

The Power of Precision Cooling Performance

For Business Critical Environment

VISIONTEC

SMART Series

PRECISION, FLEXIBLE, INNOVATIVE IT COOLING SOLUTIONS

**AIR
COOLED**

**CHILLED
WATER**

**WATER
COOLED**

**DUAL
FLUID**

Steel plates
(both sides)

Insulation



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VISIONTEC
TOWARDS PERFECTION

TOWARDS PERFECTION

The Innovative Green Data Centre Solutions Professional

INTRODUCTION

The Visiontec Smart Series Precision Environmental Control Air-conditioners are specifically designed and manufactured for cooling of sensitive machineries and sensitive electronics equipment in a low-dust and low-fibre environment, which require precise temperature and humidity control such as in modern computer rooms, data processing centres, telecommunications exchanges, archives, simulator rooms, etc.

Fast Response and Precise Temperature Control

Typical machineries and electronics equipment can generate large quantities of heat when in operation in a small area. Sometimes heat load can be 6 to 10 times higher than similar sized office space. As such, the Visiontec PAC units must have the capability to respond quickly to drastic changes in heat load in order to maintain stable temperature of $\pm 1^{\circ}\text{C}$ and relative humidity (RH) of $\pm 5\%$ within the room.

Clean Filtered Environment

The Visiontec Smart Series PACs are installed with high performance G4 class filters with high arrestance value of 90% (equivalent to MERV8 per ASHRAE 52.2 Standard) to ensure the air in the room is filtered, to reduce the concentration of dust and fibres.

Micro processor-based Programmable controller with Large Display

The Visiontec PACs are in-built with an advanced state-of-the-art microprocessor-based programmable controller which incorporates all necessary safety features to ensure energy efficient, reliable and uninterrupted operation of the unit 24 hours a day and 7 days a week. The panel-mounted LCD is of 8 rows by 22 columns having IP 65 ingress protection.

Various Systems and Wide Cooling Capacities To Choose From

The Visiontec Smart Series PACs comes with various designs such as air-cooled, water-cooled, chilled-water, or even dual-fluid to provide cooling capacities suitable for the smallest rooms to the biggest rooms imaginable. It is recommended that for building with chilled-water system, dual-fluid system shall be used to increase redundancy and energy efficiency especially when water-cooled chilled-water system is available.



Visiontec Smart Series Model Identification

NOMENCLATURE

VSMF 09 AC - D (Q) / VSHAC 50

VSMF - Visiontec Minicool
VSSF – Visiontec Servercool

Nominal Cooling Capacity, KW*

AC – Air Cooled
CH – Chilled Water
WC – Water Cooled
DF – Dual Fluid

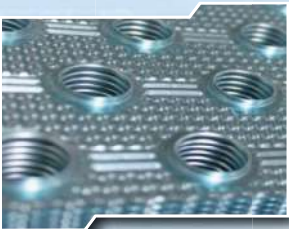
D – Down-flow
U – Up-flow
F – Front
FL– Front (Low Level)

Maximum Heat Rejection, MBH

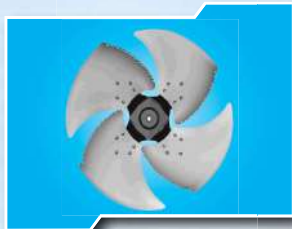
Visiontec Air-cooled Outdoor Condenser
VSHAC - 40 to 133
VSVAC - 146 to 408

Special Engineered Design

* The nominal cooling capacity is valid for air cooled at 22°C, 50% RH
* () Option



Hydrophilic fins for indoor and outdoor units



Toothed alloy fan blades for low noise and better air performance.



Double-skinned cabinet for better sound proofing and reduced insulation erosion.



Direct Drive EC Fans ensure higher efficiency and reduce maintenance



Humidity Control



A passion for perfection in precision air conditioning

With the exponential expansion in internet, ICT and computer processing power, IT server rooms and laboratories which house electronic, sensitive equipments produce ever-increasing sensible heat density. Providing stable, precise and clean air temperature and humidity is essential to reduce system failure, downtime and prolong sensitive equipment lifespan. Building comfort air-conditioners are simply not designed to meet these critical mission, **VISIONTEC** precision air-conditioners are designed specially to meet this demanding challenge. Its reliable design ensures that your mission critical environment can operate 24x7 continuously.

VISIONTEC precision air conditioners feature advanced microprocessor-based controller with LCD interface, single or dual compressors with independent refrigerant circuits coupled with large surface area cooling coils coated with **hydrophilic** corrugated aluminium fins for **both indoor and outdoor** units, ensure high efficiency operation. Every component is selected and designed for maximum reliability in mind. **VISIONTEC** is especially suitable for use in the following applications:

- Sensitive telecommunications facilities
- Computer data centres
- Critical simulator/switch centres
- Medical and biotech equipment rooms
- Laboratories and clean rooms
- Disaster recovery centres
- Internet call centres

The heart of the environmental control units is the advance microprocessor-based controller with built-in LCD display. The LCD display not only monitors your space temperature, humidity, air flow, and air cleanliness, but also provides component run times, alarm history and automatic self-test of the microprocessor on system start-up. Multiple messages will be displayed by automatically scrolling from each message to the next.

The advance microprocessor-based controller can communicate with other sub-systems through the following common standard communication protocol:

- | | |
|------------|------------------|
| • Modbus | • Trend |
| • Lonworks | • TCP/IP Gateway |
| • Bacnet | • Metasys |
| • SNMP | • SMS |

VISIONTEC MINICOOL and SERVERCOOL series close-control air conditioning units come in eight and seven sizes respectively, with capacity ranging from 9KW to 185KW in air-cooled, chilled-water, water-cooled and dual-fluid models to provide precision environmental air control for your mission-critical needs. All have the following main features:

- **Double-skinned** cabinet design for improved sound proofing, and corrosion resistance at the same time minimised insulation erosion
- Precision temperature & humidity controls with powerful LCD panel microprocessor controller
- **High sensible heat ratio** ensures energy efficiency
- Advanced microprocessor control and monitoring
- Single (MINICOOL) and dual (SERVERCOOL) scroll compressors with independent refrigerant circuits for maximum energy efficiency
- **Hydrophilic coated** fins for both **indoor and outdoor** units for better condensate removal and improved heat transfer
- **R410A** refrigerants (option R407C)
- Sight glass and filter drier included for ease of operation and maintenance
- **Toothed alloy** outdoor fan blades for low-noise and better air performance (for 46kW and above)
- **3-stage heater** as standard for improved humidity control
- **Stainless steel drain pan**
- **High efficiency Direct Drive motor**
- **Digital refrigerant pressure monitored** and set at LCD display simplify maintenance at site.
- **Hot gas bypass** for variable load and prevent icing caused by low pressure during initial part load
- Compressor Crankcase heater c/w solenoid valve to prevent refrigerant migration and mixing with crankcase oil when compressor is off.

Option

In addition to its wide range of standard features, **VISIONTEC** offers a number of installation and enhanced options that can be added to allow a tailored solution to suit each unique requirements and application:

- Steam humidifier unit
- Water leak detection
- Higher efficiency filters
- Electronic expansion valves
- Heat and smoke detector
- Remote panel mount
- Copper fin coils
- Condensate pump
- Colour Touch screen Panel
- Tandem Compressor
- Variable speed Condenser fans
- Inverter Compressor

Unit design and construction features

General

All components are selected for maximum reliability and efficiency.

Microprocessor-controlled

Latest state-of-the-art microprocessor control simultaneously control cooling, reheat, humidification, dehumidification and monitor full information on room condition, equipment status and alarm messaging. The panel-mounted LCD is of 8 row by 20 column having IP65 ingress protection.

Frame and cabinet

The heliarc welded steel frame provides for maximum strength and ease of access. Side and front panels can be easily opened and removed with quarter-turn fasteners allowing full access to all unit components. The cabinet is constructed of durable epoxy-coated steel plates with industry-leading **double-skinned design** for better insulation erosion protection and reduced noise. The unit is totally front service accessible.

Compressors

The compressors are generally of scroll type which is of rugged, low noise and **high EER/COP**. It also has minimum moving parts which reduces wear and tear. SERVERCOOL Series' dual compressors with independent refrigerant circuits further enhance energy efficiency and redundancy for part load performance. **The compressor suction and discharge pressure is linked to unit LCD display for easy refrigerant pressure monitoring, alarm setting and site troubleshooting.**

Cooling coils

Each coil consists of staggered rows of seamless copper tubes, mechanically expanded into die-formed aluminium fins. Fins are of corrugated design and coated with **hydrophilic** to enhance condensate removal, at **both indoor and outdoor units** which is also suitable for seaside corrosive environment. Every coil is computer optimized with compressor and condenser to ensure best selection to reduce operating cost.

Blowers

The blowers are of variable speed centrifugal design engineered for quiet and reliable operation. Models 09 to 33 fan have option of PSC motor or EC fans. Model 41 and above is using EC Fan technology. Direct Drive fans means no transmission loss and ensure highest efficiency. PSC motor option for model 09 to 33 is complete with 3-speed selector to adjust air flow to suit site requirement. The draw-through design ensures even air distribution across the cooling coil. The built-in variable speed control can adjust to the actual load, soft start and reduce power consumption.

Filters

Computer room air cleanliness is enhanced by disposable filter having an air arresstance value of 90 percent(based on ASHRAE 52-76), equivalent to EU4 (G4), to provide clean air and superior life-time performance.

Electric reheat

The 3-stage finned tubular electric reheat coils will maintain room dry bulb conditions during dehumidification. The reheat coils are constructed of stainless steel for corrosion resistance and long life. An optional SCR-controlled, hot gas, or hot water reheat is available which provides continuous precise control to changing load condition.

Stainless steel drain pan

Condensate drain pan fabricated of **stainless steel** with surfaces insulated with fire retardant PE foam for long life and minimum contamination.

Condenser fan

The outdoor condenser fan blades are made of durable alloy material and manufactured with technologically advanced **toothed tail-end** for higher efficiency and reduced fan noise for VSHAC133 and above. It is propeller type **direct driven by external rotor electric induction motors** of class F insulation and IP55 enclosure. The motor is running at **950rpm for quiet**, less vibration and long lasting operation.

FLEXIBILITY

VISIONTEC has a market leading portfolio of standard products along with the flexibility to develop specialist products to clients' requirement, quickly and cost effectively. The company's in-house design and development teams create customised solutions, from special sizes to unique applications. Our engineering capability ensures reliability and on-time delivery.

MINICOOL Series Technical Data

Air Cooled (DX) System Cooling Capacities

Air cooled performance at 35°C (kW, Cooling)

Model	VSMF09AC		VSMF11AC		VSMF14AC		VSMF17AC	
	Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible
On coil (DB/WB/RH)								
26.7°C/19.4°C/ 50%	11.2	8.4	12.8	10.0	15.5	11.8	18.9	14.8
24.0°C/16.9°C/ 50%	10.4	8.2	11.9	9.8	14.4	11.6	17.6	14.5
22.0°C/15.6°C/ 50%	9.9	8.1	10.4	9.6	13.7	11.4	16.7	14.2
20.0°C/14.2°C/ 50%	9.2	7.4	9.7	8.9	12.7	10.5	15.6	13.1

Please contact VISIONTEC SYSTEM for other design requirements.

TECHNICAL DATA

Air-cooled system data

Model	Model	INDOOR UNIT OUTDOOR UNIT		VSMF09AC	VSMF11AC	VSMF14AC	VSMF17AC
				VSHAC40	VSHAC50	VSHAC62	VSHAC75
Air volume / Motor		Quantity	CFM / Kw	1600/0.6	2000/0.6	2500/0.75	2800/1.1
Electrical data		Compressor hp	hp	3.5	4	5	6
		FLA (without heater)	amp	12.1	12.9	14.7	14.9
		Heater kW/Stage	kW	3.6/3	6/3	6/3	6/3
		FLA (with heater)	amp	17.1	21.2	23.0	23.2
Amp		Condenser fan	amp	1.7	1.7	1.7	1.7
Evaporator coil		FACE AREA	m2 (ft2)	0.31(3.33)	0.37(4.00)	0.43(4.67)	0.46(5.00)
		Rows		2	2	2	3
Condenser coil		FACE AREA	m2 (ft2)	0.69(7.39)	0.78(8.44)	0.93(10.0)	1.05(11.25)
		Rows		2	2	2	2
		HOT GAS		1/2 (1)	1/2 (1)	1/2 (1)	1/2 (1)
		LIQUID		3/8 (1)	3/8 (1)	3/8 (1)	3/8 (1)
Condensate drain pipe				3/4	3/4	3/4	3/4
	Dimension	INDOOR UNIT	Length (mm)	864	864	864	864
	Width (mm)		813	813	813	813	
	Height (mm)		1880	1880	1880	1880	
	Weight (kg)		318	320	322	338	
	OUTDOOR UNIT		Length (mm)	813	813	966	966
			Width (mm)	607	607	559	559
			Height (mm)	775	876	972	972
			Weight (kg)	58	65	85	90

* Dimension may change according to total length from indoor to outdoor unit. Refer to VISIONTEC SYSTEM.

Note: Height of upflow unit to add 457mm if fitted with Free Blow Plenum.

Chilled Water System Cooling Capacities

Chilled water performance at 6.7°C chilled water entering temperature (kW, Cooling)

Model	VSMF09CH		VSMF11CH		VSMF14CH		VSMF17CH	
	Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible
On coil (DB/WB/RH)								
26.7°C/19.4°C/ 50%	11.5	8.1	16.3	11.9	21.3	15.6	26.6	19.7
24.0°C/16.9°C/ 50%	7.5	6.8	11.1	10.2	14.7	13.5	18.2	17.0
22.0°C/15.6°C/ 50%	6.1	6.1	9.0	9.0	12.0	12.0	14.7	14.7
20.0°C/14.2°C/ 50%	4.7	4.7	6.9	6.9	9.3	9.3	11.4	11.4

Please contact PA VISION for other design requirements.

TECHNICAL DATA

Chilled water system data

Model	Model	INDOOR UNIT		VSMF09CH	VSMF11CH	VSMF14CH	VSMF17CH
				Air volume / Motor		Quantity	CFM / Kw
Electrical data		FLA (without heater)	amp	2.9	4.7	5.1	10.3
		Heater kW/Stage	kW	3.6/3	6/3	6/3	6/3
		FLA (with heater)	amp	7.9	13.1	13.4	18.6
		FACE AREA	m2 (ft2)	0.36(3.83)	0.45(4.79)	0.43(4.58)	0.70(7.50)
		Rows		2	2	3	2
Connection Size (inch)		Inlet/Outlet		1	1	1	1
Condensate drain pipe				3/4	3/4	3/4	3/4
	Dimension	INDOOR UNIT	Length (mm)	787	787	787	1143
	Width (mm)		813	813	813	813	
	Height (mm)		1880	1880	1880	1981	
	Weight (kg)		236	240	247	363	

Note: Height of upflow unit to add 457mm if fitted with Free Blow Plenum.

Subject to change without notice due to continuing engineering innovation and improvements.

All power supply shall be 415/3/50Hz.

MINICOOL Series Technical Data

Air Cooled (DX) System Cooling Capacities

Air cooled performance at 35°C (kW, Cooling)

Model	VSMF20AC		VSMF24AC		VSMF30AC		VSMF33AC	
	Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible
On coil (DB/WB/RH)								
26.7°C/19.4°C/ 50%	24.0	20.2	26.8	21.2	36.0	26.3	40.7	31.2
24.0°C/16.9°C/ 50%	21.1	17.8	24.9	20.8	31.5	24.2	37.8	30.7
22.0°C/15.6°C/ 50%	19.1	16.2	23.7	20.3	28.2	22.0	35.9	30.1
20.0°C/14.2°C/ 50%	17.7	14.9	22.0	18.7	26.2	18.6	33.4	27.7

Please contact VISIONTEC SYSTEM for other design requirements.

TECHNICAL DATA

Air-cooled system data

Model	INDOOR UNIT		VSMF20AC	VSMF24AC	VSMF30AC	VSMF33AC
Model	OUTDOOR UNIT		VSHAC90	VSHAC105	VSHAC133	VSHAC146
Air volume / Motor	Quantity	CFM / Kw	3300/0.55(2)	3700/0.55(2)	4000/0.75(2)	5300/2.2
Electrical data	Compressor hp	hp	7	8	10	12
	FLA (without heater)	amp	24.7	25.8	32.6	30.1
	Heater kW/Stage	kW	9/3	9/3	9/3	12/3
	FLA (with heater)	amp	37.2	38.3	45.1	46.8
Amp	Condenser fan	amp	2.4	2.4	4.7	4.7
Evaporator coil	FACE AREA	m2 (ft2)	0.56(6.03)	0.70(7.50)	0.74(7.92)	1.01(10.89)
		Rows	3	3	3	3
		Condenser coil	FACE AREA	m2 (ft2)	1.07(11.5)	1.25(13.42)
Rows	2	2		2	2	
	HOT GAS	1/2 (1)		7/8 (1)	7/8 (1)	7/8 (1)
		LIQUID	1/2 (1)	1/2 (1)	1/2 (1)	5/8 (1)
Condensate drain pipe			3/4	3/4	3/4	3/4
Dimension	INDOOR UNIT	Length (mm)	1168	1168	1168	1422
		Width (mm)	813	813	813	813
		Height (mm)	1981	1981	1981	1981
		Weight (kg)	433	467	474	599
	OUTDOOR UNIT	Length (mm)	991	991	1082	1082
		Width (mm)	661	661	800	800
		Height (mm)	966	1118	1123	1174
		Weight (kg)	103	111	155	158

* Dimension may change according to total length from indoor to outdoor unit. Refer to VISIONTEC SYSTEM.

Note: Height of upflow unit to add 457mm if fitted with Free Blow Plenum.

Chilled Water System Cooling Capacities

Chilled water performance at 6.7°C chilled water entering temperature (kW, Cooling)

Model	VSMF20CH		VSMF24CH		VSMF30CH		VSMF33CH	
	Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible
On coil (DB/WB/RH)								
26.7°C/19.4°C/ 50%	33.1	24.2	35.3	27.6	43.6	32.6	53.2	38.5
24.0°C/16.9°C/ 50%	22.9	20.9	25.1	24.4	30.9	28.6	37.6	33.5
22.0°C/15.6°C/ 50%	18.6	18.6	20.7	20.7	25.3	25.3	30.7	30.2
20.0°C/14.2°C/ 50%	14.4	14.4	15.7	15.7	19.7	19.7	23.9	23.9

Please contact VISIONTEC SYSTEM for other design requirements.

TECHNICAL DATA

Chilled water system data

Model	INDOOR UNIT		VSMF20CH	VSMF24CH	VSMF30CH	VSMF33CH
Air volume / Motor	Quantity	CFM / Kw	3800/0.55(2)	4600/0.60(2)	5000/0.75(2)	5200/0.75(2)
Electrical data	FLA (without heater)	amp	10.3	9.5	10.2	10.2
	Heater kW/Stage	kW	9/3	9/3	9/3	12/3
	FLA (with heater)	amp	22.8	22	26.9	26.9
	Evaporator coil	FACE AREA	m2 (ft2)	0.70(7.50)	0.99(10.63)	0.97(10.41)
	Rows		3	2	3	4
Connection Size (inch)	Inlet/Outlet		1	1	1 1/8	1 1/8
Condensate drain pipe			3/4	3/4	3/4	3/4
Dimension	INDOOR UNIT	Length (mm)	1143	1524	1524	1524
		Width (mm)	813	813	813	813
		Height (mm)	1981	1981	1981	1981
		Weight (kg)	376	531	538	551

Note: Height of upflow unit to add 457mm if fitted with Free Blow Plenum.

Subject to change without notice due to continuing engineering innovation and improvements.

All power supply shall be 415/3/50Hz.

SERVERCOOL Series Technical Data

Air Cooled (DX) System Cooling Capacities

Air cooled performance at 35°C (kW, Cooling)

Model	VSSF41AC		VSSF46AC		VSSF52AC		VSSF61AC	
On coil (DB/WB/RH)	Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible
26.7°C/19.4°C/ 50%	46.9	36.2	54.0	42.0	61.5	49.6	69.2	56.4
24.0°C/16.9°C/ 50%	43.6	35.5	50.2	41.1	57.2	48.6	64.4	55.3
22.0°C/15.6°C/ 50%	41.4	34.8	47.8	40.3	54.3	47.6	61.2	54.2
20.0°C/14.2°C/ 50%	38.5	32.0	44.4	37.1	50.5	43.8	56.8	49.9

Please contact VISIONTEC SYSTEM for other design requirements.

TECHNICAL DATA

Air-cooled system data

Model	INDOOR UNIT		VSSF41AC	VSSF46AC	VSSF52AC	VSSF61AC
Model	OUTDOOR UNIT		VSHAC182	VSVAC204	VSVAC230	VSVAC270
Air volume / Motor	Quantity	CFM / Kw	6800/3.25(2)	7600/3.25(2)	8500/1.70(3)	10000/1.7(3)
Electrical data	Compressor hp	hp	2 x 7	2 x 8	2 x 9	2 x 10
	FLA (without heater)	amp	36.7	39.6	46.8	49.1
	Heater kW/Stage	kW	12/3	12/3	18/3	18/3
Amp	FLA (with heater)	amp	53.4	56.2	71.8	74.1
	Condenser fan	amp	4.7	5.3	9.3	9.3
Evaporator coil	FACE AREA	m2 (ft2)	1.19(12.83)	1.37(14.78)	1.45(15.63)	1.68(18.06)
		Rows	3	3	3	3
Condenser coil	FACE AREA	m2 (ft2)	2.10(22.56)	2.63(28.33)	2.63(28.33)	3.16(34.0)
		Rows	2	2	2	2
		HOT GAS	1/2 (2)	7/8 (2)	7/8 (2)	7/8 (2)
		LIQUID	1/2 (2)	1/2 (2)	1/2 (2)	5/8 (2)
Condensate drain pipe	Dimension		3/4	3/4	3/4	3/4
		INDOOR UNIT	Length (mm)	1689	1689	2235
		Width (mm)	813	813	813	813
		Height (mm)	1981	1981	1981	1981
		Weight (kg)	687	728	882	889
	OUTDOOR UNIT	Length (mm)	1082	1118	1118	1118
		Width (mm)	800	1092	1092	1092
		Height (mm)	1478	1435	1359	1562
		Weight (kg)	175	193	221	240

* Dimension may change according to total length from indoor to outdoor unit. Refer to VISIONTEC SYSTEM.

Note: Height of upflow unit to add 457mm if fitted with Free Blow Plenum.

Chilled Water System Cooling Capacities

Chilled water performance at 6.7°C chilled water entering temperature (kW, Cooling)

Model	VSSF41CH		VSSF46CH		VSSF52CH		VSSF61CH	
On coil (DB/WB/RH)	Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible
26.7°C/19.4°C/ 50%	58.9	44.5	71.2	53.0	83.4	62.1	100.8	72.3
24.0°C/16.9°C/ 50%	41.6	38.8	50.3	46.5	59.1	54.3	71.3	62.8
22.0°C/15.6°C/ 50%	34.0	34.0	41.1	41.1	48.3	48.3	58.0	56.6
20.0°C/14.2°C/ 50%	26.5	26.5	32.0	32.0	37.6	37.6	45.1	45.1

Please contact VISIONTEC SYSTEM for other design requirements.

TECHNICAL DATA

Chilled water system data

Model	INDOOR UNIT		VSSF41CH	VSSF46CH	VSSF52CH	VSSF61CH	
Air volume / Motor	Quantity	CFM / Kw	7000/1.70(2)	8000/3.25(2)	9000/3.25(2)	9400/3.60(2)	
Electrical data	FLA (without heater)	amp	5.2	9.8	9.8	10.9	
	Heater kW/Stage	kW	12/3	12/3	18/3	18/3	
	FLA (with heater)	amp	21.9	26.5	34.9	35.9	
Evaporator coil	FACE AREA	m2 (ft2)	1.74(18.75)	1.74(18.75)	1.74(18.75)	1.86(20.00)	
		Rows	2	3	3	4	
Connection Size (inch)		Inlet/Outlet	1 3/8	1 3/8	1 5/8	1 5/8	
Condensate drain pipe	Dimension		3/4	3/4	3/4	3/4	
		INDOOR UNIT	Length (mm)	1930	1930	1930	1930
		Width (mm)	813	813	813	813	
		Height (mm)	1981	1981	1981	1981	
		Weight (kg)	637	655	660	687	

Note: Height of upflow unit to add 457mm if fitted with Free Blow Plenum.

Subject to change without notice due to continuing engineering innovation and improvements.

All power supply shall be 415/3/50Hz.

SERVERCOOL Series Technical Data

Air Cooled (DX) System Cooling Capacities

Air cooled performance at 35°C (kW, Cooling)

Model	VSSF69AC		VSSF79AC		VSSF92AC	
On coil (DB/WB/RH)	Total	Sensible	Total	Sensible	Total	Sensible
26.7°C/19.4°C/ 50%	79.4	64.9	87.3	73.2	101.1	81.6
24.0°C/16.9°C/ 50%	73.8	63.6	81.2	71.8	94.1	80.0
22.0°C/15.6°C/ 50%	70.1	62.3	77.1	70.4	89.3	78.4
20.0°C/14.2°C/ 50%	65.2	57.3	71.7	64.7	83.1	72.1

Please contact VISIONTEC SYSTEM for other design requirements.

TECHNICAL DATA

Air-cooled system data

Model	INDOOR UNIT		VSSF69AC	VSSF79AC	VSSF92AC
Model	OUTDOOR UNIT		VSVAC306	VSVAC350	VSVAC408
Air volume / Motor	Quantity	CFM / Kw	11300/3.25(3)	12200/3.25(3)	13800/3.6(3)
Electrical data	Compressor hp	hp	2 x 12	2 x 13.5	2 x 15
	FLA (without heater)	amp	59.9	62.5	69.6
	Heater kW/Stage	kW	18/3	18/3	18/3
	FLA (with heater)	amp	84.9	87.5	94.6
Amp	Condenser fan	amp	9.3	9.3	9.3
Evaporator coil	FACE AREA	m2 (ft2)	1.94(20.83)	2.06(22.22)	2.34(25.21)
	Rows		3	3	3
		m2 (ft2)	3.90(42.0)	3.64(39.17)	4.49(48.33)
Condenser coil	FACE AREA	Rows	2	3	3
		HOT GAS	7/8 (2)	3/4 (2)	7/8 (2)
		LIQUID	5/8 (2)	5/8 (2)	5/8 (2)
Condensate drain pipe			3/4	3/4	3/4
Dimension	INDOOR UNIT	Length (mm)	2642	2692	2642
		Width (mm)	813	813	813
		Height (mm)	1981	1981	1981
		Weight (kg)	1,021	1,046	1,091
	OUTDOOR UNIT	Length (mm)	1422	1422	1727
		Width (mm)	1092	1092	1092
		Height (mm)	1562	1994	1994
		Weight (kg)	270	346	384

* Dimension may change according to total length from indoor to outdoor unit. Refer to VISIONTEC SYSTEM.

Note: Height of upflow unit to add 457mm if fitted with Free Blow Plenum.

Chilled Water System Cooling Capacities

Chilled water performance at 6.7°C chilled water entering temperature (kW, Cooling)

Model	VSSF69CH		VSSF79CH		VSSF92CH	
On coil (DB/WB/RH)	Total	Sensible	Total	Sensible	Total	Sensible
26.7°C/19.4°C/ 50%	121.2	89.0	149.2	103.1	176.0	122.3
24.0°C/16.9°C/ 50%	85.9	77.7	105.8	88.8	125.1	105.5
22.0°C/15.6°C/ 50%	69.9	69.9	85.8	79.7	101.5	94.8
20.0°C/14.2°C/ 50%	54.4	54.4	66.8	66.8	79.2	79.2

Please contact VISIONTEC SYSTEM for other design requirements.

TECHNICAL DATA

Chilled water system data

Model	INDOOR UNIT		VSSF69CH	VSSF79CH	VSSF92CH
Air volume / Motor	Quantity	CFM / Kw	12200/3.25(2)	12500/3.25(3)	15000/3.60(3)
Electrical data	FLA (without heater)	amp (hp)	14.7	14.7	16.3
	Heater kW/Stage	kW	18/3	18/3	18/3
	FLA (with heater)	amp	39.8	39.8	41.4
Evaporator coil	FACE AREA	m2 (ft2)	2.45(26.25)	2.67(28.75)	2.90(31.25)
	Rows		3	4	4
Connection Size (inch)		Inlet/Outlet	2 1/8	2 1/8	2 1/8
Condensate drain pipe			3/4	3/4	3/4
Dimension	INDOOR UNIT	Length (mm)	2642	2642	3150
		Width (mm)	813	813	813
		Height (mm)	1981	1981	1981
		Weight (kg)	896	937	1080

Note: Height of upflow unit to add 457mm if fitted with Free Blow Plenum.

Subject to change without notice due to continuing engineering innovation and improvements.

All power supply shall be 415/3/50Hz.

MINICOOL Series Technical Data

Water Cooled System Cooling Capacities

Performance at 29.4°C (85°F) entering water temperature (kW)

Model	VSMF09WC		VSMF11WC		VSMF14WC		VSMF17WC		VSMF20WC		VSMF24WC		VSMF30WC	
	Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible
On coil (DB/WB/RH)														
26.7°C/19.4°C/ 50%	12.1	8.6	13.8	10.3	16.7	12.2	20.4	15.3	25.9	20.8	28.9	21.8	38.9	27.1
24.0°C/16.9°C/ 50%	11.2	8.5	12.8	10.1	15.6	12.0	19.0	15.0	22.8	18.3	26.9	21.4	34.0	24.9
22.0°C/15.6°C/ 50%	10.7	8.3	11.2	9.9	14.8	11.7	18.1	14.7	20.6	16.7	25.6	20.9	30.5	22.7
20.0°C/14.2°C/ 50%	9.9	7.6	10.5	9.1	13.8	10.8	16.8	13.5	19.1	15.3	23.8	19.2	28.3	19.2

Please contact VISIONTEC SYSTEM for other design requirements.

TECHNICAL DATA

Water Cooled system data

	INDOOR UNIT		VSMF09WC	VSMF11WC	VSMF14WC	VSMF17WC	VSMF20WC	VSMF24WC	VSMF30WC
Air volume / Motor	Quantity	CFM / Kw	1600/0.6	2000/0.6	2500/0.75	2800/1.1	3300/0.55(2)	3700/0.55(2)	4000/0.75(2)
	Compressor hp		3.5	4	5	6	7	8	10
Electrical data	FLA (without heater)	amp	3.6/3	6/3	6/3	6/3	9/3	9/3	9/3
	Heater kW/Stage	kW	12.1	12.9	14.7	14.9	24.7	25.8	32.6
	FLA (with heater)	amp	17.1	21.2	23	23.2	37.2	38.3	45.1
Evaporator coil	FACE AREA	m2 (ft2)	0.31(3.33)	0.37(4.00)	0.43(4.67)	0.46(5.00)	0.56(6.03)	0.70 (7.50)	0.74(7.92)
		Rows	2	2	2	3	3	3	3
Condensate drain pipe			3/4	3/4	3/4	3/4	3/4	3/4	3/4
Dimension	INDOOR UNIT	Length (mm)	864	864	864	864	1067	1168	1168
		Width (mm)	813	813	813	813	813	813	813
		Height (mm)	1880	1880	1880	1880	1880	1981	1981
		Weight (kg)	343	350	355	375	458	508	519

Note: Height of upflow unit to add 457mm if fitted with Free Blow Plenum.

SERVERCOOL Series Technical Data

Water Cooled System Cooling Capacities

Performance at 29.4°C (85°F) entering water temperature (kW)

Model	VSMF33WC		VSSF41WC		VSSF46WC		VSSF52WC		VSSF61WC		VSSF69WC		VSSF79WC		VSSF92WC	
	Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible
On coil (DB/WB/RH)																
26.7°C/19.4°C/ 50%	43.9	32.2	50.7	37.3	58.3	43.2	66.4	51.0	74.8	58.1	85.7	66.8	94.3	75.4	109.2	84.0
24.0°C/16.9°C/ 50%	40.8	31.6	47.1	36.5	54.2	42.4	61.8	50.0	69.5	56.9	79.7	65.5	87.7	73.9	101.6	82.4
22.0°C/15.6°C/ 50%	38.8	31.0	44.8	35.8	51.6	41.5	58.7	49.1	66.1	55.8	75.7	64.2	83.3	72.5	96.5	80.7
20.0°C/14.2°C/ 50%	36.1	28.5	41.6	33.0	47.9	38.2	54.5	45.2	61.3	51.3	70.4	59.0	77.5	66.7	89.8	74.3

Please contact VISIONTEC SYSTEM for other design requirements.

TECHNICAL DATA

Water Cooled system data

Model	INDOOR UNIT		VSMF33WC	VSSF41WC	VSSF46WC	VSSF52WC	VSSF61WC	VSSF69WC	VSSF79WC	VSSF92WC
Air volume / Motor	Quantity	CFM / Kw	5300/2.2	6800/3.25(2)	7600/3.25(2)	8500/1.70(3)	10000/1.7(3)	11300/3.25(3)	12200/3.25(3)	13800/3.6(3)
Electrical data	Compressor hp		12	2 x 7	2 x 8	2 x 9	2 x 10	2 x 12	2 x 13.5	2 x 15
	Heater kW/Stage	kW	12/3	12/3	12/3	18/3	18/3	18/3	18/3	18/3
	FLA (without heater)	amp (hp)	30.1	36.7	39.6	46.8	49.1	59.9	62.5	69.6
	FLA (with heater)	amp	46.8	53.4	56.2	71.8	74.1	84.9	87.5	94.6
Evaporator coil	FACE AREA	m2 (ft2)	1.01(10.89)	1.19(12.83)	1.37(14.78)	1.45(15.63)	1.68(18.06)	1.94(20.83)	2.06(22.22)	2.34(25.21)
		Rows	3	3	3	3	3	3	3	3
Condensate drain pipe			3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
Dimension	INDOOR UNIT	Length (mm)	1422	1689	1689	2235	2235	2642	2642	2642
		Width (mm)	813	813	813	813	813	813	813	813
		Height (mm)	1981	1981	1981	1981	1981	1981	1981	1981
		Weight (kg)	639	733	778	1173	1879	1121	1160	1218

Note: Height of upflow unit to add 457mm if fitted with Free Blow Plenum.

MINICOOL Series Technical Data

Dual Fluid (DF) System Cooling Capacities

Air cooled performance at 35°C (kW) and Chilled water performance at 6.7°C chilled water entering temperature (kW, Cooling)

Model	VSMF09DF		VSMF11DF		VSMF14DF		VSMF17DF		VSMF20DF		VSMF24DF		VSMF30DF	
On coil	Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible
26.7°C / 50% RH	11.2	8.4	12.8	10.0	15.5	11.8	18.9	14.8	24.0	20.2	26.8	21.2	36.0	26.3
24.0°C / 50% RH	10.4	8.2	11.9	9.8	14.4	11.6	17.6	14.5	21.1	17.8	24.9	20.8	31.5	24.2
22.0°C / 50% RH	9.9	8.1	10.4	9.6	13.7	11.4	16.7	14.2	19.1	16.2	23.7	20.3	28.2	22.0
20.0°C / 50% RH	9.2	7.4	9.7	8.9	12.7	10.5	15.6	13.1	17.7	14.9	22.0	18.7	26.2	18.6

Please contact VISIONTEC SYSTEM for other design requirements.

SPECIFICATION

Dual Fluid system data

Model	INDOOR UNIT		VSMF09DF	VSMF11DF	VSMF14DF	VSMF17DF	VSMF20DF	VSMF24DF	VSMF30DF
Model	OUTDOOR UNIT		VSHAC40	VSHAC50	VSHAC62	VSHAC75	VSHAC90	VSHAC105	VSHAC133
Air volume / Motor	Quantity	CFM / Kw	1600/0.6	2000/0.6	2500/0.75	2800/1.1	3300/0.55(2)	3700/0.55(2)	4000/0.75(2)
Electrical data	Compressor hp	hp	3.5	4	5	6	7	8	10
	FLA (without heater)	amp	9.4	10.1	12.3	13.4	16.3	20.2	26.5
	Heater kW/Stage	kW	3.6/3	6/3	6/3	6/3	9/3	9/3	9/3
	FLA (with heater)	amp	14.4	18.4	20.6	21.7	28.8	32.7	39.0
Amp	Condenser fan	amp	1.7	1.7	1.7	1.7	2.4	2.4	4.7
Evaporator coil	DX/CH (FACE AREA Each)	m2 (ft2)	0.31(3.33)	0.37(4.00)	0.43(4.67)	0.46(5.00)	0.56(6.03)	0.70(7.50)	0.74(7.92)
	Rows		2	2	2	3	3	3	3
	HOT GAS		1/2 (1)	1/2 (1)	1/2 (1)	1/2 (1)	1/2 (1)	7/8 (1)	7/8 (1)
Connection Size (inch)	LIQUID		3/8 (1)	3/8 (1)	3/8 (1)	3/8 (1)	1/2 (1)	1/2 (1)	1/2 (1)
	Inlet/Outlet		1	1	1	1	1	1	1 1/8
Condensate drain pipe		inch	3/4	3/4	3/4	3/4	3/4	3/4	3/4
Dimension	INDOOR UNIT	Length (mm)	1156	1156	1156	1156	1283	1461	1461
		Width (mm)	1067	1067	1067	1067	1067	1067	1067
		Height (mm)	1982	1982	1982	1982	1982	2032	2032
		Weight (kg)	433	448	473	483	496	508	521
		Weight (kg)	813	813	966	966	991	991	1082
	OUTDOOR UNIT	Length (mm)	607	607	559	559	661	661	800
		Width (mm)	775	876	972	972	966	1118	1123
		Height (mm)	58	65	85	90	103	111	155
		Weight (kg)							
		Weight (kg)							

Please contact VISIONTEC SYSTEM for other design requirements.

*The Condenser coil data to be based on air-cooled same model data.

Dual Fluid (DF) System Cooling Capacities

Air cooled performance at 35°C (kW) and Chilled water performance at 6.7°C chilled water entering temperature (kW, Cooling)

Model	VSMF33DF		VSSF41DF		VSSF46DF		VSSF52DF		VSSF61DF		VSSF69DF		VSSF79DF		VSSF92DF	
On coil	Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible	Total	Sensible
26.7°C / 50% RH	40.7	31.2	46.9	36.2	54.0	42.0	61.5	49.6	69.2	56.4	79.4	64.9	87.3	73.2	101.1	81.6
24.0°C / 50% RH	37.8	30.7	43.6	35.5	50.2	41.1	57.2	48.6	64.4	55.3	73.8	63.6	81.2	71.8	94.1	80.0
22.0°C / 50% RH	35.9	30.1	41.4	34.8	47.8	40.3	54.3	47.6	61.2	54.2	70.1	62.3	77.1	70.4	89.3	78.4
20.0°C / 50% RH	33.4	27.7	38.5	32.0	44.4	37.1	50.5	43.8	56.8	49.9	65.2	57.3	71.7	64.7	83.1	72.1

Please contact VISIONTEC SYSTEM for other design requirements.

SPECIFICATION

Dual Fluid system data

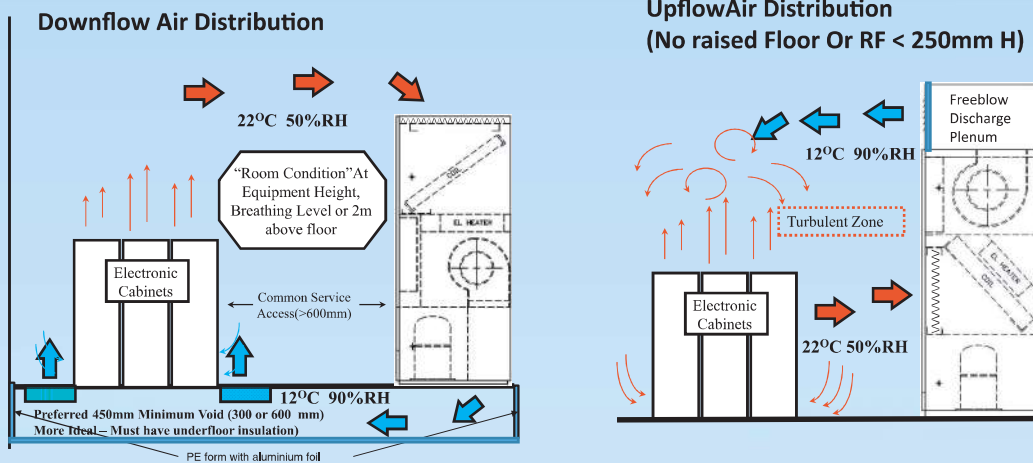
Model	INDOOR UNIT		VSMF33DF	VSSF41DF	VSSF46DF	VSSF52DF	VSSF61DF	VSSF69DF	VSSF79DF	VSSF92DF
Model	OUTDOOR UNIT		VSHAC146	VSHAC182	VSHAC204	VSHAC230	VSHAC270	VSHAC306	VSHAC350	VSHAC408
Air volume / Motor	Quantity	CFM / Kw	5300/2.2	6800/3.25(2)	7600/3.25(2)	8500/1.70(3)	10000/1.7(3)	11300/3.25(3)	12200/3.25(3)	13800/3.6(3)
Electrical data	Compressor hp	hp	12	2 x 7	2 x 8	2 x 9	2 x 10	2 x 12	2 x 13.5	2 x 15
	FLA (without heater)	amp	28.5	32.2	39.9	47.5	56.8	60.6	63.4	70.1
	Heater kW/Stage	kW	12/3	12/3	12/3	18/3	18/3	18/3	18/3	18/3
	FLA (with heater)	amp	45.2	48.9	56.6	72.5	81.8	85.6	88.2	95.1
Amp	Condenser fan	amp	4.7	4.7	5.3	9.3	9.3	9.3	9.3	9.3
Evaporator coil	DX/CH (FACE AREA Each)	m2 (ft2)	1.01(10.89)	1.19(12.83)	1.37(14.78)	1.45(15.63)	1.68(18.06)	1.94(20.83)	2.06(22.22)	2.34(25.21)
	Rows		3	3	3	3	3	3	3	3
	HOT GAS		7/8 (1)	1/2 (2)	7/8 (2)	7/8 (2)	7/8 (2)	7/8 (2)	3/4 (2)	7/8 (2)
Connection Size (inch)	LIQUID		5/8 (1)	1/2 (2)	1/2 (2)	1/2 (2)	5/8 (2)	5/8 (2)	5/8 (2)	5/8 (2)
	Inlet/Outlet		1 1/8	1 3/8	1 3/8	1 5/8	1 5/8	2 1/8	2 1/8	2 1/8
Condensate drain pipe		inch	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
Dimension	INDOOR UNIT	Length (mm)	1791	2045	2045	2400	2400	2756	2756	2756
		Width (mm)	1168	1168	1168	1168	1168	1168	1168	1168
		Height (mm)	2032	2032	2032	2032	2032	2032	2032	2032
		Weight (kg)	780	827	839	1152	1242	1347	1477	1537
		Weight (kg)	1082	1082	1118	1118	1118	1422	1422	1727
	OUTDOOR UNIT	Length (mm)	800	800	1092	1092	1092	1092	1092	1092
		Width (mm)	1174	1478	1435	1359	1562	1562	1994	1994
		Height (mm)	158	175	193	221	240	270	346	384
		Weight (kg)								
		Weight (kg)								

*The Condenser coil data to be based on air-cooled same model data.

Subject to change without notice due to continuing engineering innovation and improvements.

All power supply shall be 415/3/50Hz.

TYPICAL AIRFLOW DISTRIBUTION



VISION-SMART MONITORING / CONTROL

In order to facilitate maintenance and service, evaporator fan and compressors run hours, room temperature and humidity are recorded. The last hundred events and alarms of the unit can be recalled and displayed. All these information are stored in EEPROM or FLASH-Memory which not require back-up battery during power failure. All units are provided with standard dry contacts built-in for fire and BMS control and monitoring and mobus high level interface.

Vision-Smart Web

The optional Vision-Smart Web card is used to interface VISION-SMART Controller to a 10Mbps Ethernet network. Besides, connections to the following networks are also possible:

- SNMP v1, v2, v3 network with TRAP
- BACnet Ethernet
- BACnet over IP network
- LAN or Internet



AISLE CONTAINMENT

The common issue for data centre cooling is the permanent mixing of cooled and heated air. In order to ensure efficient cooling, it is necessary to segregate the cooled supply air and the hot return air by way of aisle containment

Application and operation

Aisle containment is a combination of door and roof components which facilitate consistent separation of the hot and cold air in the data centre. Visiontec System has the necessary expertise and experience in designing the most suitable configuration to suit your needs.

Benefits

- Improved energy efficiency and performance of cooling equipment
- Higher cooling density can be achieved
- Easy to install and retrofit
- An inexpensive solution to increase the performance of your existing facility



AIR COOLED REMOTE CONDENSER

VSHAC-40, 50, 62, 75, 90, 105, 133, 146, 182

Model	L	W	H	P	D	B
VSHAC 40	813	381	737	533	187	457
VSHAC 50	813	381	838	533	187	457
VSHAC 62	965	483	933	559	-	559
VSHAC 75	965	229	933	610	-	559
VSHAC 90	991	533	927	610	127	610
VSHAC 105	991	533	1080	610	127	610
VSHAC 133	1083	610	1083	660	152	686
VSHAC 146	1083	610	1133	660	152	686
VSHAC 182	1083	610	1438	660	152	686

* VSHAC 133, 146, 182 – Toothed Tail End

VSVAC-204, 230, 270, 306, 350, 408

Model	L	W	H	D
VSVAC 204	1118	1092	1118	318
VSVAC 230	1118	1092	1118	241
VSVAC 270	1118	1092	1321	241
VSVAC 306	1422	1092	1321	241
VSVAC 350	1422	1092	1702	241
VSVAC 408	1727	1092	1702	241

*Toothed Tail End

Note: All dimensions are in mm

GUIDE SPECIFICATION

1.0 GENERAL

This section outlines the specification of the precision air-conditioning system for data centres which generate large quantities of heat when in operation. The precision air conditioners shall be designed to be well distributed with precisely controlled temperature and humidity for high sensible heat environment.

The product shall be factory-tested for quality before shipment. The system shall be designed and manufactured according to international quality standards. The manufacturer shall be ISO 9001 certified.

1.1 Indoor Unit

The precision environmental control unit shall be VISIONTEC or equal factory assembled unit. Each unit shall be a complete environmental control system factory wired, tested and specifically designed to provide precise temperature, humidity and dust control. The precision air-conditioners shall be rated for ___ Kw total and ___ Kw sensible capacity with _____ cfm (CMH) floor standing type to suit drawings and construction site limitation.

1.1.1 Frame and Cabinet

The unit shall have heliarc welded steel frame which provides for maximum strength and ease of access. Side and front panels shall be easily opened and removed with quarter-turn fasteners allowing full access to all unit components. The panel shall be of **double wall/skinned construction** with insulation sandwiched between outer and inner steel panel to provide thermal protection and reduce insulation erosion and enhance sound attenuation. All internal joints between frame and panel shall have **PE vapour seal** to reduce cold air leakage thus prevent condensation.

1.1.2 Coil Section

The unit shall be designed for draw through type with large face areas ensuring low velocity to reduce turbulence and provide greater efficiency in the cooling and dehumidification process. The cooling coils shall consist of staggered rows of seamless per tubes, mechanically expanded into die-formed aluminium fins. The fins shall have corrugated design and pre-coated with **hydrophilic coating** to enhance condensate removal and superior to withstand corrosive environment.

For Chilled water, the cooling coil shall be controlled by built-in 2-way control valve c/w chilled water inlet/supply sensor via microprocessor.

Spot type water detection system shall be provided as option at the drain pan and able to be extended to the raised floor if required.

The condensate drain pan shall be fabricated with stainless steel with bottom and side surfaces insulated with fire retardant PE foam for long life and better corrosion resistance.

1.1.3 Blower Section

The blower shall be centrifugal design engineered for quiet and reliable operation. It shall be designed for _____ CFM (CMH).

For cooling capacity 33kw and below, the unit shall use direct drive system c/w 3-speed adjustment. Model 41kw and above shall use EC Fan technology. Direct Drive fans means no transmission loss and ensure highest efficiency. PSC motor option for model 09 to 33 is complete with 3-speed selector to adjust air flow to suit site requirement. The draw-through design ensures even air distribution across the cooling coil. The build-in variable speed control can adjust to the actual load, soft start and reduce power consumption.

GUIDE SPECIFICATION (Cont.)

1.1.4 Compressors (Applicable for DX system only)

The unit shall be **hermetic scroll compressor** type with high EER, low sound power level, best sound quality due to low discharge pulse and high reliability to meet application requirement.

For cooling capacity 33kw and below, unit shall use single **hermetic scroll compressor**. For cooling capacity 41kw and above, unit shall use **twin scroll compressors with independent refrigerant circuits for maximum load adjustment flexibility**. Each compressor refrigerant circuit shall have **hot gas bypass c/w solenoid valve to enable the unit to cater for possible low initial cooling load and prevent icing when suction pressure is low**. Tandem compressors which require difficult refrigerant oil balance shall not be acceptable. Each compressor shall have **built-in crankcase heater and solenoid valve** to protect the compressor from refrigerant condensate and migration. **The refrigerant pressure shall be digital type which is linked to LCD display for monitoring** and alarm setting and sensor without physical pressure gauge troubleshooting.

1.1.5 Filters

The filter chamber shall be an integral part of the system, designed within the frame and cabinet. The filters shall be disposable type high performance **G4 class filters with high arrestance value of 90% (based on ASHRAE 52-76)** or EU4 based on European standards to reduce the concentration of dust and fibre.

1.1.6 Electrical Reheat

The unit shall have multi-stage stainless steel finned tubular reheat coils capable of providing ample capacity to maintain room dry bulb conditions during a system call for dehumidification. The reheat shall be installed on the discharge air side of the cooling coil and shall be ____ kW in **three (3) stages** to provide more accurate controlled response to the requirements of the computer room. Single or dual stage heater is not acceptable. The heating elements shall be protected by thermal and air differential pressure safety switches.

2.0 Outdoor Unit (DX and Dual Fluid Systems)

The casing of the condensing section shall be heavy gauge steel panels, tightly fitted with gasket on rigid frame, to guard against leaks of conditioned air. All steel parts shall be coated with oven-baked epoxy paint and gone through salt-spray test of minimum 840 hours.

The condenser coils shall be of seamless copper tubes mechanically bonded to aluminum fins for heat rejection performance enhancement as well as corrosion resistance and tested under water to 2800 kPa with compressed air. The aluminum fins shall be **hydrophilic** coated superior to withstand corrosive environment.

Fans shall be propeller type direct driven by weatherproof external rotor electric induction motors. The condenser fan blades shall be made of durable alloy material and manufactured with **toothed tail-end** for unit capacity if 30kw and above for higher air performance and reduced fan noise. Fan motor have class F insulation and IP55 enclosure directly coupled.

The motor shall be suitable for PAC with capacity of 46kW and above operation with 415/3/50 electric supply with +10% or -15% voltage fluctuation. The motor shall be of **6 poles running at 950rpm** for quiet, less vibration and long lasting operation.

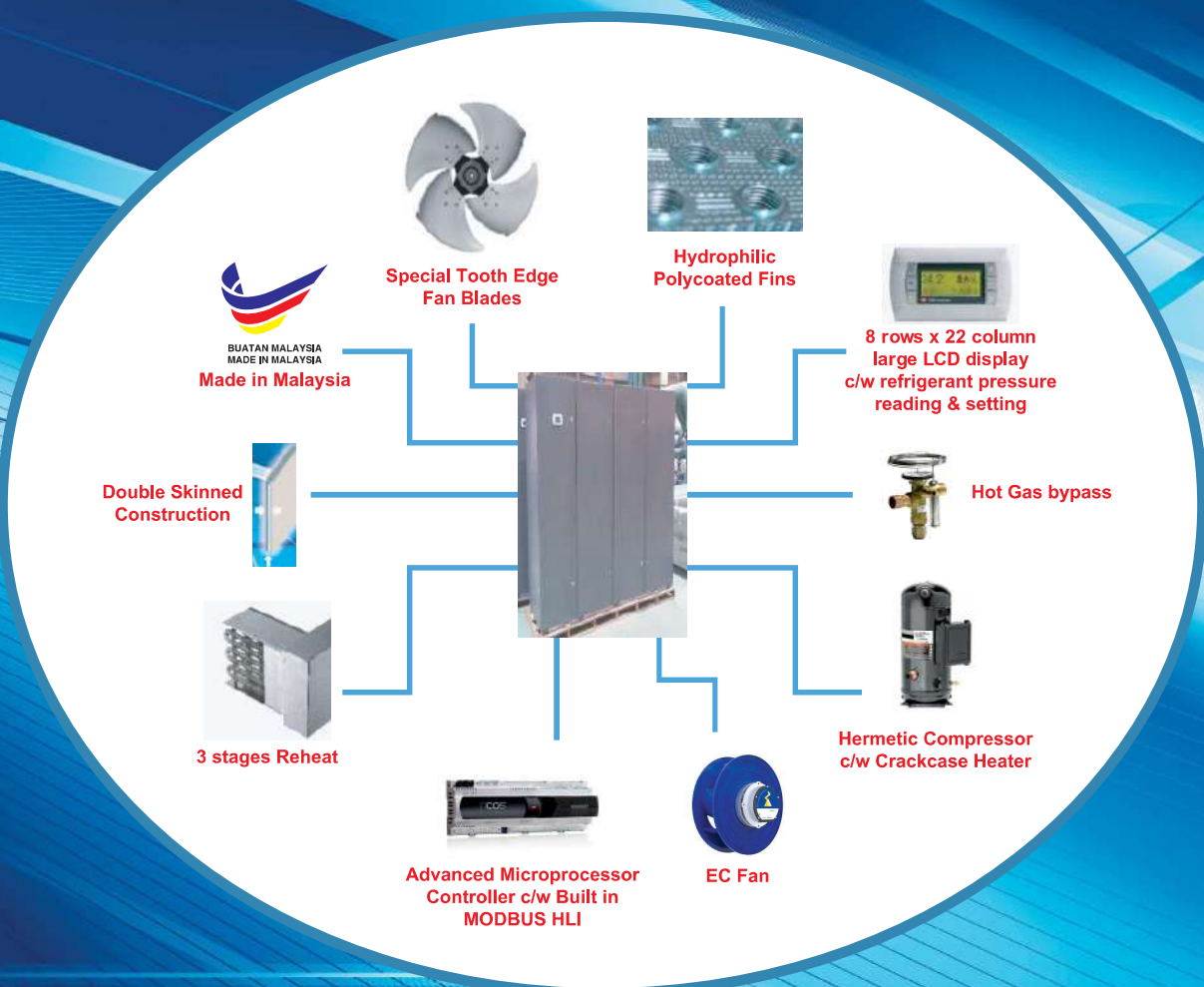
3.0 MONITORING AND CONTROLLING SYSTEM

The precision air-conditioners shall have in-built advance microprocessor based programmable controller which incorporates all necessary safety and protection features to ensure energy efficient, reliable and uninterrupted operation of the unit, for 24 hours per day and 7 days a week.

The unit shall have **8 rows, 22 columns backlit LCD displays with 6 operation buttons**. It shall display temperature, humidity, airflow status, cleanliness and shall be able to provide component run times, alarm history, an automatic self-test of the microprocessor on system start-up. The microprocessor controller shall be of 16 bits type with flash memory to store customised application programming data. Multiple alarms shall be able to be displayed sequentially in order of occurrence. The controllers of each unit shall be able to be linked in a **network up to 16 units to provide automatic duty/standby and lead-lag control**. The unit shall have built-in starter with all major electrical components with MCB and contactors, fire alarm relay and BMS/Off/Local switches built-in to ensure independent control testing and isolation.



Air cooled • Chilled water • Water cooled • Dual fluid



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