



CITEC
Pioneering The Future

PRECISION • EFFICIENCY • CREATIVITY

PRODUCT CATALOGUE

G-VOLUTION
GROUND-BREAKING GREEN TECHNOLOGY

THE COMPANY



CITEC INTERNATIONAL was established in year 1996. As one of the leaders in designing and manufacturing Precision Air Conditioning system, CITEC always places great emphasis on achieving the highest standards and incorporates stringent quality controls throughout its operations. Every CITEC product is designed and built within a Quality Management System ISO9001, Environmental Management System ISO14001 & Occupational Health & Safety Assessment System ISO18001 and CE certified.

To date, CITEC has established wide distributorship throughout Asia Pacific. This distributor partner network serves to provide excellent product support and long-term services to CITEC clients across various industries.



- **Factory**
- **Sales Offices**
- **Supports**

SUPPORTS:

- | | |
|---|---|
| ■ Australia | ■ Malaysia |
| ■ Bangladesh | ■ Pakistan |
| ■ Brunei | ■ Philippines |
| ■ China | ■ Singapore |
| ■ Hong Kong | ■ Sri Lanka |
| ■ India | ■ Thailand |
| ■ Indonesia | ■ United Arab Emirates |
| ■ Japan | ■ Vietnam |
| ■ Macau | |

CERTIFICATION



China Quality Certification

ISO Certification



Manufacturing License



CCC Certification



CE Certification

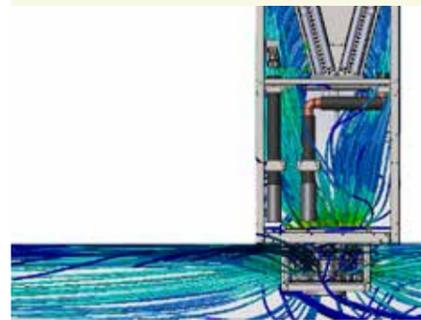
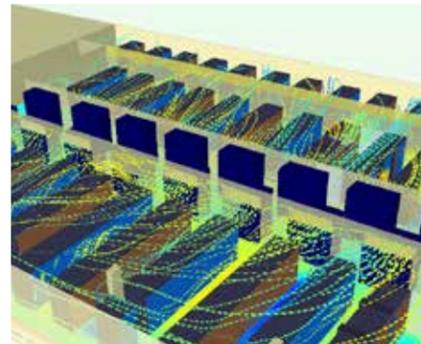


Outstanding Products – by Advanced Engineering Design Tools and Facilities

Every CITEC product is designed and built using our unrivalled experience in Precision Air Conditioning, with extensive testing of components and complete systems. Every aspect is engineered to ensure maximum reliability, economy of operation and long working life, together with ease of installation and maintenance.

CITEC products are designed with sophisticated 3D CAD system with each design detail carefully considered. Computational Fluid Dynamic (CFD) analysis will be conducted to ensure the airflow inside the unit is optimized and free from any negative effects. And thus best performance and highest efficiency can be assured with our products.

Each CITEC product undergo extensive and stringent test for performance, reliability and safety verification in our state of arts Testing Laboratories in China. The testing facilities are built in accordance to ASHRAE Standard and China GB Standard and are accredited by national authorities as full compliance facilities. The well-equipped computerized facilities can conduct capacity test up to 200kW and air flow test up to 36000CMH. Thus with CITEC product, the performance and reliability are guaranteed.



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G-VOLUTION

GROUND-BREAKING GREEN TECHNOLOGY

G-VOLUTION is the embodiment of the next generation in Precision Air Conditioning solutions, where energy savings and increased uptime are encased in a sleek, compact exterior featuring advanced technology and cutting-edge components.



Introducing G-VOLUTION, the latest Precision Air Conditioning system engineered to run seamlessly in critical environments by delivering constant, efficient and intelligent cooling circulation consistently for 24 hours, 7 days a week. G-VOLUTION can adapt to fluctuating heat loads while consuming low energy resources.

Although the opportunity cost of high energy consumption can dramatically impact our bottom line, our motivation behind creating Precision Air Conditioning technology is based on high performing and energy saving technology that reduces greenhouse gas emissions on a global scale.

The G-VOLUTION is designed for areas with limited space as well as large data centers with intricate hardware networks and is customizable to fit every client's needs and specifications.



The G-VOLUTION Consists of Flexible Energy Saving Units Manufactured and Assembled with High Quality Components.

By CITEC definition, the ideal Precision Air Conditioning unit should be easily integrated into the most complex high-tech applications, which is why we have intentionally devised a wide range of configurations to provide maximum design freedom minus the hefty price tag.

With the G-VOLUTION, one can enjoy versatility in terms of fan arrangement, filter specifications, service clearance, network language and protocol adaptability. Our range is also designed to allow for minimal footprint required as all models can be accessed and maintained from the front.

Our intelligent Genius 5+ Controller and optional DC Inverter compressor are what makes our Energy Saving units the pioneer in energy-efficient solutions for Precision Air Conditioning. In the long term, the G-VOLUTION will provide significant reductions in operating costs as well as shorten remuneration periods.

COMPACT DIMENSIONS MEETS FULL FRONT ACCESS

At CITEC, our design objective is to make Precision Air Conditioning units that meet the definition of efficient handling, easy accessibility and simple installation. We understand critical space can come at a very high cost especially in critical environments, and that it is not only vital to operate Precision Air Conditioning with the smallest possible footprint but to also have units that comes with full front access for easy maintenance and servicing.

Our units have slim widths in order to take advantage of space in data centers and to allow adjacent modules to be installed either side by side or adjacent to other equipment.



HIGH PERFORMANCE AND EFFICIENCY

G-VOLUTION performs with a tight operating tolerance of $\pm 1^\circ\text{C}$ and $\pm 5\%$ Relative Humidity (RH). The system operates with low energy consumption as a result of combining highly efficient scroll compressors together with the precise control of the Electronic Expansion Valve (EEV). The enhanced heat transfer capabilities of our cooling coil as well as the optional EC fan has made it possible to further improve on energy efficiency.



EASE OF CONTROL WITH A TOUCH

Touch screen display provides informative and user-friendly interface for easy navigation. The display can show graphical information via animated icons and also capable of plotting trend graphs for temperature and humidity.



EFFICIENCY STARTS FROM INTELLIGENT CONTROL

CITEC Genius 5+ controller provides intelligent and advanced control for precision cooling application. The controller supports a wide range of cooling control strategies for mission critical facilities including auto-sequencing, supply air control and containment system. Energy-saving features such as EC fan control, compressor and EEV optimization and intelligent humidity control are built in to the standard control program.



Genius 5+ Controller

COMPLETE SOLUTION FOR NETWORK CONNECTIVITY

CITEC provides complete solution for all remote monitoring connection. The built-in RS485 communication port can support MODBUS system while additional communication interface cards are available for connection to other BMS system and network system such as BACNET, LONWORKS and TCP/IP.

Built-in auto-sequencing function allows up to 8 units to be connected in a network to perform duty-standby task, thus preventing down time and increasing reliability.



LonWorks Card



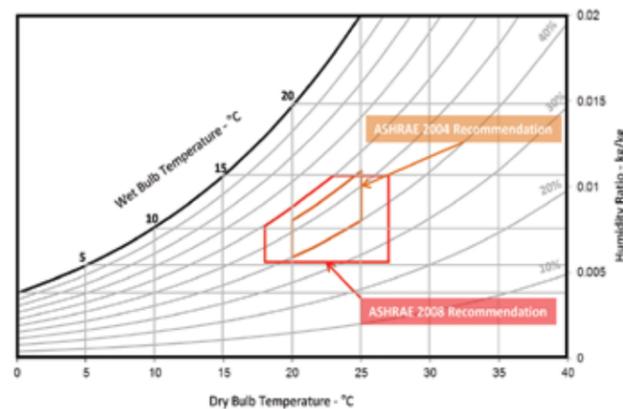
pCOWeb Card



pCOnet Card

HUMIDITY CONTROL THAT WILL NOT DRAIN YOUR ENERGY

Since year 2008, ASHRAE has specified recommended humidity for data processing space in terms of dew point. CITEC has established dew point control in addition to the relative humidity control. Dew point control or absolute humidity control can prevent the unnecessary humidifying and de-humidifying process thus reducing energy consumption.



DESIGN FEATURES

G-VOLUTION

ES Range

(Direct Expansion System)



VERSATILE CONFIGURATION

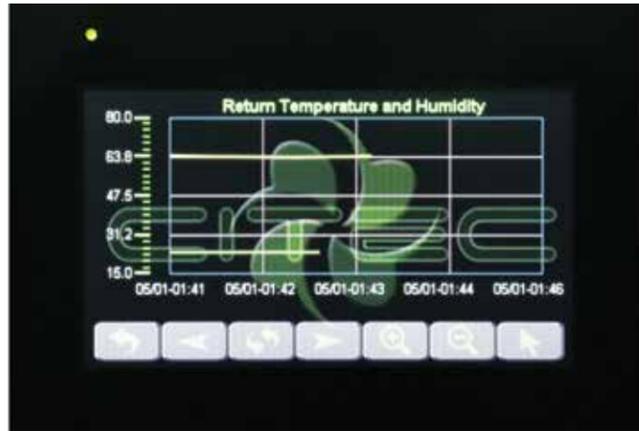
Models can be constructed from base modules of varying sizes and capacities. This modular concept allows larger models to be broken down into smaller basic modules allowing the unit to fit through places where space is limited and then reassembled on site. The base modules consist of models range from 15-25kW, 30-35kW, 40-50kW, 60-80kW and 90-100kW.

The unit can also fitted with DC Inverter Compressors which can regulate the capacity based on the actual cooling demand. This has greatly reduces the unit energy consumption and thus increased the efficiency especially during part load. The capacity can be regulated from as low as 30% up to 100%. Such wide capacity control range enables maximum energy saving potential and reduces the unit operating cost plus it can control the supply air temperature precisely within a tight operating tolerance.

All models in the G-VOLUTION are built from common components as well, which makes storage and keeping track of spare parts a simple task.



A STEP FORWARD WITH DC INVERTER COMPRESSOR

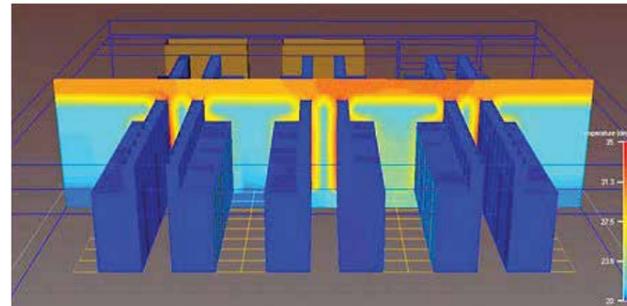


BETTER TEMPERATURE AND HUMIDITY PRECISION

With the synergized operation between the variable speed compressor, EC fan and EEV, the intelligent Genius 5+ controller can adequately control the cooling coil temperature to enable more precise control of temperature and humidity with minimal energy consumption.

PERFECT CHOICE FOR HEAT/AISLE CONTAINMENT COOLING SOLUTION

Unlike the unit with fixed speed compressor, the ability of the DC Inverter unit in regulating capacity enables the precise control of unit supply air temperature, thus is perfect for supply air control strategy application such as Heat/Aisle Containment Solution.



GREAT FLEXIBILITY IN EFFICIENT WAY

With DC Inverter compressor, you no longer need to worry about the matching of the air conditioning system capacity with the equipment load when deploying equipment in multiple stages. The unit can be intelligently self-regulated to match the equipment heat load in each stage efficiently and optimistically without the need of your attention.



DIRECT DRIVE EC FAN

The Electronically Commutated (EC) fan motor combination offers a number of advantages over traditional belt-driven forward curved centrifugal blower, such as:

- Higher efficiency compared to forward curved fans
- Reduced losses due to the absence of pulley and belt usage in the standard belt-driven fan
- 15-30% more energy savings
- Variable speed control
- Maintenance-free, higher reliability
- Soft start feature, where the fan slowly ramps up to the desired speed

An underfloor version of the EC fan is available for downflow models. Studies have shown that the placement of underfloor EC fans contribute to a 10% to 15% improvement in performance and is recommended for users who would like to utilize the full capacity of the EC fan. These fans are pre-wired and pre-packaged into the Precision Air Conditioning unit prior to delivery for instant installation.



1 DOUBLE SKIN ACCESS PANEL WITH GASKET LINING

The solid and rigid double skin insulated access panels on the G-VOLUTION Series ensure excellent sound isolation and greatly reduce the breakout noise of the unit. The special FERMAPOR gasket on the door panels effectively eliminates air leakage from the units. This gasket is applied to the door panels using a special machine to ensure strong bonding between the gasket and the panels, thus increasing the reliability of the whole panel assembly.



2 ELECTRICAL AND CONTROL PANEL

High and low voltage cables are segregated and each component is protected by individual MCB. AC3 components such as fan motors and compressors are protected by manual motor starters. All cabling are colour coded and numbered for easy reference.

3 ELECTRONIC EXPANSION VALVE

The innovative Electronic Expansion Valve (EEV) provides highly efficient control of refrigerant flow based on real-time feedback. The EEV can provide fast, stable and precise control even under low-load condition. The presence of the temperature and pressure probe allow real time monitoring of suction temperature and pressure as well as the superheat of the system.



4 COIL

Large coil face area allows more cooling capacity at lower face velocity. Therefore, the unit can achieve better efficiency while at the same time minimizing the air side pressure loss. Hydrophilic fin provides additional protection to the coil and at the same time, ensures fast removal of condensate on the coil.



5 SCROLL COMPRESSOR

High efficiency hermetic scroll compressors provide reliability, quiet and superior cooling performance. For even better part load efficiency and control precision, some models can be fitted with scroll compressor with DC Inverter technology. DC Inverter scroll compressor enables capacity regulation with variable speed. Thus can perfectly matching the heat load without start/stop cycling.

All compressors are with screw thread connection for easy service and maintenance.

6 3 TYPES OF FAN CONFIGURATION

The G-VOLUTION Direct Expansion System offers 3 types of fan configuration. DIDW centrifugal fan driven by AC motor as standard while high efficiency Electronically Commutated (EC) fan is offered as option. Apart from increasing the efficiency of the units, EC fan also enables various control strategies for data center cooling such as under floor pressure control and variable airflow control. For downflow system, if the raise floor has sufficient height (>400mm), then the efficiency of the unit can be further improved as much as 15% by locating the EC fan under the raise floor. For models using DC Inverter Compressor, only EC fans (both in-unit and underfloor) are available to complement the capacity regulation capability of the units.

OPTIONAL FEATURES & COMPONENTS AVAILABLE

- Humidifier
- Serviceable Humidifier
- Water Detection Kit
- Fan Speed Controller
- 3-stage Electrical Reheat
- High Efficiency Filters
- Differential Pressure Transmitter
- Fire Alarm Relay
- Supply Air Temperature and Humidity Sensor
- Compressor Crankcase Heater
- Liquid Receiver
- Oil Separator
- Automatic Transfer Switch
- Colour Touch Screen
- Horizontal Discharge Section (Upflow Model Only)
- Remote Control and Supervisory Systems

TECHNICAL SPECIFICATION

ES Range with Standard Compressor

UNIT MODEL (ESD/ESU xxx A/W)		8*	12*	15	20	25	30**	35**	40	45	50	60	70	80	90	100
Gross Total Capacity	kW	9.83	14.72	18.17	20.23	25.70	31.90	35.07	41.64	44.60	49.66	61.86	69.18	82.06	89.38	99.52
Gross Sensible Capacity	kW	9.83	12.72	18.17	20.23	23.11	28.17	29.59	41.64	43.21	45.37	61.86	66.48	72.06	86.06	90.42
S.H.R.		1.00	0.86	1.00	1.00	0.90	0.88	0.84	1.00	0.97	0.91	1.00	0.96	0.88	0.96	0.91
GENERAL DATA																
Nominal Air Flow	m3/s	1.00	1.00	1.84	1.84	1.84	2.24	2.24	3.70	3.70	3.70	5.30	5.30	5.30	7.20	7.20
No. of Fan(s)		1	1	1	1	1	1	1	2	2	2	2	2	2	3	3
No. of Compressor(s)		1	1	1	1	1	1	1	1	1	1	2	2	2	2	2
No. of Refrigerant Circuit(s)		1	1	1	1	1	1	1	1	1	1	2	2	2	2	2
Sound Level	dBA	52	52	61	61	61	62	62	64	64	64	66	66	66	67	67
CONDENSER																
Nominal Air Cooled Model	HEC	194	234	234	234	314	374	434	574	574	574	2x374	2x374	2x574	2x574	2x574
Nominal Water Cooled Model		WA20	WA30	WB40	WB40	WB60	WB60	WB80	WB80	WB80	WC60	2xWB60	2xWB60	2xWB80	2xWB80	2xWC60
Nominal Water Flow	l/s	0.56	0.87	1.04	1.16	1.49	1.85	2.06	2.36	2.53	2.89	3.52	3.93	4.75	5.06	5.80
Waterside Pressure Drop of Condenser	kPa	36.8	42.8	14.1	17.5	15.9	24.5	21.7	28.3	32.6	57.1	22.1	27.6	28.8	32.7	57.3
ELECTRIC RE-HEATER																
Nominal Heater Capacity	kW	6	6	6	6	6	6	6	12	12	12	12	12	12	12	12
No. of Heater Step(s)		1	1	1	1	1	1	1	2	2	2	2	2	2	2	2
ELECTRODE HUMIDIFIER																
Nominal Humidifier Capacity	kg/hr	5	5	5	5	5	5	5	5	5	5	5	5	5	8	8
UNIT DIMENSION & WEIGHT																
Width	mm	648	648	800	800	800	885	885	1315	1315	1315	1815	1815	1815	2500	2500
Depth	mm	654	654	891	891	891	891	891	891	891	891	891	891	891	891	891
Height	mm	1940	1940	1985	1985	1985	1985	1985	1985	1985	1985	1985	1985	1985	1985	1985
Gross Weight - "A" Version	kg	165	195	275	275	300	310	310	445	450	450	610	610	617	790	790
Gross Weight - "W" Version	kg	173	204	286	287	314	324	326	461	466	466	638	638	645	822	822
Min. Service Allowance	mm	600	600	725	725	725	725	725	725	725	725	725	725	725	800	800

Notes:

- 1) Cooling capacity is based on 24°C, 45%RH, R407C refrigerant, 45°C condensing temperature, 400V/3ph+N/50Hz power supply, 50Pa ESP.
- 2) Sound level is for downflow models measured at 1m in freefield conditions.
- 3) Nominal air cooled condenser sizing is suggestion only based on 35°C ambient & nominal operating condition. Other sizes may be selected to suit requirement as necessary.
- 4) Nominal water cooled condenser sizing is suggestion only based on water in/out 30/35°C & nominal operating condition. Other sizes may be selected to suit requirement as necessary.
- 5) Water cooled condenser to be installed externally, please consult factory if required to be installed internally.
- 6) For underfloor EC fan option, raise floor height must be >400mm. (*Option not available for model 8 and 12).
- 7) Weight shown is for standard downflow unit. Not included additional option.
- 8) **For model 30 & 35, only EC fan version is available.

Due to our policy of continuous development and improvement, the specifications and data herein are subjected to change without notice. We must therefore reserve the right to supply equipment that may differ from that described and illustrated herein. All information, including illustrations, contained in this brochure, is believed to be accurate and reliable. Users, however, should independently evaluate the suitability of each product for their own application. CITEC makes no warranties as to accuracy or completeness of the information, and disclaims any liability regarding its use.

TECHNICAL SPECIFICATION

ES Range with DC Inverter Compressor

UNIT MODEL (ESD/ESU xx A/W)		20	25	30	35	40	45	60	70	80	90
Gross Total Capacity	kW	21.06	25.03	30.34	34.92	41.17	46.36	59.70	72.64	79.98	92.81
Gross Sensible Capacity	kW	21.06	22.82	27.49	29.52	41.17	43.95	59.70	65.74	68.97	87.52
S.H.R.		1.00	0.91	0.91	0.85	1.00	0.95	1.00	0.91	0.86	0.94
GENERAL DATA											
Nominal Air Flow	m3/s	1.84	1.84	2.24	2.24	3.70	3.70	5.30	5.30	5.30	7.20
No. of Fan(s)		1	1	1	1	2	2	2	2	2	3
No. of Compressor(s)		1	1	1	1	1	1	2	2	2	2
No. of Refrigerant Circuit(s)		1	1	1	1	1	1	2	2	2	2
Sound Level	dBA	62	62	63	63	64	64	66	66	66	67
CONDENSER											
Nominal Air Cooled Model	HEC	234	314	374	434	574	574	2x374	2x434	2x574	2x574
Nominal Water Cooled Model		WB40	WB60	WB60	WB80	WB80	WB80	2xWB60	2xWB80	2xWB80	2xWB80
Condenser Water Flowrate	l/s	1.22	1.50	1.81	2.12	2.40	2.70	3.49	4.31	4.72	5.41
Condenser Water Pressure Drop	kPa	19.6	16.0	23.3	23.0	29.5	37.3	21.7	23.7	28.5	37.3
ELECTRIC RE-HEATER											
Nominal Heater Capacity	kW	6	6	6	6	12	12	12	12	12	12
No. of Heater Step(s)		1	1	1	1	2	2	2	2	2	2
ELECTRODE HUMIDIFIER											
Nominal Humidifier Capacity	kg/hr	5	5	5	5	5	5	5	5	5	8
UNIT DIMENSION & WEIGHT											
Width	mm	800	800	885	885	1315	1315	1815	1815	1815	2500
Depth	mm	891	891	891	891	891	891	891	891	891	891
Height	mm	1985	1985	1985	1985	1985	1985	1985	1985	1985	1985
Gross Weight - "A" Version	kg	265	265	275	280	415	430	545	545	570	725
Gross Weight - "W" Version	kg	277	279	289	296	431	446	573	573	602	757
Min. Service Allowance	mm	725	725	725	725	725	725	725	725	725	800

* Standard unit comes with EC Fan, Fan Speed Controller and Crankcase Heater

* Using R410A refrigerant

Notes:

- 1) Cooling capacity is based on 24°C, 45%RH, R410A refrigerant, 45°C condensing temperature, 400V/3ph+N/50Hz power supply, 50Pa ESP.
- 2) Sound level is for downflow models measured at 1m in freefield conditions.
- 3) Nominal air cooled condenser sizing is suggestion only based on 35°C ambient & nominal operating condition. Other sizes may be selected to suit requirement as necessary.
- 4) Nominal water cooled condenser sizing is suggestion only based on water in/out 30/35°C & nominal operating condition. Other sizes may be selected to suit requirement as necessary.
- 5) Water cooled condenser to be installed externally, please consult factory if required to be installed internally.
- 6) For underfloor EC fan option, raise floor height must be >400mm.
- 7) Weight shown is for standard downflow unit. Not included additional option.

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DESIGN FEATURES



G-VOLUTION

EC & ECL Range (Chilled Water System)

COMPLETE CHILLED WATER SOLUTION

CITEC offers chilled water Precision Air Conditioning units with two different designs to suit various application. Whether you need a unit with small foot print for your small computer room or a high energy efficient unit with underfloor EC fan for large data center, CITEC has the answer for you. CITEC Chilled Water system ranges from 25kW to 200kW and is distributed over 2 different ranges namely EC and ECL. Each range has the unique design features that can meet your requirement.

The EC range is designed to fit in large coil with maximum heat exchange surface. It has low coil face velocity thus reducing air friction loss and therefore ensuring the units to operate at highest efficiency.

ECL range is designed to achieve maximum performance with minimum foot print. The cooling coils are designed and arranged in such a way that enable maximum heat transfer area within limited cabinet space. ECL range is best suited for data center with high raise floor.

DOUBLE SKIN ACCESS PANEL WITH GASKET LINING

The solid and rigid double skin insulated access panels on the G-VOLUTION Series ensure excellent sound isolation and greatly reduce the breakout noise of the unit. The special FERMAPOR gasket on the door panels effectively eliminates air leakage from the units. This gasket is applied to the door panels using a special machine to ensure strong bonding between the gasket and the panels, thus increasing the reliability of the whole panel assembly.



WATER TEMPERATURE SENSORS (OPTIONAL)

Inlet water temperature and outlet water temperature sensors can be fitted into the units to monitor the supply water condition. The unit will provide early warning if the incoming water is out of the desired operating condition, thus enabling early rectification actions and preventing potential downtime.

1 ELECTRICAL AND CONTROL PANEL

High and low voltage cables are segregated and each component is protected by individual MCB. AC3 components such as fan motors are protected by manual motor starters. All cabling are colour coded and numbered for easy reference.

2 COIL

Large coil face area allows more cooling capacity at lower face velocity. Therefore, the unit can achieve better efficiency while at the same time minimizing the air side pressure loss. Hydrophilic fin provides additional protection to the coil and at the same time, ensures fast removal of condensate on the coil.



3 MODULATING BALL VALVE

Modulating ball valve rated PN25 with equal percentage characteristic ensures excellent control of water flow through the cooling coil. The flow characterised disc inside the valve greatly enhances the control stability especially under low-load condition.



4 3 TYPES OF FAN CONFIGURATION

The G-VOLUTION EC Range Chilled Water System offers 3 types of fan configuration. DIDW centrifugal fan driven by AC motor as standard while high efficiency Electronically Commutated (EC) fan is offered as option. Apart from increasing the efficiency of the units, EC fan also enables various control strategies for data center cooling such as underfloor pressure control and variable airflow control. For downflow system, if the raise floor has sufficient height (>400mm), then the efficiency of the unit can be further improved as much as 15% by locating the EC fan below the raise floor.

For ECL Range, only EC fan will be fitted to complement to the design core value of the product range. For underfloor EC fan, the raise floor need to have sufficient height of >500mm.

OPTIONAL FEATURES & COMPONENTS AVAILABLE

- Humidifier
- Serviceable Humidifier
- Water Detection Kit
- 3-stage Electrical Reheat
- High Efficiency Filters
- Differential Pressure Transmitter
- Fire Alarm Relay
- Supply Air Temperature and Humidity Sensor
- Automatic Transfer Switch
- Colour Touch Screen
- 3-way Chilled Water Valve
- Chilled Water In and Out Sensor
- Screwed Water Connection
- Water Differential Pressure Switch
- Horizontal Discharge Section (Upflow Model Only)
- Remote Control and Supervisory System

TECHNICAL SPECIFICATION

EC Range

UNIT MODEL (ECD/ECU xxx)		25*	30**	50*	60	70	80	95	110	125	135	150
Downflow:												
Gross Total Capacity	kW	24.07	30.27	51.01	64.31	74.71	83.63	100.27	113.93	123.42	131.51	155.54
Gross Sensible Capacity	kW	22.31	27.58	46.08	57.00	66.77	73.76	87.09	99.01	106.18	115.05	133.88
S.H.R.		0.93	0.91	0.90	0.89	0.89	0.88	0.87	0.87	0.86	0.88	0.86
Upflow:												
Gross Total Capacity	kW	24.07	30.27	51.01	61.16	71.20	79.58	95.93	108.20	117.73	127.41	151.06
Gross Sensible Capacity	kW	22.31	27.58	46.08	54.22	63.76	70.39	83.55	94.22	101.33	111.52	130.11
S.H.R.		0.93	0.91	0.90	0.89	0.90	0.88	0.87	0.87	0.86	0.88	0.86
GENERAL DATA												
Nominal Air Flow (Downflow)	m3/s	1.84	2.24	3.70	4.40	5.20	5.20	6.00	7.00	7.00	7.60	8.60
Nominal Air Flow (Upflow)	m3/s	1.84	2.24	3.70	4.20	5.00	5.00	5.80	6.70	6.70	7.40	8.40
No. of Fan(s)		1	1	2	2	2	2	2	3	3	3	3
Sound Level	dBA	61	62	64	67	67	67	68	68	68	68	68
CHILLED WATER COIL												
Downflow:												
Nominal Water Flow	l/s	1.15	1.45	2.44	3.07	3.57	4.00	4.79	5.44	5.90	6.28	7.43
Water Pressure Drop	kPa	34.6	56.6	67.7	107.9	69.2	70.9	107.6	145.4	90.6	60.6	87.2
Upflow:												
Nominal Water Flow	l/s	1.15	1.45	2.44	2.92	3.40	3.80	4.58	5.17	5.63	6.09	7.22
Water Pressure Drop	kPa	34.6	56.6	67.7	104.0	65.8	65.9	101.2	135.0	89.5	59.8	86.5
ELECTRIC RE-HEATER												
Nominal Heater Capacity	kW	6	6	12	12	12	12	12	12	12	12	12
No. of Heater Step(s)		1	1	2	2	2	2	2	2	2	2	2
ELECTRODE HUMIDIFIER												
Nominal Humidifier Capacity	kg/hr	5	5	5	5	5	5	8	8	8	8	8
UNIT DIMENSION & WEIGHT												
Width	mm	800	885	1315	1550	1800	1800	2065	2300	2300	2550	2815
Depth	mm	891	891	891	891	891	891	891	891	891	891	891
Height	mm	1985	1985	1985	1985	1985	1985	1985	1985	1985	1985	1985
Gross Weight	kg	245	260	355	405	485	505	535	570	595	635	710
Min. Service Allowance	mm	725	725	725	725	725	725	725	725	725	725	725

Notes:
 1) Cooling capacity is based on 24°C, 45%RH, Chilled Water In/Out based on 7/12°C, 50Hz, 50Pa ESP.
 2) Sound level is for downflow models measured at 1m in freefield conditions.
 3) For underfloor EC fan option, raise floor height must be >400mm.
 4) Weight shown is for standard downflow unit. Not included additional option.
 5) For upflow version, only EC fan is available (*except model 25 & 50).
 6) **For downflow version, only EC fan is available.

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TECHNICAL SPECIFICATION

ECL Range

UNIT MODEL (ECL xxx)		70	80	125	140	180	200
Gross Total Capacity	kW	69.20	76.74	127.79	141.71	180.09	200.13
Gross Sensible Capacity	kW	61.05	66.61	112.58	122.97	159.52	174.46
S.H.R.		0.88	0.87	0.88	0.87	0.89	0.87
GENERAL DATA							
Nominal Air Flow	m3/s	4.4	4.4	8.2	8.2	11.7	11.7
No. of Fan(s)		1	1	2	2	3	3
Sound Level	dBA	67	67	68	68	70	70
CHILLED WATER COIL							
Nominal Water Flow	l/s	3.31	3.67	6.11	6.77	8.60	9.56
Water Pressure Drop	kPa	105.3	68.3	86.3	86.3	111.5	122.3
ELECTRIC RE-HEATER							
Nominal Heater Capacity	kW	12	12	12	12	12	12
No. of Heater Step(s)		2	2	2	2	2	2
ELECTRODE HUMIDIFIER							
Nominal Humidifier Capacity	kg/hr	5	5	8	8	8	8
UNIT DIMENSION & WEIGHT							
Width	mm	1315	1315	2065	2065	2815	2815
Depth	mm	991	991	991	991	991	991
Height	mm	1985	1985	1985	1985	1985	1985
Gross Weight	kg	385	400	600	630	785	825
Min. Service Allowance	mm	725	725	725	725	725	725

Notes:

- 1) Cooling capacity is based on 24°C, 45%RH, Chilled Water In/Out based on 7/12°C, 50Hz, 50Pa ESP.
- 2) Sound level is measured at 1m in freefield conditions.
- 3) For underfloor EC fan option, raise floor height must be >500mm.
- 4) Weight shown is for standard unit. Not included additional option.
- 5) Only downflow version with EC fan is available.

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G-VOLUTION

EH Range **(Dual Coil System)**

WHEN DOWNTIME IS NOT ACCEPTABLE

In mission critical data centers, downtime is a very costly incident. A few minutes of downtime could cause huge loss in term of monetary and business opportunities. In order to safeguard the mission critical operation and improve the data center reliability, all operation supporting facilities should have certain degree of redundancy setup. Depending on the requirement, there are many ways to incorporate redundancy in air conditioning system for data center. In CITEC, we fully understand this critical requirement and with our technical specialty, we have developed a highly reliable product with dual coil system to give you the highest level of redundancy.



DUAL COIL PRECISION AIR CONDITIONING SYSTEM

CITEC Dual Coil Precision Air Conditioning system is designed and developed to complement the air conditioning system that complies with the highest level of redundancy. There are 2 types of dual coil system: Dual Chilled Water (CW+CW) system and Direct Expansion + Chilled Water (DX+CW) system. Depending on the type of air conditioning system implemented on site, CITEC Dual Coil system can satisfy your need in preventing downtime and safeguard your data center operation.

The powerful Genius 5+ controller can monitor the operating condition of the unit closely, and will intelligently switch to the secondary system if it detects fault on the primary system. The dual coil system can also be set up to provide free cooling. By connecting the CW system to dry coolers, the system can utilize the cool ambient temperature to provide cooling to the data center thus saving great amount of energy cost.

DUAL CHILLED WATER SYSTEM

CITEC EH Range **"C Version"** is designed with 2 sets of chilled water coil within a single cabinet. The unit is connected to two independent chilled water sources: primary source and secondary source. When primary chilled water source is shut down for maintenance, or due to fault, the unit will change over to secondary chilled water source for continuity and security.

CHILLED WATER + DIRECT EXPANSION SYSTEM

Citec EH Range **"A/W Version"** is designed with dual system (CW system + DX system) within a single cabinet. When chilled water supply is available, the unit will use the low cost chilled water for the cooling but when the chilled water is unavailable due to faulty or shut down for maintenance, the DX system will take over the cooling duty to ensure continuity and security. In some buildings, central chilled water systems are installed to provide comfort air conditioning and therefore are only available during day time or office hours. EH Range **"A/W Version"** unit will use such a source of chilled water when it is available and after office hour when such low cost chilled water source is not available, the system will change over to DX system for continuous cooling.



DOUBLE SKIN ACCESS PANEL WITH GASKET LINING

The solid and rigid double skin insulated access panels on the G-VOLUTION Series ensure excellent sound isolation and greatly reduce the breakout noise of the unit. The special FERMAPOR gasket on the door panels effectively eliminates air leakage from the units. This gasket is applied to the door panels using a special machine to ensure strong bonding between the gasket and the panels, thus increasing the reliability of the whole panel assembly.



WATER TEMPERATURE SENSORS (OPTIONAL)

Inlet water temperature and outlet water temperature can be fitted to the units to monitor the supply water condition. The unit will provide early warning if the incoming water is out of the desired operating condition, thus enabling early rectification actions and preventing potential downtime.

1 ELECTRICAL AND CONTROL PANEL

High and low voltage cables are segregated and each component is protected by individual MCB. AC3 components such as fan motors and compressors are protected by manual motor starters. All cabling are colour coded and numbered for easy reference.

2 COIL

Large coil face area allows more cooling capacity at lower face velocity. Therefore, the unit can achieve better efficiency while at the same time minimizing the air side pressure loss. Hydrophilic fin provides additional protection to the coil and at the same time, ensures fast removal of condensate on the coil.



3 MODULATING BALL VALVE

Modulating ball valve rated PN25 with equal percentage characteristic ensures excellent control of water flow through the cooling coil. The flow characterised disc inside the valve greatly enhances the control stability especially under low-load condition.

4 SCROLL COMPRESSOR

High efficiency hermetic scroll compressors provide reliability, quiet and superior cooling performance. All compressors are with screw thread connection for easy service and maintenance.

5 ELECTRONIC EXPANSION VALVE

The innovative Electronic Expansion Valve (EEV) provides highly efficient control of refrigerant flow based on real-time feedback. The EEV can provide fast, stable and precise control even under low-load condition. The presence of the temperature and pressure probe allow real time monitoring of suction temperature and pressure as well as the superheat of the system.



6 2 TYPES OF FAN CONFIGURATION

The G-Volution Series Dual Coil System offer 2 types of fan configuration. High efficiency Electronically Commutated (EC) fan is offered as standard. Apart from increasing the efficiency of the units, EC fan also enables various control strategies for data center cooling such as underfloor pressure control and variable airflow control. For downflow system, if the raise floor has sufficient height (>400mm), then the efficiency of the unit can be further improved as much as 15% by locating the EC fan below the raise floor.



OPTIONAL FEATURES & COMPONENTS AVAILABLE

- Humidifier
- Serviceable Humidifier
- Water Detection Kit
- Fan Speed Controller (For AC Version Only)
- 3-stage Electrical Reheat
- High Efficiency Filters
- Differential Pressure Transmitter
- Fire Alarm Relay
- Supply Air Temperature and Humidity Sensor
- Compressor Crankcase Heater (For AC/WC Version Only)
- Liquid Receiver (For AC/WC Version Only)
- Oil Separator (For AC/WC Version Only)
- Automatic Transfer Switch
- Colour Touch Screen
- 3-way Chilled Water Valve
- Chilled Water In and Out Sensor
- Screwed Water Connection
- Water Differential Pressure Switch
- Horizontal Discharge Section (Upflow Model Only)
- Remote Control and Supervisory Systems

TECHNICAL SPECIFICATION

EH Range "C Version"

UNIT MODEL (EHU/EHD xx C)		60	70	85	95
Gross Total Capacity - Downflow	kW	60.16	72.79	90.08	96.94
Gross Sensible Capacity - Downflow	kW	53.68	65.49	79.77	88.47
S.H.R.		0.89	0.90	0.89	0.91
Gross Total Capacity - Upflow	kW	58.23	69.34	86.28	91.42
Gross Sensible Capacity - Upflow	kW	51.99	62.51	76.55	83.44
S.H.R.		0.89	0.90	0.89	0.91
GENERAL DATA					
Nominal Air Flow - Downflow	m ³ /s	4.2	5.2	6.2	7.2
Nominal Air Flow - Upflow	m ³ /s	4.1	5.0	6.0	6.8
No.of Fan(s)		2	2	3	3
Sound Level	dBA	67	67	68	68
CHILLED WATER COIL					
Nominal Water Flow - Downflow/Upflow	l/s	2.87 / 2.78	3.48 / 3.31	4.30 / 4.12	4.63 / 4.37
Water Pressure Drop - Downflow/Upflow	kPa	92.1 / 91.6	63.8 / 60.6	104.3 / 100.3	75.4 / 70.0
ELECTRIC RE-HEATER					
Nominal Heater Capacity	kW	12	12	12	12
No. of Heater Step(s)		2	2	2	2
ELECTRODE HUMIDIFIER					
Nominal Humidifier Capacity	kg/hr	5	5	5	8
UNIT DIMENSION & WEIGHT					
Width	mm	1550	1800	2065	2300
Depth	mm	991	991	991	991
Height	mm	1985	1985	1985	1985
Gross Weight	kg	475	565	610	650
Min. Service Allowance	mm	725	725	725	725

Notes:

- 1) Cooling capacity is based on 24°C, 45%RH, Chilled Water In/Out based on 7/12°C, 50Hz, 50Pa ESP.
- 2) Sound level is for downflow models measured at 1m in freefield conditions.
- 3) For underfloor EC fan option, raise floor height must be >400mm.
- 4) Weight shown is for standard downflow unit. Not included additional option.
- 5) Only EC fan is available.

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TECHNICAL SPECIFICATION

EH Range "A/W Version" with Standard Compressor

UNIT MODEL (EHU/EHD xx A/W)		60	70	85	95
DIRECT EXPANSION CIRCUIT					
Gross Total Capacity - Downflow	kW	64.16	75.14	84.24	98.27
Gross Sensible Capacity - Downflow	kW	55.92	67.10	77.65	91.72
S.H.R.		0.87	0.89	0.92	0.93
Gross Total Capacity - Upflow	kW	63.47	74.10	83.16	96.54
Gross Sensible Capacity - Upflow	kW	54.72	65.16	75.58	87.73
S.H.R.		0.86	0.88	0.91	0.91
CHILLED WATER CIRCUIT					
Gross Total Capacity - Downflow	kW	61.77	74.10	91.62	102.09
Gross Sensible Capacity - Downflow	kW	54.75	66.63	80.81	92.75
S.H.R.		0.89	0.89	0.88	0.91
Gross Total Capacity - Upflow	kW	59.80	70.99	87.77	95.37
Gross Sensible Capacity - Upflow	kW	53.04	63.62	77.57	86.64
S.H.R.		0.89	0.90	0.88	0.91
GENERAL DATA					
Nominal Air Flow - Downflow	m ³ /s	4.2	5.2	6.2	7.5
Nominal Air Flow - Upflow	m ³ /s	4.1	5.0	6.0	7.0
No. of Fan(s)		2	2	3	3
No. of Compressor(s)		2	2	2	2
No. of Refrigerant Circuit(s)		2	2	2	2
Sound Level	dBA	67	67	68	68
CONDENSER					
Nominal Air Cooled Condenser	HEC	2x374	2x434	2x574	2x574
Nominal Water Cooled Model		2xWB60	2xWB80	2xWB80	2xWC50
Nominal Water Flow - Downflow/Upflow	l/s	3.72 / 3.69	4.34 / 4.29	4.84 / 4.80	5.69 / 5.61
Waterside Pressure Drop of Condenser - Downflow/Upflow	kPa	24.7 / 24.3	24.0 / 23.6	29.9 / 29.4	77.2 / 75.2
CHILLED WATER COIL					
Nominal Water Flow - Downflow/Upflow	l/s	2.95 / 2.86	3.56 / 3.39	4.38 / 4.19	4.88 / 4.56
Water Pressure Drop - Downflow/Upflow	kPa	99.7 / 99.3	68.5 / 65.2	110.3 / 106.2	84.4 / 77.0
ELECTRIC RE-HEATER					
Nominal Heater Capacity	kW	12	12	12	12
No. of Heater Step(s)		2	2	2	2
ELECTRODE HUMIDIFIER					
Nominal Humidifier Capacity	kg/hr	5	5	5	8
UNIT DIMENSION & WEIGHT					
Width	mm	2050	2300	2565	2800
Depth	mm	991	991	991	991
Height	mm	1985	1985	1985	1985
Weight - "A" Version	kg	600	670	750	825
Weight - "W" Version	kg	630	705	785	860
Min. Service Allowance	mm	725	725	725	725

Notes:
 1) Cooling capacity is based on 24°C, 45%RH, R407C refrigerant, 45°C condensing temperature for DX system, Chilled Water In/Out based on 7/12°C, 400V/3ph/50Hz power supply, 50Pa ESP.
 2) Sound level is for downflow models measured at 1m in freefield conditions.
 3) Nominal air cooled condenser sizing is suggestion only based on 35°C ambient & nominal operating condition. Other sizes may be selected to suit requirement as necessary.
 4) Nominal water cooled condenser sizing is based on 30/35°C condensing water & nominal operating condition. Other sizes may be selected to suit requirement as necessary.
 5) For underfloor EC fan option, raise floor height must be >400mm.
 6) Weight shown is for standard downflow unit. Not include additional options.
 7) Only EC fan is available.

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TECHNICAL SPECIFICATION

EH Range "A/W Version" with DC Inverter Compressor

UNIT MODEL (EHU/EHD xx A/W)		60	70	85
DIRECT EXPANSION CIRCUIT				
Gross Total Capacity - Downflow	kW	60.92	74.54	88.03
Gross Sensible Capacity - Downflow	kW	54.49	66.84	79.29
S.H.R.		0.89	0.90	0.90
Gross Total Capacity - Upflow	kW	60.31	73.56	86.99
Gross Sensible Capacity - Upflow	kW	53.32	64.92	77.25
S.H.R.		0.88	0.88	0.89
CHILLED WATER CIRCUIT				
Gross Total Capacity - Downflow	kW	61.77	74.50	91.62
Gross Sensible Capacity - Downflow	kW	54.75	66.63	80.81
S.H.R.		0.89	0.89	0.88
Gross Total Capacity - Upflow	kW	59.80	70.99	87.77
Gross Sensible Capacity - Upflow	kW	53.04	63.62	77.57
S.H.R.		0.89	0.90	0.88
GENERAL DATA				
Nominal Air Flow - Downflow	m3/s	4.2	5.2	6.2
Nominal Air Flow - Upflow	m3/s	4.1	5.0	6.0
No. of Fan(s)		2	2	3
No. of Compressor(s)		2	2	2
No. of Refrigerant Circuit(s)		2	2	2
Sound Level	dBA	67	67	68
CONDENSER				
Nominal Air Cooled Condenser	HEC	2x374	2x434	2x574
Nominal Water Cooled Model		2xWB60	2xWB80	2xWB80
Nominal Water Flow - Downflow/Upflow	l/s	3.62 / 3.60	4.45 / 4.41	5.20 / 5.16
Waterside Pressure Drop of Condenser - Downflow/Upflow	kPa	23.4 / 23.1	25.3 / 24.8	34.5 / 34.0
CHILLED WATER COIL				
Nominal Water Flow - Downflow/Upflow	l/s	2.95 / 2.86	3.56 / 3.39	4.38 / 4.19
Water Pressure Drop - Downflow/Upflow	kPa	99.7 / 99.3	68.5 / 65.2	110.3 / 106.2
ELECTRIC RE-HEATER				
Nominal Heater Capacity	kW	12	12	12
No. of Heater Step(s)		2	2	2
ELECTRODE HUMIDIFIER				
Nominal Humidifier Capacity	kg/hr	5	5	5
UNIT DIMENSION & WEIGHT				
Width	mm	2050	2300	2565
Depth	mm	991	991	991
Height	mm	1985	1985	1985
Weight - "A" Version	kg	600	670	750
Weight - "W" Version	kg	630	705	785
Min. Service Allowance	mm	725	725	725

Notes:

- 1) Cooling capacity is based on 24°C, 45%RH, R407C refrigerant, 45°C condensing temperature for DX system, Chilled Water In/Out based on 7/12°C, 400V/3ph/50Hz power supply, 50Pa ESP.
- 2) Sound level is for downflow models measured at 1m in freefield conditions.
- 3) Nominal air cooled condenser sizing is suggestion only based on 35°C ambient & nominal operating condition. Other sizes may be selected to suit requirement as necessary.
- 4) Nominal water cooled condenser sizing is based on 30/35°C condensing water & nominal operating condition. Other sizes may be selected to suit requirement as necessary.
- 5) For underfloor EC fan option, raise floor height must be >400mm.
- 6) Weight shown is for standard downflow unit. Not include additional options.
- 7) Only EC fan is available.
- 8) Standard unit comes with fan speed controller and crankcase heater.

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TECHNICAL SPECIFICATION



Air Cooled Condenser (HEC)

AIR COOLED CONDENSER

HEC (High Performance Series)

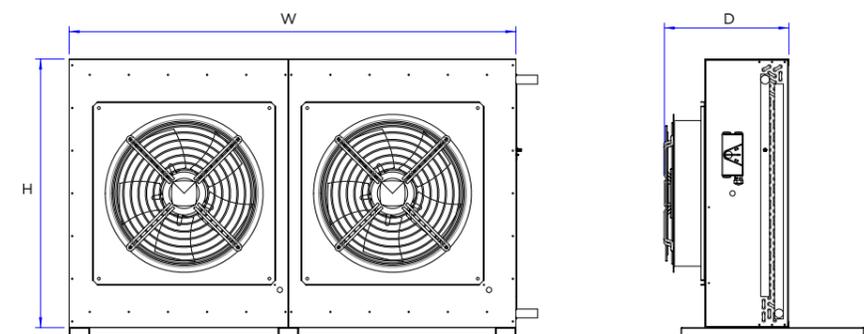
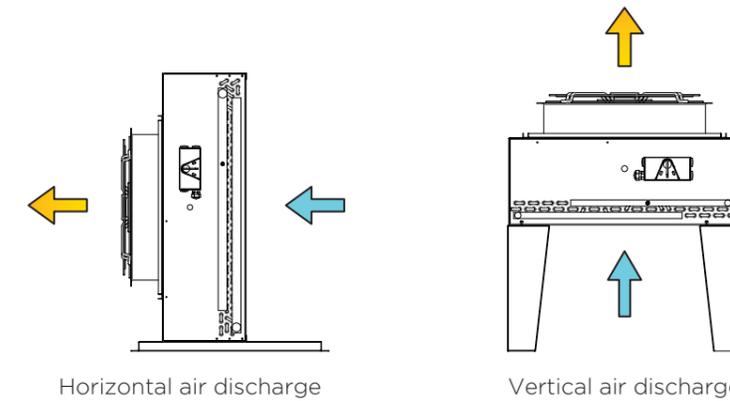
UNIT MODEL	HEC	194	234	274	314	374	434	574	654	904
Heat Rejection	kW	18.96	22.63	26.64	31.00	37.43	43.04	57.03	65.17	90.46
Air Flow	m ³ /s	2.33	2.10	2.19	2.24	2.53	2.65	4.50	4.60	6.60
No. of Fan(s)		1	1	1	1	1	1	2	2	3
Sound Level	dBA	56	56	57	59	60	61	62	62	64

DIMENSION AND WEIGHT

		822	822	862	987	1212	1362	1562	1768	2318
Width	mm	822	822	862	987	1212	1362	1562	1768	2318
Depth	mm	473	473	473	494	494	524	471	494	494
Height	mm	825	825	926	926	1028	1155	1063	1063	1063
Header Size		7/8"	7/8"	1 1/8"	1 1/8"	1 1/8"	1 3/8"	1 3/8"	1 3/8"	1 3/8"
Gross Weight	kg	56	60	63	75	90	110	125	150	205

Notes:

- 1) Heat rejection capacity based on 35°C ambient & 15°C delta T, R407C refrigerant.
- 2) Sound level is at 5m, based on free field condition.
- 3) Above data is for 230V/1ph/50Hz power supply. Models are available at different power supplies.
- 4) Unit dimensions do not include mounting legs, isolator and piping. Condenser may be placed in vertical or horizontal air discharge orientation.



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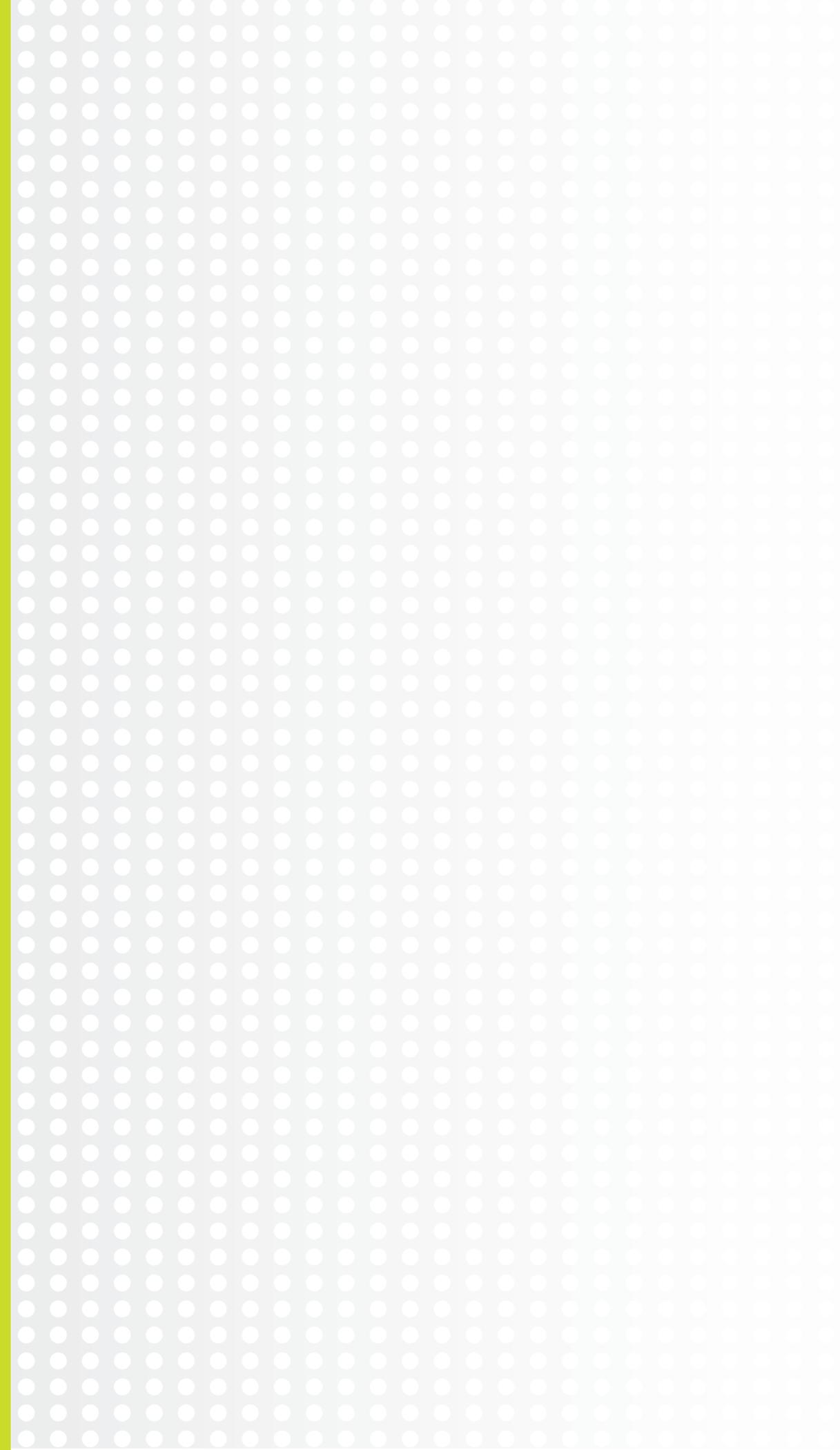
NOTES



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*“Because the best way to predict
the future is to invent it.”*

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