooler in a group and provides comprehensive fault diagnostics enabling any cooler in a multi cooler installation to be quickly identified and repaired. The IWC10 may also be set up to control Breezair cooler from EXTERNAL devices, such as PLCs and Building Management Systems (BMS).

Thermostat control

Operate up to 41 coolers from a single wall control using up to 10 smart hubs (optional). Each cooler comes with 20 m wiring loom and it can be extended up to a maximum length of 40 m (optional).

BMS COMPATIBLE

Digital Smartbox™ / control power module

A state-of-the-art digital electronic control means optimum performance. The Smartbox digital control module monitors and controls all of the cooler's features to provide ultimate comfort conditions, temperature sensing and water quality supervision – completely safely and reliably. The module also incorporates diagnostic features and memory to aid trouble-shooting and minimise downtime. Several user choice parameters are available to allow you to set up your preferred environment.

The Breezair TBA Series: quiet cooling, optimum efficiency and unsurpassed reliability

Axial fan

The better the fan, the more efficient the system. This super powerful fan is designed to maximise performance and minimise noise. The purpose designed fans are inherently balanced, with aerofoil blades to provide energy efficient, high pressure performance.

MOST RELIABLE COOLER IN THE WORLD

12.600 m3/h - 950W motor
20kW cooling (Eurovent)

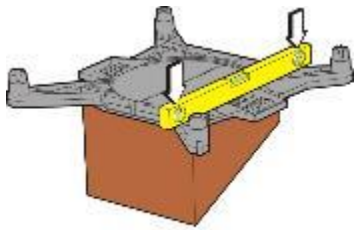
EASY INSTALLATION

AUTOWeatherseal

The AUTOWeatherseal closes the cooler air discharge outlet automatically, thus significantly reducing natural air currents from circulating in and out of the building. The result – a more comfortable and controlled environment.

Totally enclosed motor

Breezair's fan motor is fully enclosed to international standards and excludes any moisture ingress from all sources. The advanced design is rigorously tested and completely reliable.



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The Breezair Icon EXH Series:

WORLD QUIESTEST EVAP COOLER IN THE WORLD

(SPL 56dBA @ 4 metres)

Centrifugal fan

Centrifugal fans are the first choice of air conditioning engineers worldwide. The Breezair forward curved, centrifugal fans are made from injection-molded polypropylene. They are double-width, inherently statically and dynamically balanced, with aerofoil blades to provide high pressure performance and very low noise levels.

11.520 m3/h - 1500W motor
20kW cooling (Eurovent)

VERY HIGH EFFICIENCY

HushPower® direct drive (ECM) motor

Exclusive to Breezair, this motor is super efficient and electronically controlled for optimum efficiency. Corrosion resistant, it's the quietest motor available and has unsurpassed reliability, reduced energy use and runs at variable speeds.

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Breezair Supercool Range

Supercool EXS220 :
15% more cooling capacity vs EXH210

Supercool TBS580 :
24% more cooling capacity vs TBA550

Chillcel High Efficiency pads :
very strong, long lasting organic paper material
Excellent structural and cooling strength

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Breezair Supercool Range

MagIQcool™ Controller (standard)

Operate one cooler from an easy to use, wall mounted thermostat controller. The controller comes with 20 m wiring loom, that can be extended up to a maximum length of 100 m.

Advanced touch screen MagIQtouch™ Controller (optional)

The technology includes in-built Installation Wizard, making the operating process simple. Each cooler comes supplied with a 20 m wiring loom and it may be extended up to a maximum length of 40 m (optional), and to operate up to 135 coolers* from a single MagIQtouch Controller, using optional Link Module and wiring loom - no special controllers required! *Total loom length must be <= 1000 m

MagIQtouch™ BMS Control (optional)

Our coolers are BMS compatible. Please contact your local representative for further option details.

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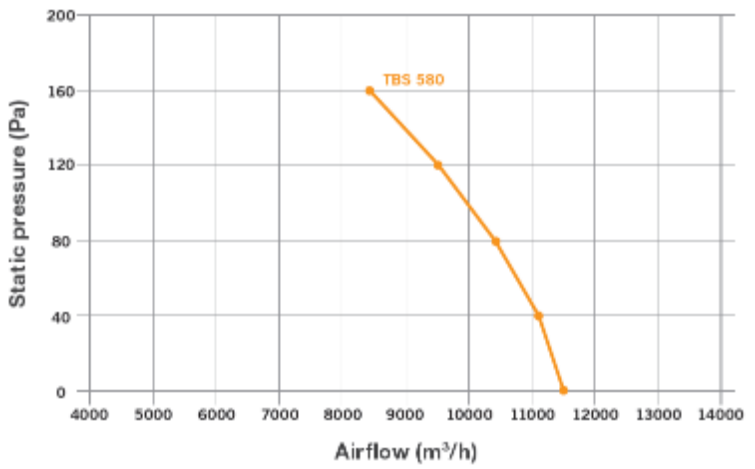
Breezair Supercool Range

TBS 580

Airflow @ 80Pa	Industry standard (m^3/h)	10440
Cooling capacity*	(kW)	15.5
Power consumption (total)	Watts max	1260
	Current max (amp)	6.0

Model#	Industry STD Rating m^3/h @ 80Pa	Motor W	Certified Air Delivery (m^3/h) (static pressure Pa)				
			0	40	80	120	160
TBS 580	10440	950	11520	11090	10440	9540	8460

FAN CURVES

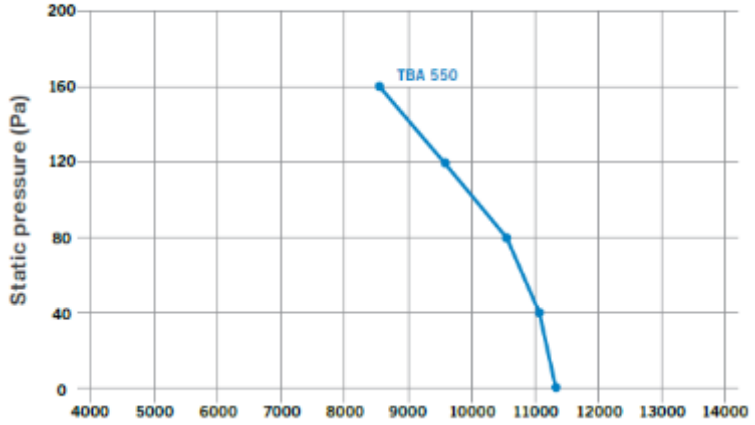


TBA 550

Airflow @ 80Pa	Industry standard (m^3/h)	10550
Cooling capacity*	(kW)	12.5
Power consumption (total)	Watts max / min	1330 / 400
	Current max (amp)	6.0

Model#	Industry STD Rating m^3/h @ 80Pa	Motor W	Certified Air Delivery (m^3/h) (static pressure Pa)				
			0	40	80	120	160
TBA 550	10550	950	11340	11050	10550	9610	8530

FAN CURVES



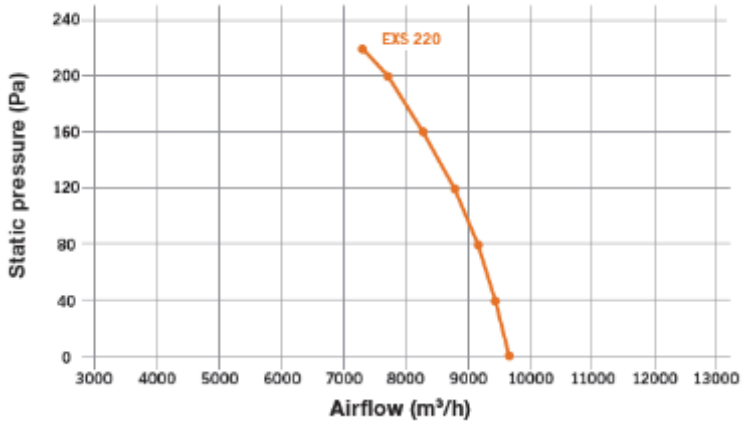
Breezair Supercool Range

EXS 220

Airflow @ 80Pa	Industry standard (m^3/h)	9140
Cooling capacity*	(kW)	14.1
Power consumption (total)	Watts max / min	1900 / 70
	Current max (amp)	9.0

Model#	Industry STD Rating m^3/h @ 80Pa	Motor W	Certified Air Delivery (m^3/h) (static pressure Pa)						
			0	40	80	120	160	200	220
EXS 220	9140	1500	9720	9430	9140	8780	8320	7700	7380

FAN CURVE

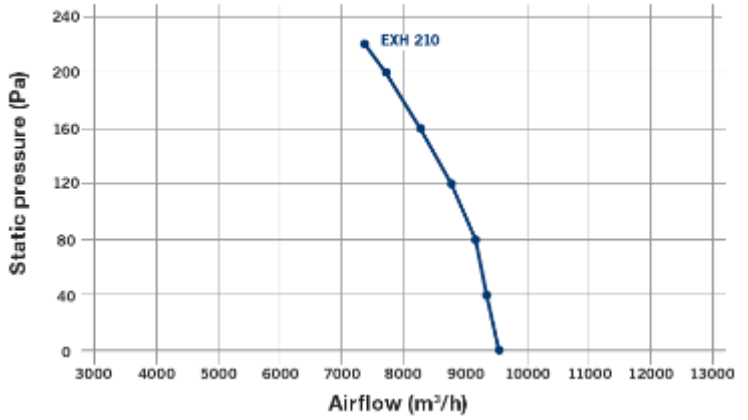


EXH 210

Airflow @ 80Pa	Industry standard (m^3/h)	9140
Cooling capacity*	(kW)	12.3
Power consumption (total)	Watts max / min	1900 / 70
	Current max (amp)	9.0

Model#	Industry STD Rating m^3/h @ 80Pa	Motor W	Certified Air Delivery (m^3/h) (static pressure Pa)						
			0	40	80	120	160	200	220
EXH 210	9140	1500	9580	9400	9140	8780	8320	7740	7420

FAN CURVES



SuperStealth

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Breezair
NUMBER ONE IN NATURAL COOLING

SuperStealth

- World's first axial fan inverter technology !
- Super quiet and super cool
- Powered with the MagIQtouch controller

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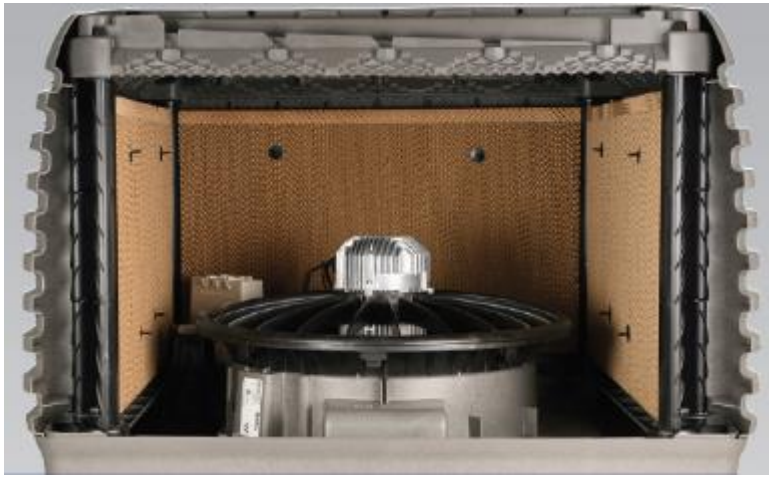
SuperStealth

- New Inverter Motor
  - 4 sizes (largest 950W)
  - Electronics on back of motor
  - 200 to 240VAC, 50 or 60Hz
- New Axial Fan
  - Improved efficiency
  - Higher pressure capability
  - Reduced Noise
  - 3000l/sec @ 80Pa
  - Meets ErP 2015 regs
- New ICPMD
  - All components 12VDC
- New Drain Valve



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Breezair
NUMBER ONE IN NATURAL COOLING

SuperStealth

- **'Invertair' – inverter motor**
  - ↑ Efficiency, ↓ Noise

- **SuperStealth fan**
  - Improved blade design, with forward swept curved blades
  - ↑ Efficiency, ↓ Noise

- **New Venturi**
  - Specifically designed to mount the motor and fan
  - Ensures minimum disturbance of air stream
  - ↑ Efficiency, ↓ Noise

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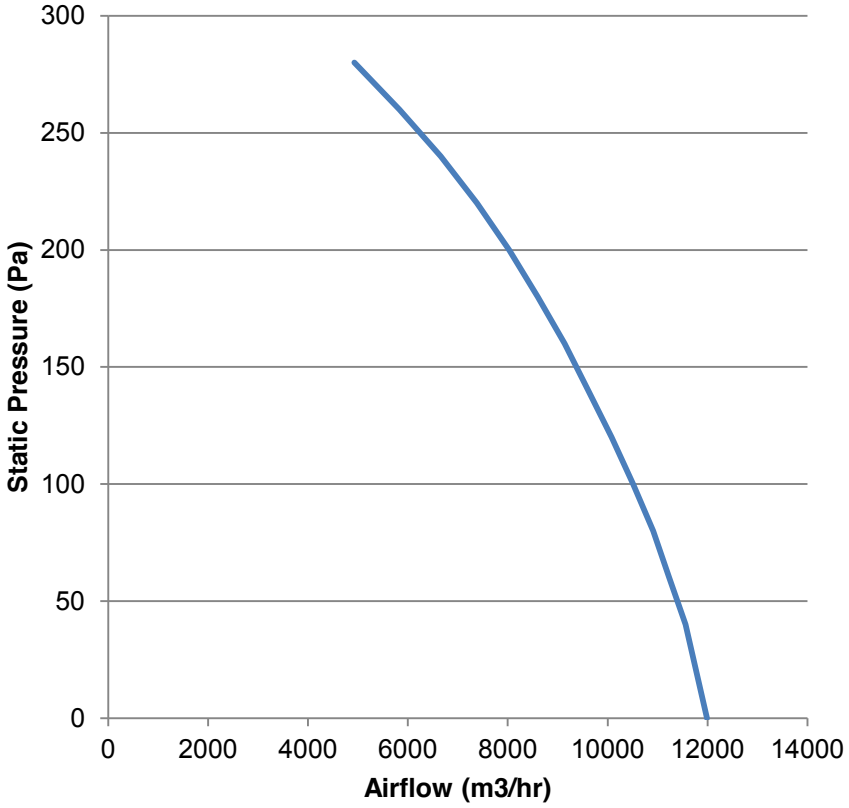
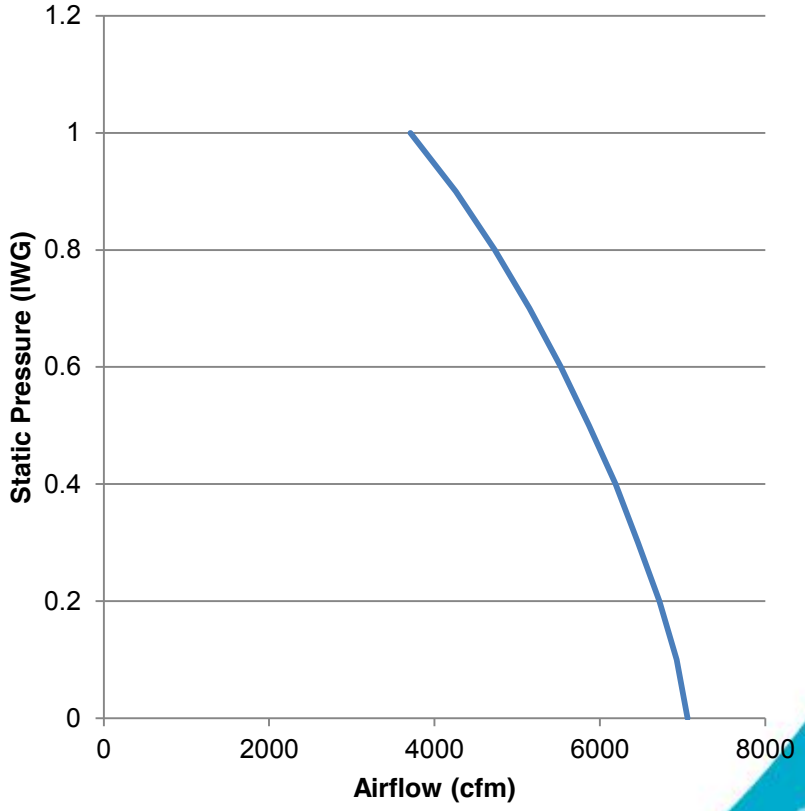
SuperStealth

Fan Curve (m^3/hr) - Europe



Fan Curve (cfm) - North America



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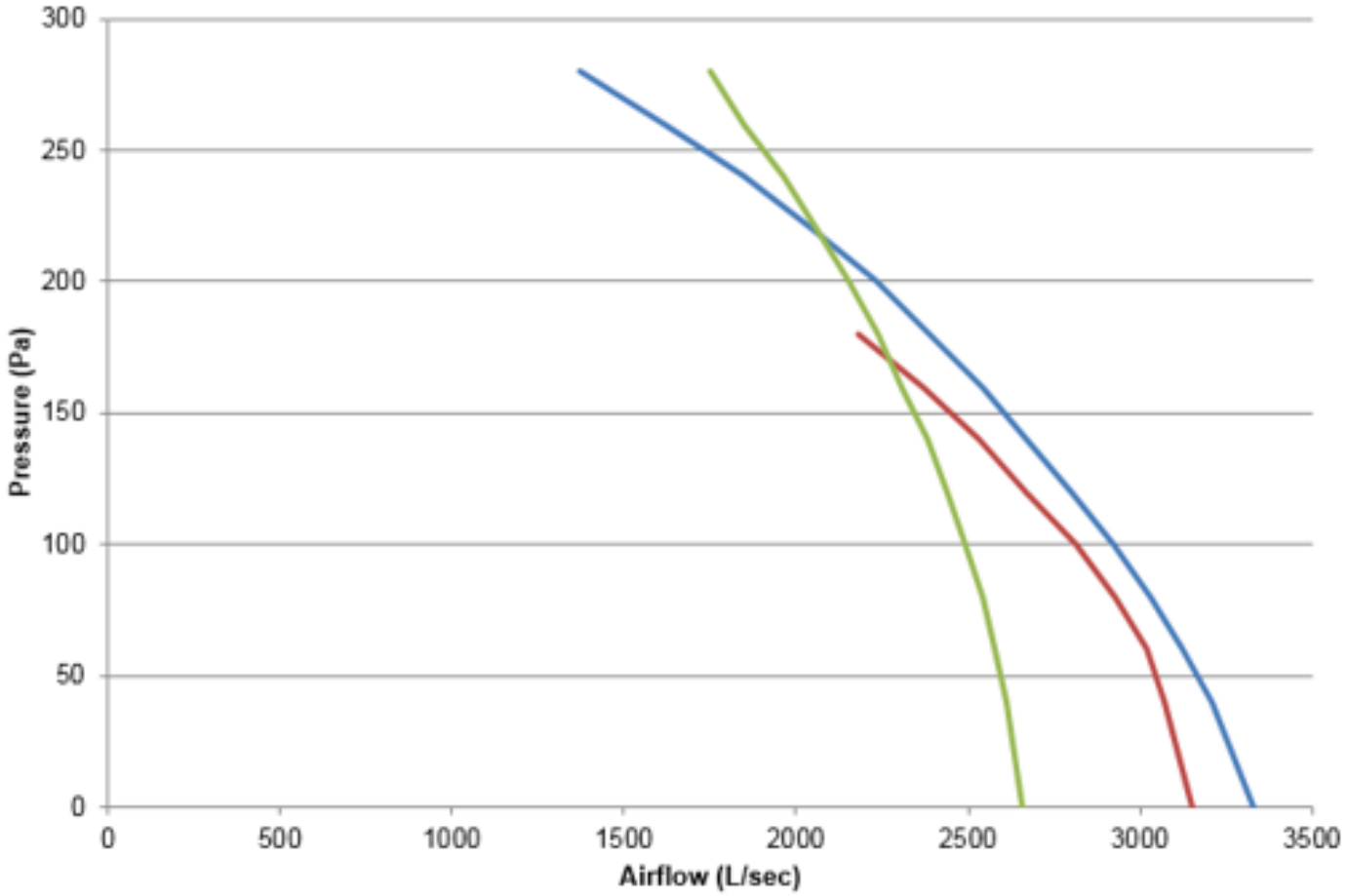
SuperStealth



-- TBSI580
-- TBA550
-- EXH210

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BREEZAIR RPC/RPX range

- 20.000 to 64.000 m3/h
- marine aluminium cabinet
- very light vs competition (50%)
- 4 Chillcel pads / side
- 2 speeds motors
- top, down or side discharge
- not MagIQtouch compatible / not IWC compatible

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BREEZAIR MOBILE MAX

- variable speeds 8.500 m3/h
- 100 litres tank
- Side discharge

- most **efficient** mobile in the world !
- **most robust cooler in the world !**

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MAGIQTOUCH®

CONTROLLER

MAGIQTOUCH® AIR SENSOR

MAGIQTOUCH® LINK MODULE

MAGIQTOUCH® ZONE CONTROL

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STEP 1

Activate screen

ILL1521-B

ILL1522-B

STEP 2

Select mode from lower taskbar

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STEP 3

Turn on cooler or heater

ILL1525-B

ILL1526-B

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STEP 4

Set desired temperature

Slide for quick temperature adjustment:

ILL1533-B

Tap for incremental adjustment or press and hold:

ILL1534-B

STEP 5

Access more advanced options by expanding the lower taskbar

STEP 6

Access wall control and system settings in the SETTINGS menu.

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There is no need to display advanced functionality if it is not required. In simple display you can set your mode and temperature and let the MagIQtouch Controller do the rest.

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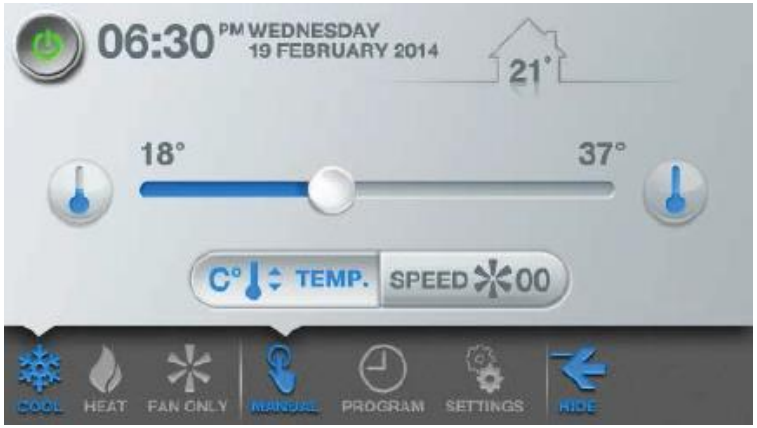
An evaporative cooler running in MANUAL mode will try to maintain the temperature you want by speeding up or slowing down the fan. Alternatively you can choose to disregard the room temperature and keep the cooler running at a constant fan speed.



If your system has zones, you'll see each zone listed in rows. Just scroll up and down to view them all.

ILL1553-A

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Night Quiet Mode

Restrict fan speed over the night time period

ILL1573-A

Access information about the appliances installed in your system.

ILL1570-B

ELEY INTERNATIONAL

ILL1576-A

ILL1577-B

ILL1579-B

ILL1580-B

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MAGIQTOUCH®

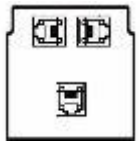
CONTROLLER

The same controller now operates an evaporative cooler, gas ducted heater and add-on refrigerated cooler.

AIR SENSOR

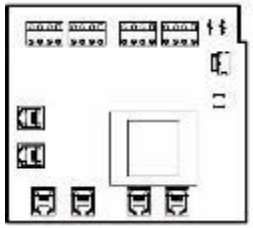
Small, discreet temperature sensor that can be used with a single Controller or in place of Slave Controllers.

LINK MODULE



Link any additional MagIQtouch appliance into the system using this small module.

ZONE CONTROL



Single Zone Control creates up to 4 zones.

OR

Link 3 Zone Controls together for up to 10 zones!

SEELEY INTERNATIONAL

MAGIQTOUCH®
AIR SENSOR

A small and discreet temperature sensor that can be used instead of the temperature sensor in the MagIQtouch wall control. The Air Sensor also measures Relative Humidity

SEELEY INTERNATIONAL

MAGIQTOUCH

Commercial / Industrial Applications
Over view 2016

ES C123 Revision 8

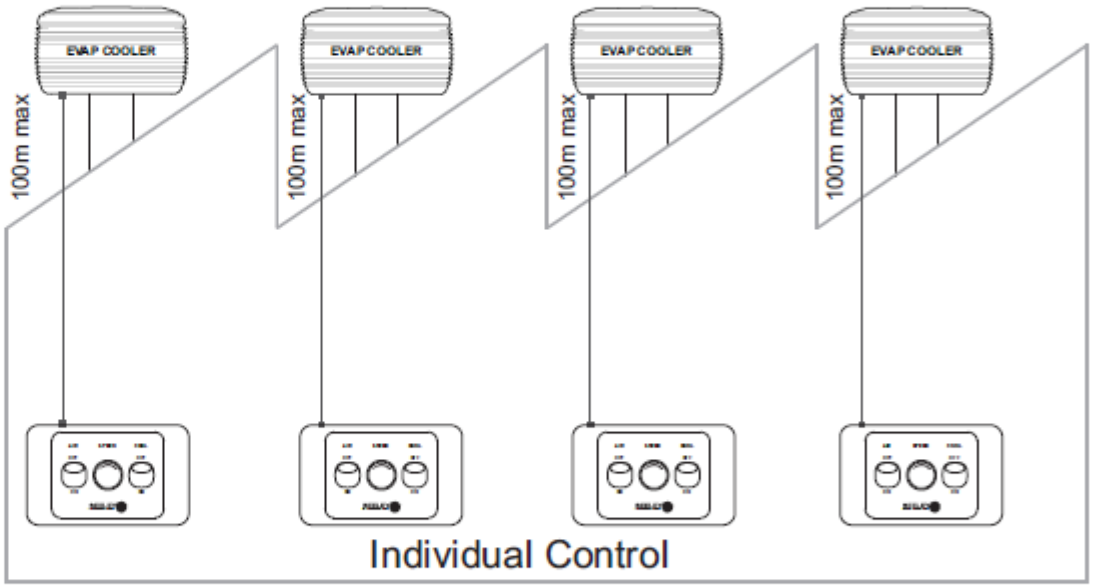
MagIQtouch Switch Controller

- Available - Now
- 1x MagIQtouch switch controller per cooler.
- No BMS interface.
- No external power supply required.
-

MagIQtouch Switch Controller Functions

- Cool (pump) - On / Off
- Fan - On / Off
- Fan Speed - Potentiometer

ILL2141-A



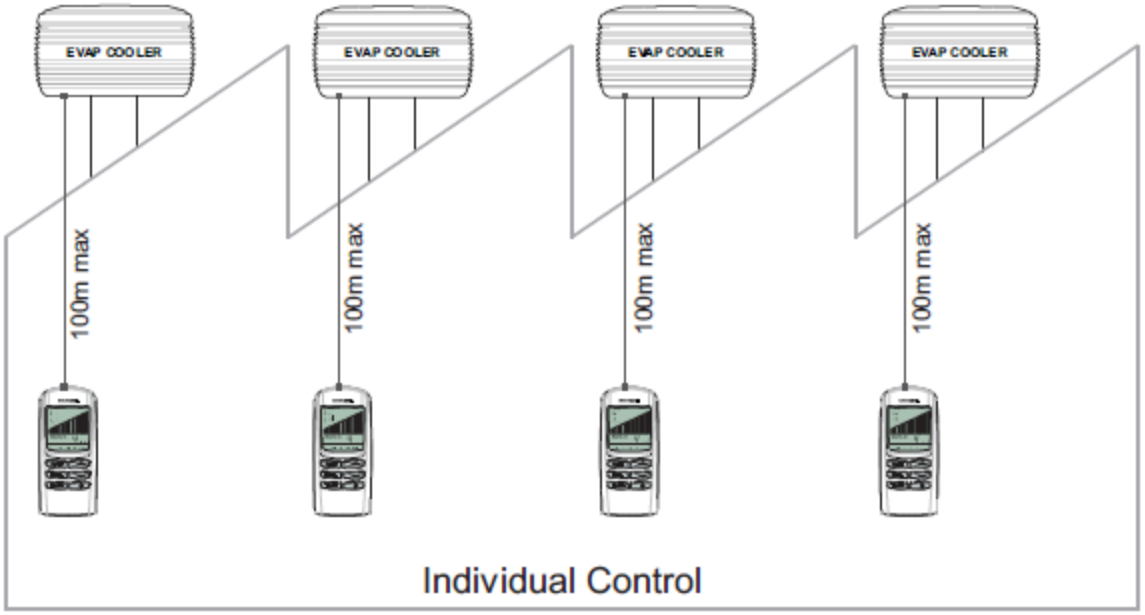
The MagIQtouch switch plate offers independent control for the fan and cooling functions.

MagIQcool Wall Controller

- Available - Now.
- 1x MagIQcool wall controller.
- 1x Link module per cooler.

MagIQcool Wall Controller Functions

- Cool (pump) - On / Off
- Fan - On / Off
- Fan Speed - 10 set points
- Thermostat mode
- Water management
- Error display
- Turn On / Off delay timer
- Parameter control

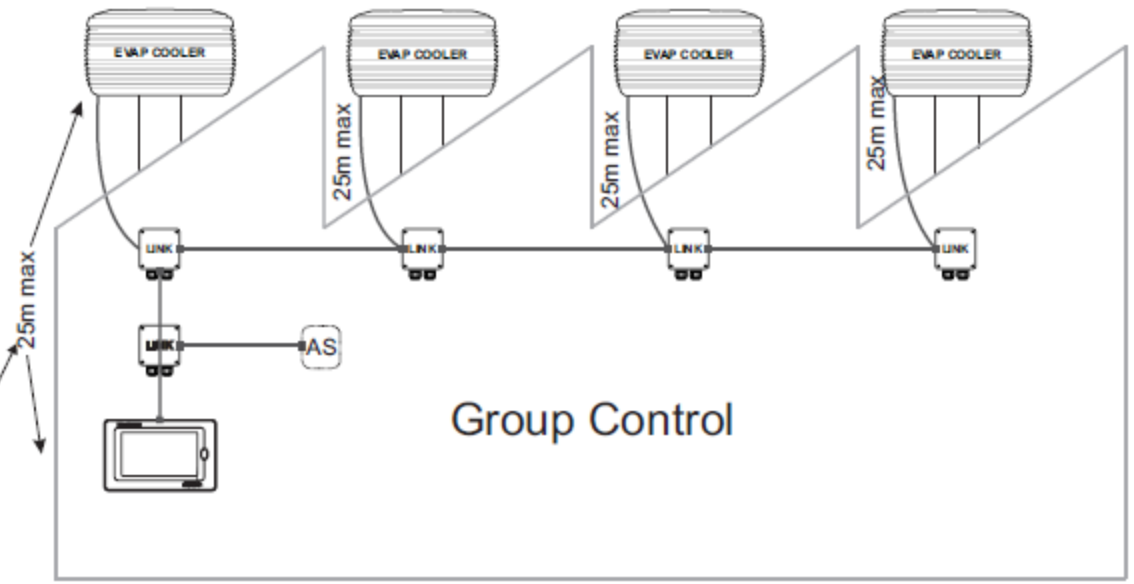


MaglQtouch Wall Control

- Available now
- 1x MaglQtouch Wall Control.
- 1x Link module per cooler.
- Up to 135 coolers.
- Air Sensor (optional) for remote temperature sensing and humidity control.

MaglQtouch Wall Controller Functions

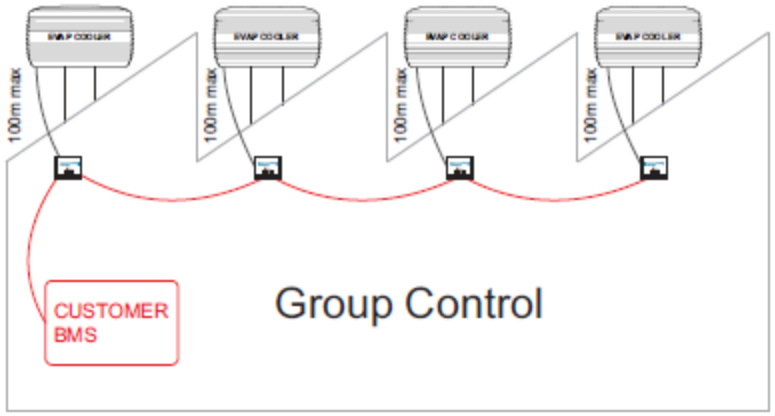
- Full system control
- Simple mode - Cool / Vent
- Advanced mode - Temp or Fan speed
- Program mode - schedule
- Temperature sensing in controller
- Error display
- Optimise system settings
- Water management
- Service access - diagnose individual coolers



Note: 40m with new processor in new wall controller manufactured in Feb 2016. Or 100m + with 5VDC. on link module

MagIQtouch™ BMS Industrial Controller MS1 - (Master version)

- Available - Early 2016
- **No** MagIQtouch wall controller.
- 1x BMS MS1 per cooler.
- Customer Input power supply 10VDC required for Actual fan speed (operate extract fan).
- Power / Error LED diagnostics.

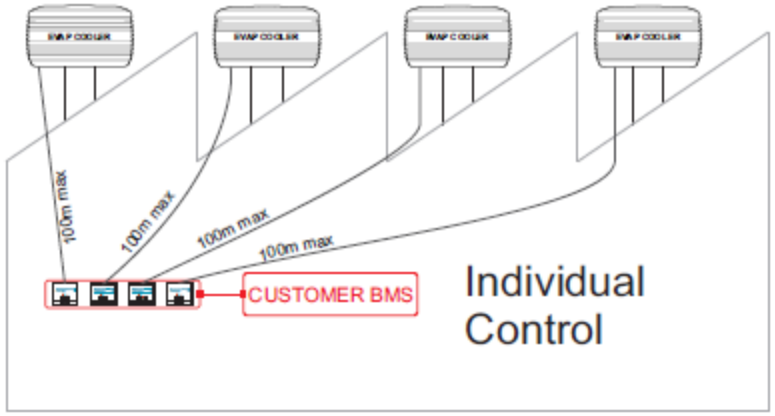


BMS MS1 Inputs

Name	Label	Function	Low	High	Output type
Unit / On / Off	ON	Turn Cooler On or Off	Off	On (LED on)	Digital 10V DC
Set Fan Speed	FAN SPEED	Set Fan speed from 1-10.	0 – 10V		Analogue 0-10V DC
Operation Mode	COOL	Cool or Vent	Fan Only Mode	Cool Mode	Digital 10V DC

BMS MS1 Outputs

Name	Label	Function	Low	High	Output type
Actual Fan speed	ACT FAN SPD	Monitor actual fan speed in operation	0 – 10V		Analogue 10V DC
Error Signal	ERROR SIGNAL	Alert system error found. Signal will output pulse sequence related to error code.	0-10V		Digital 10V DC



MagIQtouch™ BMS Industrial Controller MS1 (Slave version)

- Available - Early 2016
- 1x MagIQtouch Controller
- Customer Input power supply 10VDC required for Actual fan speed only (operate extract fan).
- Power / Error LED diagnostics.
- 1x BMS MS1 controller.
- Air Sensor (optional) for remote temperature sensing and humidity control.

MagIQtouch Wall Controller Functions

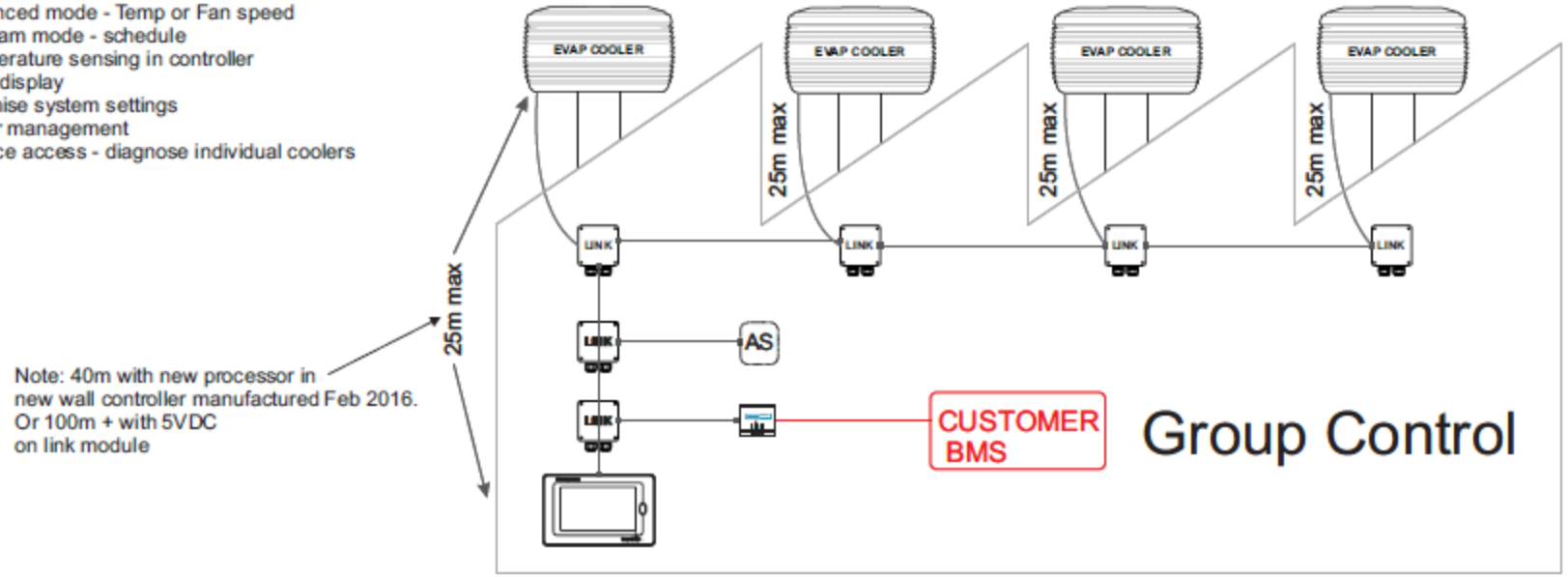
- Full system control
- Simple mode -Cool / Vent
- Advanced mode - Temp or Fan speed
- Program mode - schedule
- Temperature sensing in controller
- Error display
- Optimise system settings
- Water management
- Service access - diagnose individual coolers

BMS MS1 Inputs

Name	Label	Function	Low	High	Output type
Unit / On / Off	ON	Turn Cooler On or Off	Off	On (LED on)	Digital 10V DC
Set Fan Speed	FAN SPEED	Set Fan speed from 1-10.	0 – 10V		Analogue 0-10V DC
Operation Mode	COOL	Cool or Vent	Fan Only Mode	Cool Mode	Digital 10V DC

BMS MS1 Outputs

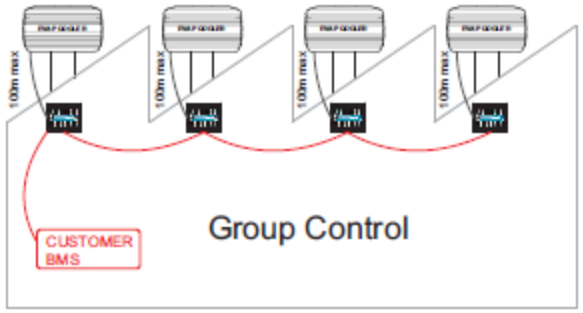
Name	Label	Function	Low	High	Output type
Actual Fan speed	ACT FAN SPD	Monitor actual fan speed in operation	0 – 10V		Analogue 10V DC
Error Signal	ERROR SIGNAL	Alert system error found. Signal will output pulse sequence related to error code.	0-10V		Digital 10V DC



Note: 40m with new processor in new wall controller manufactured Feb 2016. Or 100m + with 5VDC on link module

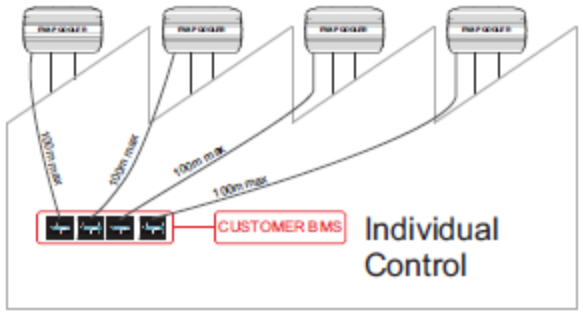
MagIQtouch™ BMS Industrial Controller M1

- Available November 2015.
- No MagIQtouch Wall Controller.
- 1x BMS Industrial Controller M1 per cooler.
- Unlimited number of coolers.
- 24V DC power supply required.



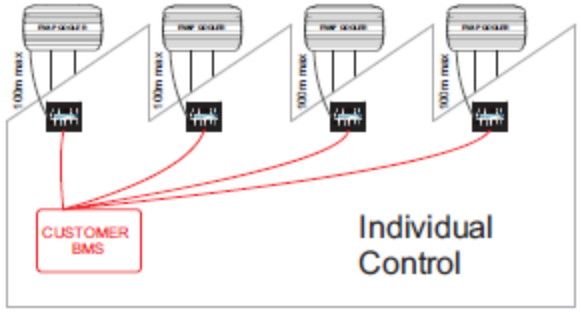
BMS M1Inputs

Name	Label	Function	Low	High	Input type
POWER IN 24V POWER IN 6V	PWR IN 24V	Power supply to operate Interface. 24v DC per Master Interface	-	-	24V DC
Unit On/Off	ON	Turn Cooler On or Off	Unit Off	Unit On	Digital 10V DC
Operation Mode	COOL	Cool or Vent	Fan Only Mode	Cool Mode	Digital 10V DC
Manual Drain	DRAIN	Manual Drain On	Normal Operation	Force Drain	Digital 10V DC
Emergency auxiliary input	EMERG AUX	BMS with Emergency shutdown to take control in the event of shut i.e. fire.	Disable operation	Enable operation	Digital 10V DC
Set Fan Speed	FAN SPEED	Set Fan speed from 1-10.	0 Fan speed	10 Fan speed	Analogue 0-10V DC



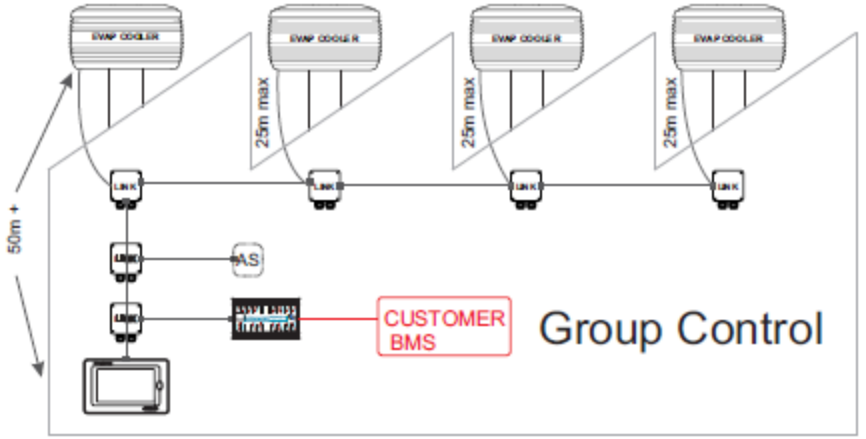
BMS M1 Outputs

Name	Label	Function	Low	High	Output type
POWER OUT 10V	PWR OUT 24V DC	Option for installer to use 10V on Master Interface or use own 10v supply for inputs and outputs	-	-	24V DC
Error Status	ERROR STATUS	LED On to highlight error found	Contact open – No Error	Contact open - Error	Digital
Error Code (LED)	ERROR CODE	LED will flash in sequence relating to the type of error found	-	-	Flashing LED
Drain Status	DRAIN STATUS	Monitor status of Drain	Contact open – Drain closed	Contact closed – Drain open	Digital
Actual Fan speed	ACT FAN SPD	Monitor actual fan speed in operation	0V DC	10V DC	Analogue



MagIQtouch™ BMS Industrial Controller S1

- Available Early 2016.
- 1x MagIQtouch Wall Controller.
- 1x Link module per cooler.
- 1x BMS Industrial Controller S1.
- Air Sensor (optional) for remote temperature sensing and humidity control.
- Up to 135 coolers
- 24V DC power supply required.



MagIQtouch Wall Controller Functions

- Full system control
- Simple mode - Cool / Vent
- Advanced mode - Temp or Fan speed
- Program mode - schedule
- Temperature sensing in controller
- Error display
- Optimise system settings
- Water management
- Service access - diagnose individual coolers

BMS S1 Inputs

Name	Label	Function	Low	High	Input type
POWER IN 24V	PWR IN 24V	Power supply to operate Interface. 24v DC per Slave Interface	-	-	24V DC
External / MagIQtouch	Ext / MagIQtouch	Switch between MagIQtouch or BMS control	MagIQtouch	BMS	Digital 10V DC
Unit On/Off	ON	Turn Cooler On or Off	Unit Off	Unit On	Digital 10V DC
Operation Mode	COOL/HEAT	Cool or Heat	Cool	Heat	Digital 10V DC
Fan Only Mode	FAN ONLY MODE	Turn Fan only On or Off	Fan Off	Fan On	Digital 10V DC
Manual Fan Speed Mode	MAN FAN SPD MODE	Select Manual Fan Speed as primary control	Off	On	Digital 10V DC
Manual Temperature Mode	MAN TEMP MODE	Select Manual Temperature mode instead of Manual Fan speed	Off	On	Digital 10V DC
Program Mode	PROG MODE	Turn 'On' program schedule set by MagIQtouch Wall controller	Off	On	Digital 10V DC
Fan Speed	FAN SPEED	Select desired fan speed level	0 – 10V DC		Analogue 0-10V DC
Temperature Control	TEMP CONTROL	Select desired temperature level based on minimum and maximum temp levels set in MagIQtouch	0 -10V DC		Analogue 0-10V DC
Emergency auxiliary input	EMERG AUX	BMS with Emergency shutdown to take control in the event of shut Le fire.	Disable operation	Enable operation	Digital 10V DC
Drain	DRAIN	Force Drain	Drain closed	Drain open	Digital 10V DC

BMS S1 Outputs

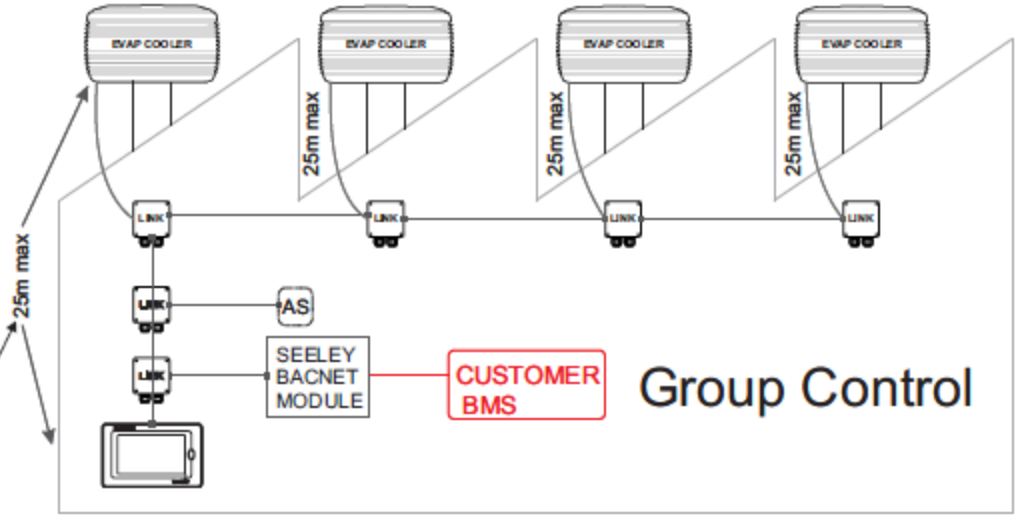
Name	Label	Function	Low	High	Output type
POWER OUT 10V	PWR OUT 10V	Option for Installer to use 10V on Slave Interface or use own 10v supply for inputs and outputs	-	-	24V DC
Error Status	ERROR STATUS	On stating error found	Contact open – No Error	Contact open - Error	Digital
Error Code (LED)	ERROR CODE	LED flashing sequence to define type of error found	-	-	Flashing LED
Cool Status	COOL STATUS	Pump 'On' or 'Off'	Pump Off	Pump On	Digital
Current Temperature	CURRENT TEMP	Monitor temperature sensor reading in either MagIQtouch controller or Air Sensor	0V =15°C	10V = 35°C	Analogue
Current Humidity	HUMIDITY STATUS	Monitor Humidity reading value on Air Sensor	0V = 0% RH	10V = 100% RH	Analogue
Drain Status	DRAIN STATUS	Monitor status of drain	Contact open – Drain closed	Contact closed – Drain open	Digital
Actual Fan speed	ACT FAN SPD	Monitor actual fan speed in operation	0 – 10V DC		Analogue

MaglQtouch™ BACnet Controller B1 (Master version)

- Available - In development.
- 1x MaglQtouch BACnet controller per cooler.
- 1x MaglQtouch wall controller.
- Air Sensor (optional) for remote temperature sensing and humidity control.
- 1x Link module per cooler when used in Slave mode

MaglQtouch Wall Controller Functions

- Full system control
- Simple mode -Cool / Vent
- Advanced mode - Temp or Fan speed
- Program mode - schedule
- Temperature sensing in controller
- Error display
- Optimise system settings
- Water management
- Service access - diagnose individual coolers

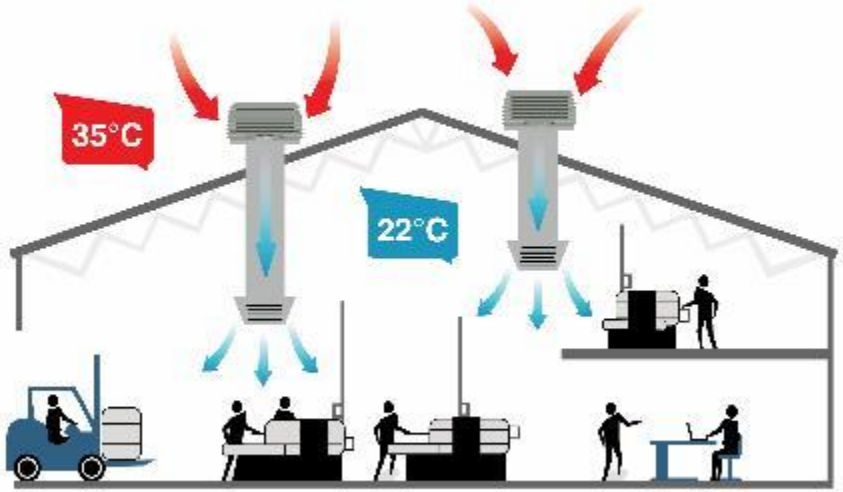


Note: 40m with new processor in new wall controller released Dec 15. Or 100m + with 5VDC on link module

Applications to the industry

Applications

DIRECT EVAPORATIVE COOLING

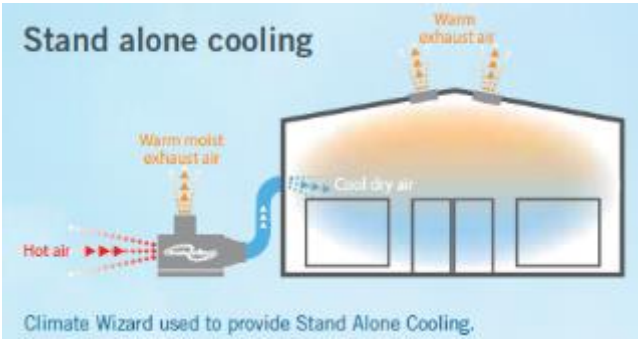


SEELEY INTERNATIONAL

Applications INDIRECT EVAPORATIVE COOLING

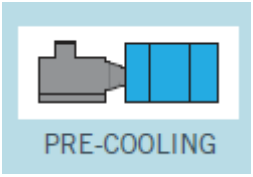
- Stand Alone

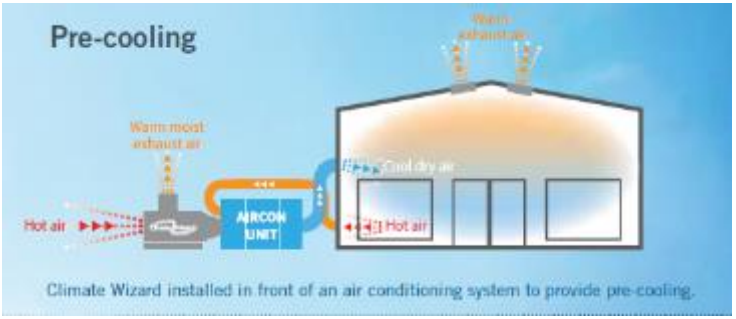
Indirect evap Cooling



- Pre Cooling

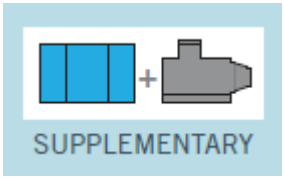
Indirect evap + AHU

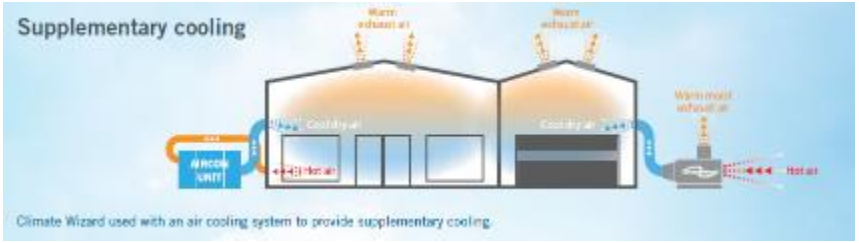




- Supplementary Cooling

Indirect & AHU



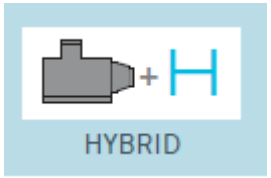


Coolerado®

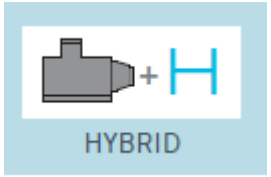
Climate Wizard®

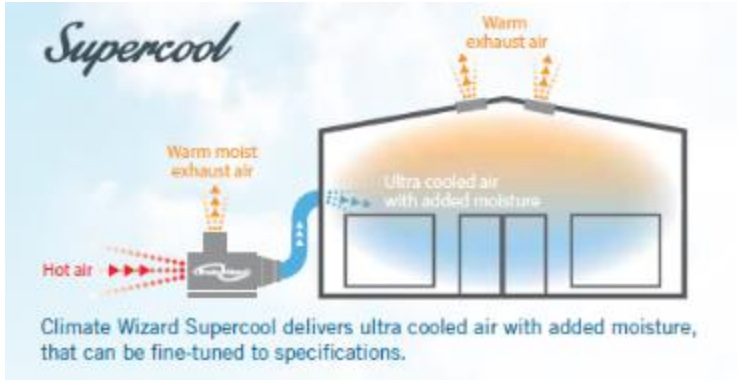
Applications INDIRECT/DIRECT EVAPORATIVE COOLING

- HyBrid Cooling and Heating

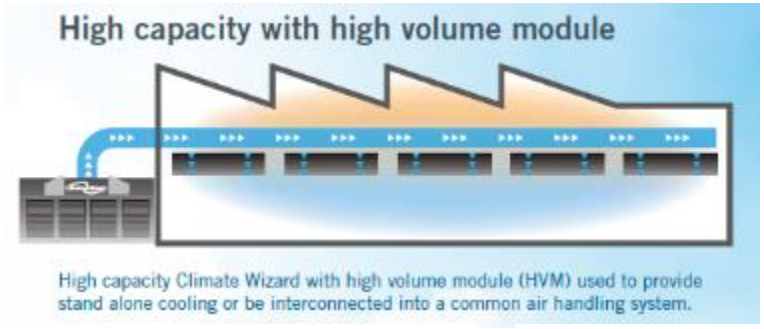


- Super Cool CW series





- High Volume Module (HVM)



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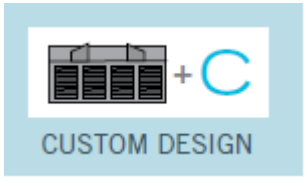
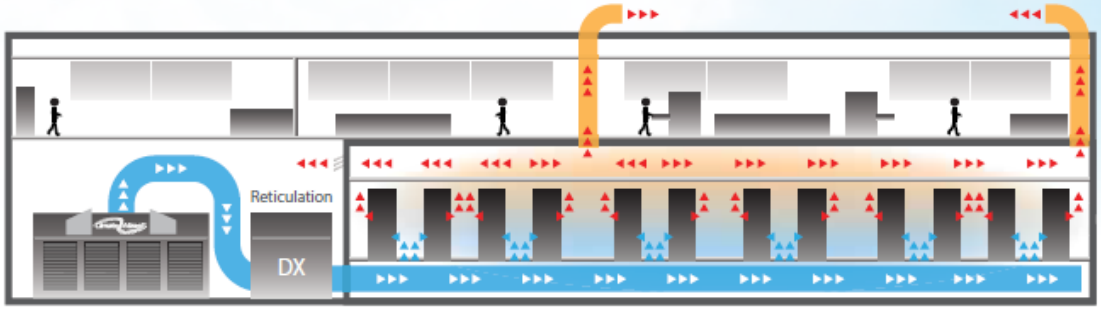
Applications

- Customised Systems



Customised to mechanical specifications

Climate Wizard high volume module can be designed to integrate with other air conditioning equipment supplied by other contractors.



Coolerado®

Climate Wizard®

INDIRECT EVAPORATIVE COOLING

Coolerado Indirect & ERV

Climate Wizard Indirect and Supercool

AUSTRALIAN MADE & OWNED

SEELEY INTERNATIONAL

• HYPER EFFICIENT COOLING BENEFITS:

- Improve IAQ (indoor air quality) with 100% outside air
- Reduced running costs
- No moisture added
- Total cooling performances increases when air temperature rises
- Reduce the energy use and improve the cooling performance of existing refrigerated systems
- Reduced electrical kW demand
- Ideal for use as a DOAS (dedicated outdoor air system), data centres cooling or for comfort cooling applications
- Flexible design and engineering configurations
- Savings on the installation costs
- No synthetic refrigerants or chemicals to harm the environment
- Simple, reliable solution to improve COP/EER (coefficient of performance / Energy efficiency ratio) and to meet various regulatory requirements

Quick Payback Low Total Cost of Ownership

Coolerado Air Conditioners use up to 90% less energy than conventional systems, providing a quick investment payback and low total cost of ownership.

Sustainable Solution

90% less energy, no chemical refrigerants, improves indoor air quality—best cooling alternative for your sustainable efforts and LEED projects.

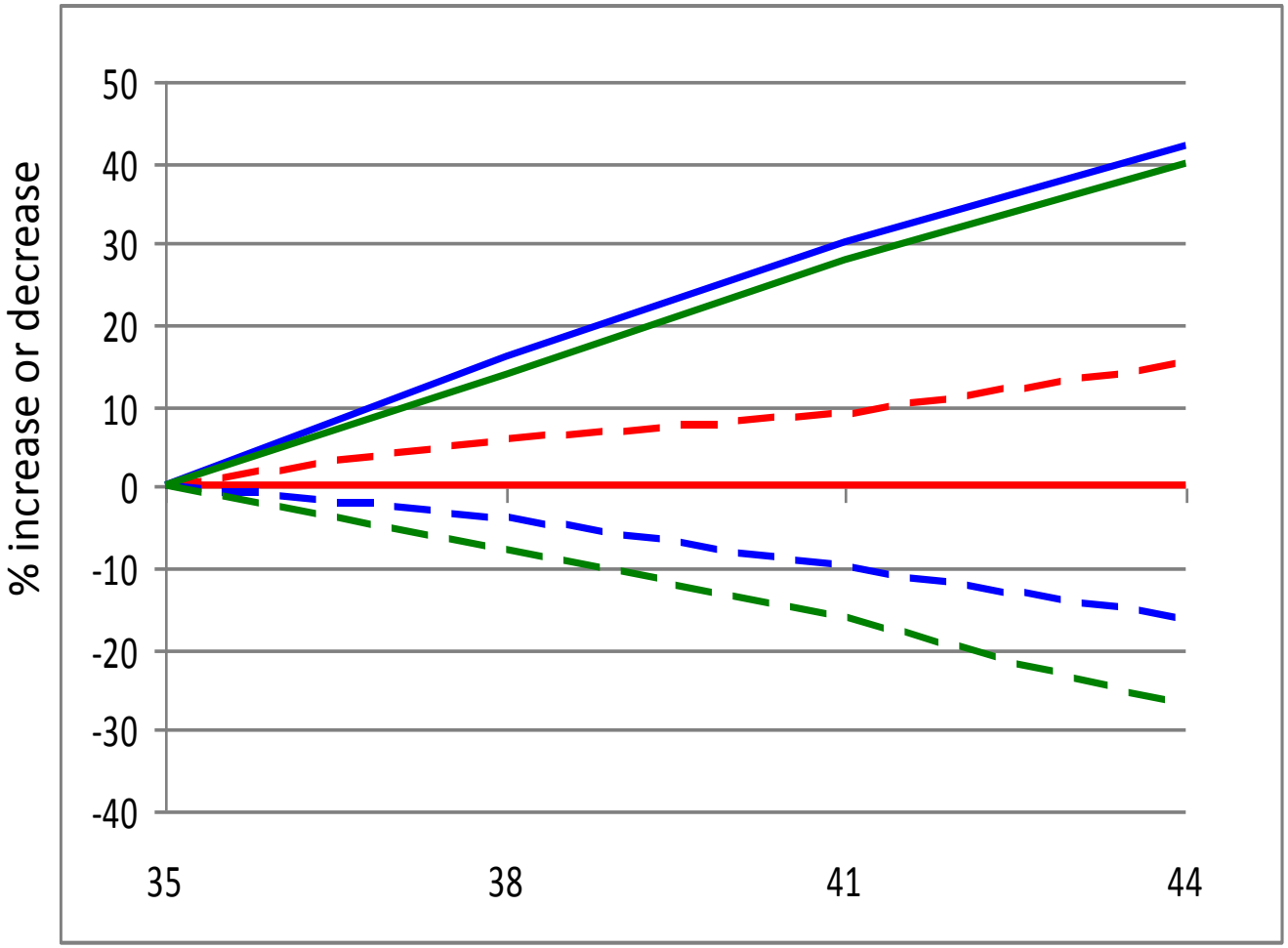
Coolerado® Climate Wizard® SEELEY INTERNATIONAL

Benefits of Climate Wizard & Coolerado

- Beneficial comparison against:
  - Direct Evaporative cooling
    - No added moisture
    - Lower supply temperatures
    - Duct resistance capability is higher, effective at 200pa
    - Airflows are lower – smaller duct sizes – comparable to refrigerated ducting sizes
    - Cooling improves as temperature rises
  - Refrigerated Airconditioning
    - No moisture added or removed (as in refrigeration)
    - Preserves essential moisture
    - 100% fresh air
    - 100% fresh air eliminates many causes of Sick Building Syndrome
    - Low Running costs
    - Low energy consumption
    - Natural Refrigerant R-718
    - Very low environmental impact (No synthetic refrigerant, which have a high GWP)
    - Cooling improves as temperature rises

Coolerado® Climate Wizard® SEELEY INTERNATIONAL

Performance comparison
Climate Wizard v refrigerated cooling



Line Style

- Refrigerated air conditioning
- Climate Wizard

Colour Key

- = Input power
- = Cooling Capacity
- = COP

Source: Uni SA Roxby Downs Report June 2009

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AUSTRALIAN MADE & OWNED

SEELEY INTERNATIONAL

Indirect evaporative 100% outside air AHU

Climate Wizard - indirect evaporative air conditioning

Dramatically reduces energy consumption and cooling costs compared to equivalent refrigerated systems

CW-H10

- COP of up to 15
- Up to 20 kW of cooling capacity in outside air pre-cooling applications
- Up to 800 L/s (2,880 m³/h) supply air

CW-H15

- COP of up to 15
- Up to 27 kW of cooling capacity in outside air pre-cooling applications
- Up to 1,100 L/s (3,960 m³/h) supply air

CW-80

- COP of up to 15
- Up to 146 kW of cooling capacity in outside air pre-cooling applications
- Up to 6,400 L/s (23,000 m³/h) supply air

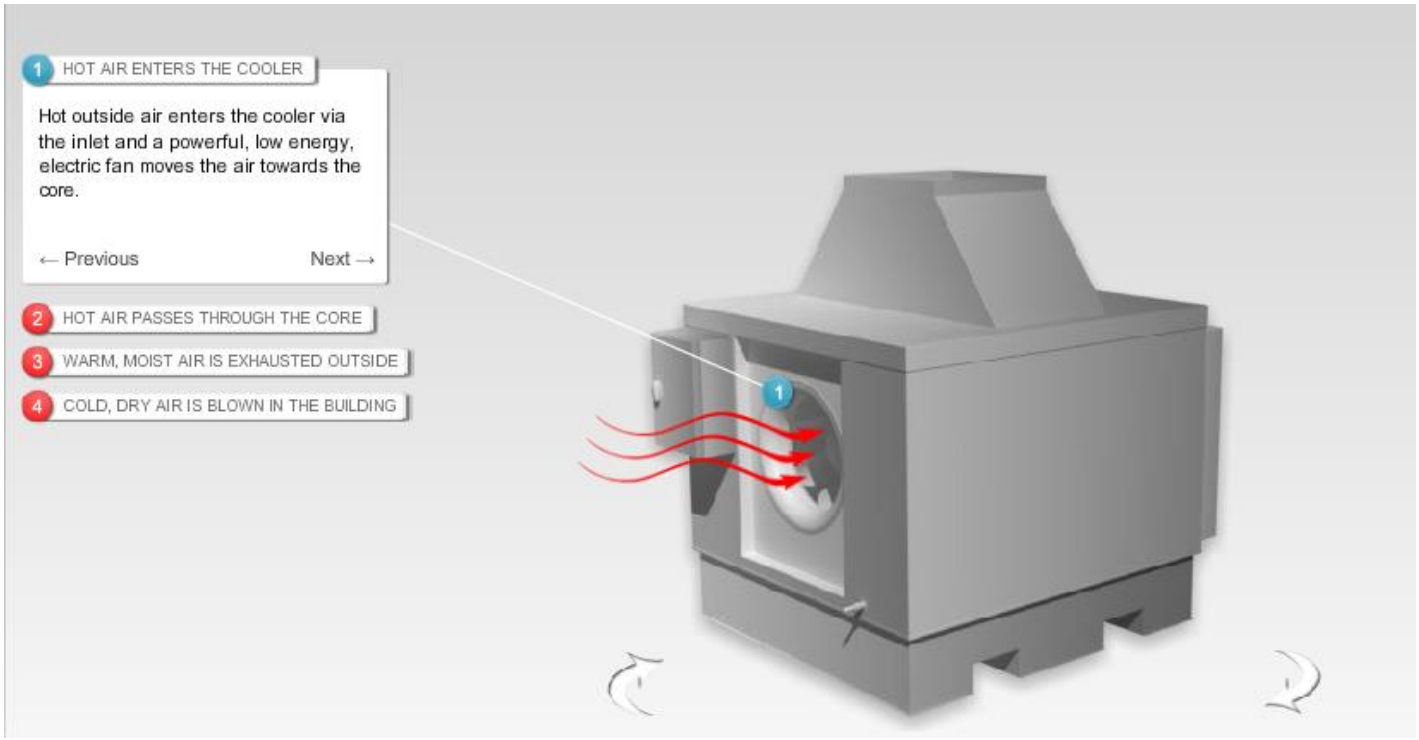
CW-160

- COP of up to 13
- Up to 264 kW of cooling capacity in outside air pre-cooling applications
- Up to 11,800 L/s (42,480 m³/h) supply air

Climate Wizard®

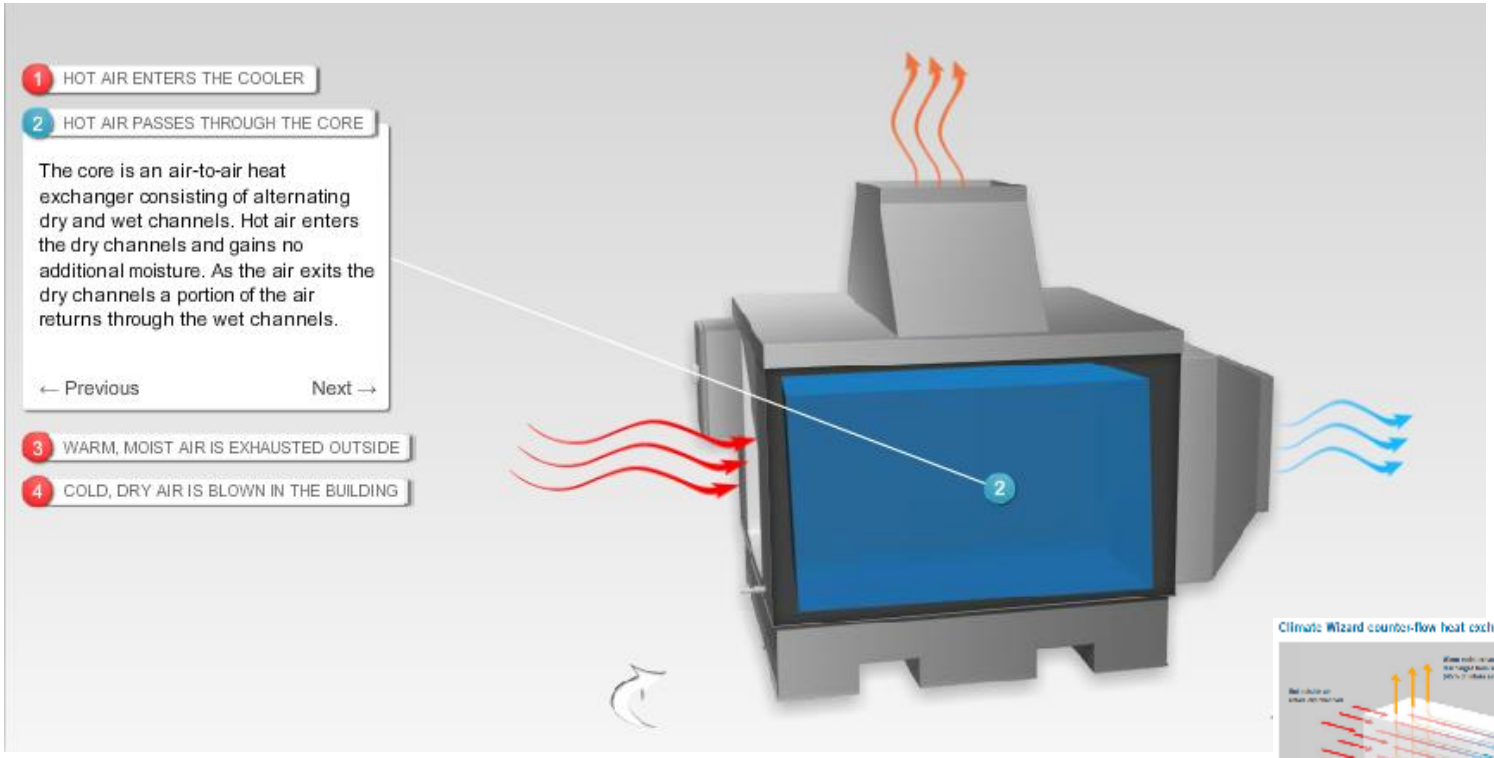
How Does It Work

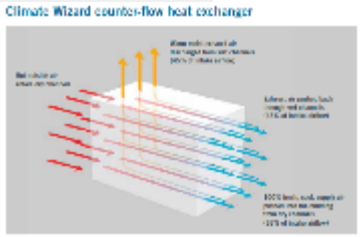
– Inlet (Hot / Warm air enters the cooler)



How Does It Work

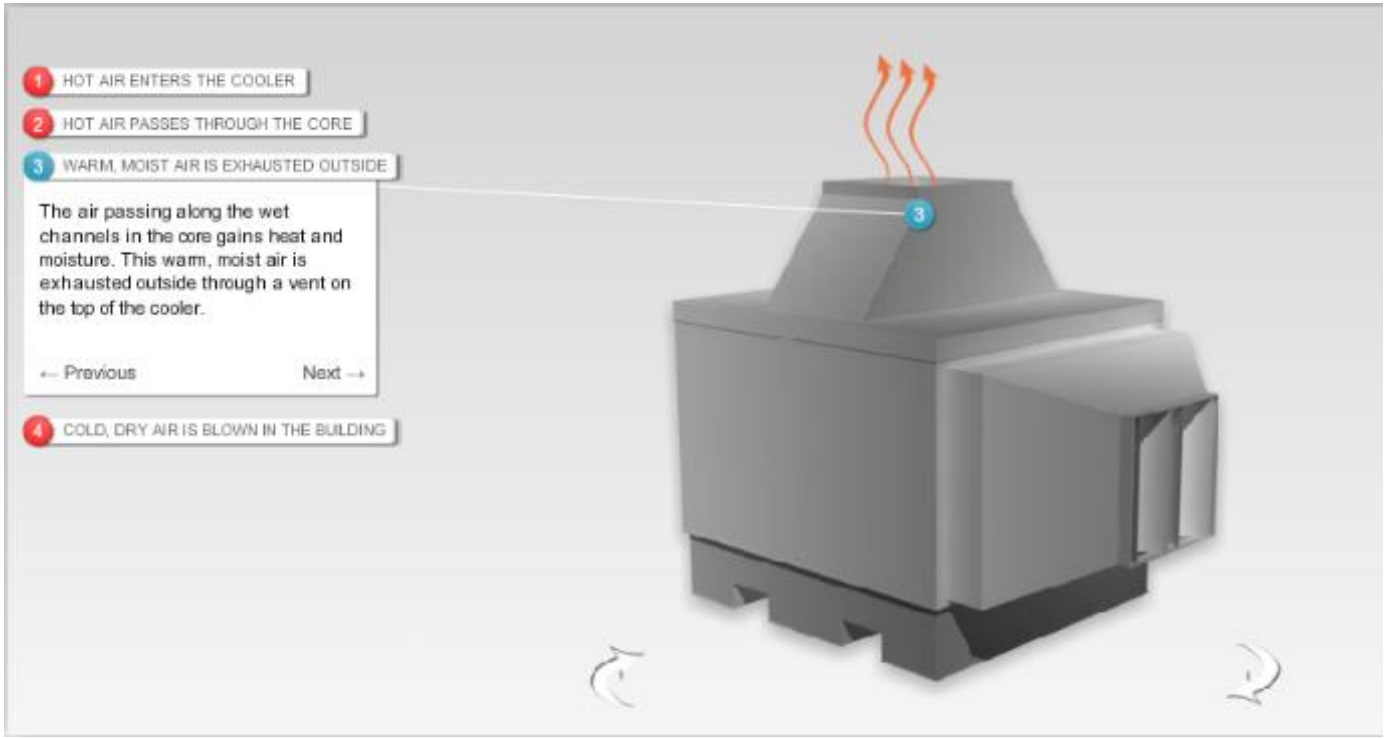
– Air Passes through the Hyper Efficient Core (Counter Flow Heat Exchanger)





How Does It Work

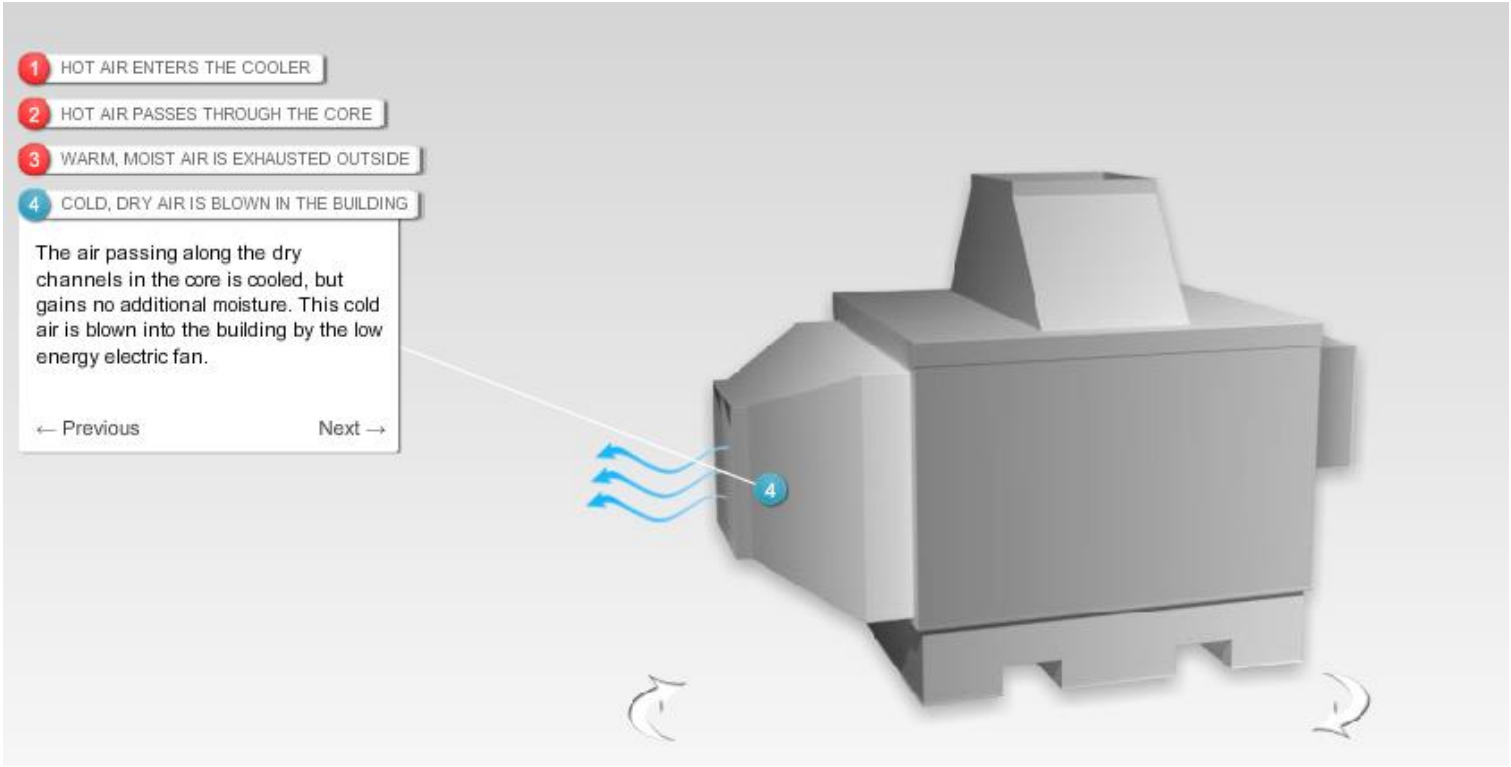
– Warm moist air exhausted



SEELEY INTERNATIONAL

How Does It Work

– Outlet – Cold air supplied to building, no added moisture



Indirect heat exchange core

- Patented Climate Wizard counter-flow heat exchanger
- Uses indirect evaporative cooling to keep added moisture separate from the supply air stream
- Designed for long service life and consistent performance
- Provides maximum efficiency

Supply air fan and electric motor

- Backward curved, direct drive, plug fan
- Variable speed ECM (electronically commutated motor) for maximum energy efficiency
- Ultra-quiet, vibration free

Supply air pressure damper

- Regulates air pressure in the discharge plenum
- Used to control exhaust flow in the wet channels
- Provides simple, positive capacity control

*Applicable to CW-H10 and CW-H15 models only.

Climate Wizard®

Water management system

Custom designed water management system minimises water consumption and maximises cleanliness

Continuously monitors and controls the water salinity level in the reservoir

Controls water cleanliness using a factory installed electro-chlorinator

Manages water distribution for minimum water consumption and maximum cooling efficiency

Drains the water system during prolonged idle periods

Alarms if low water levels are detected

Tornado® water pump

Australian designed and manufactured

Exceptional reliability under all conditions

Includes 'clever impact start' feature that will overcome any tendency for the pump to become locked up with residue during prolonged off periods

The strong synchronous motor has constant speed, independent of voltage fluctuations, and runs very cool for long life

Automatic drain valve

Part of the water management system

Controlled to manage water quality and maximise system efficiency

Drains the reservoir during prolonged idle periods

Water reservoir

One piece moulded polymer construction

Durable and corrosion free

Provides excellent sound deadening properties

Sloped to prevent standing water when drained

Climate Wizard®

Filter system

Intake air is filtered through replaceable pleated filters

The assembly includes:

- a safety screen to protect the fan
- a cover to minimise intrusion of rain

Electronic control module

Advanced electronics programmed for maximum efficiency

Controls unit operation to minimise water consumption and maximise efficiency

Can be configured to accept external BMS system inputs to control system operation (while retaining control of water management and system efficiency)

Smart, reliable, durable

Wall controller

Wall controller and a 20 m plugged control cable, factory supplied

Can be configured for thermostatically controlled VAV (variable air volume) cooling or constant volume cooling

Configured to respond to BMS (building management system) start-stop inputs applied at the unit controller

Can be replaced by direct BMS inputs applied directly to the unit mounted control board

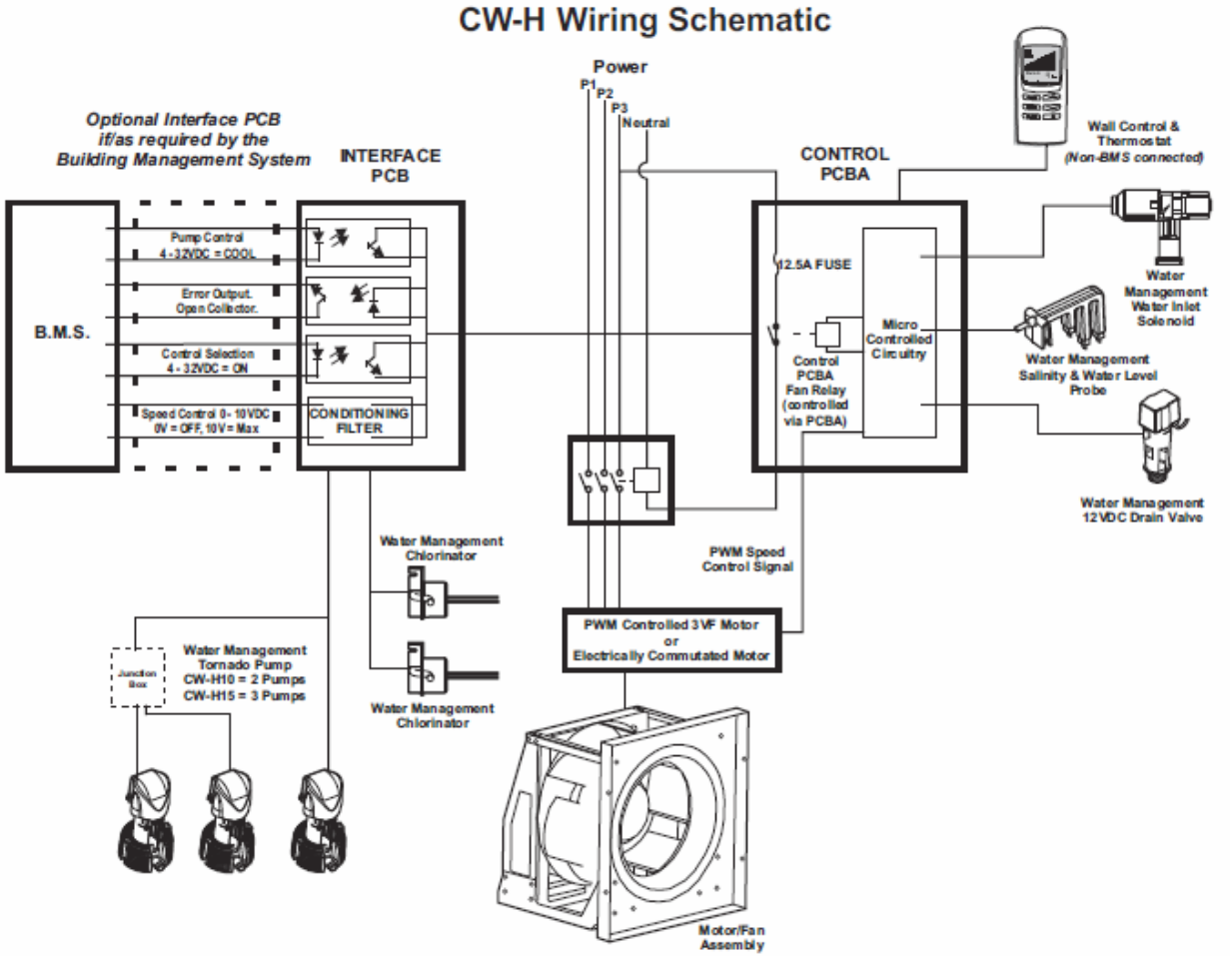
Cabinetry

- Powder coated, marine grade aluminium
- Weather proof and corrosion resistant
- Mechanical fasteners are stainless steel or aluminium

Climate Wizard®

Control Options

Wall Control



BMS Interface PCB

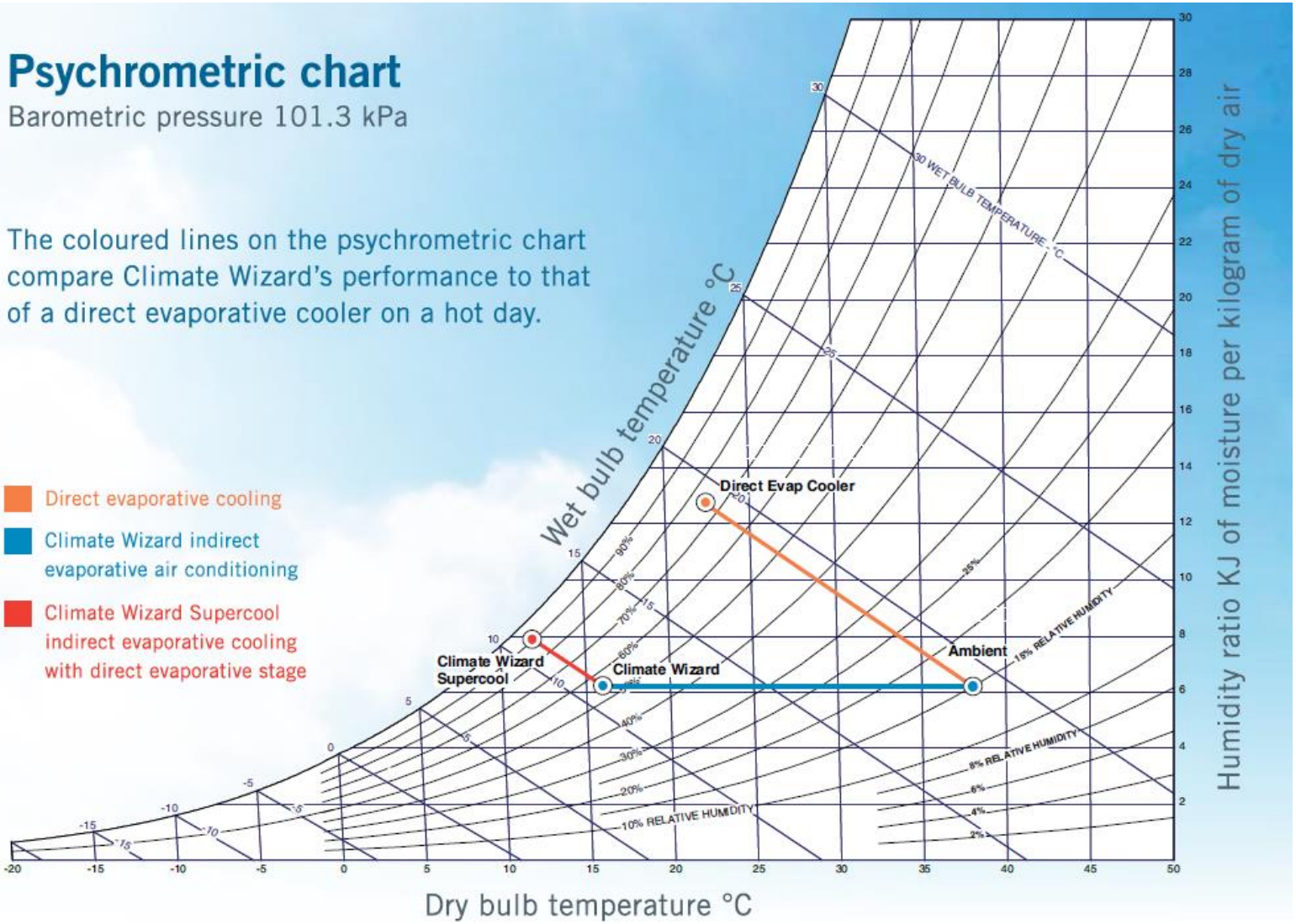
Climate Wizard

SEELEY INTERNATIONAL

Psychrometric chart

Barometric pressure 101.3 kPa

The coloured lines on the psychrometric chart compare Climate Wizard's performance to that of a direct evaporative cooler on a hot day.



Indirect evaporative 100% outside air AHU

Climate Wizard Supercool - indirect evaporative cooling with direct evaporative stage

Offers even more hyper-efficient benefits delivering lower temperatures and extremely low operating costs

CW-H15S

- COP of up to 26
- Up to 47 kW of cooling capacity in outside air pre-cooling applications
- Up to 1,700 L/s (6,120 m³/h) supply air

CW-80S

- COP of up to 18
- Up to 182 kW of cooling capacity in outside air pre-cooling applications
- Up to 6,400 L/s (23,040 m³/h) supply air

Climate Wizard Supercool winery configuration - indirect evaporative air conditioning for wine barrel storage rooms

Designed to maintain precise temperature and humidity levels – at very low operating costs

CW-H15S

winery configuration

- COP of up to 18
- Up to 32 kW of cooling capacity in outside air pre-cooling applications
- Up to 1,100 L/s (3,960 m³/h) supply air

Climate Wizard

Supercool

Climate Wizard Supercool

With Climate Wizard Supercool, the moisture content can be fine-tuned to specifications, required for different applications, from data centres to wineries.

Chillcel high efficiency evaporative pad

- High efficiency, direct-evaporative cooling pad
- Produces an ultra-low leaving air temperature with minimal additional moisture
- Designed to maximise the space cooling capacity of Climate Wizard Supercool
- Increases supply airflow

Drip tray

- Part of the independent water collection system for the direct evaporative section
- Corrosion free and self-draining

Water distributor

- The water distributor delivers a calibrated volume of water to efficiently Supercool the unit's leaving air
- A dedicated pump and water distributor are used to independently water the direct evaporative media to maximise versatility
- The system uses tried and true technology, developed over many years by Seeley International
- Designed to prevent clogging and evenly water the direct evaporative media

Climate Wizard
Supercool

CLIMATE WIZARD SUPERCOOL CAN OFTEN MEET DEMANDING COOLING SPECIFICATIONS WITHOUT THE NEED FOR SUPPLEMENTARY REFRIGERATION SYSTEMS AND THEIR ASSOCIATED OPERATING AND CAPITAL COSTS.

It delivers the following hyper-efficient benefits:

- Very high COP
- Drastic reduction in energy usage and cooling costs compared to equivalent refrigerated systems
- Improved indoor air quality
- Very low supply air temperatures
- Easy installation
- Factory installed BMS interface
- Optional BACnet interface
- CW-H15 and CW-80 models available
- Australian designed and manufactured.

In addition, you can enjoy Climate Wizard Supercool's very low operating costs, cold supply air temperatures similar to refrigerated systems, and only small increases to space relative humidity.

Climate Wizard Supercool is available in two sizes and is ideal for your next large industrial and commercial project.

Climate Wizard
Supercool

The chart below provides an overview of the range of supply air temperatures and cooling capacities achievable by Climate Wizard Supercool models in major capital cities of Europe and the Middle East in outside air or pre-cooling applications.

	CW-H15				CW-80			
	Standard		Supercool		Standard		Supercool	
City	SA °C	kW	SA °C	kW	SA °C	kW	SA °C	kW
Dubai, UAE	21.3	27.9	18.8	48.1	21.8	158.6	19.3	204.9
Rome, Italy	20.7	16.4	19.5	27.9	21.2	91.7	20.0	117.0
Lyon, France	18.0	20.7	15.9	36.2	18.5	116.8	16.4	153.3
Madrid, Spain	17.8	24.3	14.8	43.7	18.3	137.5	15.3	185.6
London, UK	17.9	17.9	16.3	31.0	18.4	100.3	16.8	130.6
Brussels, Belguim	19.4	12.8	18.4	21.8	19.9	70.7	18.9	90.4
Istanbul, Turkey	20.4	14.2	19.5	23.7	20.9	78.5	20.0	98.8
Riyadh, KSA	15.2	38.1	9.1	71.1	15.7	217.8	9.6	305.3
Lahore, Pakistan	20.7	29.2	17.8	50.9	21.2	166.0	18.3	217.3
Lisbon, Portugal	18.0	21.5	15.9	37.4	18.5	121.3	16.4	158.5

Coolerado®

AUSTRALIAN MADE & OWNED

SEELEY INTERNATIONAL

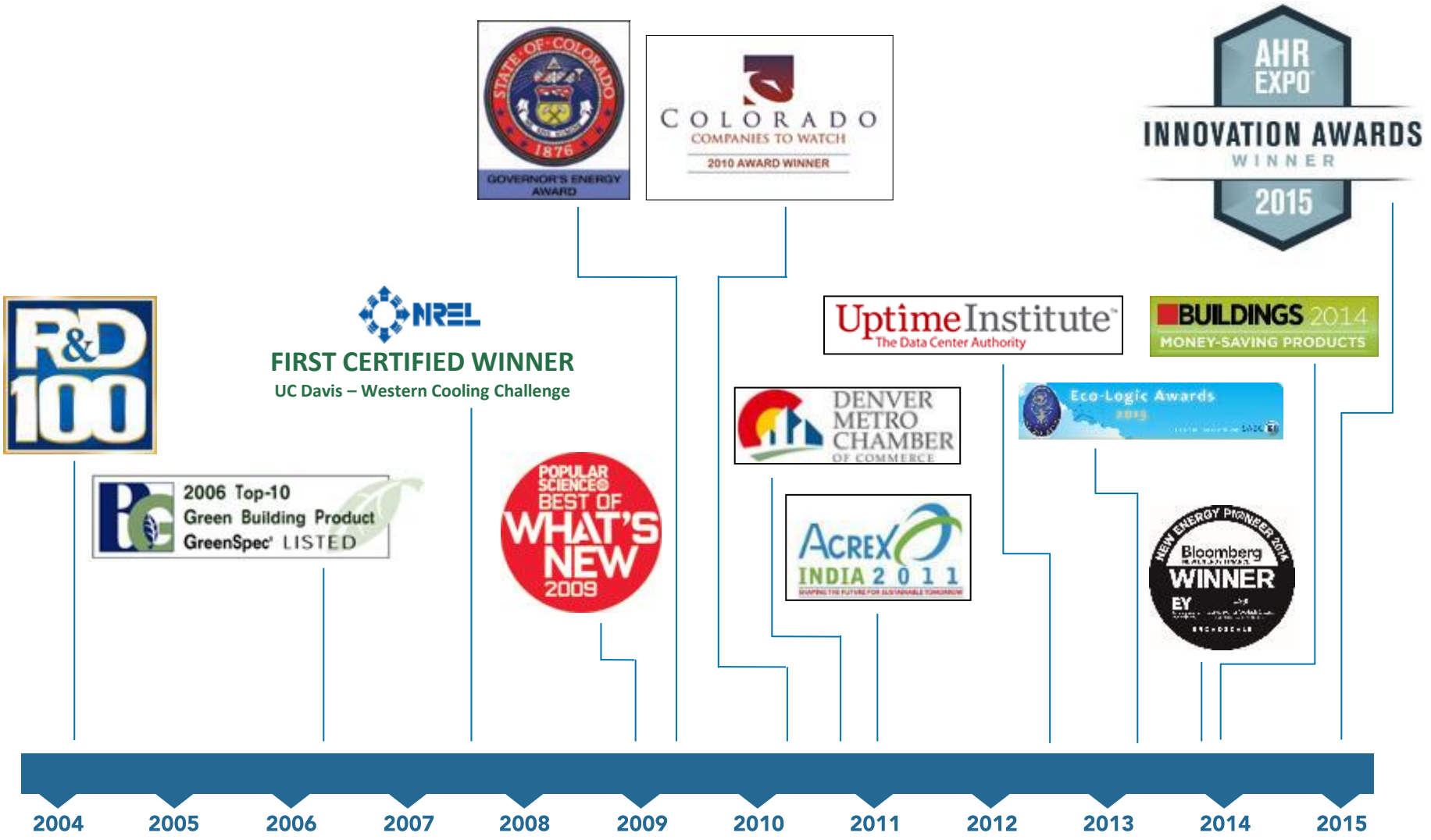
Coolerado Overview

- Founded in 1999 in Denver, CO
- Patented HMX technology uses a unique heat transfer process – known as the Maisotsenko Cycle
- Capitalized by New World Capital in 2010

Coolerado's patented Heat and Mass Exchanger (HMX)

- Provides exceptional energy recovery ventilation with great cooling and heating energy savings
- Reduced carbon emissions and 100% fresh air
- Best results with high fresh-air need or high heat-load end users
- No refrigerants, no compressor, no vibration, low maintenance
- Made in the USA

Coolerado – Accolades and Awards

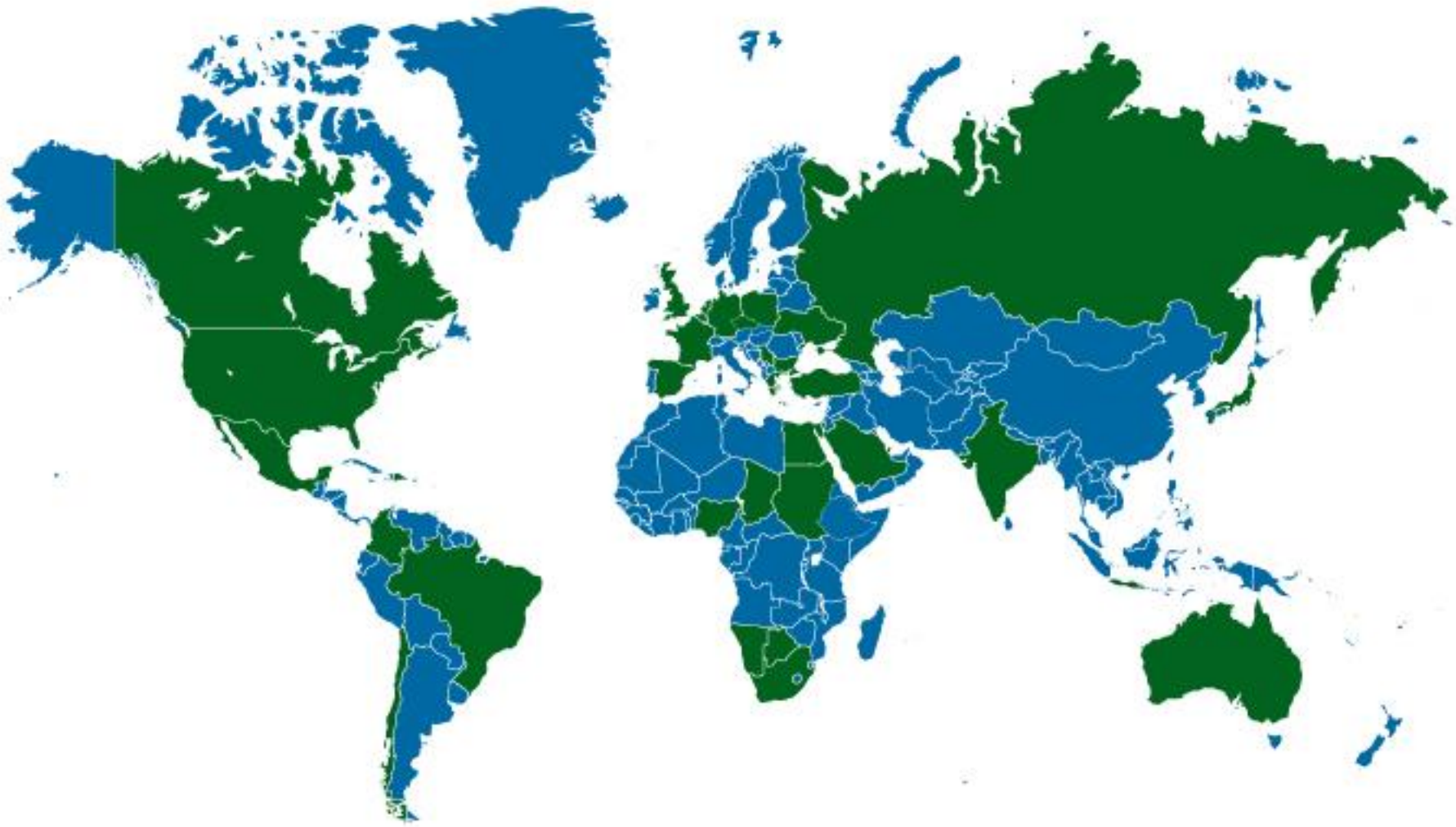


Coolerado

Don’t just take our word for it, our technology has been evaluated by many independent sources

1. Department of Energy
2. National Renewable Energy Lab
3. Sacramento Municipal Utility District
4. Pacific Gas & Electric
5. Federal Energy Management Program
6. Tested by ETL
7. CE Compliant

Proven technology installed in more 30 countries



Coolerado®

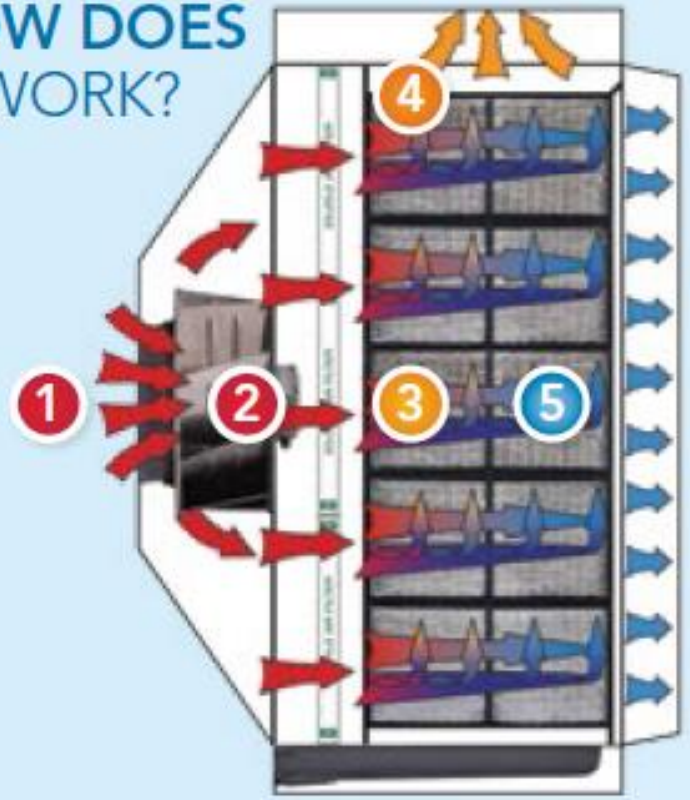
Coolerado M50: Modular and Mighty

- HMX (Heat and Mass Exchange) technology in a super-versatile casing
- Stackable side-by-side
- Easy to increase cooling power
- Durable, easy to install and maintain
- Help to reduce energy bill
- Ideal for data centers, health care facilities, retails stores, restaurant and more…

- Conditioned air flow at 635L/s without ducting losses
- Intake airflow 1105L/s
- Working airflow 470L/s
- Conditioned air is cooled up to 120% of intake air'swet bulb temperature without changing moisture content

Coolerado®

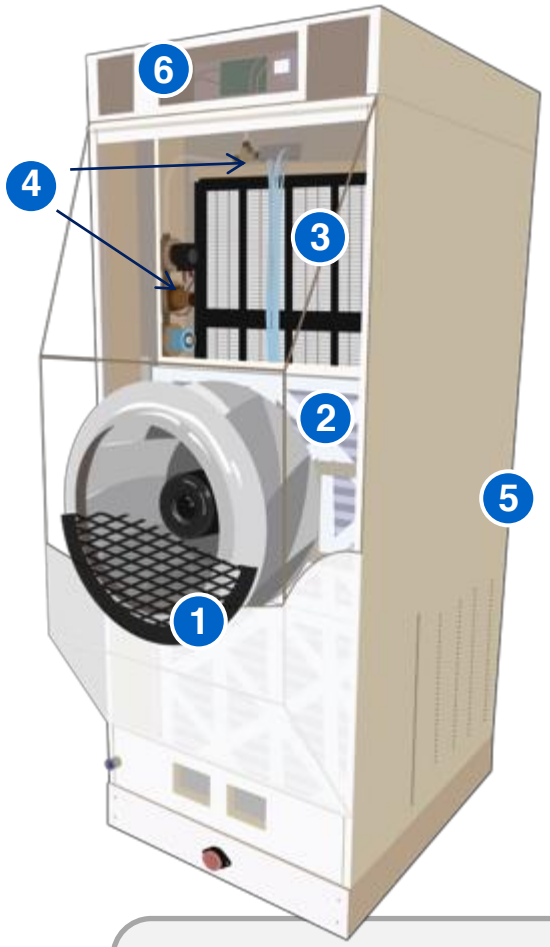
HOW DOES IT WORK?



1. **FRESH AIR** Outside air is drawn into the air conditioner by a fan.
2. **FILTERED** The air is then cleaned by a set of high efficiency air filters.
3. **HEAT AND MASS EXCHANGE** The air enters an array of HMXsthat use a new patented technology.
4. **WORKING AIR AND WATER** About half of the air that enters the HMX is saturated with water and returns to the atmosphere, carrying heat energy removed from the conditioned air.
5. **CONDITIONED AIR** The other half of the air that enters the HMXis cooled without adding humidity.

Coolerado®

What's Inside: Coolerado M50



1. Electronically Commutated Motor and Fan Assembly
2. High Efficiency Air Filters
3. Coolerado Heat and Mass Exchanger (HMX)
4. Water Delivery System
5. Cabinet
6. Water Control Board

- Cools
- Provides fresh air
- Low maintenance
- 90% less electricity for cooling

Coolerado®

Coolerado… others

Coolerado C60

HMX core

Coolerado®

Coolerado

Coolerado
Energy Recovery Ventilator

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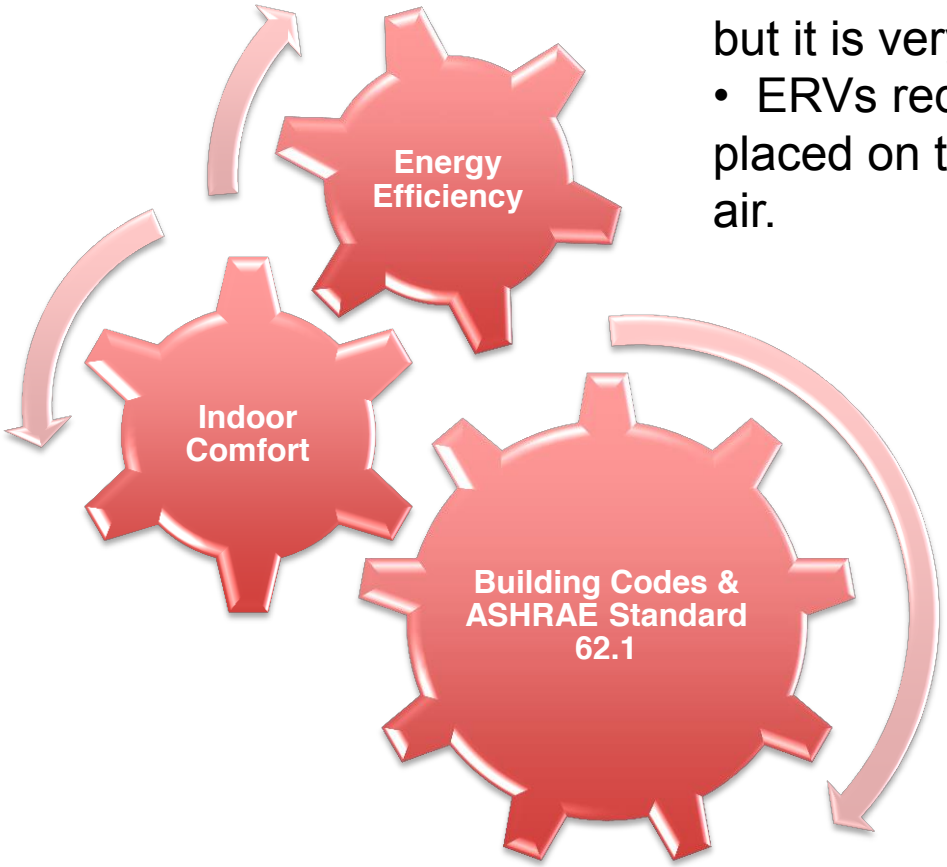
It's all about IAQ, Comfort & Energy Efficiency

- Buildings are tight and need ventilation.
- RTUs can provide the ventilation and comfort but it is very expensive.
- ERVs reduce the cooling and heating loads placed on the RTUs units by untreated outdoor air.



ERV SALES

Coolerado®

It is a Big Pie, What's Our Slice?

- World wide revenue will grow from $1.6 billion in 2014 to $2.8 billion in 2020.
- $40% North America
- $40% Europe
- $20% Rest of the World

Coolerado®

How Steep is the Climb?

OPPORTUNITIES

- It is a big-growing market.
- ERVs are a common solution and are rising in demand.
- We are not breaking in as a new comer with a new and “disruptive” technology.
- Coolerado will be another ERV in the market but positioned as the most efficient of all.

CHALLENGES

- Popularity of the wheel.
- Coolerado ERV uses water.
- Access to distribution channels.
- Price.
- Inventory availability compared to other brands.
- Coolerado will be another ERV.
- Standard and custom features.
- Warranty 5 years vs. 3 years.

If the Building does not need Ventilation, it does not need an ERV

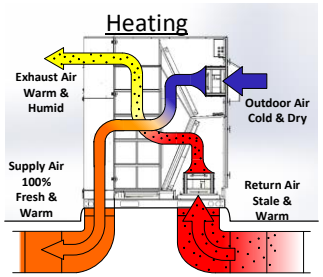
Coolerado®

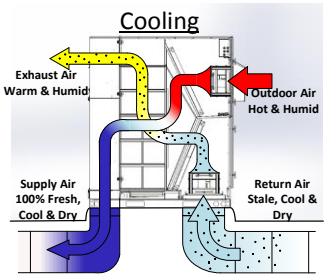
How does it work ?

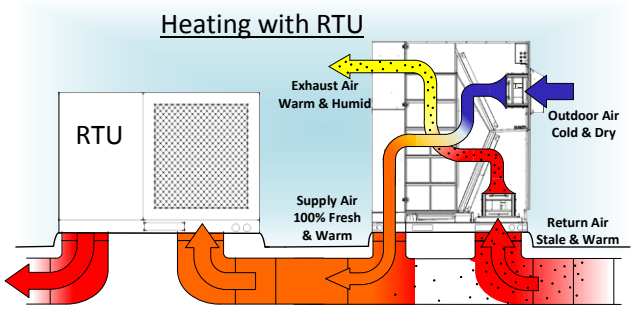
Coolerado®

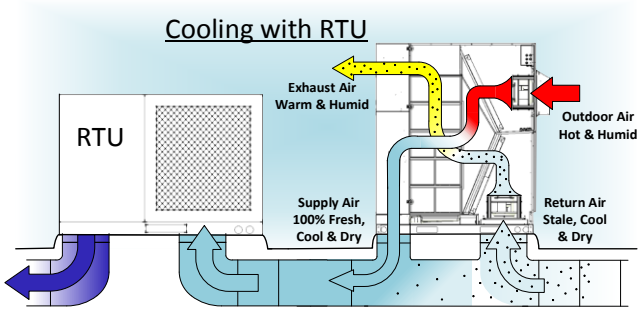
HMX Deployed as an Energy Recovery Ventilator

- Takes fresh air drawn from outside and delivers it into the space, exhausts stale indoor air to the outside improving indoor air quality. With negligible cross-contamination, airborne contaminants are flushed from the space
- The HMX transfers heat energy to and from the incoming and outgoing air
- In climates that experience hot and humid conditions, the HMX condenses incoming humidity and drains it away
- In the summer it is a super air conditioner and provides positive pressure to the building









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Best Applications Considerations

- Spaces with ventilation needs greater than 10% of the HVAC unit's supply air rating.
- Spaces where summer ventilation and cooling is more important than winter heating.
- Regions with hot and dry summers and mild winters.
- Regions with hot and humid summers and mild winters and ventilation requirements less than 50%.
- Spaces that during the summer months would benefit from pressurization to keep hot air from filtering in through walls.
- Retrofits of existing systems to handle outside air without changing the existing HVAC unit.
- Spaces with return air that is not contaminated with grease or heavy industrial contamination.

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