

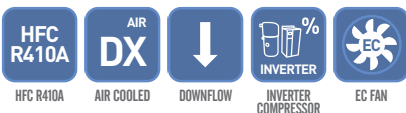


SmartCool™ i-drive Inverter Compressor

5 - 83kW

- + Up to 45% more cooling kW/m² *
- + Up to 21% more cooling kW/m² **

* compared to fixed speed compressor systems
** compared with nearest competitor units



Precision air conditioning

Taking efficiency even further

The SmartCool™ i-drive inverter compressor is a market leading, highly efficient, indoor packaged unit providing extremely precise, reliable climate control.

Optimised for high return air temperatures and ideal for hot and cold aisle containment, the range is perfect for the 24/7 operation of sensitive systems in data centres and other critical applications.

Inverter driven compressors enable precise control of supply air temperature (+18°C to +26°C), varying their running speed to adjust to expected or unforeseen load variations, resulting in increased efficiency and a wider operating envelope.

Flexible installation

With a wide outdoor ambient envelope (-20°C up to +50°C) and the capability of longer pipe runs, allowing outdoor condensers to be up to 100 metres from internal units, the SmartCool™ i-drive allows for flexible installation without compromising efficiency or performance.

Optimise your unit selection

The SmartCool™ i-drive gives you the flexibility to optimise unit selection to match the considerations of your specific project. Our range comprises of two optimised capacity selections for traditional and high return air temperatures, suitable for periphery cooling and aisle containment applications respectively.

Choose from 11 downflow models available in:

- All units are single circuit DX air-cooled with either one single inverter driven compressor (X100) or a tandem compressor set (X200)
- 4 case sizes



Up to 21% more cooling kW/m²*

* compared to similar leading competitor units



50-60Hz inverter compressors

Up to 45% more cooling kW/m² (compared to fixed speed compressors)

React to system load fluctuations and exactly match cooling load

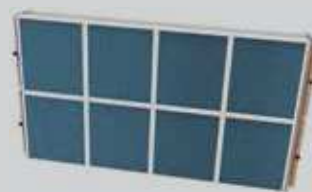


EC backward curved fans with composite impellers

Up to 70% more efficient*

Particularly at part load between 30% and 100%; EC fans respond seamlessly to load fluctuations

* than an AC fan at part load



Large surface area filters

Increased system efficiency

Reduced airside pressure drops and improved airflow resulting in increased performance and reduced fan power usage

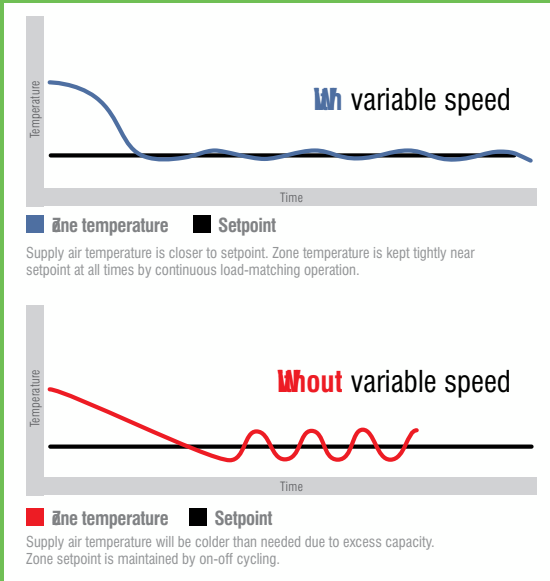


Oil separators

Increased system efficiency and reliability (particularly at part load)

Enables long pipe runs up to 100m

Exact capacity match



The SmartCool™ i-drive range saves up to 17% on running costs compared to a fixed speed system*

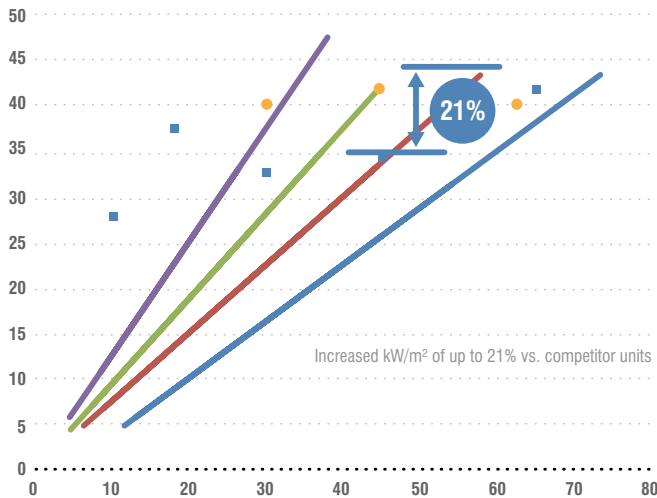
*Based on London ambient profile – 22kW base load and 1kW variable – 24/7 operation

Intelligent controls identify the optimised operating point for the system so that the inverter-driven compressor and variable speed fans are always running at the most efficient point for the room load. The inverter compressor also offers reduced sound levels during part load operation of the compressors and a starting current equivalent to 10% of a traditional fixed speed compressor ensuring increased reliability.

Market leading cooling density

SmartCool™ i-drive 5-83kW DX models typically offer up to 21% more cooling kW/m²

*compared to similar leading competitor units



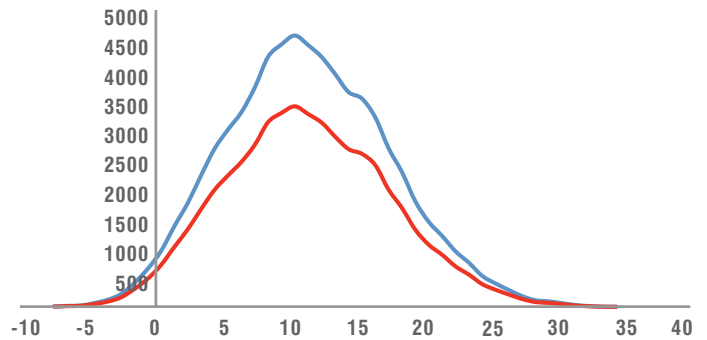
SmartCool™ i-Drive cooling capacity comparison

— SV09 — SV12 — SV15 — SV18 ■ Competitor 1 ● Competitor 2

y axis: kW/m² x axis: GROSS TOTAL COOLING CAPACITY (kW)

Capacities based on: Air On Condition 24°C/50%RH and 45°C Condensing

30% increase in cooling duty



Energy Analysis SV09 at High and Low Return Air Temp on to SmartCool (24°C Room Temperature Setpoint)

● SV0-D047-X100-0-1 x CR50 x axis: Outdoor Ambient Temperature °C

● SV0-D047-X100-0-1 x CR50 y axis: kWhrs

*Base load 22kW, Variable load 1kW

The red characteristic shows the performance of the system with a relatively high return air temperature of 34°C and the blue with a relatively low return air temperature of 24°C. The higher return air temperature increases the evaporating temperature of the refrigeration system which in turn increases the efficiency of the compressor and the system significantly.

The new variable speed compressors used on the SmartCool™ i-drive units have wider operating envelopes when compared with traditional fixed speed compressors. This means that higher evaporating temperatures can be achieved and subsequent energy saving benefits can be obtained above what is achievable from a fixed speed system. In this example the annual energy saving is 26% or £1825 over one year (based on 10p per kWhr and 24/7 operation in London).

Precise conditioning

Intuitive climate control

Sensitive computer equipment operates best within tight environmental tolerances, yet thermal loads in data centres are continually fluctuating and many servers are under-utilised.

Rather than wasting power by working at full load, the SmartCool™ i-drive anticipates and responds immediately to expected or unforeseen load variations, managing specific temperatures with 1°C accuracy.

Efficient dehumidification – no reheat required

The SmartCool™ i-drive removes moisture from the room via a segregated evaporator coil (option) which allows dehumidification while maintaining cooling capacity and operating under constant pressure control, helping manage air distribution and preventing hot spots.

When the segregated evaporator coil is operating in dehumidification mode, the evaporating temperature is reduced below the dew point of the air even at high return air temperature conditions, enabling precise humidity control in all modes of operation. This is especially useful when the SmartCool™ fans are being used for constant pressure control or air volume management.

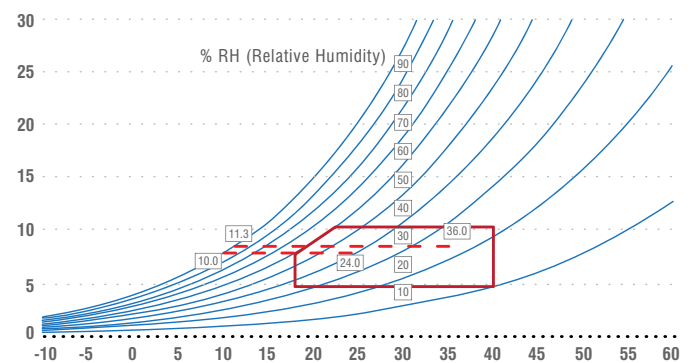
The use of a variable speed compressor on the i-drive units ensures that the supply air temperature is maintained at set-point during the dehumidification process.

For dryer climates, a re-humidification option is also available.



Dehumidification Mode

In dehumidification mode at high return air temperatures, the unit will start to take moisture out of the air by lowering the evaporating temperature. For example, the air temperature into the application will drop from 36°C to 24°C but the air coming off the evaporator coil will be a mixture of relatively cold and relatively warm air (10°C and 36°C respectively in this example). Some areas of the evaporator coil will be below the dew point of the air and other areas will be above. This is shown in the chart below i.e. the air temperature drops to the saturation line intersecting at the dew point temperature (in this case 11.3°C).



y axis: Moisture Content (g Water / kg Dry Air)
x axis: Dry Bulb Temperature (°C)

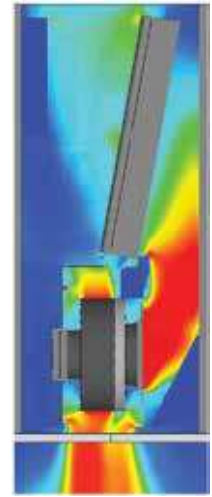
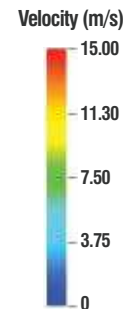
Optimised air flow

And pressure management

The SmartCool™ i-drive delivers cold air through floor-mounted grilles directly to the front of the server racks. By presenting the right amount of air flow, at the correct temperature to the server inlet, the SmartCool™ Inverter Compressor ensures optimum air flow management and eliminates hot spots. Further, airside pressure drops are reduced, and unit efficiency is increased, thanks to a new slab coil design.

SmartCool™ i-drive 5 - 83kW

CFD analysis showing improved air flow path



Typically a 50% drop in air volume results in an 83% reduction in fan power output

Oil separators

For increased system efficiency and reliability particularly at part load.

Full 360° unit access

Front access to fans, compressors, filters and inverters for ease of maintenance and improved serviceability.

Large surface area filters

Improve air flow resulting in increased performance and reduced fan power usage.

Constant air volume control (option)

Controls air flow through the unit. EC fans speed up to optimise performance throughout.

Constant pressure control (option)

Adapts to changes in the room in hot aisle and cold aisle configurations. Air pressure within the floor void is controlled using a variable speed fan to maintain positive air pressure and setpoint.



Intelligent controls

Seamlessly managing your system



The control centre of each of our cooling systems is a sophisticated electronic microprocessor with control logic specially developed by Airedale.

The microprocessor uses sensors to send and receive messages to and from active components such as compressors, fans and pumps so they interact with each other, balancing cooling duty, temperature, air flow and pressure to exactly match the application.

By integrating intelligent components, the controller manages and optimises the system's performance and reduces power draw.

Smart networking solutions:

Fully-programmable via the control panel's user-friendly display, the microprocessor can be linked with all standard BMS protocols to:



Trigger alarm messages



Send alarm/service messages via email or SMS using an interface



Operate time scheduling



Allow adjustment of temperature setpoints

Future-proof, flexible, 24/7

As an intelligent stand-alone unit or when networked with up to eight units, the SmartCool™ adapts to your data centre's particular requirements. Its compact, modular design makes it easy for multiple units of different size and capacity to be added as load increases or to eliminate hot spots. Smartly networked standby units ensure 24/7 availability.

Integration protocols

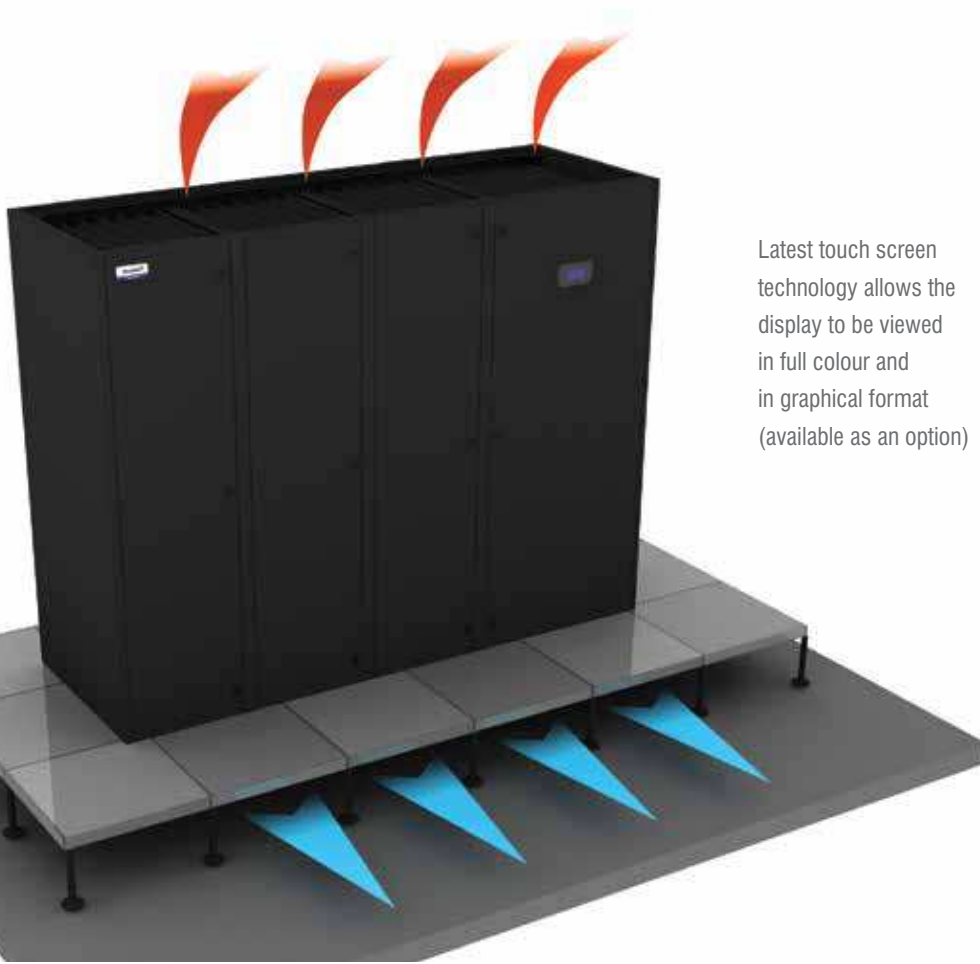
Modbus®

BACnet™



SNMP

ECHELON™
THE LONWORKS COMPANY



Building management

Taken to another level

ACIS™ building management system developed by Airedale, enables you to manage smart cooling and other building services, from any manufacturer, in a single, integrated system across multiple sites and communication protocols. ACIS™ sits at the front end of a building system, putting you in control of reducing operating costs.

With the click of a button on a PC, tablet or phone, valuable and intelligent information can be pulled back automatically for remote 24/7 monitoring and maintenance; enhanced system operation and improved decisions.

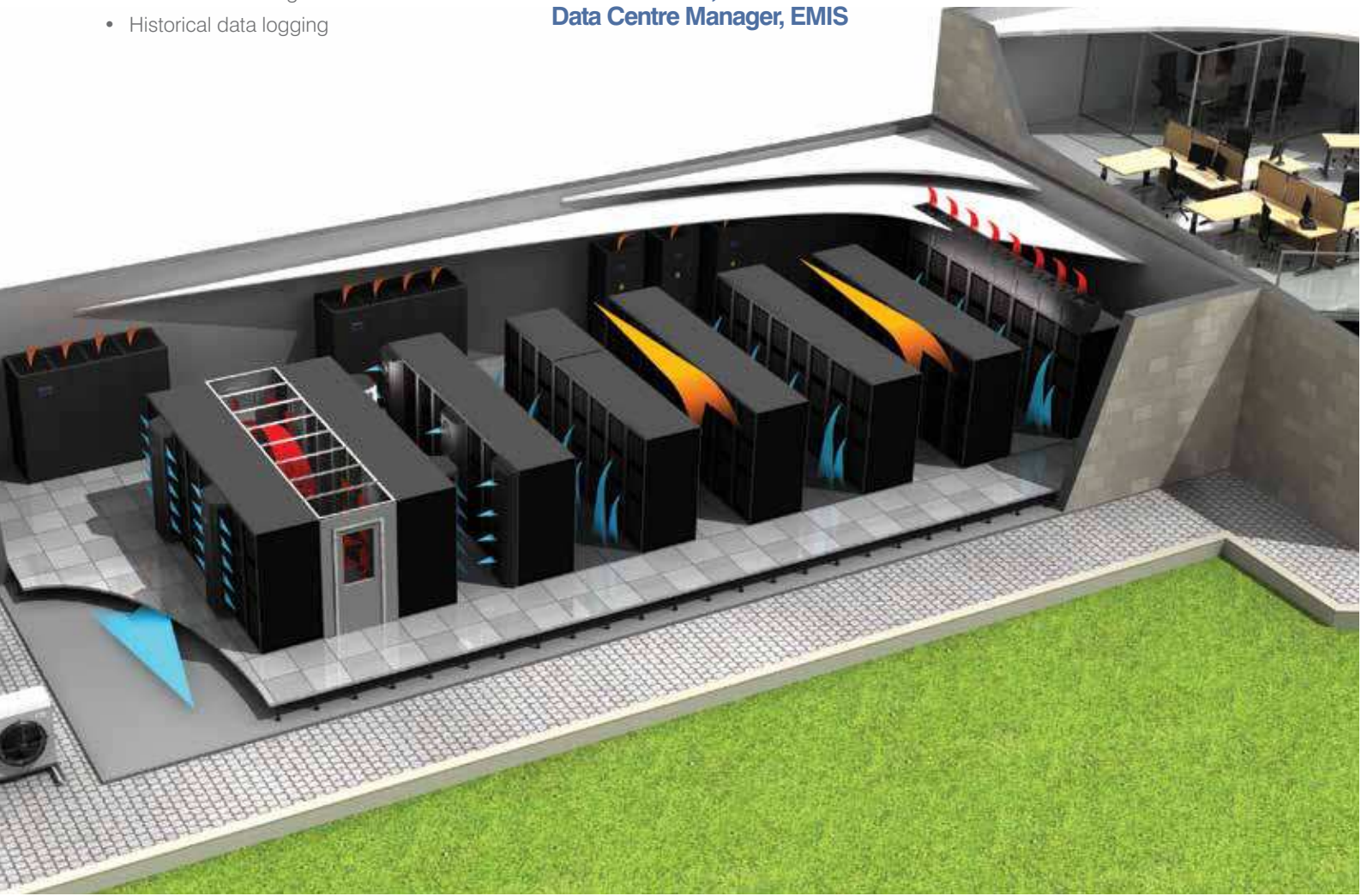
Key Features:

- Total facility integration
- System optimisation & redundancy
- Energy monitoring & analysis
- Remote monitoring
- Historical data logging



“ ACIS™ gives us 24/7 control of the operation and peace of mind. ”

**Mike Marchant,
Data Centre Manager, EMIS**



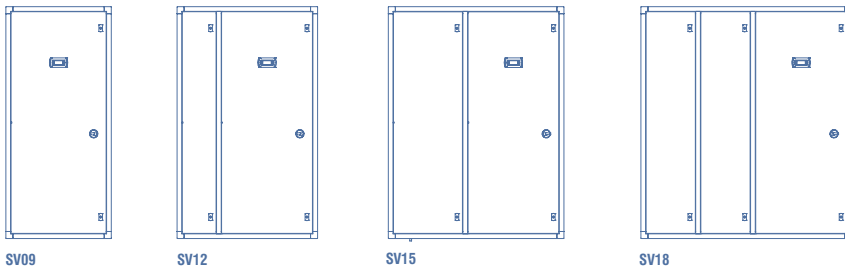
Specifications at a glance

SmartCool™ i-drive: Optimising the key drivers in efficient high density operation

- Variable speed inverter driven compressors for exact capacity match
- Up to 21% more cooling kW/m² (compared to similar leading competitor units)
- Optimised for hot and cold aisle containment with return air temperatures up to 40°C
- Long pipe runs allows outdoor condensers to be situated up to 100m from internal units
- Wide operating ambient envelope (-20°C to +50°C)
- Full 360° unit access for service and maintenance



DX i-drive



Environment

- EC backward curved centrifugal fans with composite impellers and profiled aerofoil blades
- Compliant inverter scroll compressors for increased reliability, minimal sound and extended operating envelope (up to +26°C supply temperatures and +50°C condenser ambient temperature - model dependant)
- Designed and optimised for R410A which requires only a minimum refrigerant charge and high heat transfer coefficient and has a high heat transfer coefficient
- Vibration eliminators are used to absorb compressor vibration from the rest of the system for increased reliability and system longevity

Optional

- Refrigerant leak detection for F Gas compliance

Electrical & Controls

- Advanced Airedale controls technology managing and optimising the system's performance
- pC05+ microprocessor technology
- PGD1 display (door mounted)
- 400V, 3Ph, 50Hz or 380V, 3Ph, 60Hz power supply
- Return air temperature sensor

Optional

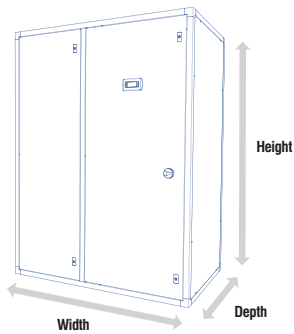
- ACIS™ building energy management system
- PGD touch display (door mounted)
- Single power supply with ultracap module
- Dual power supply including ultracap module
- Supply air temperature sensor

Energy-saving

- Inverter driven compressors for outstanding efficiency
- Electronic expansion valves for 30% increase in efficiency over a thermostatic expansion valve
- EC backward curved fans provide up to 70% more efficiency over a traditional AC fan; coupled with constant pressure control improves air distribution and air management
- Up to 21% more cooling kW/m² (compared to similar leading competitor units)
- Optimised for high return air temperature operation, up to 26% more efficient than if the same system was used at low return air temperatures
- High efficiency G4 (EU4) rated, pleated disposable filters give superior high performance with lower airside pressure drops

Optional

- Upgraded EC fans for high external static pressure applications
- High efficiency filtration G3+M6



Case size	Height (mm)	Width (mm)	Depth (mm)
1	1980	900	890
2	1980	1200	890
3	1980	1500	890
4	1980	1800	890

Table 1 - case size dimensions

Nomenclature explained

Example	SV	18	D	083	-	X200	-	0
SV	SmartCool Inverter							
09	Case width in decimetres (900mm)							
12	Case width in decimetres (1200mm)							
15	Case width in decimetres (1500mm)							
18	Case width in decimetres (1800mm)							
D	Downflow unit							
083	Nominal capacity (kW)							
X100	DX air-cooled - (single circuit - single compressor)							
X200	DX air-cooled - (single circuit - tandem compressor)							
0	400V/3~ & 230V1~/ 50Hz							
1	380V/3~ & 220V1~/ 60Hz							

Compressor Selections	SmartCool Inverter Model	Maximum Gross Sensible Cooling Capacity (kW)
Standard Capacity	SV09D023-X100-0/1	26.1
	SV12D026-X100-0/1	28.4
	SV12D034-X100-0/1	38.4
	SV15D036-X100-0/1	36.0
	SV15D040-X100-0/1	47.5
	SV18D042-X100-0/1	43.9
High Capacity	SV18D049-X100-0/1	50.3
	SV09D047-X100-0/1	33.8
	SV12D055-X100-0/1	41.3
	SV15D063-X200-0/1	55.0
	SV18D083-X200-0/1	67.9

Table 2 - capacities for high capacity models and standard capacity models at 24°C, 45% RH air on

Compressor Selections	SmartCool Inverter Model	Maximum Gross Sensible Cooling Capacity (kW)
Standard Capacity	SV09D023-X100-0/1	33.5
	SV12D026-X100-0/1	37.8
	SV12D034-X100-0/1	48.1
	SV15D036-X100-0/1	47.8
	SV15D040-X100-0/1	60.1
	SV18D042-X100-0/1	57.7
High Capacity	SV18D049-X100-0/1	65.4
	SV09D047-X100-0/1	44.6
	SV12D055-X100-0/1	52.6
	SV15D063-X200-0/1	70.7
	SV18D083-X200-0/1	88.0

Table 3 - capacities for high capacity models and standard capacity models at 36°C, 23% RH air on

Mechanical

- 11 models: DX air cooled (16-83kW), 4 case sizes
- Single circuit DX air cooled with one single inverter driven compressor or a tandem compressor set (tandem compressor sets compromise either one inverter driven compressor and one fixed speed, or two inverter driven compressors)
- Downflow configuration
- Low fan power input and reduced airside pressure drop with slab coil arrangement
- Large surface area filters for lower airside pressure drop
- Aluminium extruded frame and hinged door panels for easy front access to all major components
- Suction strainer safeguards against compressor failure and increases system longevity
- Magnetic discharge non return valves for reduced pressure drop

Optional:

- Open, front and rear discharging floorstands
- Liquid line solenoid valve (if ultracap module or dual power are not selected)
- Compressor soft start (on SV15D063-X200 unit only)

Precision

- 50-60 Hz SmartCool™ inverter driven compressors for exact capacity match saving substantial energy at part load
- 'Draw through' configuration for maximum heat exchanger efficiency

Optional:

- Constant air volume control whereby fans speed changes if faced with system resistance
- Constant air pressure control
- Variable air flow in response to changes in room demand (dependent on application)
- Segregated evaporator coil allows dehumidification while maintaining cooling capacity and operating under constant pressure control

SmartCool™ technical specifications:

Case size (mm)	Model no.	Nominal cooling (kW) TC	Nominal cooling (kW) SC	EER	No. of fans	Air volume m ³ /s
Single circuit						
H x W x D Inverter - DX air cooled - Low Return Air Temperature (24°C / 45% RH and 45°C condensing)						
Full load - Maximum cooling capacity						
1. 1980 x 900 x 890	SV09D023-X100-0/1	27.4	27.4	2.65	1	1.9
	SV09D047-X100-0/1	40.0	35.5	2.28	1	1.9
2. 1980 x 1200 x 890	SV12D026-X100-0/1	29.9	29.9	2.77	1	2.5
	SV12D034-X100-0/1	40.4	40.4	2.58	1	2.5
	SV12D055-X100-0/1	45.3	43.3	2.52	1	2.5
3. 1980 x 1500 x 890	SV15D036-X100-0/1	37.8	37.8	2.85	2	3.3
	SV15D040-X100-0/1	49.8	49.8	2.73	2	3.3
	SV15D063-X200-0/1	61.6	57.7	2.68	2	3.3
4. 1980 x 1800 x 890	SV18D042-X100-0/1	46.1	46.1	2.73	2	4.1
	SV18D049-X100-0/1	52.8	52.8	2.78	2	4.1
	SV18D083-X200-0/1	75.9	71.3	2.46	2	4.1
Part load - Maximum efficiency						
1. 1980 x 900 x 890	SV09D023-X100-0/1	16.5	16.5	3.20	1	1.9
	SV09D047-X100-0/1	22.1	22.1	3.13	1	1.9
2. 1980 x 1200 x 890	SV12D026-X100-0/1	20.1	20.1	3.17	1	2.5
	SV12D034-X100-0/1	21.1	21.1	3.17	1	2.5
	SV12D055-X100-0/1	24.1	24.1	3.19	1	2.5
3. 1980 x 1500 x 890	SV15D036-X100-0/1	25.4	25.4	3.17	2	3.3
	SV15D040-X100-0/1	24.4	24.4	3.08	2	3.3
	SV15D063-X200-0/1	40.6	40.6	3.21	2	3.3
4. 1980 x 1800 x 890	SV18D042-X100-0/1	31.0	31.0	3.08	2	4.1
	SV18D049-X100-0/1	26.6	26.6	3.07	2	4.1
	SV18D083-X200-0/1	40.3	40.3	3.12	2	4.1
H x W x D Inverter - DX air cooled - High Return Air Temperature (36°C / 23% RH and 45°C condensing)						
Full load - Maximum cooling capacity						
1. 1980 x 900 x 890	SV09D023-X100-0/1	35.1	35.1	3.46	1	1.9
	SV09D047-X100-0/1	46.8	46.8	2.69	1	1.9
2. 1980 x 1200 x 890	SV12D026-X100-0/1	39.7	39.7	3.79	1	2.5
	SV12D034-X100-0/1	50.5	50.5	3.21	1	2.5
	SV12D055-X100-0/1	55.2	55.2	3.10	1	2.5
3. 1980 x 1500 x 890	SV15D036-X100-0/1	50.2	50.2	3.84	2	3.3
	SV15D040-X100-0/1	63.1	63.1	3.48	2	3.3
	SV15D063-X200-0/1	74.2	74.2	3.24	2	3.3
4. 1980 x 1800 x 890	SV18D042-X100-0/1	60.6	60.6	3.58	2	4.1
	SV18D049-X100-0/1	68.7	68.7	3.64	2	4.1
	SV18D083-X200-0/1	92.4	92.4	2.98	2	4.1
Part load - Maximum efficiency						
1. 1980 x 900 x 890	SV09D023-X100-0/1	22.4	22.4	4.52	1	1.9
	SV09D047-X100-0/1	33.0	33.0	3.96	1	1.9
2. 1980 x 1200 x 890	SV12D026-X100-0/1	24.1	24.1	4.50	1	2.5
	SV12D034-X100-0/1	32.4	32.4	4.19	1	2.5
	SV12D055-X100-0/1	36.5	36.5	4.17	1	2.5
3. 1980 x 1500 x 890	SV15D036-X100-0/1	29.0	29.0	4.15	2	3.3
	SV15D040-X100-0/1	39.8	39.8	4.35	2	3.3
	SV15D063-X200-0/1	45.6	45.6	4.20	2	3.3
4. 1980 x 1800 x 890	SV18D042-X100-0/1	36.1	36.1	3.88	2	4.1
	SV18D049-X100-0/1	40.9	40.9	4.23	2	4.1
	SV18D083-X200-0/1	61.3	61.3	4.06	2	4.1

Quality is assured by our on-site, world-class testing facilities that set the standard as one of the most advanced testing centres of its kind within the global air conditioning industry.

This facility is integral to our development process and ensures our team of designers and engineers conduct a rigorous test program to produce and improve each of our manufactured units.

Designed and built to exceed stringent international standards, our test centre is capable of testing a complete range of air conditioning equipment including precision air conditioning to 250kW and chillers up to 2MW.

We apply a consistent design philosophy which combines innovative sustainability with premium performance and efficiency across each range. Our state-of-the-art, on-site R&D laboratory is BS EN 14511 and BS EN 13053 compliant and allows us to test units for every application.

Our air conditioning units consistently offer some of the industry's leading proven environmental and cost performance figures, combined with the highest quality, reliability and service.

Total support

Whenever you need it

At Airedale, we don't just manufacture and supply cooling and refrigeration products; we also provide a broad range of supporting services to ensure our customers receive the best possible aftersales care.

With more than 40 years' experience in business critical cooling, investing in an Airedale cooling or refrigeration solution means that you can benefit from our advice, expertise and technical support too. From design and selection, through to commissioning and beyond, we make sure your system reduces your total cost of ownership, whilst providing maximum availability and longevity.

Service plans Maximising your system's effectiveness 24/7



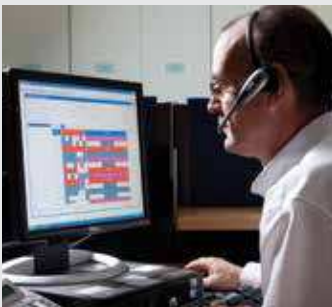
An Airedale service plan provides a planned, preventative maintenance package to sustain the optimum efficiency of your system, enabling the user to see real savings in energy costs and reduced carbon emissions.

With Airedale, you can rest assured that help is never far away. Our 24/7 emergency helpline and call out service is available 365 days of the year, ensuring that we are always on hand to provide expert advice and immediate help, day or night.

A guaranteed emergency response time means that a qualified Airedale engineer will be with you in no time, therefore maximising your system's uptime. Service plans also ensure F Gas compliance and incorporate a full parts and labour warranty for the first 12 months.

For more information visit www.airedale.com

* For customers outside the UK, our international distributors trained by Airedale would be pleased to offer service on Airedale units



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an experienced
engineer**

Find out how we design our systems to reduce your whole life costs. Our highly experienced engineers are adept at tailoring our systems to suit your requirements.

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**Have complete
control of your site**

Customers with critical sites can benefit from our remote monitoring facility. Aftersales services include chiller sequencing, network setup and integration as well as a live demonstration and training centre at our head office.



**24/7 support;
maintenance and
spares**

Immediate help on hand to keep your critical cooling system operational. Realise the full potential of your system; improve its longevity and efficiency and be F Gas compliant. Avoid downtime with our fast, efficient spares service.



**Develop
your skills**

Learn more about your cooling system by attending an air conditioning and refrigeration course in our purpose-built training school. Train on high-tech cooling systems and fully operational rigs in our dedicated workshops. Industry recognised courses also available. Email training@airedale.com for further details.

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