



RT SERIES

ROOFTOP PACKAGED UNIT

UAYN-AFY1A



ROOFTOP PACKAGED UNITS

Class	Capacity, kW (Cool/Heat)	Model Name
350	37.2/34.3	UAYN350AFY1A
400	40.8/37.6	UAYN400AFY1A
470	45.8/44.1	UAYN470AFY1A
530	53.4/54.3	UAYN530AFY1A
640	66.1/64.9	UAYN640AFY1A
750	73.1/71.8	UAYN750AFY1A
840	81.9/82.0	UAYN840AFY1A

ACCESSORIES

Type	Class						
	350	400	470	530	640	750	840
MERV 8 Replacement Filter	BAF287A350	BAF287A530			BAF287A750		BAF287A940
Vibration Mounting Kit	BKSB28A530				BKSB28A750		BKSB28A940
Remote Temperature Sensor	MKRCS01-19						

- RT Series – R410A Rooftop Packaged Unit (UAYN-AFY1A)
 - 7 model capacities (350 – 840 Class, 37.2 – 81.9kW)
 - AFR: 1,950 – 4,580L/s
 - ESP: 210 – 400Pa
- Compact footprint ideal for R22 replacement market*
- Designed & manufactured in Australia

FEATURES

- Indoor EC plug fan (fixed speed control only)
 - Adjustable with up to 300Pa ESP increase over rated
- Outdoor propeller fans are EC motor driven & weather proof
- Dual fixed speed scroll compressors (2 step, 50 & 100% capacity)
- Improved EER of up to 14% (vs UAYQ-CY1A)
- Hydrophilic blue fin indoor & outdoor coils
- Foil faced 20mm PE Thermobreak insulated panels
- Built-in 2" RA filter rails with included MERV 8 filters
- Built-in demand response (DRED) capability
- 4.3" touch controller with Auto, Offset mode, Scheduler & After Hours
- After hours push button is included
- Optional vibration mounting kit & remote temp. sensor (25m)
- Built-in economy cycle function (dry bulb only, hardware not included)



RT
SERIES

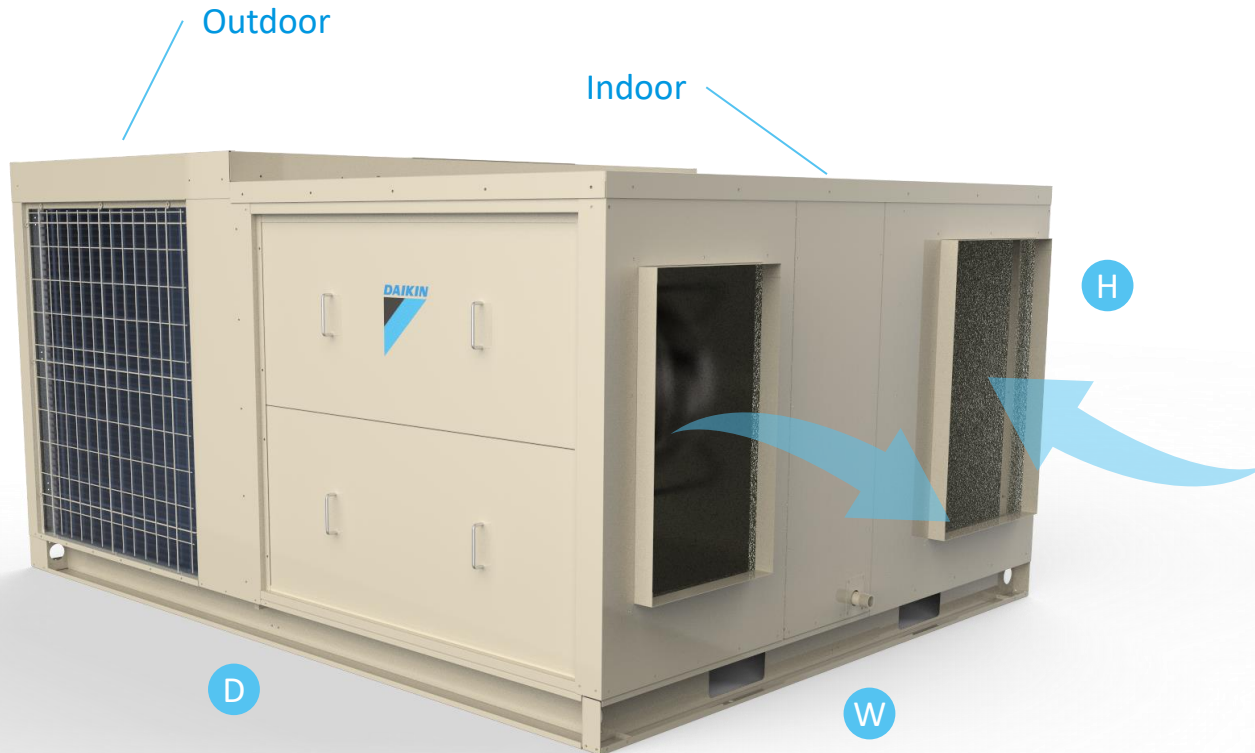
UAYN-AFY1A



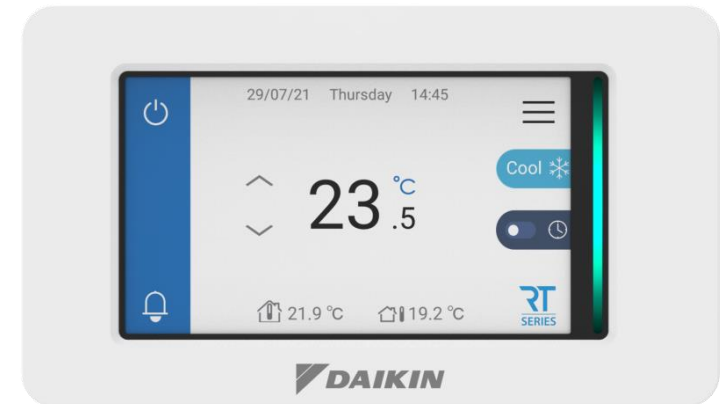
RT Touch Controller
Included with 15m cable

*Same foot mounting position as common R22 rooftop packaged unit ranges

RT SERIES



Class	Dimensions (mm)			Footprint
	H	W	D	
350	1,276	1,914	2,525	4.8m ²
400	1,360			
470				
530	1,403	2,220	2,484	5.5m ²
640	1,757			
750	1,980	2,207	2,835	6.3m ²
840				

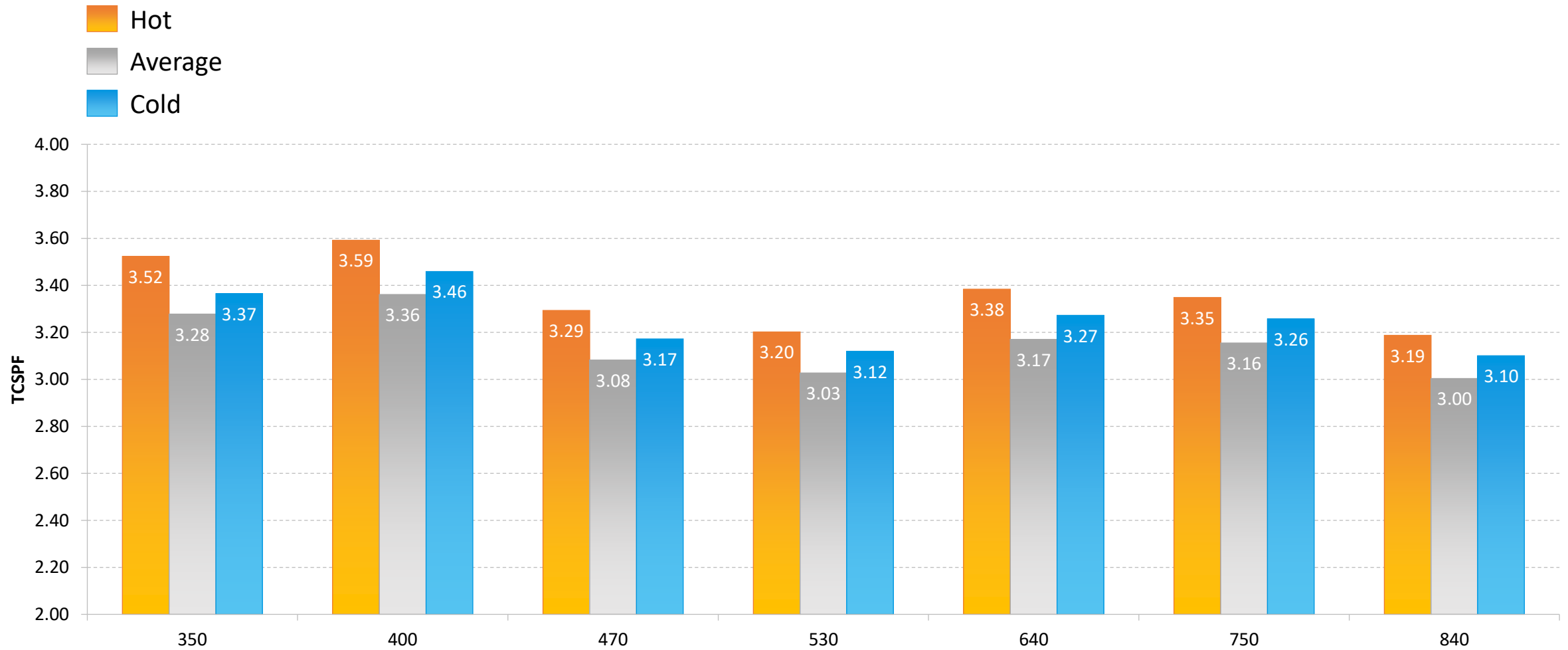


Included Controller

Wall Mounted: 88 x 152 x 32

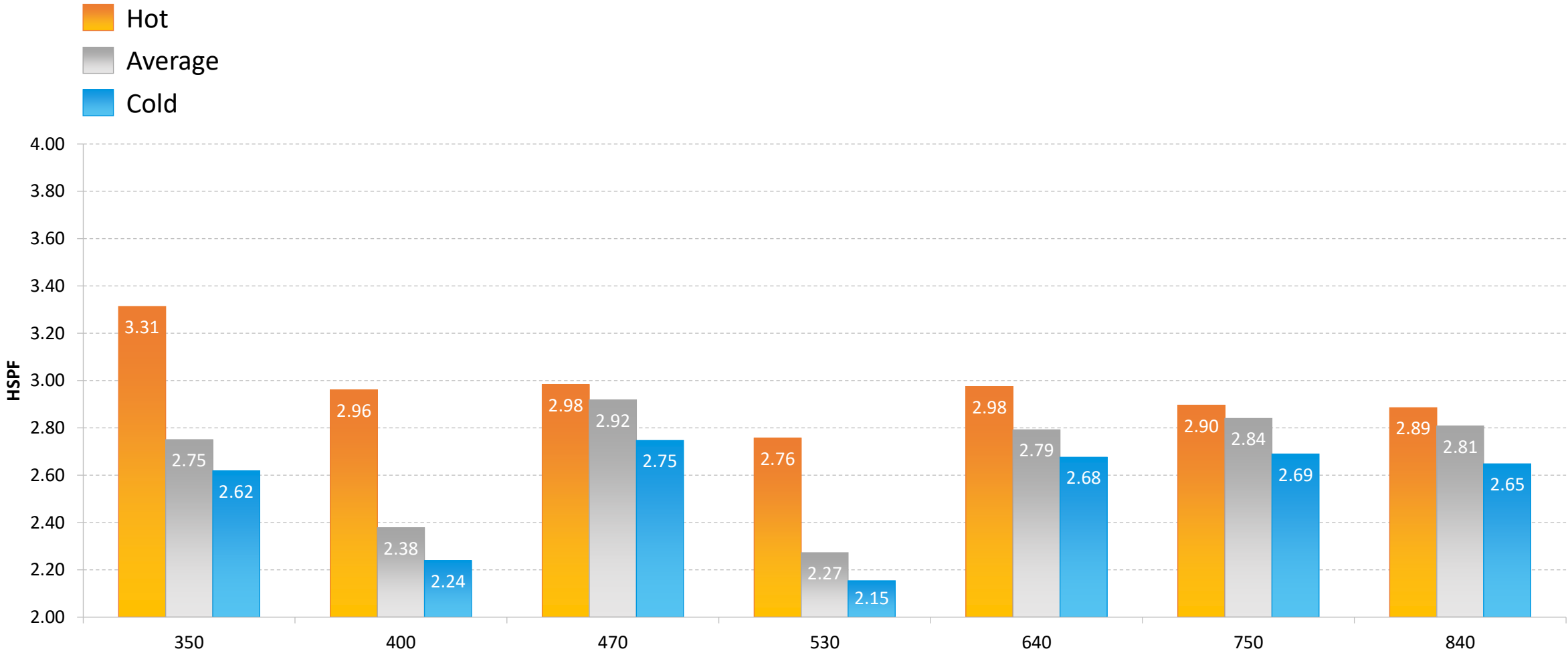
Flush Mounted: 88 x 152 x 9

Seasonal Energy Performance – Cooling



TCSPF/HSPF refers to the seasonal efficiency of an air conditioner as outlined in the GEMS Determination 2019
TCSPF : Total Cooling Seasonal Performance Factor as per AS/NZS 3823.4.1:2014
HSPF : Heating Seasonal Performance Factor as per AS/NZS 3823.4.2:2014

Seasonal Energy Performance – Heating



TCSPF/HSPF refers to the seasonal efficiency of an air conditioner as outlined in the GEMS Determination 2019

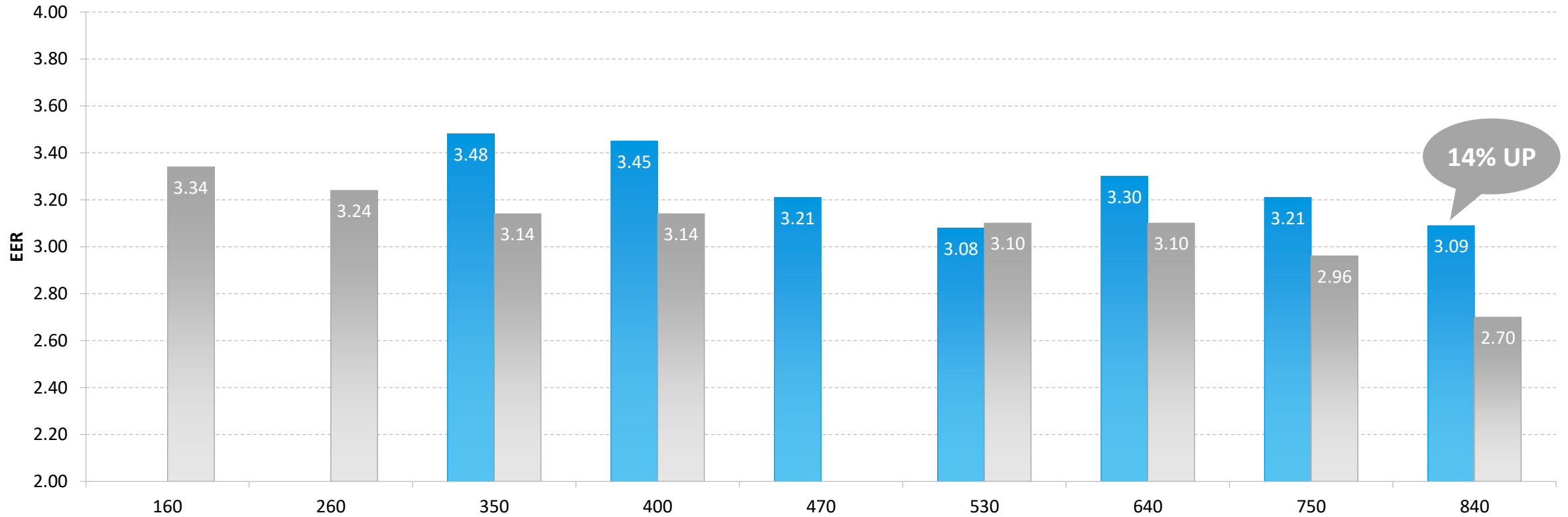
TCSPF : Total Cooling Seasonal Performance Factor as per AS/NZS 3823.4.1:2014

HSPF : Heating Seasonal Performance Factor as per AS/NZS 3823.4.2:2014

EER Performance



- New: UAYN-AFY1A
- Current: UAYQ-CY1A

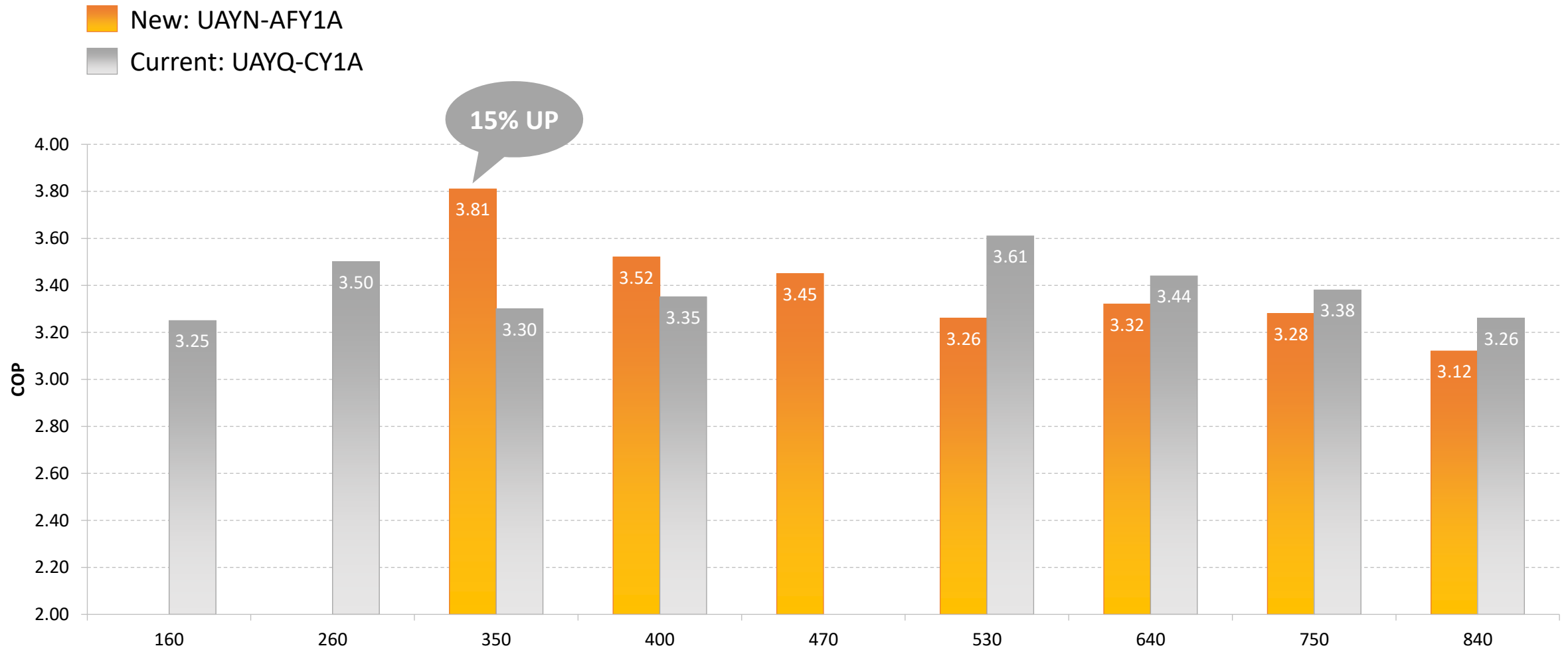


At Rated Conditions

Cooling : Indoor temp. : 27°CDB, 19°CWB, Outdoor temp. : 35°CDB.

Heating : Indoor temp. : 20°CDB, Outdoor temp. : 7°CDB, 6°CWB.

COP Performance



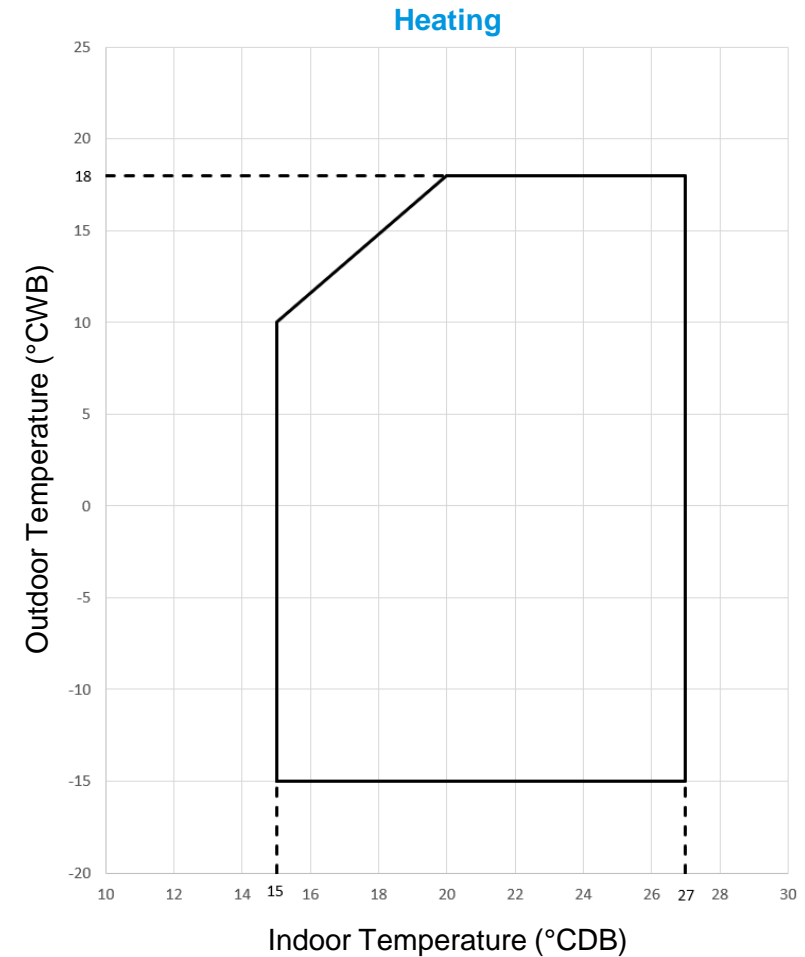
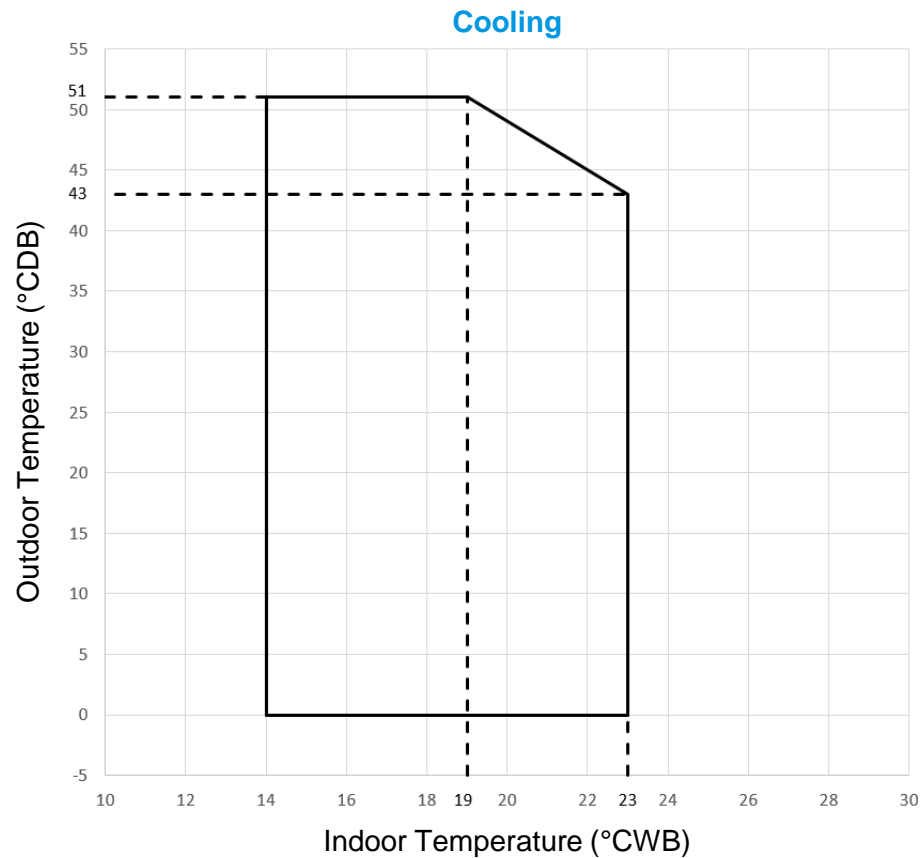
At Rated Conditions

Cooling : Indoor temp. : 27°CDB, 19°CWB, Outdoor temp. : 35°CDB.

Heating : Indoor temp. : 20°CDB, Outdoor temp. : 7°CDB, 6°CWB.

Operation Limits

- Cooling operation range of up to 51°C ambient condition when indoor temp. is between 14 – 19°CWB
- Heating operation range of as low as -15°C ambient condition
- Conditions outlined are at nominal airflow rate



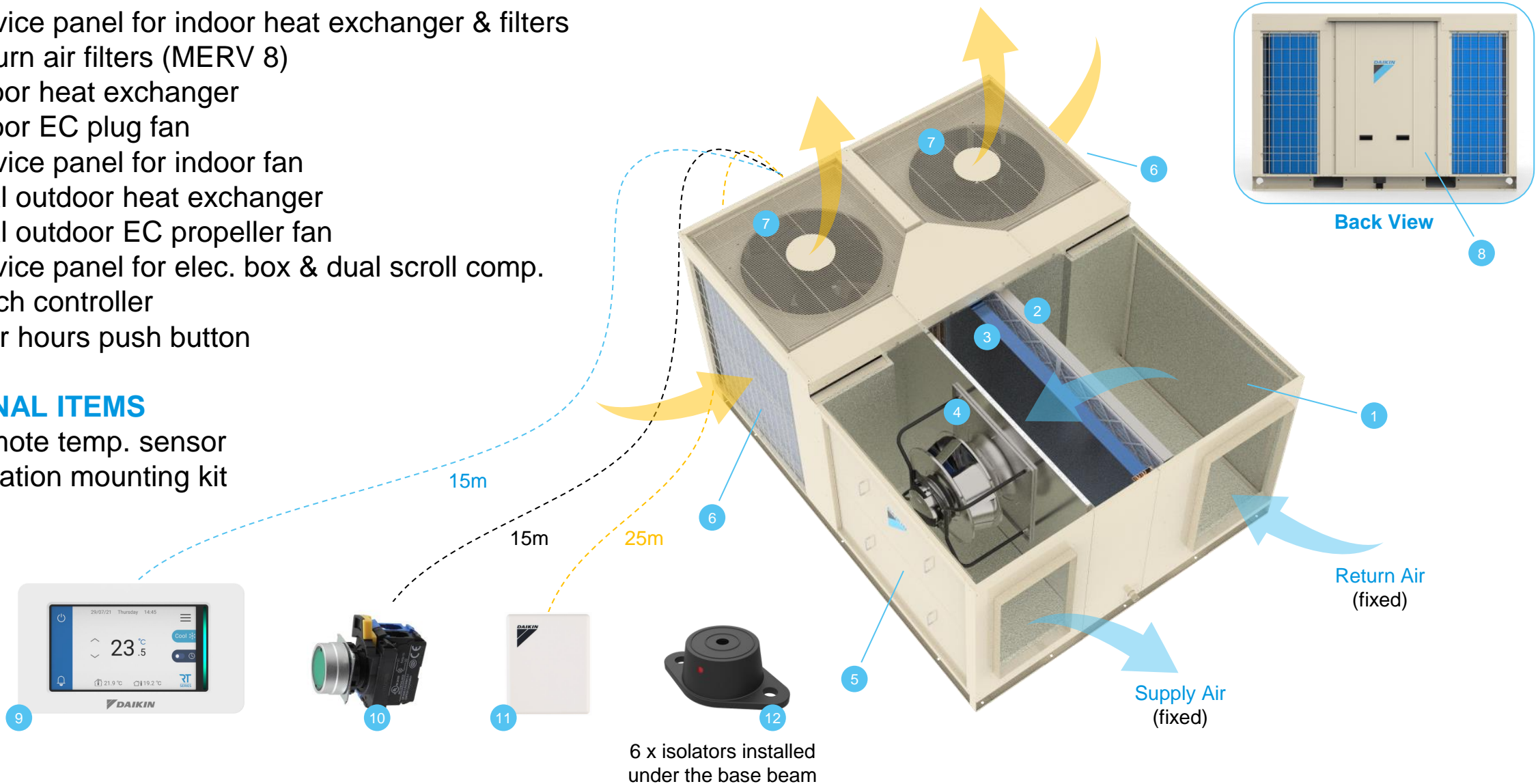
System Components & Optional Accessories

CORE COMPONENTS

1. Service panel for indoor heat exchanger & filters
2. Return air filters (MERV 8)
3. Indoor heat exchanger
4. Indoor EC plug fan
5. Service panel for indoor fan
6. Dual outdoor heat exchanger
7. Dual outdoor EC propeller fan
8. Service panel for elec. box & dual scroll comp.
9. Touch controller
10. After hours push button

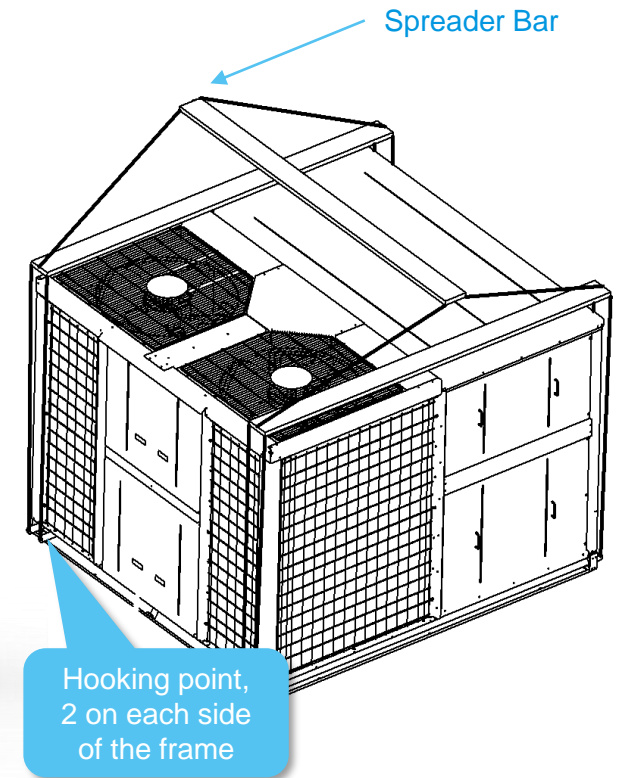
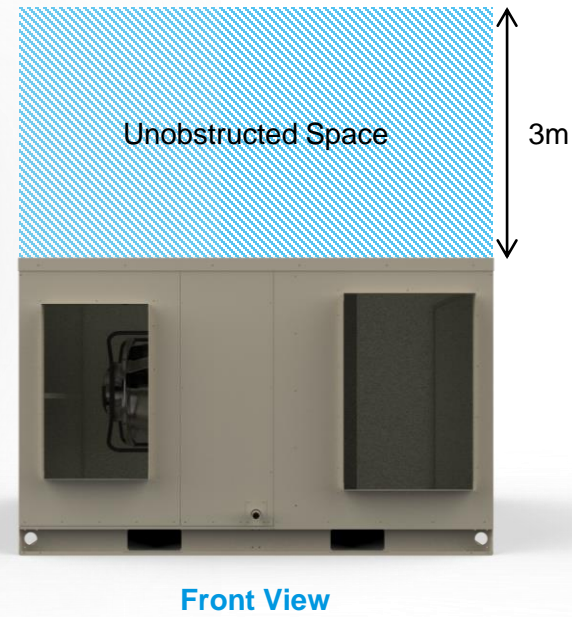
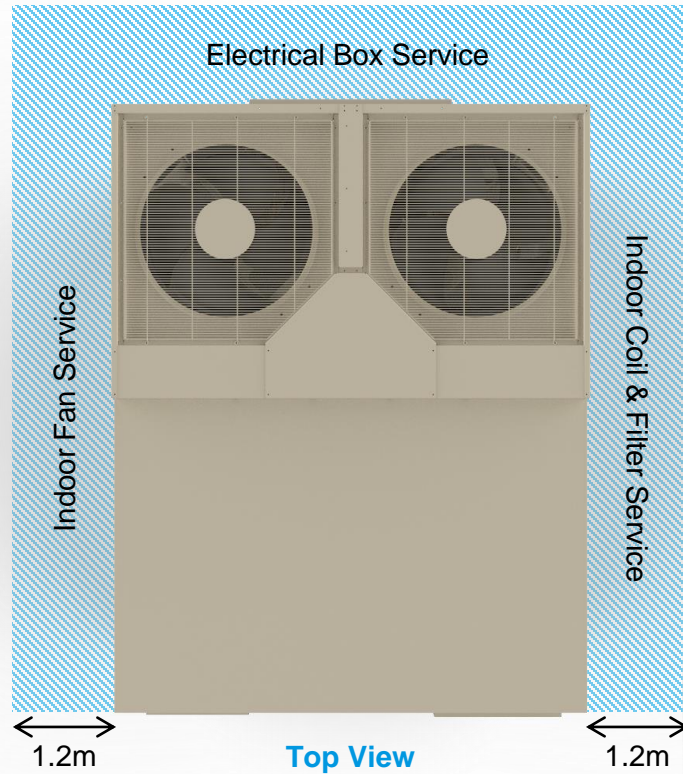
OPTIONAL ITEMS

11. Remote temp. sensor
12. Vibration mounting kit



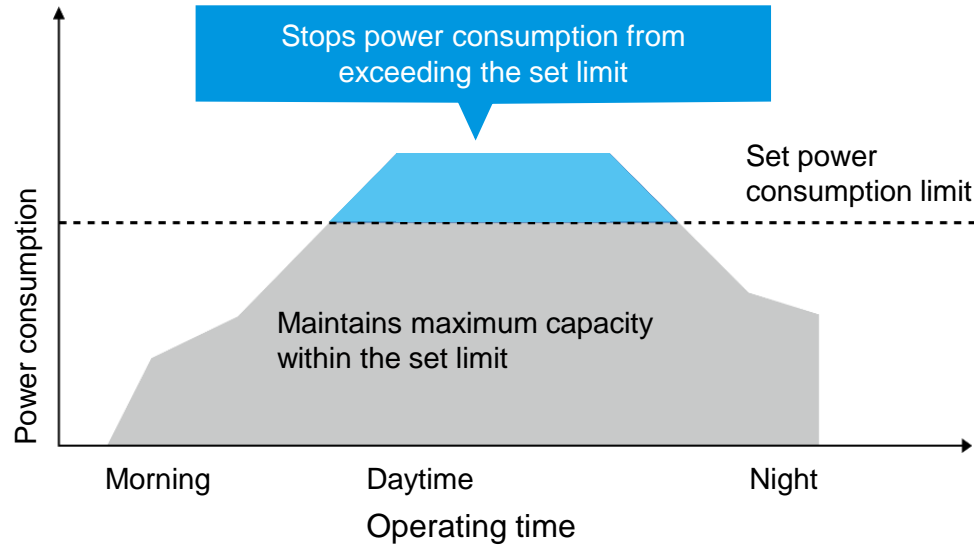
Crane Lifting & Service Space

- To avoid damage a 'spreader bar' must be utilised when lifting the rooftop packaged unit
- Four hooking points are located on the base frame of the unit
- Service space of 1.2m is recommended for each side of the unit (excluding the front for SA & RA)
- Top of the unit requires 3m of unobstructed space for optimal operation

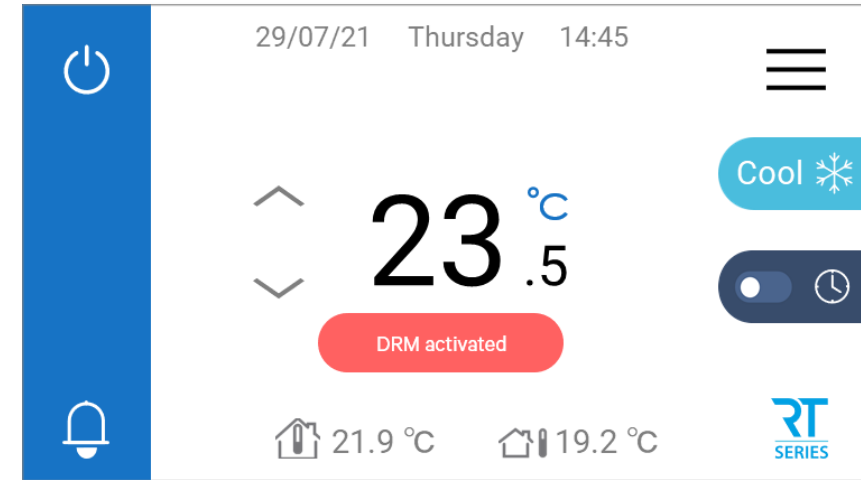


Built-in Demand Response (DRED)

- The RT Series rooftop packaged units feature built-in DRED contacts
- DRED is an acronym for Demand Response Enabling Device
- Designed to enable electricity providers to reduce peak demand when necessary



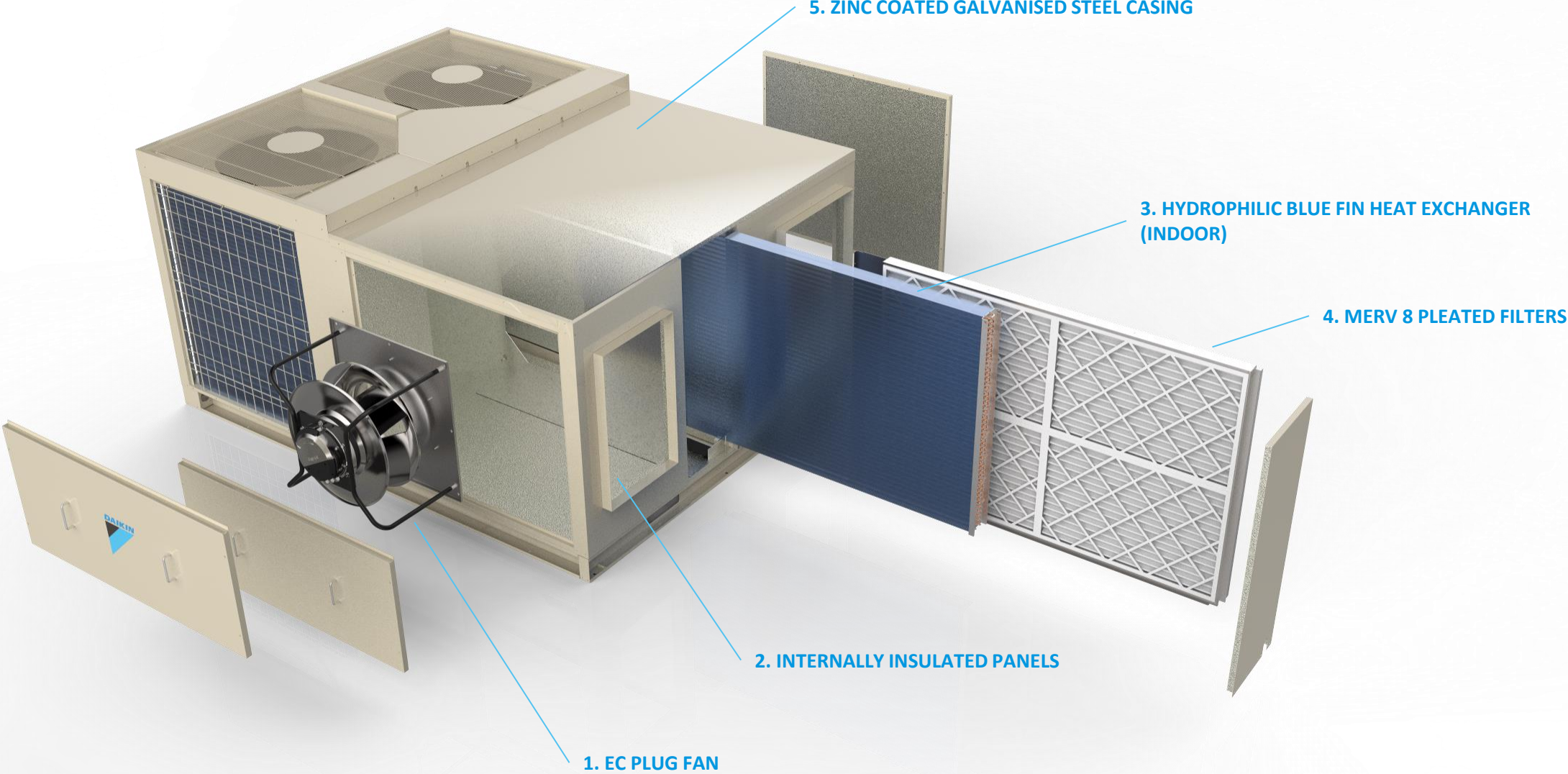
Modes	Limit	Details
DRM 1	0%	All Comp. & ODU Fan Off
DRM 2	50%	1 x Comp. On
DRM 3	75%	1 x Comp. On & 1 x Comp. Cycling*



A DRM activated icon will be displayed on the controller when under demand response operation

*Compressor usage will be balanced such that the same compressor is not always cycled

FEATURES & TECHNOLOGY



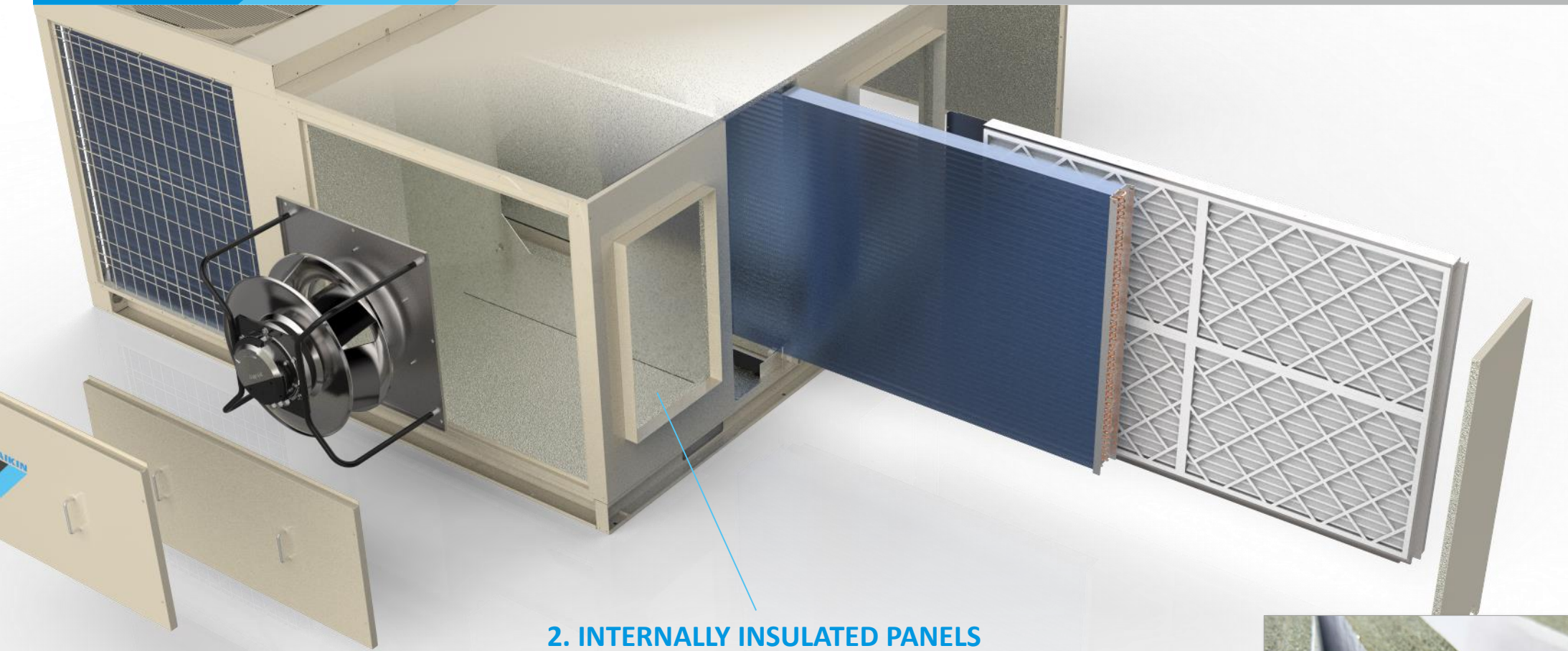


1. EC PLUG FAN

ebm-papst EC plug fan, 2 x fans used for 750 & 840 Class.

- 5 x backward curve aluminium fan blades
- Spider mounted design & IP55 rated
- Soft start motor reduces motor & shaft mechanical stress for improved reliability
- Exceeds IE4/super premium efficiency

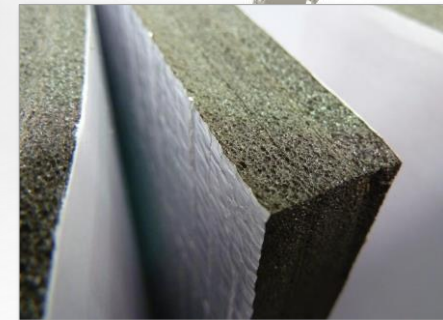


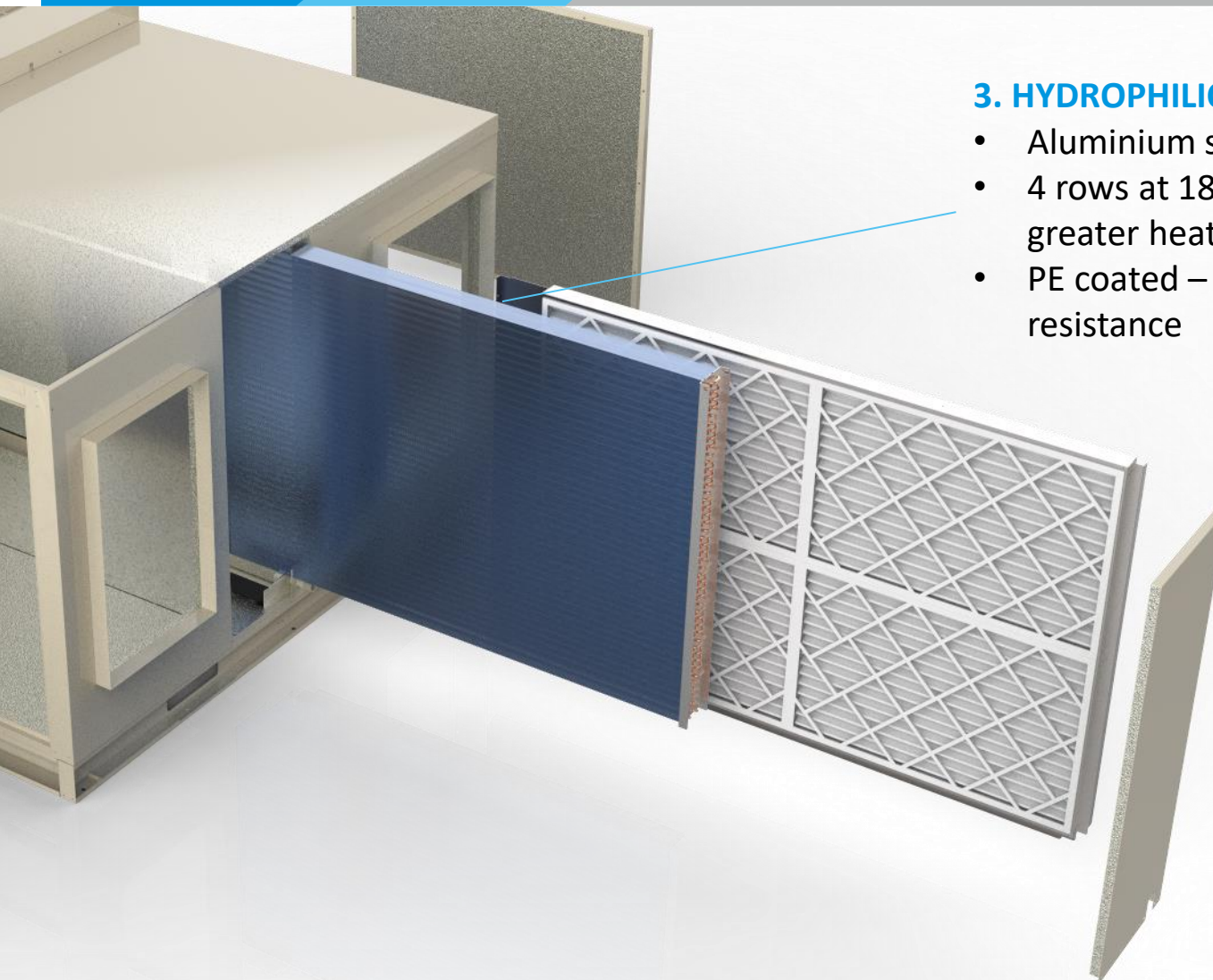


2. INTERNALLY INSULATED PANELS

Both supply & return airside compartment is internally insulated with 'Foil Faced PE Thermobreak'.

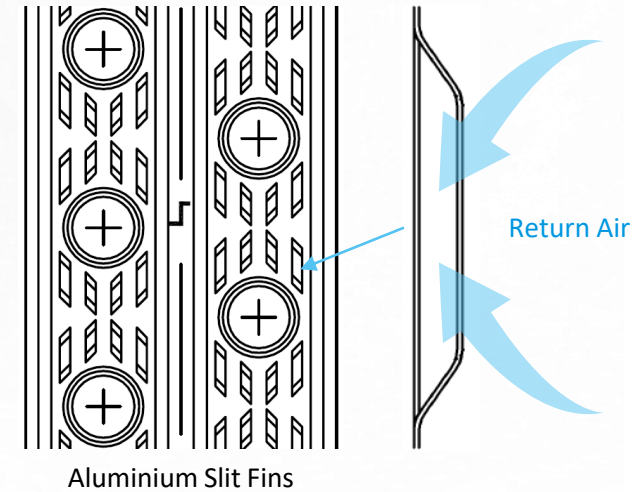
- Closed cell polyolefin foam – reinforced with AL foil
- Low thermal conductivity: 0.032W/mK @ 23°C
- 20mm thickness for panels & 10mm for drain pan

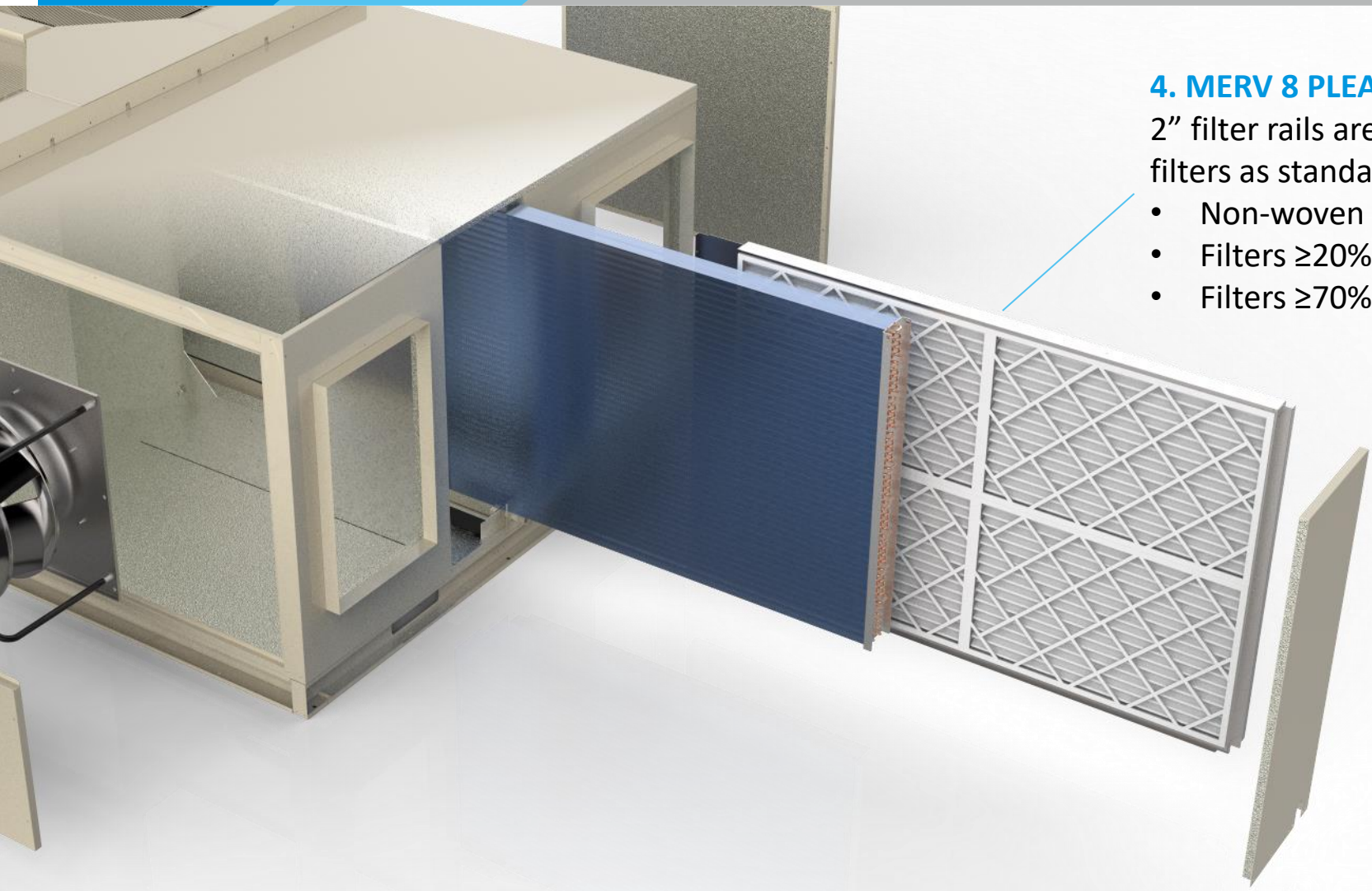




3. HYDROPHILIC BLUE FIN HEAT EXCHANGER

- Aluminium slit fins with $\varnothing 7\text{mm}$ copper pipes
- 4 rows at 18 fins per inch, maximises surface area for greater heat exchange in a compact footprint
- PE coated – an acrylic & hydrophilic coat for corrosion resistance





4. MERV 8 PLEATED FILTERS

2" filter rails are provided with preinstalled MERV 8 pleated filters as standard.

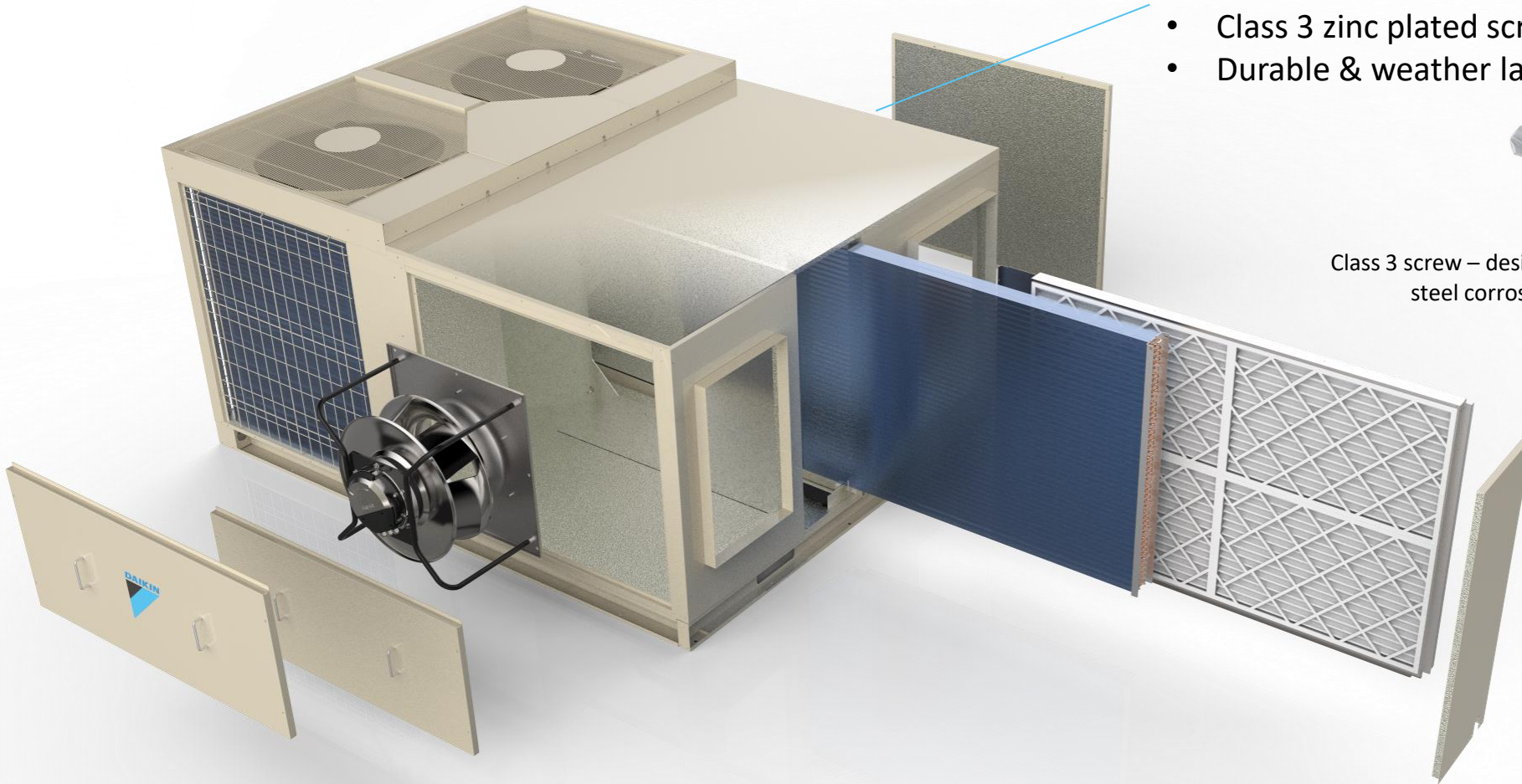
- Non-woven cotton synthetic blend (50mm pleated)
- Filters $\geq 20\%$ of 1.0 – 3.0 μm particles
- Filters $\geq 70\%$ of 3.0 – 10.0 μm particles



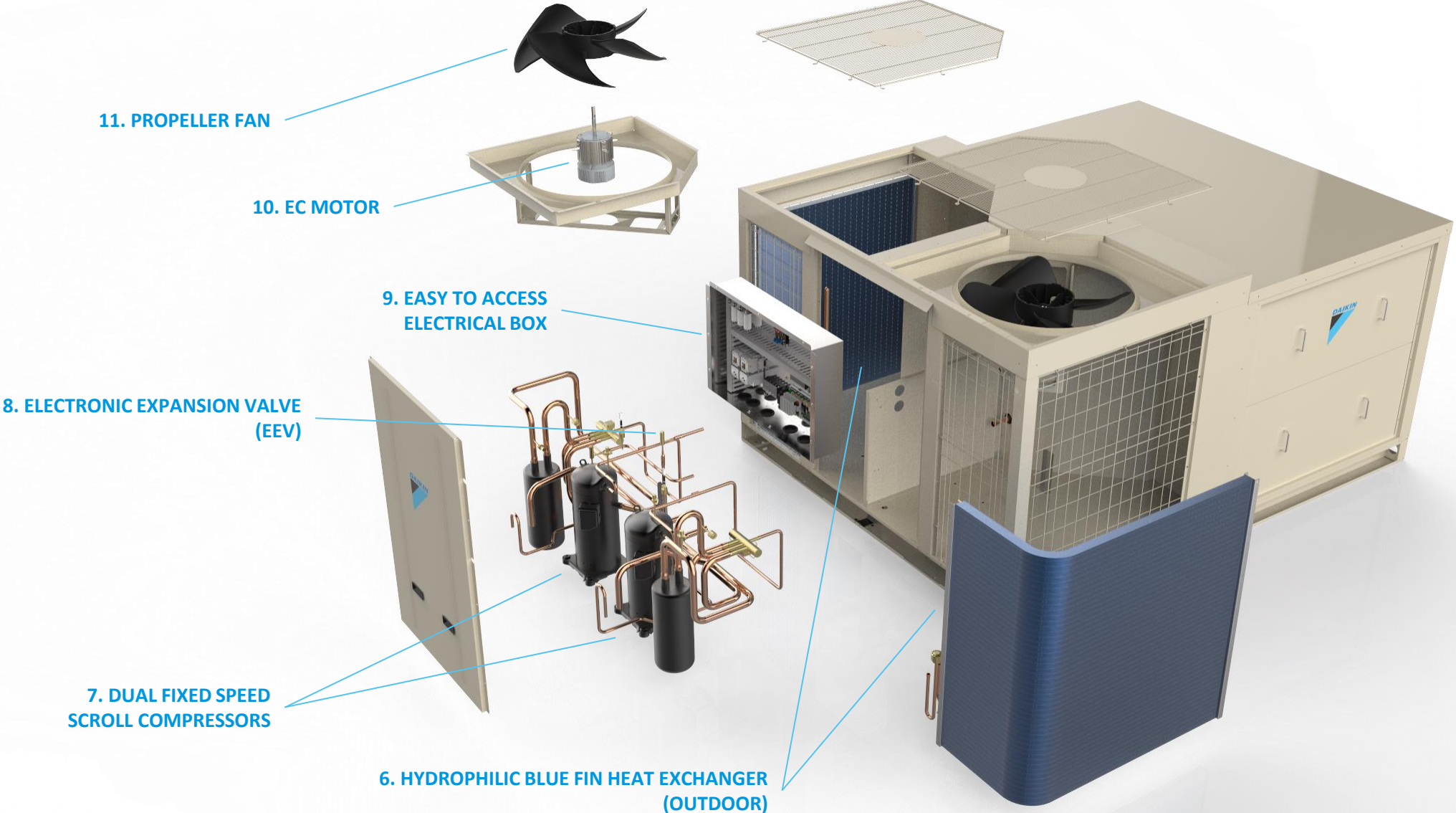
Replacement filter available for purchase separately

5. ZINC COATED GALVANISED STEEL CASING

- Further electrostatic powdered coated in ivory white
- Class 3 zinc plated screws used in casing assembly
- Durable & weather lasting resistant finish



Class 3 screw – designed to withstand an atmospheric steel corrosion rate of 25-50µm/year.

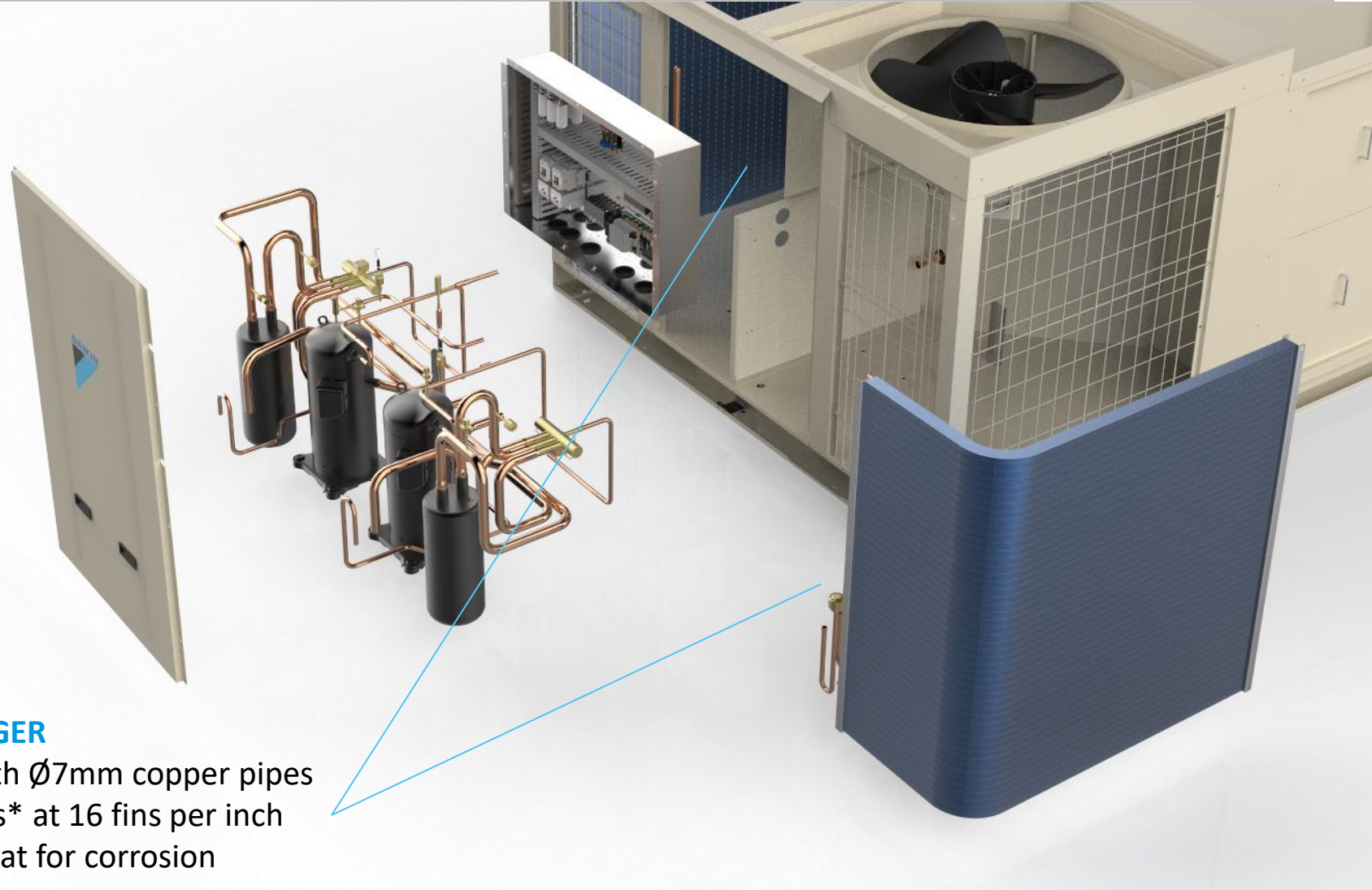




Fine Louver Fin
(conventional)



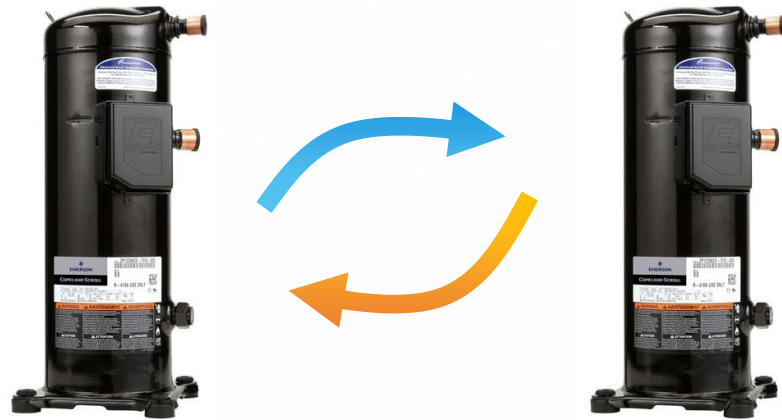
Waffle Fin
(RT Series)



6. HYDROPHILIC BLUE FIN HEAT EXCHANGER

- Aluminium corrugated (waffle) fins with $\varnothing 7\text{mm}$ copper pipes
- Dual heat exchangers each with 2 rows* at 16 fins per inch
- PE coated – an acrylic & hydrophilic coat for corrosion resistance

*3 rows for 530 Class



Compressor used for 50% load will be alternated to produce similar run times on each compressor

7. DUAL FIXED SPEED SCROLL COMPRESSORS

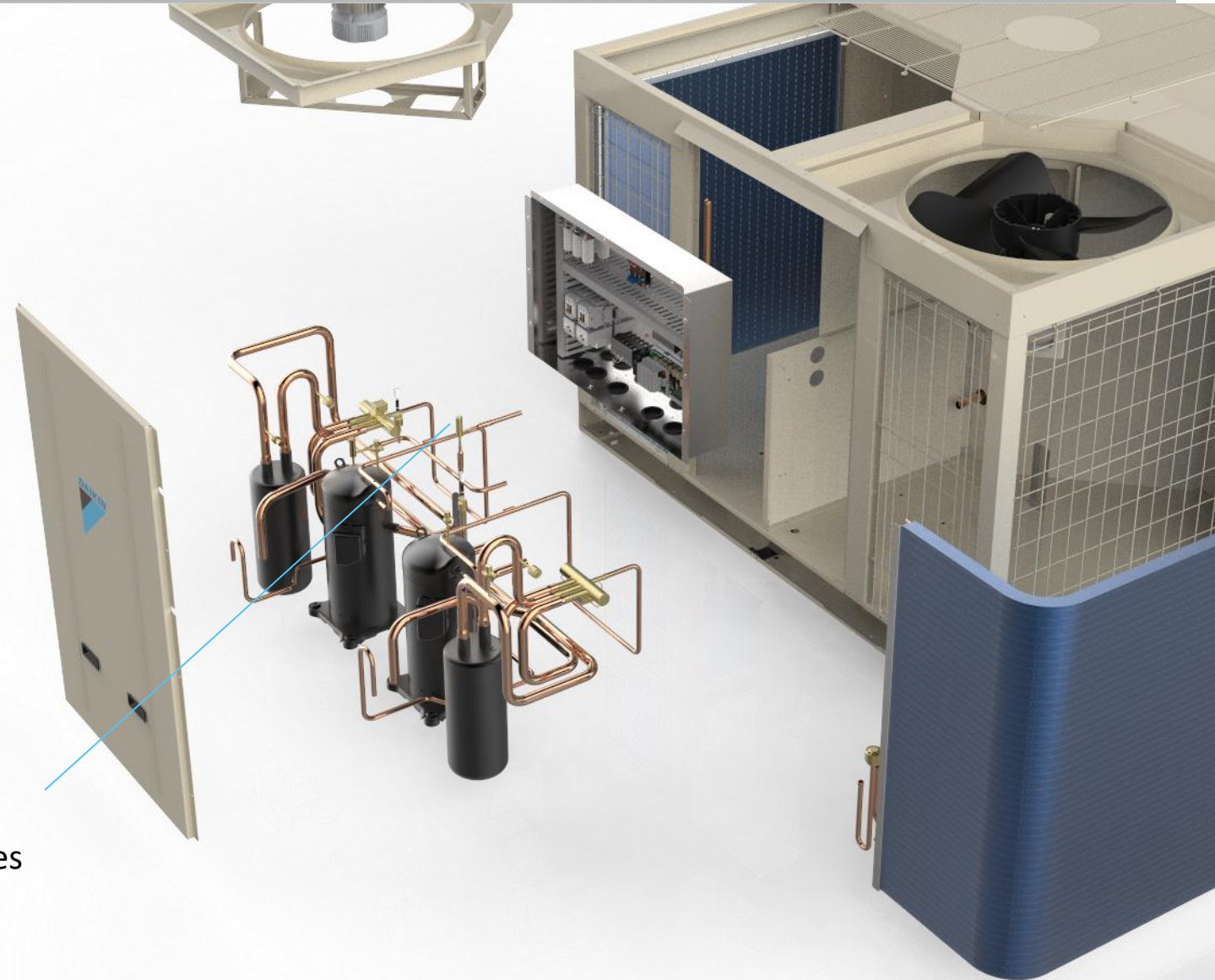
- 2 step control, 50 & 100% capacity
- Compressor balance loading function, ensures the accumulated run time of each compressor is similar to extend compressor longevity





8. ELECTRONIC EXPANSION VALVE (EEV)

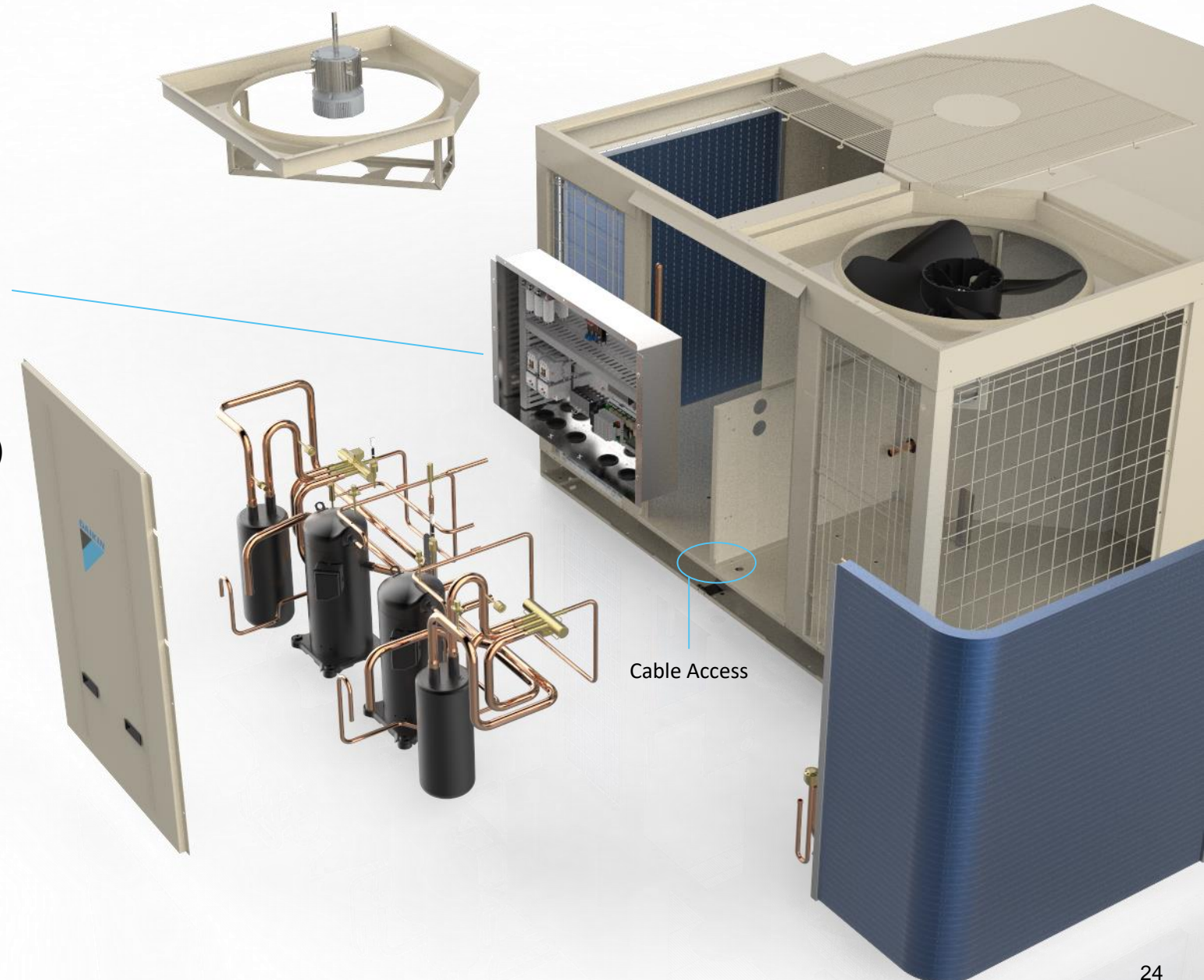
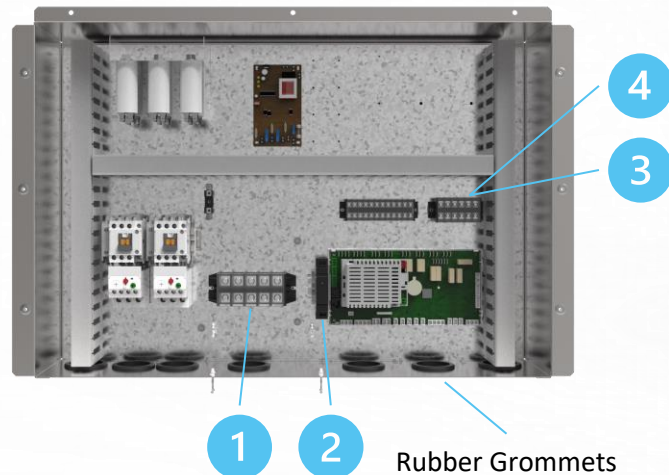
- Expansion valve is electronically operated for precise control of refrigerant flow into the evaporator
- Greater efficiency due to better superheat control*
- Enables fast & accurate response to heat load changes



*Compared to Thermostatic Expansion Valve (TEV)

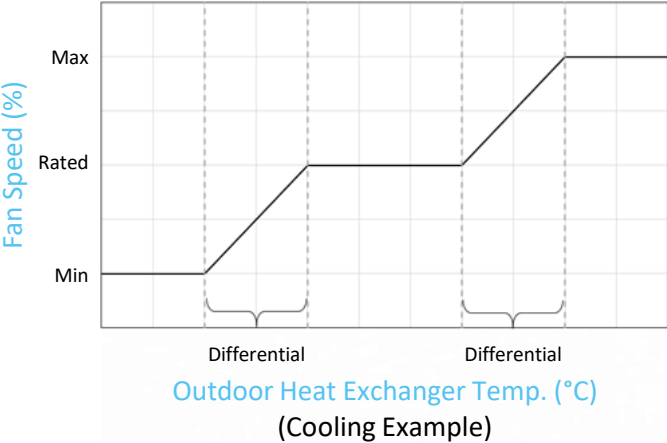
9. EASY TO ACCESS ELECTRICAL BOX

- Complete rooftop system is IP44 rated
- External cables are conveniently fed from the bottom & through the rubber grommets
- All-in-one electrical box, gain access to:
 1. Rooftop power supply terminals
 2. RT Touch Controller terminals
 3. After hours push button contacts
 4. DRED contacts (DRM1, 2, 3* & common)



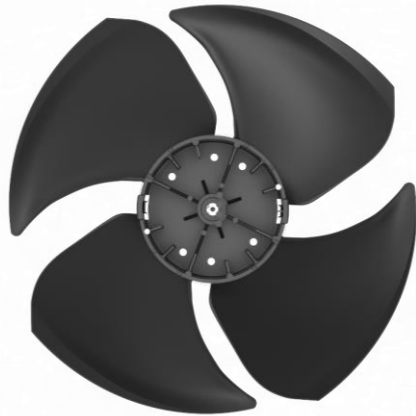
10. EC MOTOR

- Electronically commutated (EC) motor
- Exceeds IE4 efficiency
- IP44 rated (IP55 for 640 – 840 Class)
- Fan speed is modulated according to operation mode (cool or heat) & heat exchanger temp.

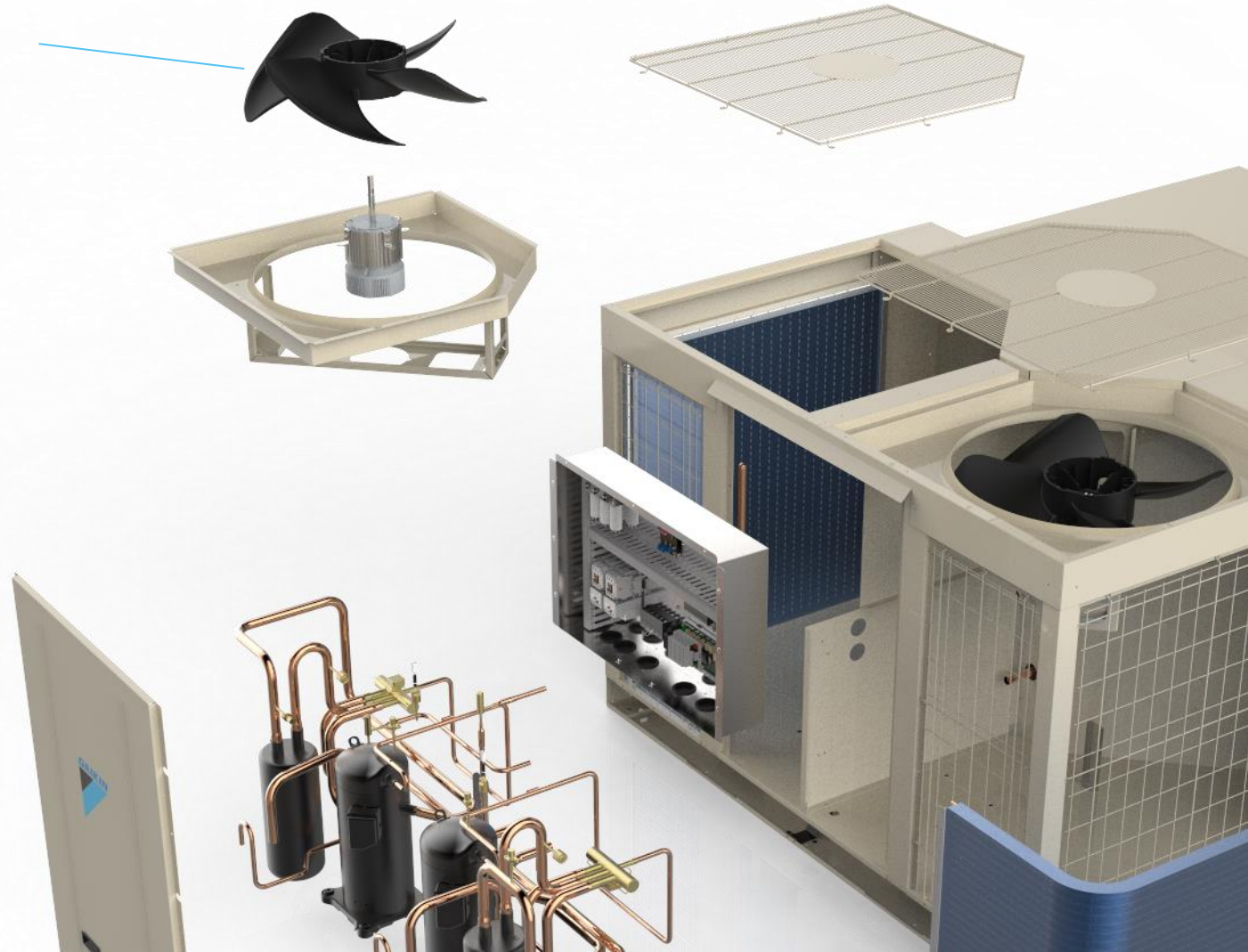


11. PROPELLER FAN

- Sharp edge fan blade curvature reduces vibration and pressure loss
- Large diameter fan quietly delivers high air volume
- ESP of up to 30Pa (for ducting)



Ø681mm, 4 Blade Design



Sequential Control Function

- This function automatically activates during system start up
- Key components (fans, compressors etc.) are turned on sequentially to prevent electrical surges in the system
- The operation sequence of components is dependent on the set operation mode at start up

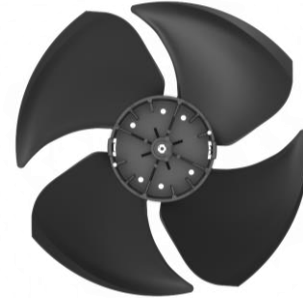


Indoor Fans

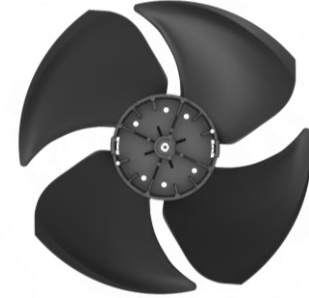


Comp 1

Comp 2



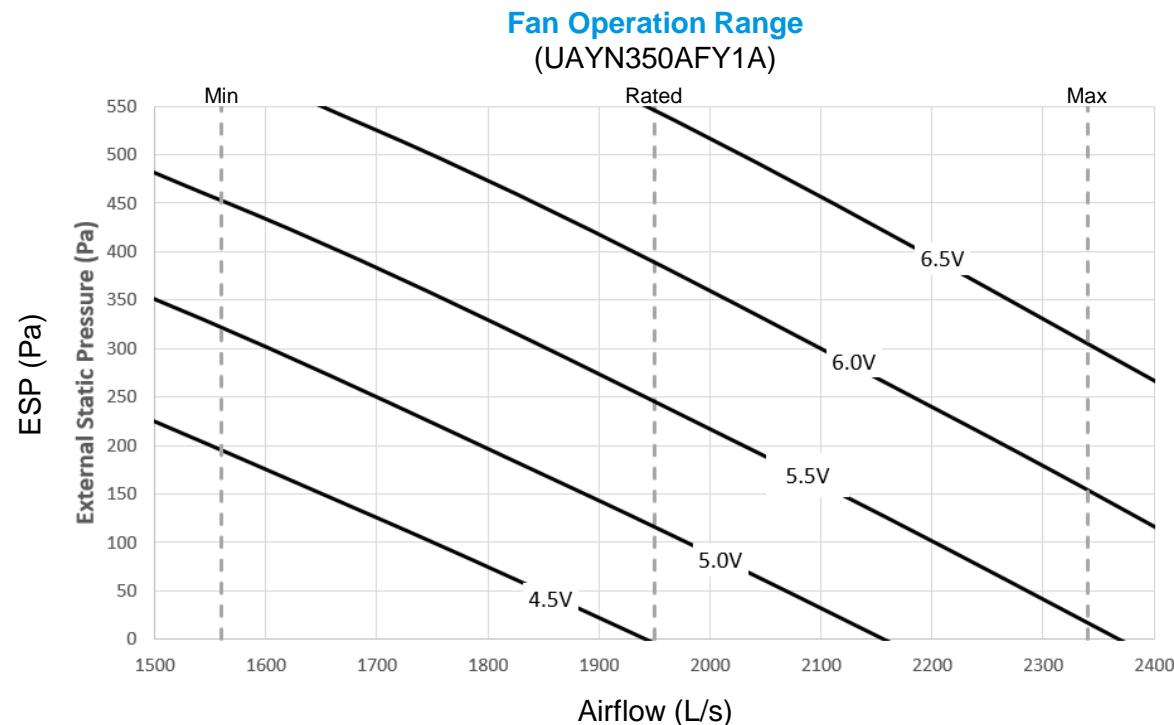
Outdoor Fan 1



Outdoor Fan 2

Mode	Sequence
Fan Only	<i>Indoor Fans Only</i>
Cool	<i>Indoor Fans → Comp 1 → Outdoor Fan 1 → Comp 2 → Outdoor Fan 2</i>
Heat	<i>Indoor Fans → Comp 1 → Outdoor Fan 1 → Four Way Valve 1 → Comp 2 → Outdoor Fan 2 → Four Way Valve 2</i> (Hot Start: Indoor Fans will start in low fan speed & switch to set fixed speed once indoor coil = 40°C or after 3mins)

- The indoor EC plug fan operates in fixed speed control only
- Set speed is configurable with adjustments made in percentage increments (%) correlating to fan speed voltage
- Fan speed **must be** set within the allowable fan operation range (i.e. for UAYN350AFY1A, this is 4.5 – 6.5V)
- ESP increase of up to 300Pa over the rated value can be achieved (i.e. UAYN350AFY1A, rated ESP = 210Pa)



Note, engineering data will only show fan curves at 0.5V increments. Setting fan speed outside of this increment i.e. 5.2V etc. is allowable however no supporting data will be available.

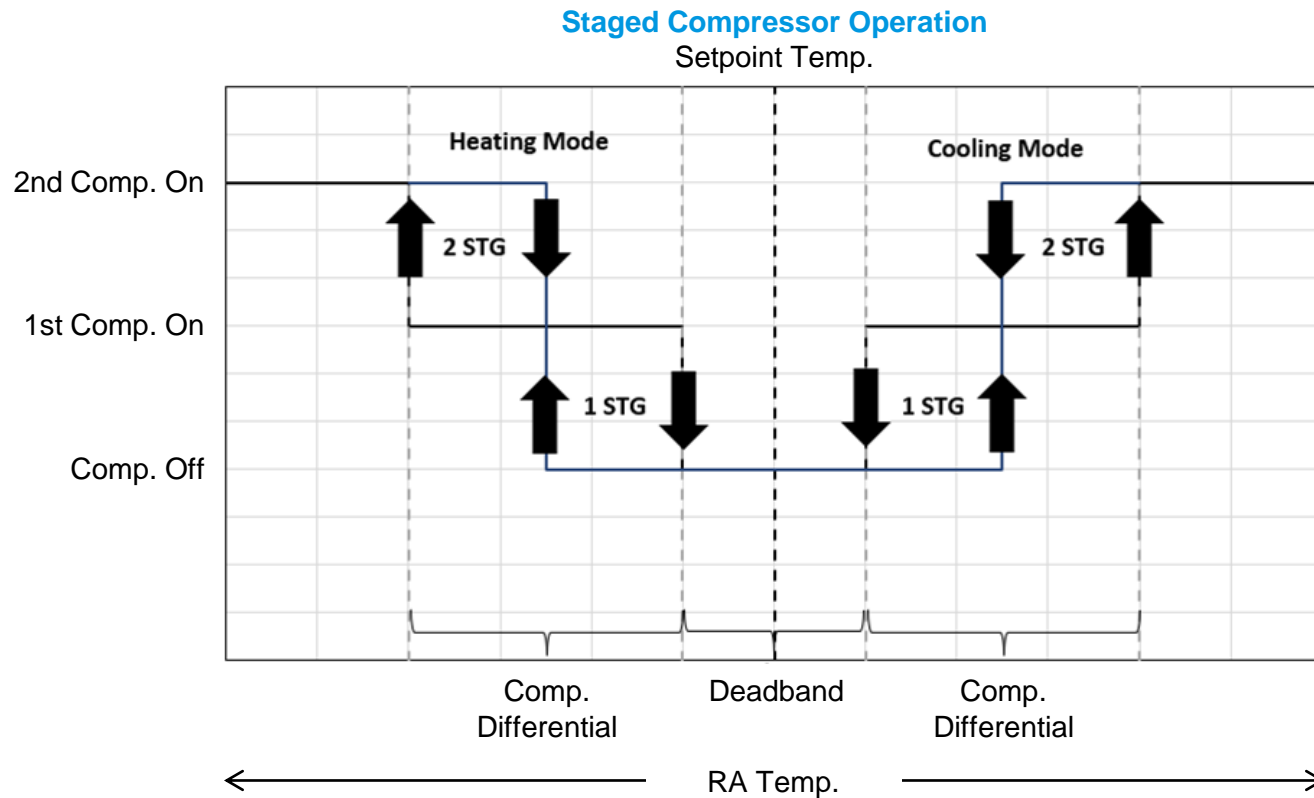


EXAMPLE

- Fan speed: 50% = 5.0V
- Fan speed: 65% = 6.5V
- Allowable range: 4.5 – 6.5V

Staged Compressor Operation & Auto Mode

- Operation of the compressors (Comp.) in stages (STG) is automatically controlled based on RA temp. vs setpoint temp. (SP)
- Staged compressor operation only occurs during Cool, Heat & Auto mode (Fan only = compressor off)
- 'Auto' mode allows the system to automatically select Cool or Heat depending on RA temp. & setpoint temp.



STAGED OPERATION

- Deadband: RA temp. range from SP where both Comp. = OFF (thermo off)
- Comp. Differential: RA temp. range from Deadband where both Comp. = ON
- Both Deadband & Comp. Differential values can be configured via the controller in Service mode
- Two Deadband values can be set, one for 'Normal' operation & one for 'Economy' (Offset) operation

AUTO MODE

- Cool: if $RA\ temp. > (SP + \frac{Comp.\ Diff}{2} + \frac{Deadband}{2})$
- Heat: if $RA\ temp. < (SP + \frac{Comp.\ Diff}{2} + \frac{Deadband}{2})$

- The dual outdoor heat exchangers (HX) allow each HX to enter defrost cycle separately*
- I.e. If both HX require defrost, the 2nd HX will enter defrost cycle once the 1st HX is completed
- Improves comfort as reduced heating capacity can still be provided to the indoor environment

DEFROST LOGIC (during heating mode)

Trigger for defrost cycle of each outdoor heat exchanger (HX) occurs when its temp. drops under 3°C & either one of the below occurs.

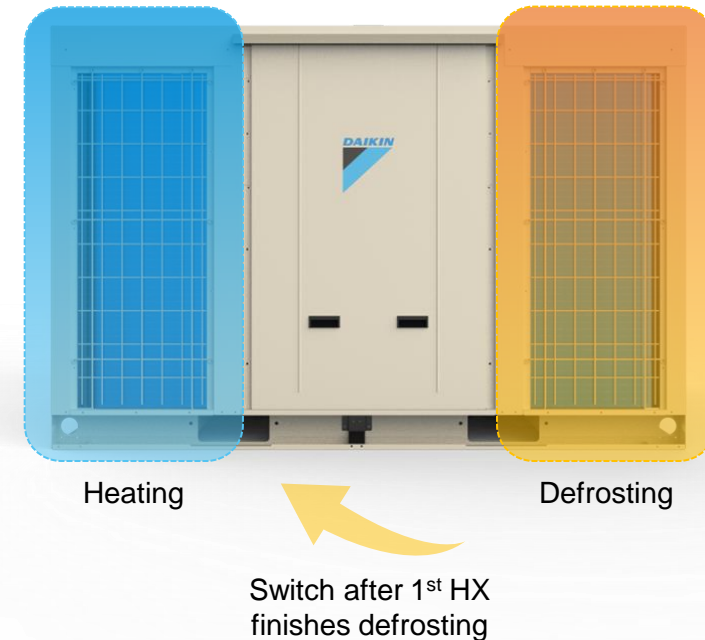
1. HX temp. reaches -8°C within 30min
2. HX temp. reaches -4°C within 60min
3. HX temp. reaches -2°C within 120min

Defrost cycle of the HX will terminate when either of the below occurs.

1. HX temp. > 10°C
2. Defrost cycle operated for 10min

Upon defrost cycle termination, outdoor fan dry mode will run for 30s followed by defrost cycle of 2nd HX if required.

Min time between defrost cycles can be set, default: 60min.

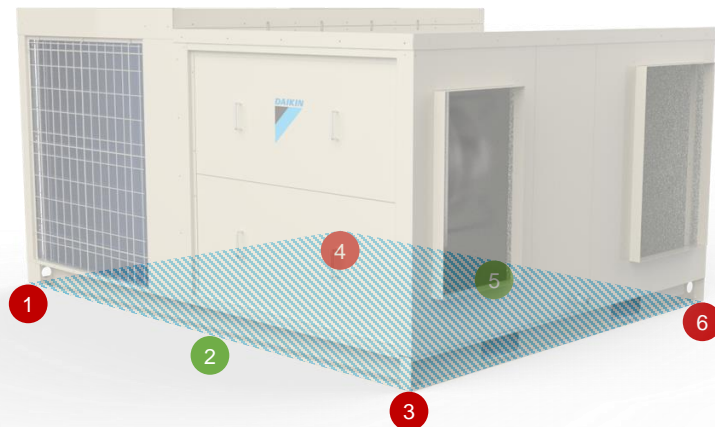
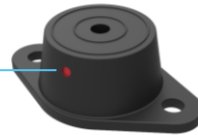


Both the vibration mounting kit (BKSB28A*) & remote temp. sensor (MKRCS01-19) are optional accessories.

VIBRATION MOUNTING KIT

- 3 kits available to suit various rooftop models
- 6 x colour coded rubber isolators in each kit, including M12 mounting screws and flat washers
- Colour coding is to indicate its load range & must be fixed accordingly to the base beam (see IM for details)

3 Colour Codes
(red, green, white)



UAYN650AFY1A Example

REMOTE TEMP. SENSOR

- Used for room temp. sensing operation*
- 25m wire harness included & connects to TB2 11 & 12 replacing existing return air sensor connections
- Setup with the controller required (see IM for details)



MKRCS01-19
60(H) x 50(W) x 20(D)

*Without this sensor the rooftop packaged unit uses the built-in return air temp. sensor for operation

GENERAL OPERATION

RT Touch Controller

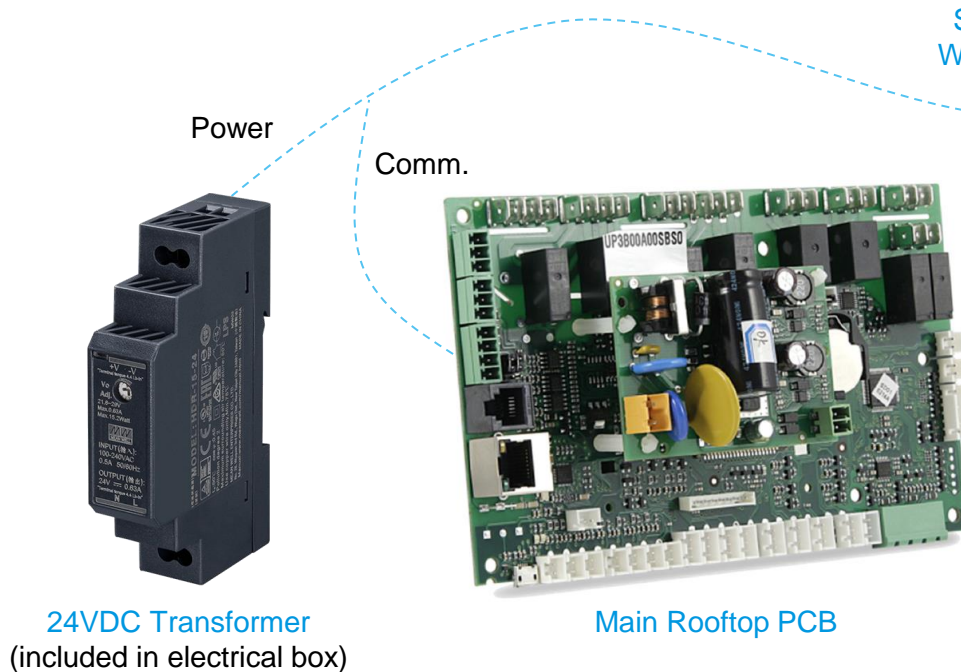
- 4.3” resistive touch screen LCD controller (480 x 272 resolution)
- Wall mounted: 88(H) x 152(W) x 32(D) mm
- Flush mounted: 88(H) x 152(W) x 9(D) mm

FEATURES

- Check operation at a glance with built-in operation status LED
- User operation & service configuration available on the same controller
- Wire harness (15m) included for connection to rooftop packaged unit*



WIRING EXAMPLE



- OFF – Unit Off
- CYAN – Unit On, Cooling
- YELLOW – Unit On, Heating
- GREEN – Unit On, Fan Only
- RED – Unit Error Lockout
- RED (BLINKING) – Unit Error Warning

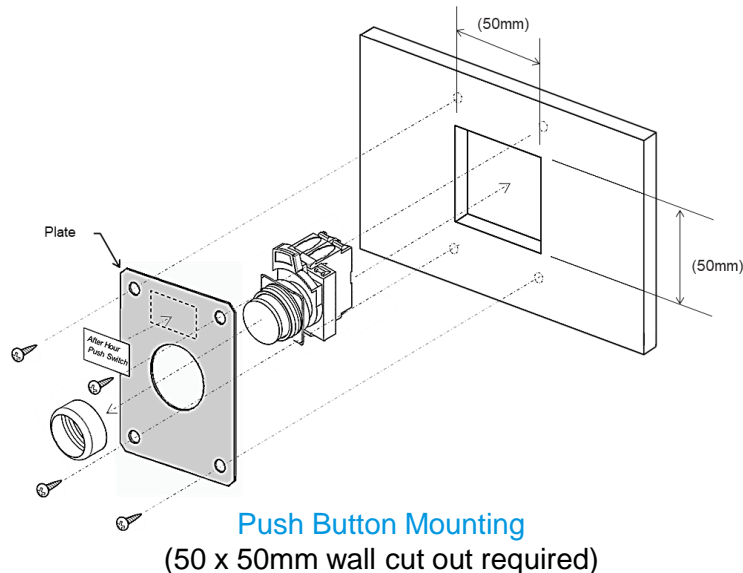
*Can be extended up to 50m using field supplied cable (power: 2 core AWG 12-20 & comm.: 3 core AWG 20-22)

- 'After Hours' push button is a switch when pressed will turn on the rooftop packaged unit for a set time limit
- Overrides any schedules set on the controller & with operation time limit set in 1hr increments (1hr, 2hr etc. up to 12hr)

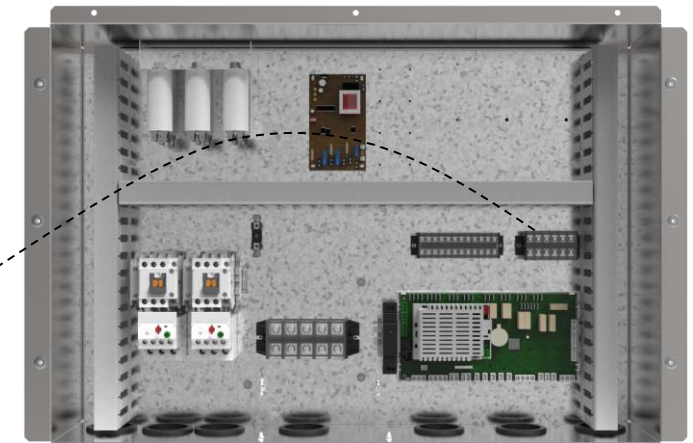
FEATURES

- Normally open momentary action switch (self resetting, i.e. returns to its original position)
- Wire harness (15m) included for connection to rooftop packaged unit*
- Installation plate, label & screws also included

WIRING EXAMPLE



Single 15m
Wire Harness



*Can be extended up to 50m using field supplied cable (2 core AWG 18-20)

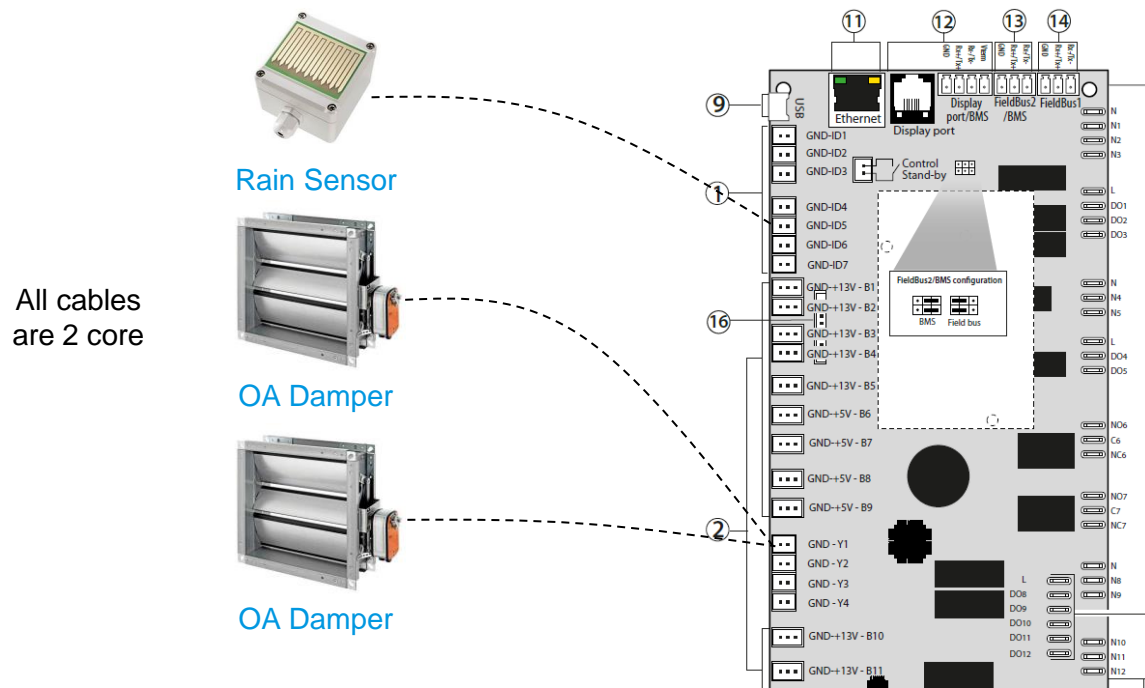
Economy Cycle Function

- NCC requires AC systems that deliver $\geq 2,000\text{L/s}$ to be capable of economy cycle operations
- RT Series feature pre-programmed economy cycle function (dry bulb only) with damper & optional rain sensor contacts
- OA & RA dampers, rain sensor, cables & connectors are **not** included (all field supplied)

FEATURES

- Single 0-10V DC output to the dampers (OA & RA dampers are wired in parallel & inverted) & dry digital input for rain sensor
- Minimum OA damper opening position can be set (i.e. at least 20% open at all times when the unit is ON)
- Maximum OA damper opening position when rain is detected can be set (i.e. up to 80% open when rain is detected)
- Economy cycle only operates when outdoor temp. range is between 8°C & current room temp. delta ($\text{RT}\Delta$)

EXAMPLE



Contacts	Connector Specification*
GND-ID5	Pin: JST-SXH-001T-P0.6
GND-Y1	Connector: JST-XHP-2

*Connectors are field supplied

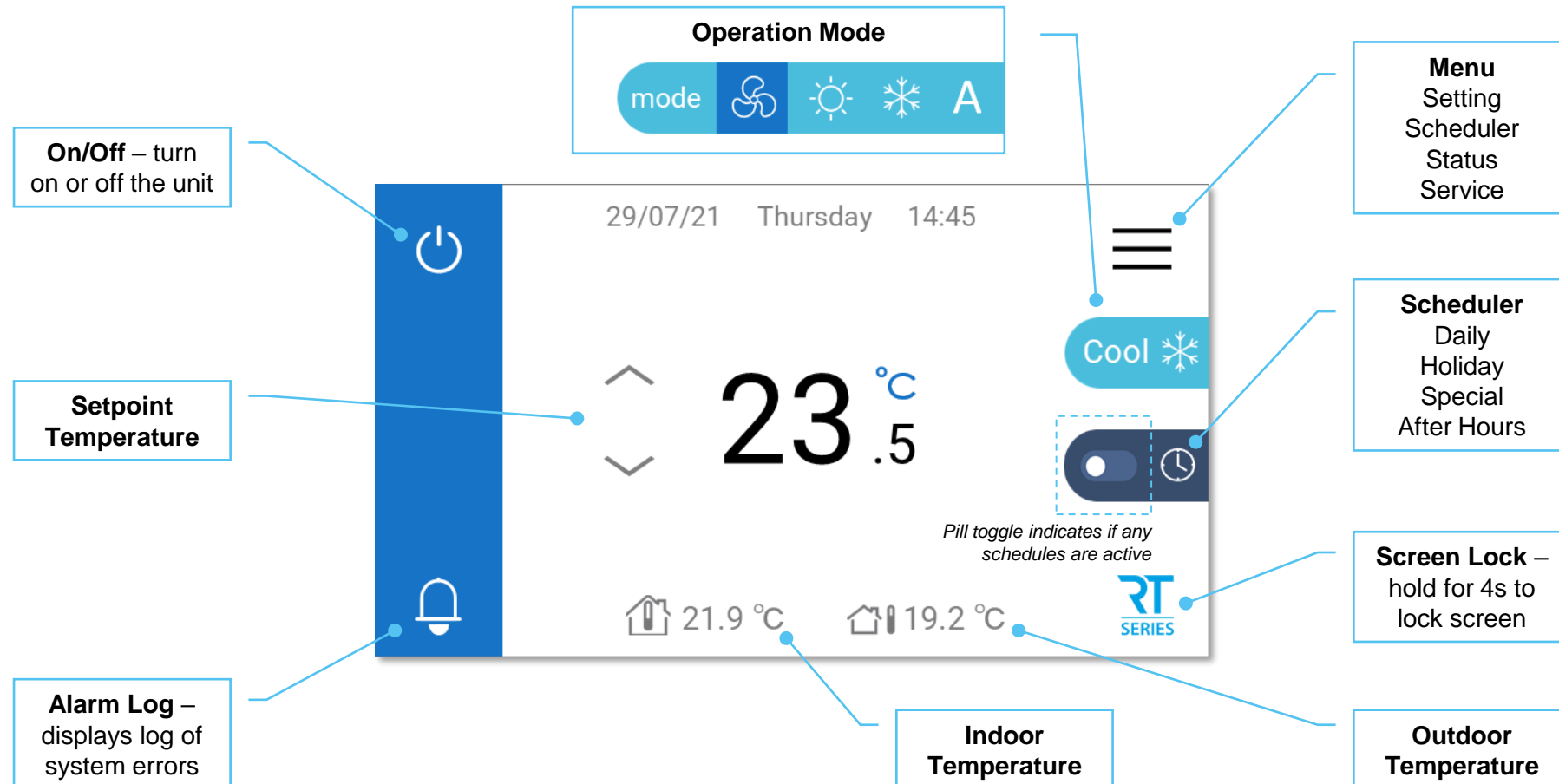
*If $\text{RT}\Delta$ is set to 1°C & current Room Temp. = 20°C
 Economy cycle will operate only if:
 Outdoor Temp. range is between $8^{\circ}\text{C} - (20 - 1^{\circ}\text{C}) = 8 - 19^{\circ}\text{C}$*

Notes:

1. $\text{RT}\Delta$ can be set from 0 to 20°C with recommended value of 1 – 4°C
2. Dampers open linearly against outdoor temp.
3. OA & RA dampers operate inversely proportional to each other
4. Compressors may still operate during economy cycle

User Interface – Main Screen

- The Main Screen provide convenient access to key functions
- Setpoint, indoor & outdoor temperature is also displayed on this screen
- Operation modes include: Fan Only, Heat, Cool & Auto mode



- Four scheduler functions are available
- The schedule priority are as follows: (low) Daily Events → Holiday Periods → Special Days → After Hours (high priority)

Daily Events – schedule on, off & offset times for each day of the week (4 actions per day).

Holiday Periods – set time periods where the schedules are deactivated (5 periods available).

Special Days – set specific days to deactivate the schedule (5 days available).

After Hours – set the duration (hr) the unit will operate after the 'After Hours' push button is pressed.

*Offset Operation forces the system to use Deadband – Economy and can only be selected in the Daily Events schedule

- Alarms are system errors such a compressor failure etc. including error codes
- Any active alarms will be highlighted by a red bubble on the main screen with the number of current active alarms
- Date & time of alarm occurrence is also displayed (alarm history of up to 2 days can be shown)



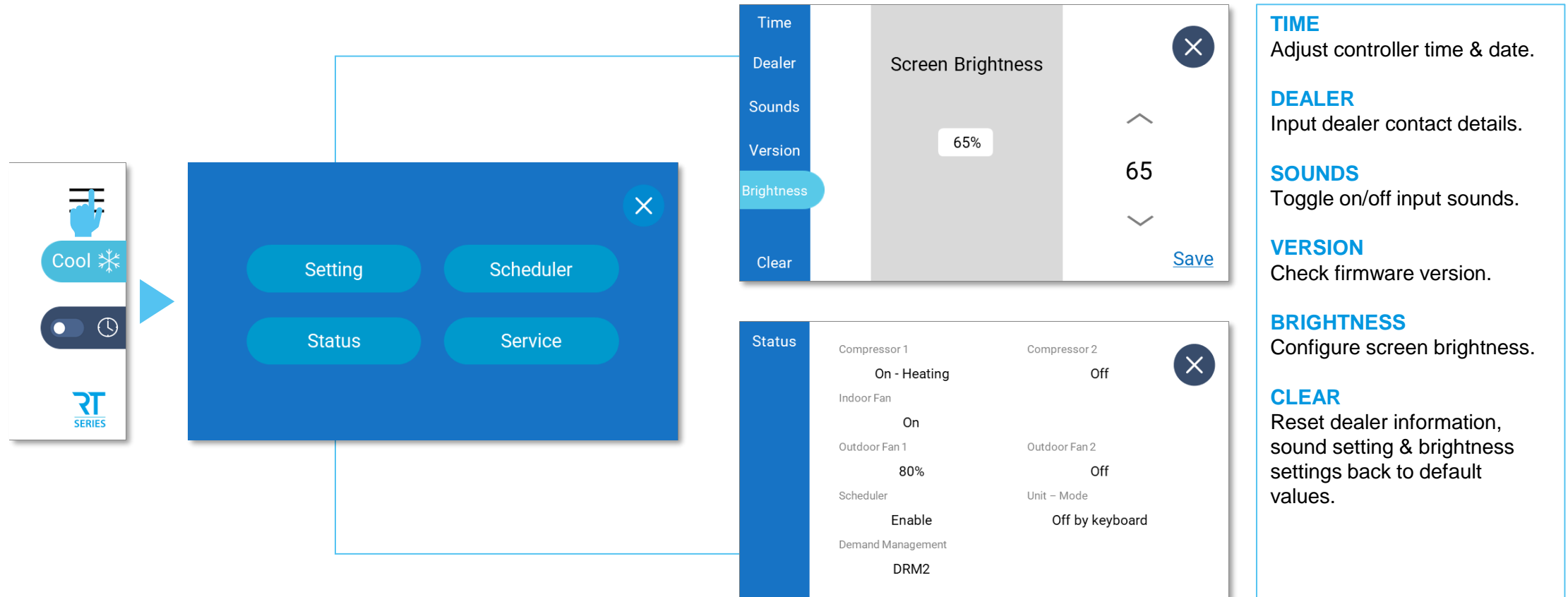
Name	Time
E4 - Comp 2 Low Press	01/12/2021 - 08 42 29
Compressor 2 Alarm	01/12/2021 - 08 42 29

Active Alarms – displays current active alarms

Name	State	Time
E4 - Comp 2 Low Press	Triggered	1 Dec 2021 08 42 29
Compressor 2 Alarm	Triggered	1 Dec 2021 08 42 29
Compressor 1 Alarm	Triggered	1 Dec 2021 08 42 29
E4 - Comp 1 Low Press	Triggered	1 Dec 2021 08 42 29
Compressor 1 Alarm	Not Triggered	1 Dec 2021 08 43 15

Alarm History – displays history of previous alarms

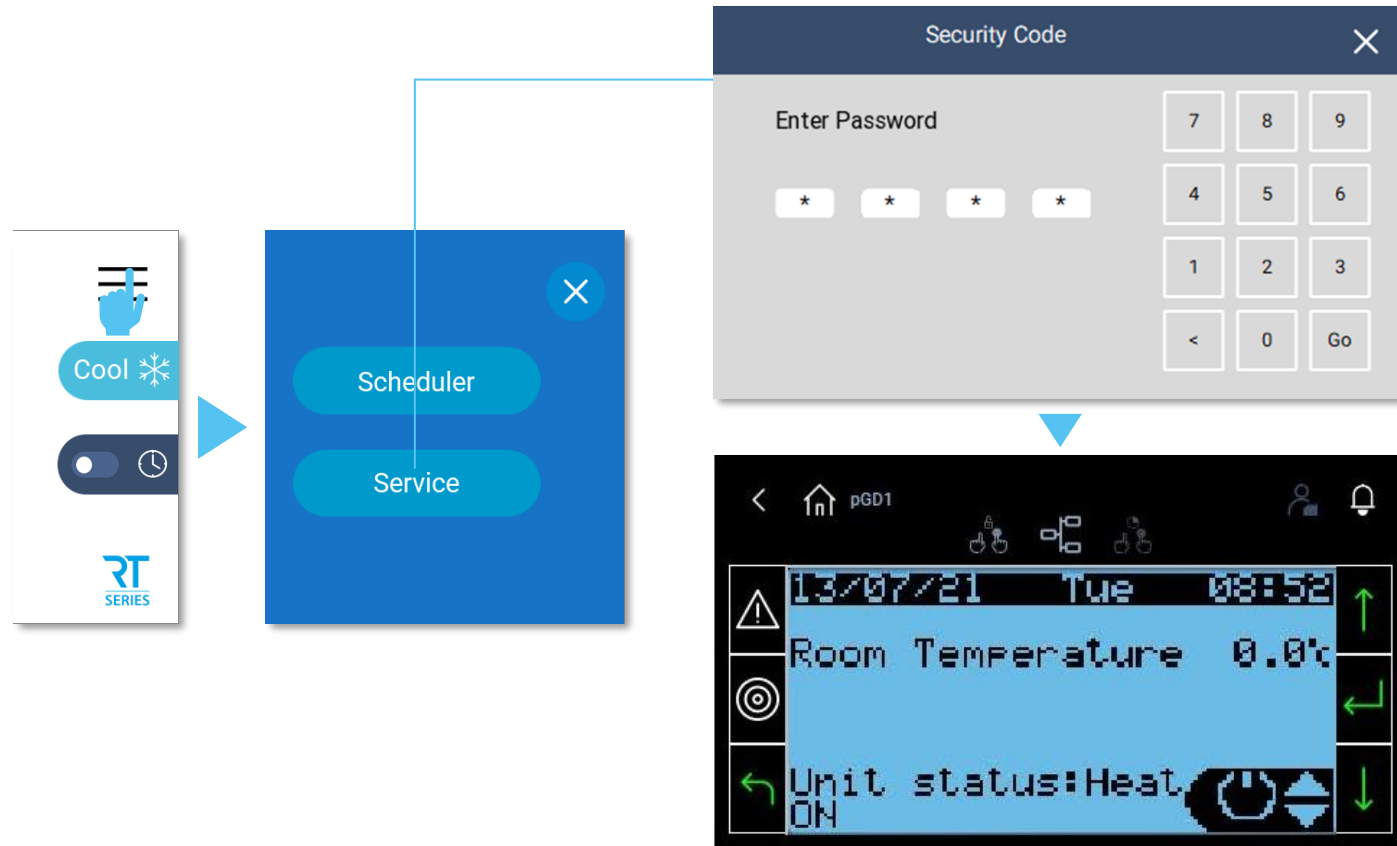
- **Menu** button enables access to Setting, Status & Service (access to Scheduler is also available here)
- Entry of the service security code is required to access 'Service' (Service mode)
- Service mode provides additional service settings such as fixing fan speed, enabling DRED, deadband configuration etc.



SERVICE SETTINGS

Accessing Service Mode

- Service mode can be accessed directly from the RT Touch Controller using a service security code (see service manual)
- The service mode user interface will be emulated on the controller
- Key available settings are highlighted in the below table



Function	Detail
View Component Status	<ul style="list-style-type: none"> • Thermistors & transducer reading • Component fault status • Compressor, reversing valve status • View indoor & outdoor fan speed • EEV status & super heat reading
Set Temp.	<ul style="list-style-type: none"> • Configure deadband temp. • Set compressor differential temp.
Set Fan Speed	<ul style="list-style-type: none"> • Indoor fan speed setting
Air Filter Sign	<ul style="list-style-type: none"> • Set filter replacement timer
Economy Cycle	<ul style="list-style-type: none"> • Configure economy cycle settings
Unit Config.	<ul style="list-style-type: none"> • DRM enable/disable • Outdoor defrost settings • Remote temp. sensor setup • Enable economy cycle
Other Settings	<ul style="list-style-type: none"> • Date & time • Unit of measure (SI, Imperial etc.) • Language • Change service security code*

*To reset service security code to default code refer to service manual

Service Mode – View Component Status

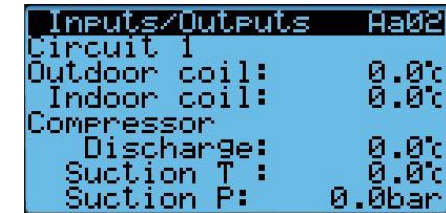
- Viewing component status enable simplified trouble shooting of system integrity
- On the main screen press the **DOWN** button followed by **ENTER** (navigation buttons) to start viewing component status
- Use the **UP & DOWN** button to navigate (scroll up & down) through components for viewing



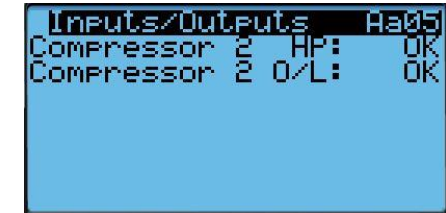
Main Screen

Navigation Buttons

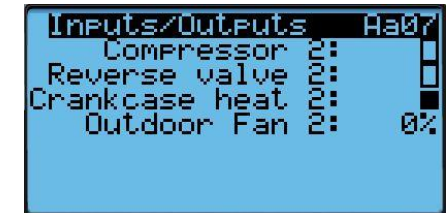
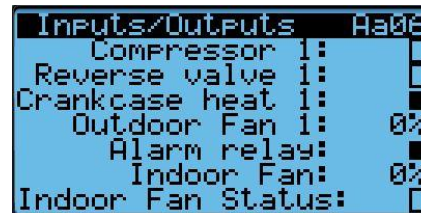
Thermistors & transducers readings



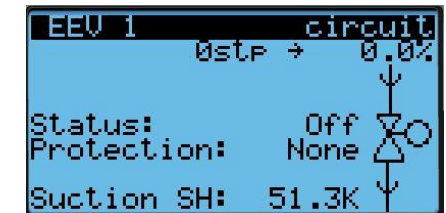
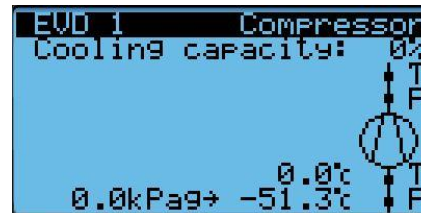
Component fault status



Compressor, reversing valve & fan status



EEV status & super heat reading



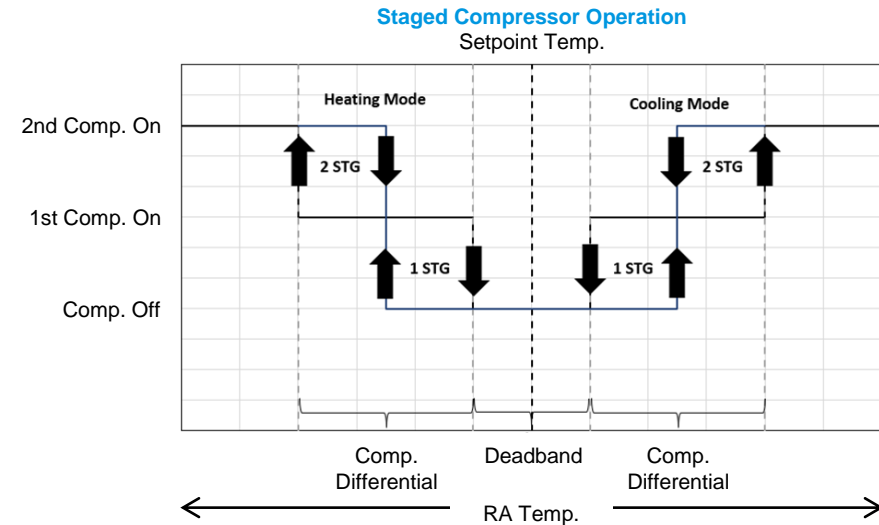
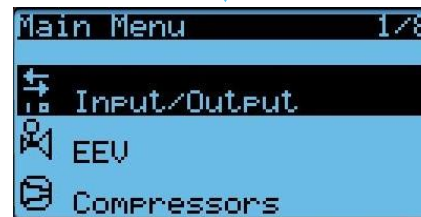
Service Mode – Set Temperature

- In this section, we can set the Compressor Differential Temp., Deadband – Normal & Deadband – Economy
 - Deadband – Normal: is the Deadband that the system uses during normal operation
 - Deadband – Economy: is the Deadband that the system uses when 'Offset' operation is selected in the scheduler
- During Offset operation greater energy savings occur due to a wider temp. range from setpoint where comp. is in off state
- On the main screen press **MENU** button → enter security code → select 'Input/Output' & adjust temp. accordingly



Main Screen

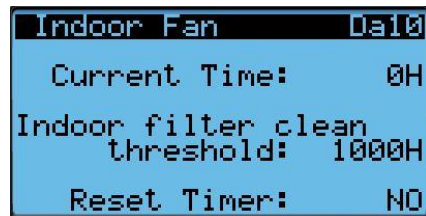
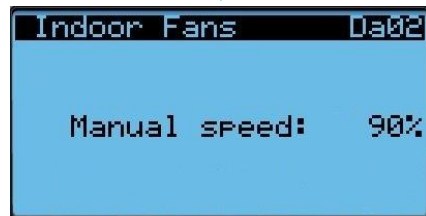
Menu Button



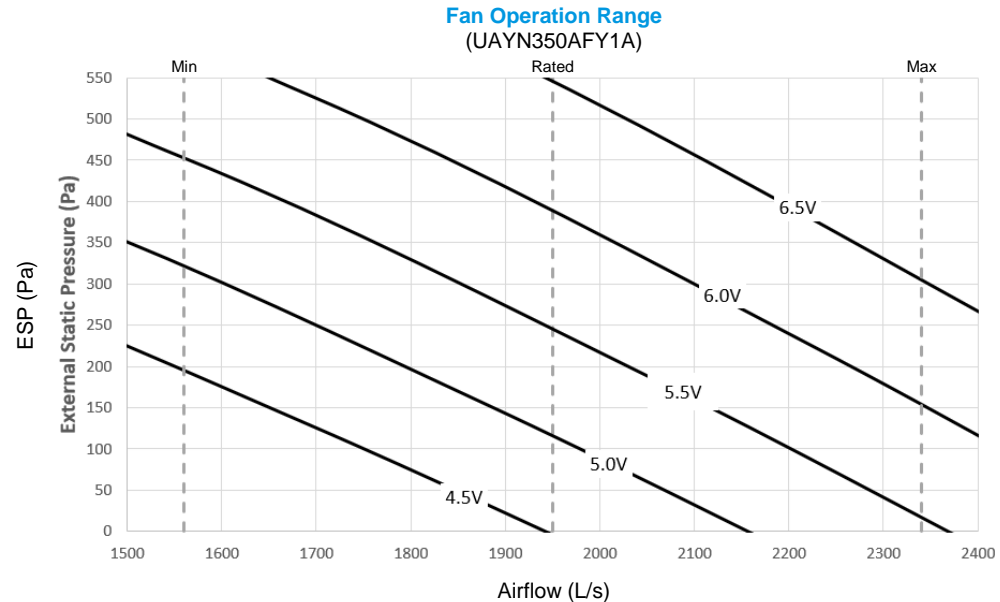
- Comp. Differential: lower value, faster temp. pull down
- Deadband – Normal: higher value, greater energy savings reduced comfort
- Deadband – Economy: same as 'Normal' except only used during Offset operation

Service Mode – Set Fan Speed & Air Filter Sign

- In the **MENU** screen select 'Fans' to configure indoor fan speed & set the filter replacement timer
- Fan speed is in % and refers to fan voltage (i.e. 50% = 5.0V), refer to engineering data for fan curves & their voltages
- Filter replacement timer is a countdown timer that activates the filter sign on the controller to indicate filter replacement
- Countdown timer is based on the indoor fan run time

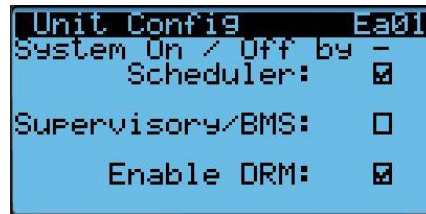


See current fan run time
Set countdown in hrs
Reset timer if required



Note, engineering data will only show fan curves at 0.5V increments. Setting fan speed outside of this increment i.e. 5.2V etc. is allowable however no supporting data will be available.

- To access unit configuration settings select 'Unit Config' in the **MENU** screen
- In this menu you can enable/disable DRM (DRED), manage defrost settings & setup remote temp. sensor
- DRED contacts must be utilised if DRM is enabled



Enable/Disable DRM
DRM 1: Compressor Off
DRM 2: 50% Power Limit
DRM 3: 75% Power Limit



START DEFROST SETPOINT

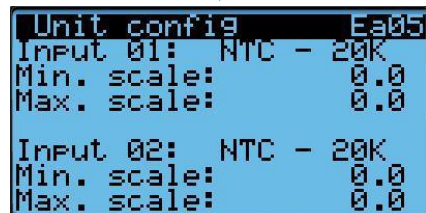
- Available from 1 – 3°C
- Countdown timer for defrost cycle activation, starts when the outdoor HX drops below this setpoint

END DEFROST SETPOINT

- Available from 10 – 15°C
- Defrost cycle ends when the outdoor HX reaches above this setpoint

INDOOR FAN STATUS

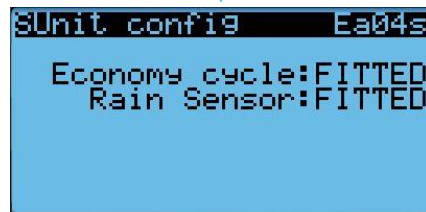
- Indoor fan can be enabled/disabled during defrost cycle



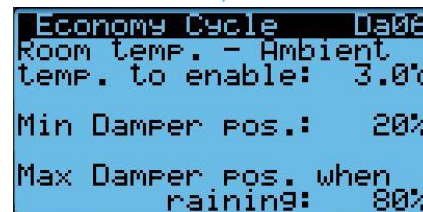
Set Input 01 to 'NTC - 10K' when using remote temp. sensor (room air)
Set Input 01 to 'NTC - 20K' when using built-in return air sensor (default)

Service Mode – Enable & Configure Economy Cycle

- Economy cycle must first be enabled in 'Unit Config' menu
- Further configuration can be made within the 'Fans' menu, available settings include adjusting:
 - Minimum OA damper position when the system is ON
 - Maximum OA damper position when rain is detected & the system is ON
 - Maximum economy cycle outdoor activation temperature by adjusting room temp. delta (RTΔ)*



Enable economy cycle by setting to 'FITTED'
If rain sensor is connected, change to 'FITTED'



ROOM TEMP. – AMBIENT TEMP. TO ENABLE

- This is room temp. delta (RTΔ)
- If set to 3°C and current room temp. = 23°C
- Then economy cycle will operate if outdoor temp. range is between 8°C & 20°C (23 – 3)
- RTΔ can be set from 0 to 20°C with recommended value of 1 – 4°C

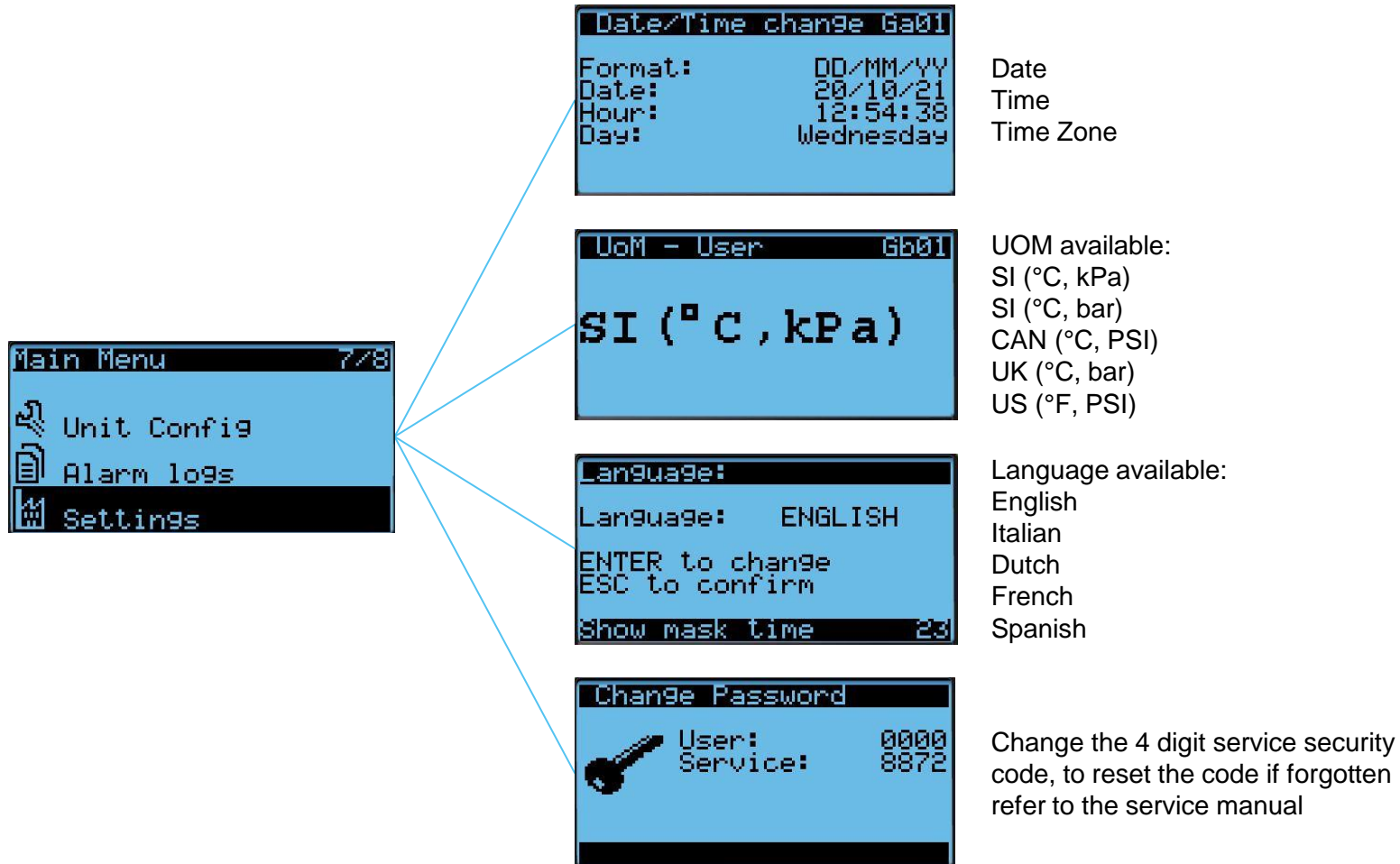
MIN DAMPER POS.

- Minimum OA damper opening position

MAX DAMPER POS. WHEN RAINING

- Maximum OA damper opening position if rain is detected by the rain sensor

- Other settings include configuring date/time, unit of measure, service security code & language of the Service mode GUI
- In **MENU** screen select 'Settings' to access these settings



THANK YOU.

Any questions?