VOLTAS LIMITED

Air-Cooled Scroll Chillers

with refrigerant R407C & R22

A TATA Product

VOLTAS

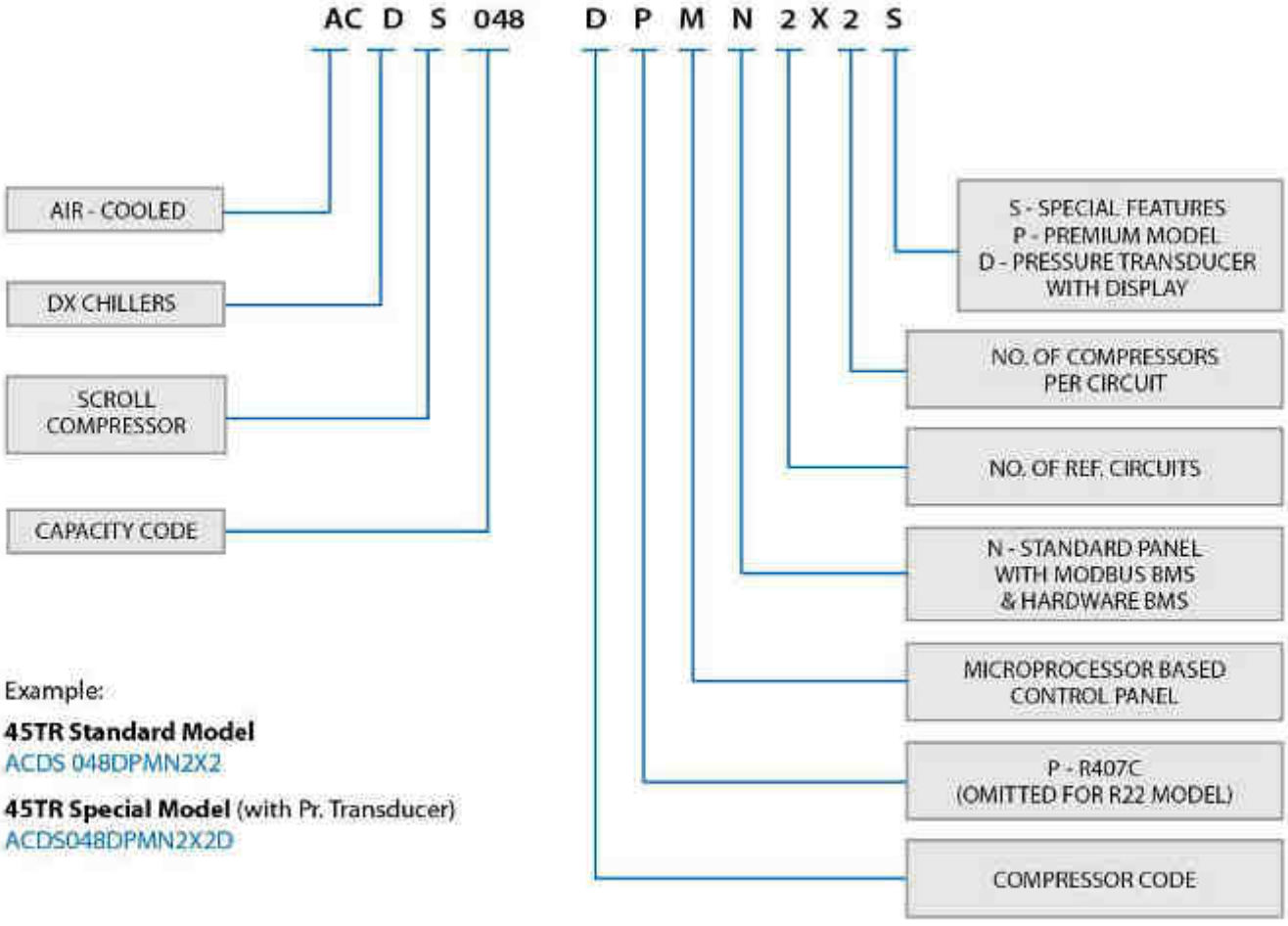
AIR-COOLED SCROLL CHILLER

Voltas is the pioneer and a leading provider of integrated end-to-end solutions in the field of electromechanical and refrigeration. We are committed to provide customers with technology that suits their needs and have introduced a wide variety of air-cooled scroll chillers with R 22 and R 407 C refrigerant options.

With ISO 9001 standard certified factories, Voltas possesses total capability in the manufacture of scroll chillers. These chillers are available in a wide range of capacities from 11 TR to 90 TR. They are easy to install and commission and can handle varying cooling requirements, aided by multiple compressor configurations.

Voltas scroll chillers have become an ideal choice for various air conditioning applications including, office spaces, banks, hotels, hospitals, shopping malls, multiplexes, commercial complexes and process cooling requirements.

MODEL NOMENCLATURE



Example:

45TR Standard Model
ACDS 048DPMN2X2

45TR Special Model (with Pr. Transducer)
ACDS048DPMN2X2D

FEATURES:

Voltas chillers are available in a wide range of models, with R 407C & R 22 refrigerants.

SCROLL CHILLERS								
Air - Cooled Chillers (Nominal Capacity)								
R407C	11 TR	22 TR	34 TR	45 TR	56 TR	68 TR	75 TR	87 TR
R22	12 TR	24 TR	36 TR	48 TR	60 TR	72 TR	80 TR	90 TR

Energy Efficiency

A range of sophisticated components such as highly energy efficient imported compressor, superior design of air- cooled condenser & chiller , internally grooved, cross-hatched copper tube coil with matched circuitry and a microprocessor controller, results in low power consumption.

Higher energy efficiency – Tandem compressor models

Scroll chillers from 48 TR to 90 TR use compressors operating in tandem. This improves the operating efficiency during part load periods, since the entire condenser area is utilized for the heat rejection even though only one compressor may be in operation.

Capacity Modulation

Multiple compressors are used in most of the models, with independent refrigerant circuits. The microprocessor controller ensures that only the required number of compressors operate during part load conditions, there by saving power.

Operating Reliability

The compressor is a no contact scroll design with the motor cooled by the suction gas. Higher capacity scroll chillers use tandem compressors with suction gas distribution restrictor which allows balanced operation of compressor. The chillers are charged & tested in the factory prior to despatch ,ensuring operating reliability.

Quiet Operations

The chillers use ultra quiet, high efficiency scroll compressors. The condenser fans are designed for low noise levels.

Easy to install

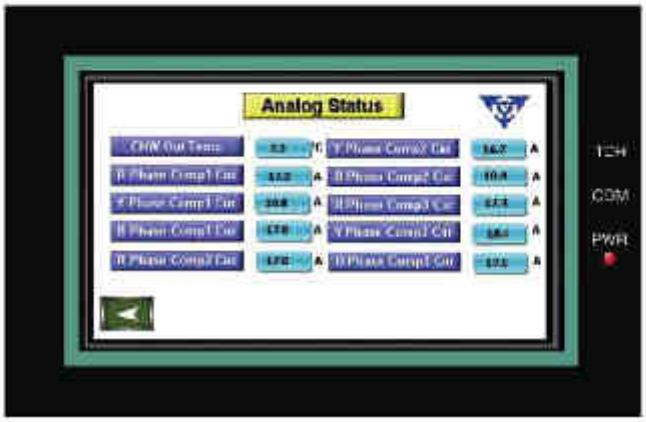
The chillers are pre-wired, fully charged and run tested at the factory, saving installation and start up time.

Voltas Countrywide After Sales Service

A nationwide service networks backs every unit. After the initial warranty period, Voltas offers annual service schemes. More than 90% of the customers have opted for these schemes. You cannot get a better insurance.

MICROPROCESSOR - BASED CONTROLLER

Specially designed controller has multiple features with following benefits:



Touch Screen

Three modes of operation :

- **Local mode :** Start / Stop & control through
- **Remote mode :** Remote Start / Stop through Digital input connected through cables
- **BMS Mode :** Remote data access through MODBUS RTU protocol. Available communication port RS485 can be linked to Building Management System (BMS)
- **MMI :** 4.3"TFT Touch Screen Color Display

Equalization of Compressor Runtime :

- The Micro processor Controller ensures equal running of compressors in multiple compressors units. This ensures longer life of compressors

Safety & Protection :

- Microcomputer Motor Protection Device **(MPD)** : Protects chiller from
  - *Phase unbalance* • *Phase loss* • *Phase reversal* • *Overload* • *Underload*

- Microcomputer Voltage Protection Device **(VPD)** : Protects chiller from
  - *Phase loss* • *Phase reversal*

- Safety features protect the system from :
  - *Freezing* • *Low Pressure* • *Anti Recycle* • *Low Chilled Water Temperature*
  - *High Pressure* • *Sensor Error* • *Low Water Flow in Chiller*

Touch Pad :

- Provides user friendly interface with graphical display
- Gives visual annunciation for safety trips
- Sturdy design for all environment
  - *4.3" Resistive Touch Screen* • *65536 colours TFT - LCD Display* • *Resolution : 480 x 272*
  - *Humidity : 10% - 85% non condensing* • *Operating Temperature : -20°C to + 60°C*
  - *Protection level : IP55 (surface)*

Self diagnosis Function

- Digital Display of all digital inputs & output such as Outlet temperature for Chillers, Current, Voltage & Compressor run hours, low water flow, etc
- Diagnose mode for easy trouble shooting – shows alarm history for the last 100 trips with Date, Time & Cause of failure

Controls & Interlocks

- The chilled water pump is interlocked with compressors
- The safety controls are preset at factory while operating controls are field adjustable, depending on actual operating requirements

Optional Features:

- Dual-mode chillers for thermal storage system
- Condenser Coil with anti-corrosion coating
- Suction & discharge pressure transducers & pressure display
- Control Panel as per NEMA standard

TECHNICAL DATA A/C SCROLL CHP (R407C)

Unit Model No.	ACDS 012DPMN 1X1	ACDS 024DPMN 2X1	ACDS 036DPMN 3X1	ACDS 048DPMN 2X2	ACDS 060DPMN 3X1	ACDS 072DPMN 3X2	ACDS 080DPMN 2X2	ACDS 090DPMN 2X2
* Nom. Capacity (TR)	11	22	34	45	56	68	75	87
COMPRESSOR								
Compressor Type	Hermatic Scroll							
Compressor Qty.	1	2	3	4	3	6	4	4
Rpm	2900	2900	2900	2900	2900	2900	2900	2900
Unit Capacity Reduction Steps in %	100/50	100/50	100/66.7/33.3	100/75/50/25	100/66.7/33.3	100/83.3/66.7 /50/33.3/16.7	100/75/50/25	100/75/50/25
Max. Allowable Operating Current Per Compr. (Amps At 400 volts)	35	35	35	35	69	35	69	72
Operating Current per Compr.- Amps	23	23	23	23	37	23	37	44
EVAPORATOR								
Evaporator Type	Shell & Tube - DX							
Water Flow Rate (USgpm)	29	59	90	120	149	180	200	225
**Water Nozzle Size NB (mm)	50	65	80	100	100	125	125	150
CONDENSER								
Condenser Type	Fin & Tube							
Fan Qty.	2	2	2	4	4	4	4	6
Total CFM	11,000	22,000	26,000	42,000	44,000	48,000	52,000	66,000
UNIT DIMENSION								
Length (mm)	2500	2535	2535	2625	2625	2625	2625	3900
Width (mm)	650	1270	1270	2236	2236	2236	2236	2236
Height (mm)	1400	2340	2340	2340	2400	2440	2400	2400

Note1 : *Capacity rated for evap. inlet water temp 12° C, leaving water temp 7° C at design ambient of 35° C Evaporator Water side fouling factor of 0.000018 m^2 °C/W.
Power & control supply voltage is 360 - 440 V & 210-240 V respectively and frequency is 50Hz.
Note 2 : ** Sizing of water piping to be done at site to be determined based on operating tonnage & available pump head .
Note 3 : For chilled water outlet allowable temperature range is 5°C to 12°C. For other temperature, higher ambient / other duty / flow application please refer to Voltas Sales Team.
Note 4 : Product development is a continuous process in Voltas, hence specifications and technical data are subject to alterations without notice.

VOLTAS

AIR-COOLED SCROLL CHILLER

TECHNICAL DATA A/C SCROLL CHP (R22)

Unit Model No.	ACDS 012DMN 1X1	ACDS 024DMN 2X1	ACDS 036DMN 3X1	ACDS 048DMN 2X2P	ACDS 060DMN 3X1	ACDS 072DMN 3X2	ACDS 080DMN 2X2	ACDS 090DMN 2X2P
* Nom. Capacity (TR)	12	24	36	48	60	72	80	90
COMPRESSOR								
Compressor Type	Hermatic Scroll							
Compressor Qty.	1	2	3	4	3	6	4	4
Rpm	2900	2900	2900	2900	2900	2900	2900	2900
Unit Capacity Reduction Steps in %	100/50	100/50	100/66.7/33.3	100/75/50/25	100/66.7/33.3	100/83.3/66.7 /50/33.3/16.7	100/75/50/25	100/75/50/25
Max. Allowable Operating Current Per Compr. (Amps At 400 volts)	35	35	35	35	69	35	69	72
Operating Current per Compr.- Amps	23	23	23	23	37	23	37	44
EVAPORATOR								
Evaporator Type	Shell & Tube - DX							
Water Flow Rate (USgpm)	32	64	96	128	160	192	213	237
**Water Nozzle Size NB (mm)	50	65	80	100	100	125	125	150
CONDENSER								
Condenser Type	Fin & Tube							
Fan Qty.	2	2	2	4	4	4	4	6
Total CFM	11,000	22,000	26,000	42,000	44,000	48,000	52,000	66,000
UNIT DIMENSION								
Length (mm)	2500	2535	2535	2625	2625	2625	2625	3900
Width (mm)	650	1270	1270	2236	2236	2236	2236	2236
Height (mm)	1400	2340	2340	2340	2400	2440	2400	2400

Note1 : *Capacity rated for evap. inlet water temp 12° C, leaving water temp 7° C at design ambient of 35° C Evaporator. Water side fouling factor of 0.000018 m^2 °C/W.
Power & control supply voltage is 360 - 440 V & 210-240 V respectively and frequency is 50Hz.

Note 2 : ** Sizing of water piping to be done at site to be determined based on operating tonnage & available pump head .

Note 3 : For chilled water outlet allowable temperature range is 5°C to 12°C. For other temperature, higher ambient / other duty / flow application please refer to Voltas Sales Team.

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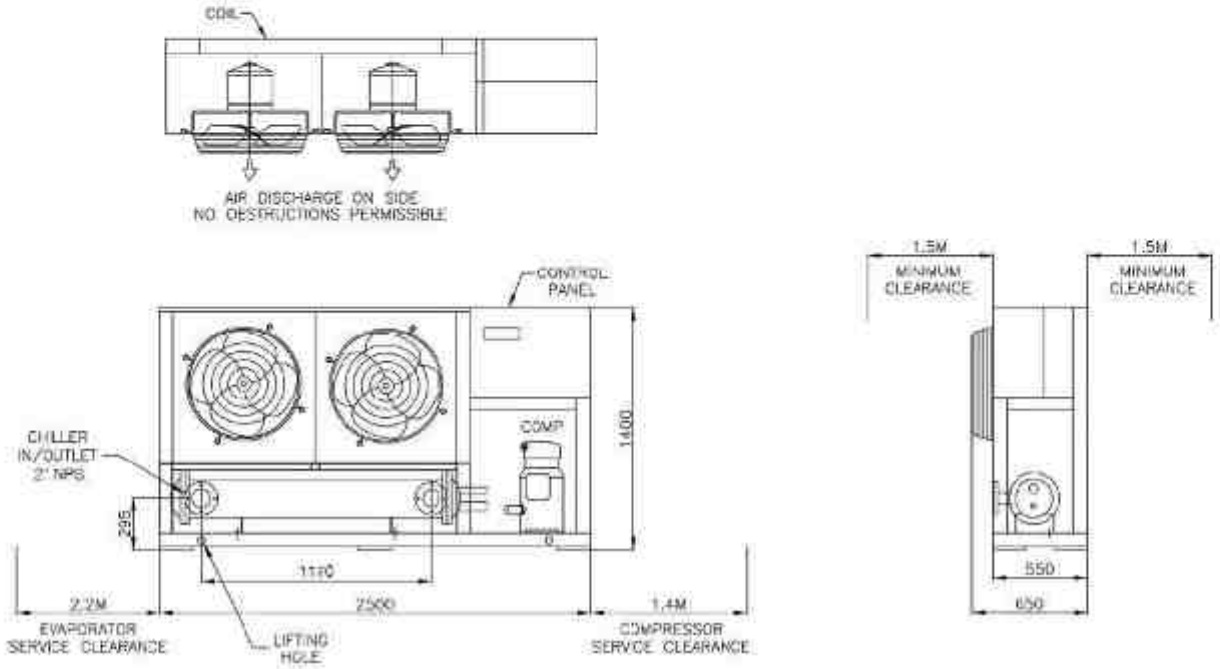
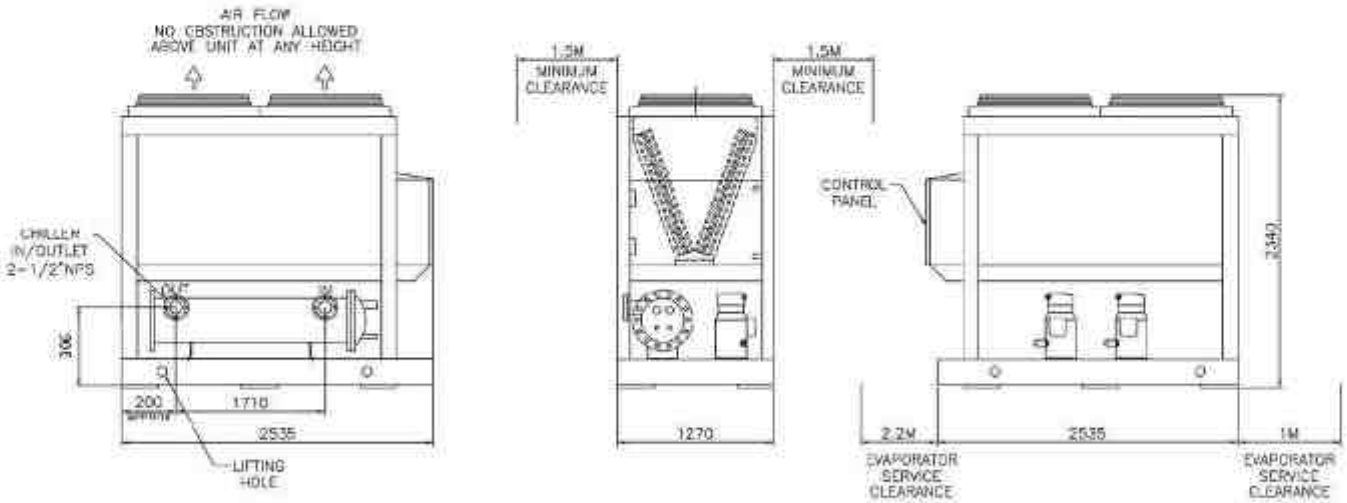
G. A DRAWING OF CHILLER PACKAGE MODEL

ACDS012DPMN1X1 | ACDS012DMN1X1



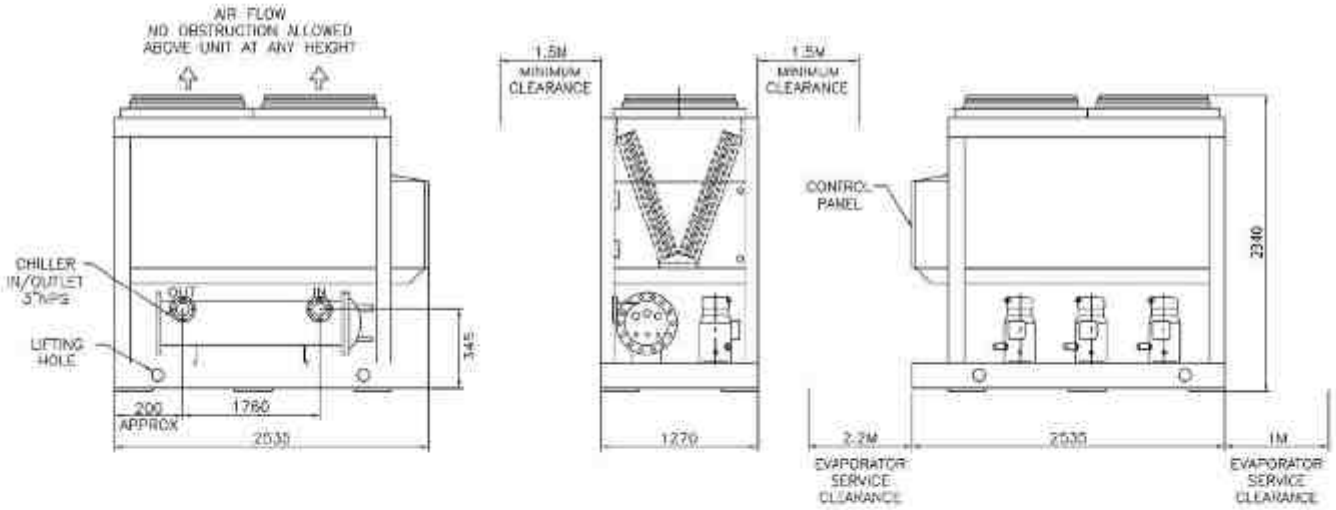
G. A DRAWING OF CHILLER PACKAGE MODEL

ACDS024DPMN2X1 | ACDS024DMN2X1



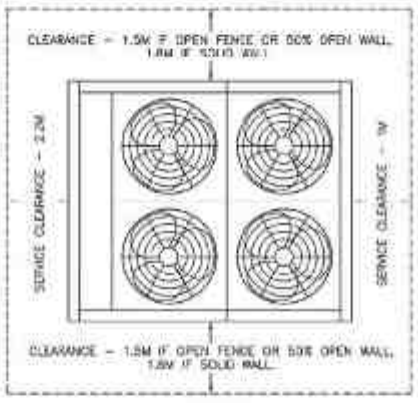
G. A DRAWING OF CHILLER PACKAGE MODEL

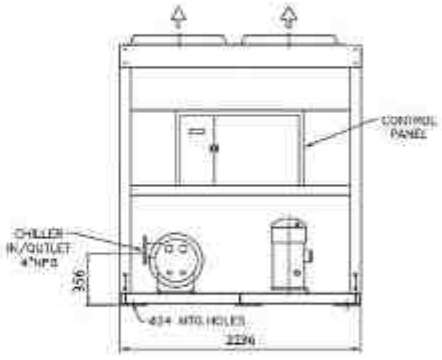
ACDS036DPMN3X1 | ACDS036DMN3X1

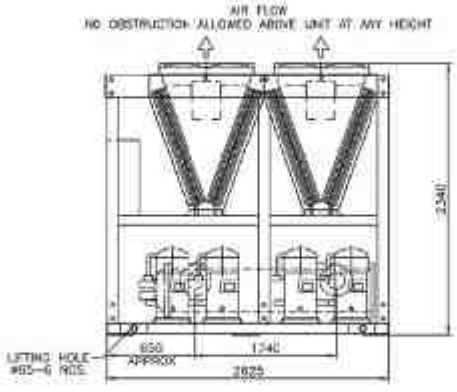


G. A DRAWING OF CHILLER PACKAGE MODEL

ACDS048DPMN2X2 | ACDS048DMN2X2P

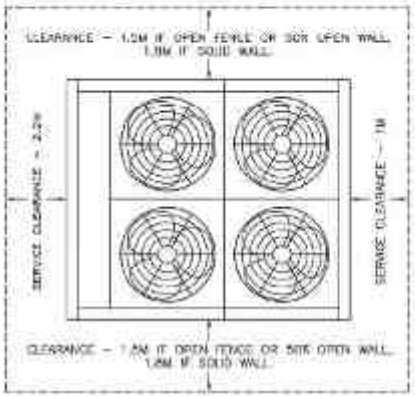


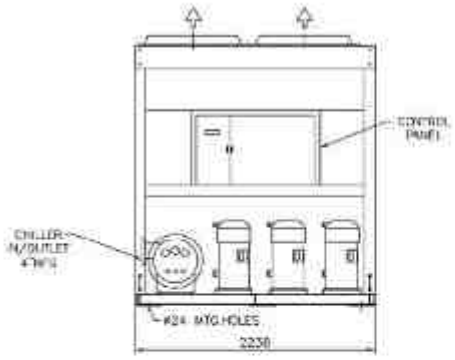


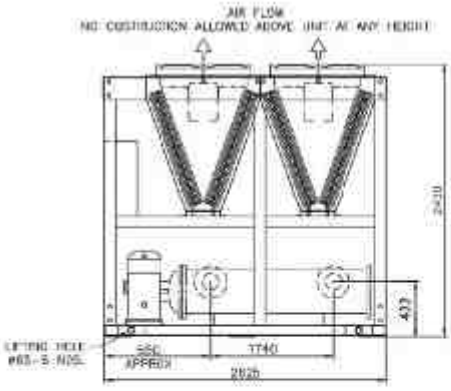


G. A DRAWING OF CHILLER PACKAGE MODEL

ACDS060DPMN3X1 | ACDS060DMN3X1

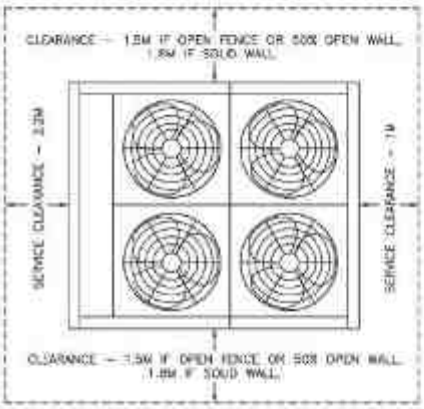


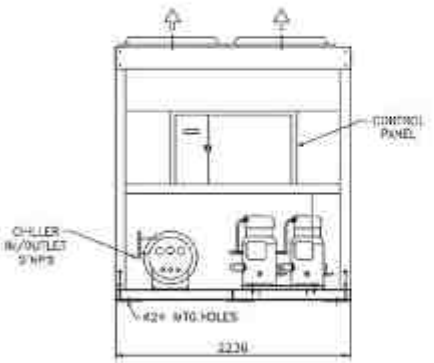


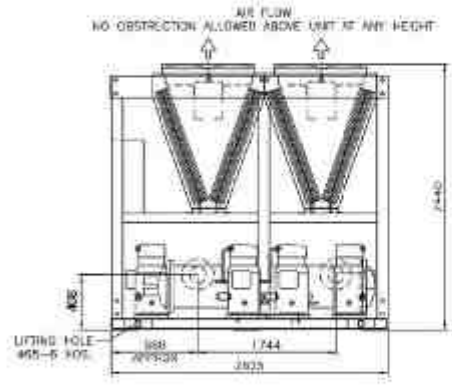


G. A DRAWING OF CHILLER PACKAGE MODEL

ACDS072DPMN3X2 | ACDS072DMN3X2







SPECTRUM OF HVAC PRODUCTS & SYSTEMS

PACKAGED & DUCTABLE SPLIT UNIT

VARIABLE REFRIGERANT FLOW SYSTEM (VRF)

ENERGY EFFICIENT
AIR COOLED SCREW CHILLER

ENERGY EFFICIENT
WATER COOLED SCREW CHILLER

AIR COOLED SCROLL CHILLER

WATER COOLED SCROLL CHILLER

AIR COOLED RECIPROCATING CHILLER

WATER COOLED RECIPROCATING CHILLER

DOUBLE EFFECT VAM

CO-GEN VAPOUR ABSORPTION MACHINE (VAM)

PROCESS REFRIGERATION PACKAGE

IAQ & ENERGY REDUCTION SYSTEM

WATER COOLED CENTRIFUGAL CHILLER

STP EA ODOUR / H_2S REMOVAL SYSTEM

AIR HANDLING UNIT

VOLTAS

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VL/CHP/ACSC/02/02/15/2k

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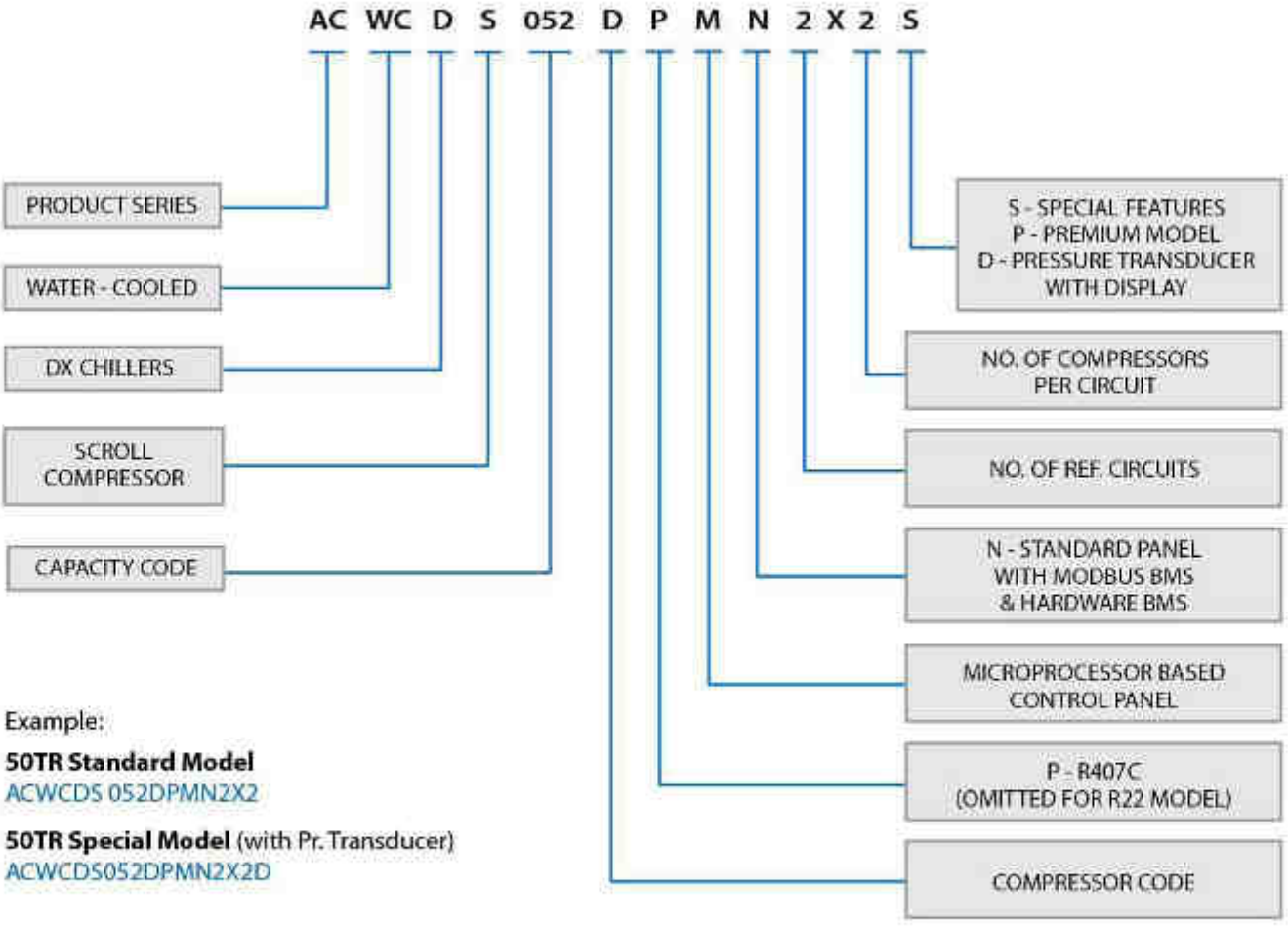

Example:

50TR Standard Model
ACWCDS 052DPMN2X2

50TR Special Model (with Pr. Transducer)
ACWCDS052DPMN2X2D

FEATURES:

Voltas chillers are available in a wide range of models, with R 407C & R 22 refrigerants.

SCROLL CHILLERS								
Water - Cooled Chillers (Nominal Capacity)								
R407C	12.5 TR	25 TR	37.5 TR	50 TR	60 TR	75 TR	80 TR	95 TR
R22	13 TR	26 TR	39 TR	52 TR	64 TR	78 TR	85 TR	100 TR

Energy Efficiency

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Capacity Modulation

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Operating Reliability

The compressor is a no contact scroll design with the motor cooled by the suction gas. Higher capacity scroll chillers use tandem compressors with suction gas distribution restrictor which allows balanced operation of compressor. The chillers are charged & tested in the factory prior to despatch, ensuring operating reliability.

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- **MMI :** 4.3" TFT Touch Screen Color Display

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  - *High Pressure* • *Sensor Error* • *Low Water Flow in condenser, Chiller*

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  - *4.3" Resistive Touch Screen* • *65536 colours TFT - LCD Display* • *Resolution : 480 x 272*
  - *Humidity : 10% - 85% non condensing* • *Operating Temperature : -20°C to + 60°C*
  - *Protection level : IP55 (surface)*

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- Digital Display of all digital inputs & output such as Outlet temperature for Chillers, Current, Voltage & Compressor run hours, low water flow, etc
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Controls & Interlocks

- The chilled water pump is interlocked with compressors
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Optional Features:

- Dual-mode chillers for thermal storage system
- Suction & discharge pressure transducers & pressure display
- Control Panel as per NEMA standard

TECHNICAL DATA W/C SCROLL CHP (R407C)								
Unit Model No.	ACWCDS 013DPMN 1X1P	ACWCDS 026DPMN 2X1P	ACWCDS 039DPMN 3X1P	ACWCDS 052DPMN 2X2P	ACWCDS 064DPMN 3X1	ACWCDS 078DPMN 3X2	ACWCDS 085DPMN 2X2	ACWCDS 0100DPMN 2X2
* Nom. Capacity (TR)	12.5	25	37.5	50	60	75	80	95
COMPRESSOR								
Compressor Type	Hermatic Scroll							
Compressor Qty.	1	2	3	4	3	6	4	4
Rpm	2900	2900	2900	2900	2900	2900	2900	2900
Unit Capacity Reduction Steps in %	100	100/50	100/66.7/33.3	100/75/50/25	100/66.7/33.3	100/83.3/66.7 /50/33.3/16.7	100/75/50/25	100/75/50/25
Max. Allowable Operating Current Per Compr. (Amps At 400 volts)	35	35	35	35	69	35	69	72
Operating Current per Compr. (Amps at 400 volts & design rating condition	20	20	20	20	32	20	32	37
EVAPORATOR								
Evaporator Type	Shell & Tube - DX							
Water Flow Rate (USgpm)	33	67	100	133	157	200	209	253
**Water Nozzle Size NB (mm)	50	65	80	100	100	125	125	150
CONDENSER								
Condenser Type	Shell & Tube							
Water Flow Rate (usgpm)	41	81	122	163	192	244	256	310
**Water Nozzle Size NB (mm)	40	40	40	50	50	50	150	150
UNIT DIMENSION								
Length (mm)	2200	2550	2650	2700	2650	2600	2700	2800
Width (mm)	1000	1000	1150	1150	1150	1350	1400	1400
Height (mm)	1150	1350	1200	1500	1450	1950	1500	1600

Note1 : *Capacity rated for evap. inlet water temp 12° C, leaving water temp 7° C and design at entering condenser water temperature of 30° C. Evaporator fouling factor of 0.000018 m² °C/W and condenser fouling factor of 0.000044 m² °C/W.
Power & control supply voltage is 360 - 440 V & 210 - 240 V respectively and frequency is 50Hz.

Note 2 : ** Sizing of water piping to be done at site to be determined based on operating tonnage & available pump head.

Note 3 : For chilled water outlet allowable temperature range is 5°C to 12°C.
For other temperature, higher ambient / other duty / flow application please refer to Voltas Sales Team.

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VOLTAS

WATER-COOLED SCROLL CHILLER

TECHNICAL DATA W/C SCROLL CHP (R22)

Unit Model No.	ACWCDS 013DMN 1X1	ACWCDS 026DMN 2X1	ACWCDS 039DMN 3X1	ACWCDS 052DMN 2X2P	ACWCDS 064DMN 3X1	ACWCDS 078DMN 3X2P	ACWCDS 085DMN 2X2	ACWCDS 0100DMN 2X2
* Nom. Capacity (TR)	13	26	39	52	64	78	85	100
COMPRESSOR								
Compressor Type	Hermatic Scroll							
Compressor Qty.	1	2	3	4	3	6	4	4
Rpm	2900	2900	2900	2900	2900	2900	2900	2900
Unit Capacity Reduction Steps in %	100	100/50	100/66.7/33.3	100/75/50/25	100/66.7/33.3	100/83.3/66.7 /50/33.3/16.7	100/75/50/25	100/75/50/25
Max. Allowable Operating Current Per Compr. (Amps At 400 volts)	35	35	35	35	69	35	69	72
Operating Current per Compr.- (Amps at 400 volts & design rating condition	20	20	20	20	32	20	32	37
EVAPORATOR								
Evaporator Type	Shell & Tube - DX							
Water Flow Rate (USgpm)	35	69	104	138	169	207	226	266
**Water Nozzle Size NB (mm)	50	65	80	100	100	125	125	150
CONDENSER								
Condenser Type	Shell & Tube							
Water Flow Rate (usgpm)	42	85	127	169	207	254	276	326
**Water Nozzle Size NB (mm)	40	40	40	50	50	50	150	150
UNIT DIMENSION								
Length (mm)	2200	2550	2650	2700	2650	2600	2700	2800
Width (mm)	1000	1000	1150	1150	1150	1350	1400	1400
Height (mm)	1150	1350	1200	1500	1450	1950	1500	1600

Note1 : *Capacity rated for evap. inlet water temp 12° C, leaving water temp 7° C and design at entering condenser water temperature of 30° C. Evaporator fouling factor of 0.000018 m^2 °C/W and condenser fouling factor of 0.000044 m^2 °C/W.
Power & control supply voltage is 360 - 440 V & 210-240 V respectively and frequency is 50Hz.

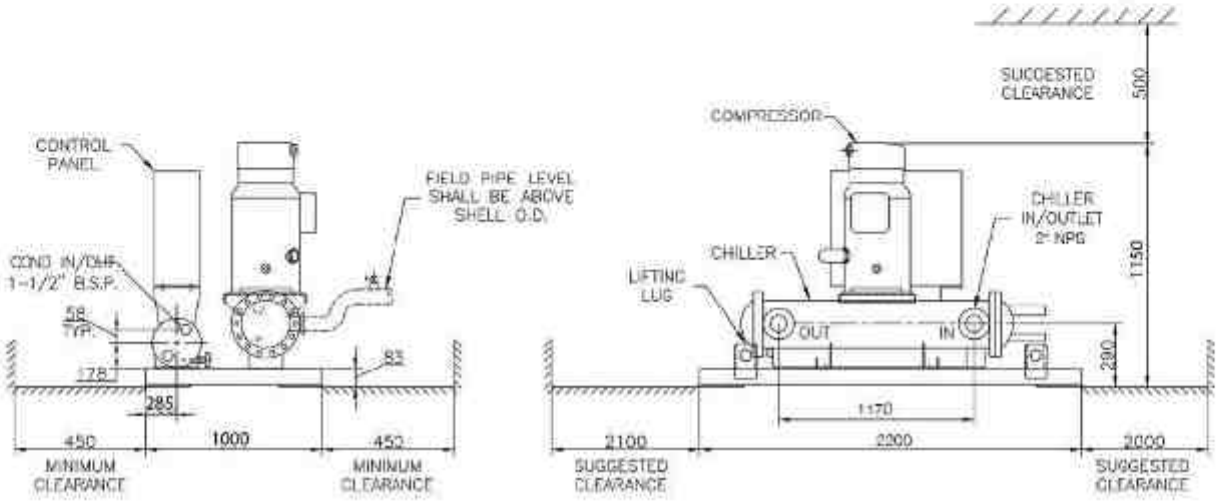
Note 2 : ** Sizing of water piping to be done at site to be determined based on operating tonnage & available pump head.

Note 3 : For chilled water outlet allowable temperature range is 5°C to 12°C. For other temperature, higher ambient / other duty / flow application please refer to Voltas Sales Team.

Note 4 : Product development is a continuous process in Voltas, hence specifications and technical data are subject to alterations without notice

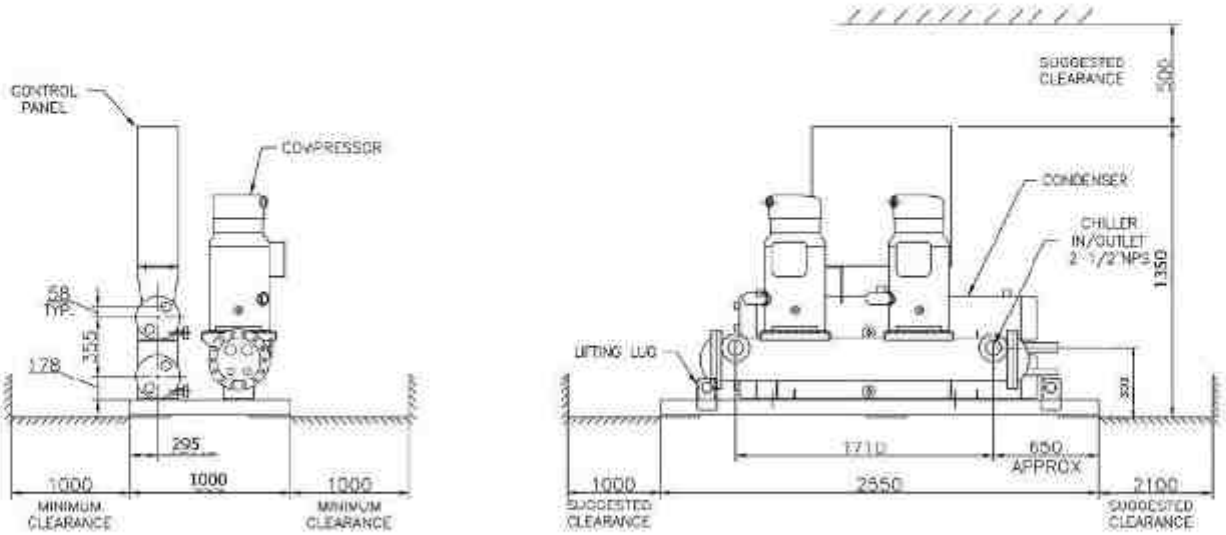
G. A DRAWING OF CHILLER PACKAGE MODEL

ACWCDS013DPMN1X1P | ACWCDS013DMN1X1



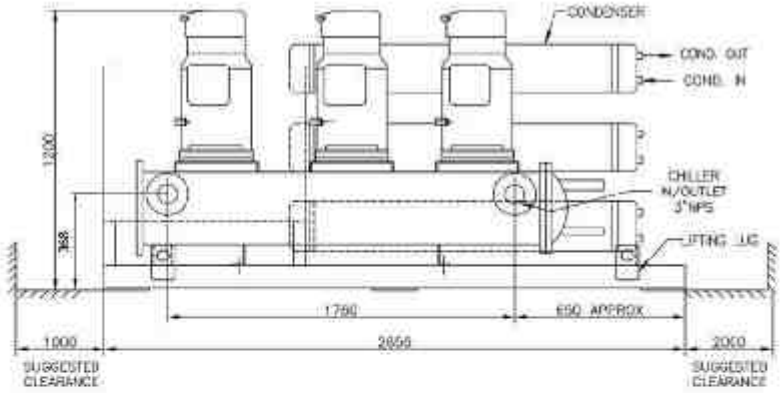
G. A DRAWING OF CHILLER PACKAGE MODEL

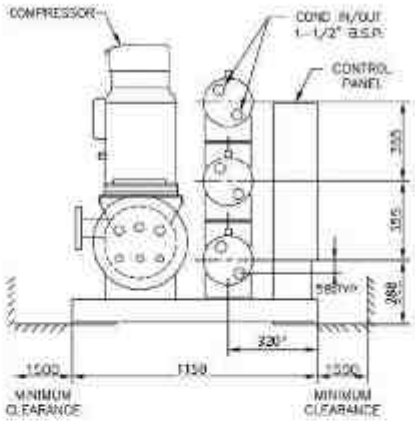
ACWCDS026DPMN2X1P | ACWCDS026DMN2X1



G. A DRAWING OF CHILLER PACKAGE MODEL

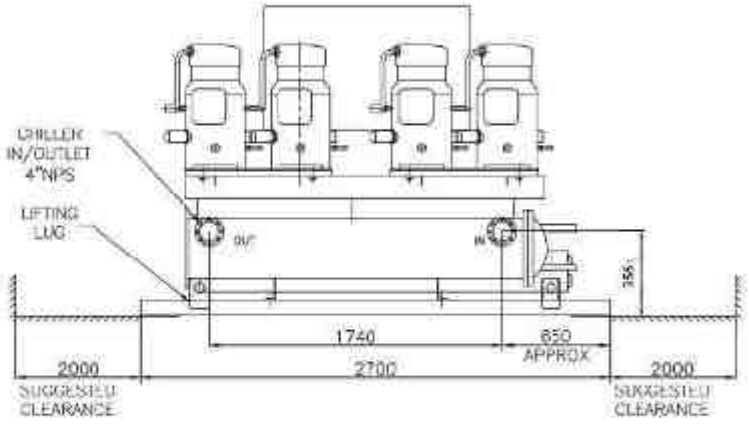
ACWCDS039DPMN3X1P | ACWCDS039DMN3X1

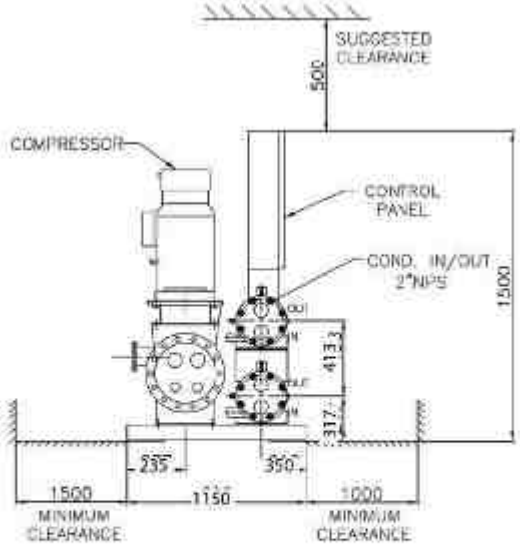




G. A DRAWING OF CHILLER PACKAGE MODEL

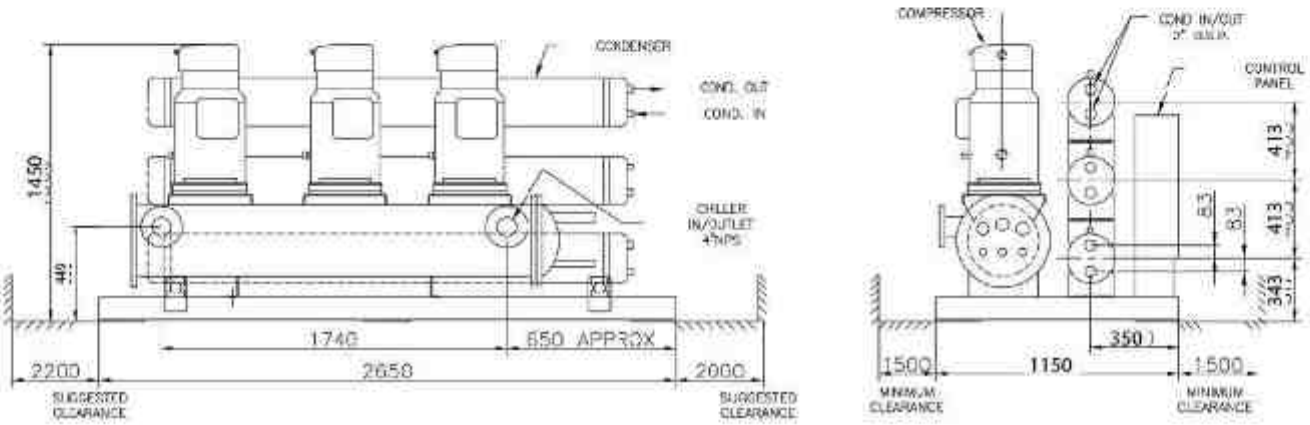
ACWCDS052DPMN2X2P | ACWCDS052DMN2X2P





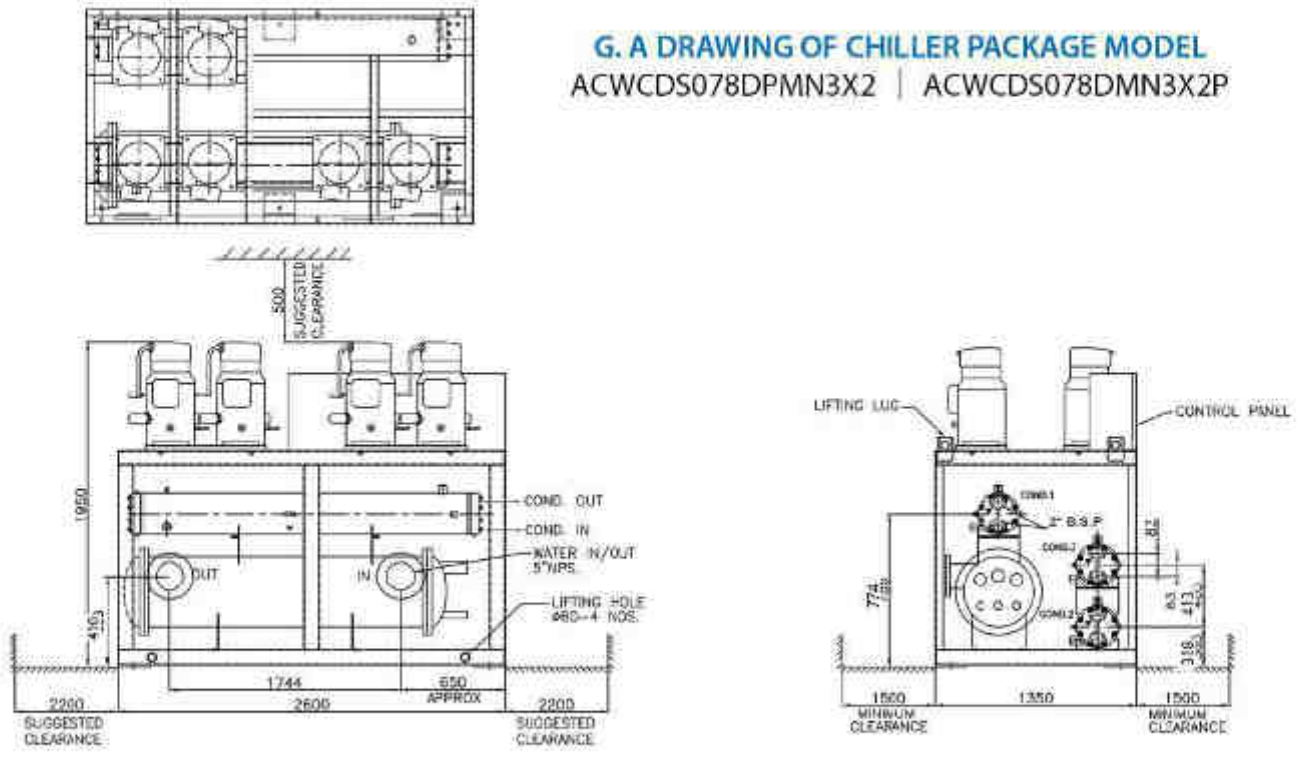
G. A DRAWING OF CHILLER PACKAGE MODEL

ACWCDS064DPMN3X1 | ACWCDS064DMN3X1



G. A DRAWING OF CHILLER PACKAGE MODEL

ACWCDS078DPMN3X2 | ACWCDS078DMN3X2P



SPECTRUM OF HVAC PRODUCTS & SYSTEMS

PACKAGED & DUCTABLE SPLIT UNIT

VARIABLE REFRIGERANT FLOW SYSTEM (VRF)

ENERGY EFFICIENT
AIR COOLED SCREW CHILLER

ENERGY EFFICIENT
WATER COOLED SCREW CHILLER

AIR COOLED SCROLL CHILLER

WATER COOLED SCROLL CHILLER

AIR COOLED RECIPROCATING CHILLER

WATER COOLED RECIPROCATING CHILLER

DOUBLE EFFECT VAM

CO-GEN VAPOUR ABSORPTION MACHINE (VAM)

PROCESS REFRIGERATION PACKAGE

IAQ & ENERGY REDUCTION SYSTEM

WATER COOLED CENTRIFUGAL CHILLER

STP EA ODOUR / H_2S REMOVAL SYSTEM

AIR HANDLING UNIT

VOLTAS

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VL/CHP/WCSC/02/02/15/2k

A TATA Enterprise

VOLTAS LIMITED
Domestic Projects Group

Energy Efficient
Air-Cooled Screw Chillers

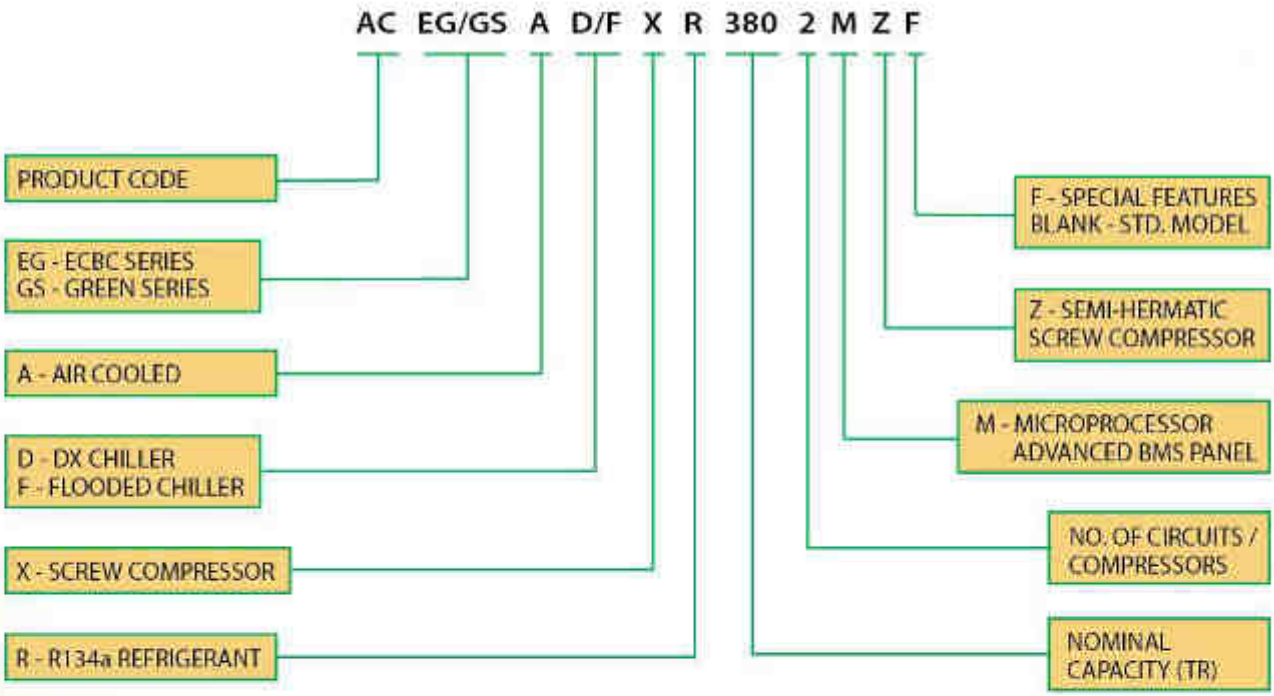
ECBC & GREEN Series
Capacity:
100 TR to 380 TR

ENERGY-EFFICIENT AIR-COOLED SCREW CHILLERS

Voltas Electro-mechanical and Refrigeration Business Group, an ISO:9001 company is the pioneer and leader in the field of electro-mechanical and refrigeration. Because of its commitment to provide customers with the latest green technology and 'best value for money', Voltas has introduced a new series of energy-efficient Chillers, using the environment friendly refrigerant R-134a.

The chillers have become an ideal choice for **Green Building Projects** and other air-conditioning applications. Available in a wide range of capacities, each unit is tested in a state-of-the-art facility, matching international standards, prior to their delivery - thus ensuring reliability and optimum performance.

MODEL NOMENCLATURE



WIDEST RANGE

ECBC Series - 100 TR to 380 TR

Green Series - 90 TR to 360 TR

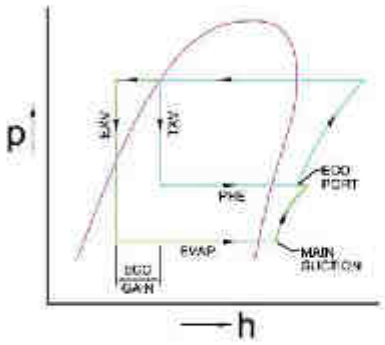
(For models of higher & lower capacities than those mentioned here, please contact us)

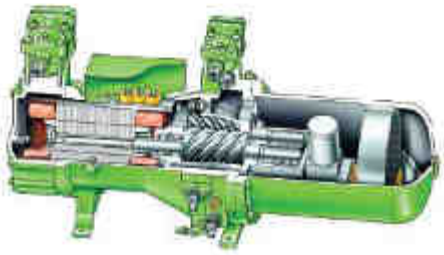
EIGHT POWERFUL FEATURES:

Exceptional Energy Efficiency by Design

- **Basic equipments** are designed to operate compressors on a comparatively better suction pressure and an optimum discharge pressure, to maximiz e efficiency benefit.
- **Compressor** with step-less ca pacity control mechanism, oper ates in response to the chilled water outlet temperature, and precisely matches the part -load requirements without hunting.
- **Electronic expansion** with controller and sensors, respond quickly to the variable operating conditions and enhances efficiency.
- **Fan cycling** programmed on discharge pressure, saves the energy consumption during low ambient temperature, or at partial load operation.
- **Compressor** staging has been programmed to save energy, by running adequate numbers of compressors at maximum efficiencies, even at different loads.
- **Economizer** greatly improves efficiency of the unit and full-load cooling capacity. Additional sub cooling is created by expanding one part of liquid refrigerant from condenser, to sub cool remaining part of total refrigerant, in a compact plate-type heat exchanger (PH E).

The Economizer's working process is depicted in the diagram. Screw compressor is provided with an additional suction port called ECO port, which makes it possible to suck the refrigerant vapour from PHE, to accomplish economizer heat transfer.





Screw Compressors Mean Efficiency and Reliability

Screw Compressors are sourced from industry's best manufacturers, and are tested in accordance with ARI / Eurovent standards. The Compressors are known for efficiency, ruggedness, reliability and consistent part-load operations.

Salient features of these compressors are:

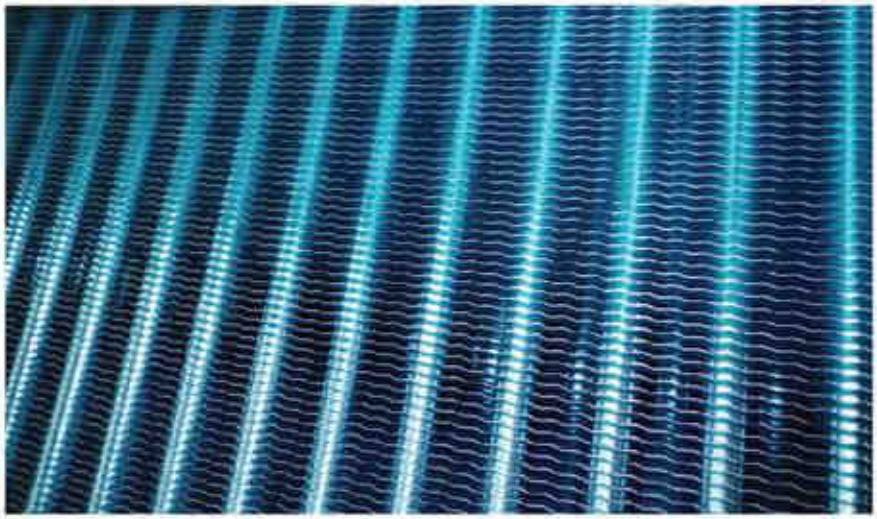
- High-efficiency due to scientific profile design of screws, high-speed oper ation and precision controls.
- Step-less capacity control from 100% to 25% for each compressor.
- These are semi-hermetic t ype compressors and hence, easily servicea ble.
- Robust and proven construction with double-walled, single-housing and new sl ider technology.
- Each compressor is provided with a self-motor protection module, PTC motor winding protection, oil temperature protection, oil level switch and oil heaters - all these guaranty reliabilitee and long life.
- Multistage and ultrafine, inbuilt oil-sepa rator results in less oil carryover rate.
- Lower sound level due to double-walled casting.

Electronic Expansion Valve (EXV) – Precise and Efficient Control

EXVs are used to maintain a precise flow of refrigerant to the evaporator, under both full-load and part-load operation of the compressor. It can precisely control superheat at the outlet of the evaporator with faster response, irrespective of the wide variation in capacity. EXVs are an improvement over conventional thermostatic expansion valves and enable reduction of energy loss and hence, improve overall efficiency of chillers.

The EXV operation is controlled by an electronic controller module, which is user-friendly and provides multiple application options. It is provided with battery back-up so that in case of a power failure, EXV can close positively and stop any liquid flood-back to compressor.

Air-cooled Condenser - Designed for efficiency and modular construction



Sophisticated software used in the designing of the condenser coil helps optimize operating discharge pressure and maximize chiller design efficiency. These are subsequently validated by actual tests. Standard coils are manufactured using super-slit, louvered aluminum fins and 99.9% pure copper tubes, mechanically expanded and tested at 400psig pressure. Tubes used are inner groove type with enhanced heat transfer efficiency. Coils made of pre-coated fins are offered as an optional feature. This increases resistance to corrosion. Modular construction of condensers provides compactness and allows easier approachability for service and handling.

Flooded / Direct Expansion Chiller – Maximising efficiency

The evaporators are manufactured using imported and highly efficient, compact ridged inner-finned copper tubes, which are mechanically expanded for better fitment.

Chillers are fabricated and pressure-tested, as per relevant standards for pressure vessels. Each chiller model design is validated by special design software and optimized for efficiency, refrigerant / water velocities and pressure drops.

Liquid Injection

During part-load operation of the compressor, discharge gas temperature is likely to go beyond tolerable limits. To control it within a safe limit, liquid injection is provided in compressor after certain level of discharge gas temperature is reached, to enhance operation range and life of the compressor.

Micro-computer Control Panel

Advanced micro-computer control is a standard feature on all Voltas Screw Chillers. This maintains all analog and digital inputs to achieve precise control of the operational and protective functions of the unit. **Direct Digital Control (DDC)** allows fingertip user interaction. The easy-to-use, push-button key board and menu-driven software provides access to operating conditions, control set points and alarm history, displayed on a prominent 32 character alpha-numeric LCD.

User-friendly Operation Modes

- Programmed Auto Mode: Auto-start and stop are programmable for an entire year. This minimizes operator interface and facilitates auto-restart on power restoration after load shedding or grid supply failure.
- Auto Mode: Start-and-Stop of the unit is controlled manually by a single button. Subsequent operation of the unit is fully automatic through microcomputer control.
- Test-service Mode: Facilitates testing of the unit under supervision.
- Remote mode (for Hardware BMS): Facilitates switching-on of the unit from a remote location through Hardware BMS. Panels are provided with three additional digital outputs and one digital input (start key) hardware BMS, as a standard scope of supply.

Display Information

Easily accessible measurements include the following parameters:

- Leaving chilled water temperature
- Number of compressor starts
- Suction pressure
- Remote / Local operation option
- Discharge pressure.
- Oil level fault indication.
- System voltage
- Compressor ON / OFF status
- Compressor current for each compressor.
- Compressor load percentage for each compressor
- Compressor elapsed run time for each compressor.
- Discharge gas temperature.

System Protections

The following system protection controls will automatically act for protecting the chiller under abnormal conditions, and ensure system reliability and safety.

- Low suction pressure
- Compressor oven current, for each compressor.
- High discharge pressure.
- High winding temperature.
- High oil temperature.
- High discharge gas temperature.
- Freeze protection
- Sensor error
- Chilled water flow
- Single phase and phase reversal.
- Low oil level
- Over / under current and current imbalance
- Anti recycle
- Preventive maintenance due trip
- Self protection (SE – E1)
- Over / under voltage and voltage imbalance.

Diagnostic Displays

The diagnose mode provides for easy trouble – shooting.

- Unit tips 50 hours prior to completion of 8000 hours, as a precautionary measure, for preventive maintenance.
- Alarm history of last 10 trips with date, time and causes of failures.
- Protection trips for various vital parameters.

Adaptive Control

- Discharge / suction pressure limiting is done by unloading. This offers the advantages of chiller running unloaded, instead of tripping.
- In case the compressor current increases above set valve, the microcomputer senses the increase and signals the computer to unload, thus maintaining current within set value.

Voltas countrywide after – sales service

- A nationwide service network backs every unit.
- After the initial warranty period, Voltas offers annual maintenance service schemes. More than 90% of the customers have opted for these schemes. You cannot get better insurance.

Our service offerings are

- Service level agreement (SLA) to O & M / key customers in all sectors, with guaranteed uptime of > 95%.
- 24 x 7 services to O & M / key customers in all sectors.
- Conversation of chillers with R22 refrigerant to those with R 134a refrigerant.
- Accredited ESCO grade I certification – energy optimization through assessment of HVAC systems, including managing / conserving utilities to optimize Capex and Opex.
- Life cycle solutions provided, as compared to product warranties offered by other manufacturers.

Optional Features offered:

- Air – cooled condenser coils with pre – coated aluminum fins (for corrosive atmospheric conditions).
- Dual – mode chillers for thermal storage system.
- Communication port for remote connectivity, status and fault indication.
- BMS compatibility with MODBUS / BACnet can be linked to Integrated Building Management Systems (IBMS).

TECHNICAL DATA SHEET - ECBC A/C SCREW CHILLER PKG.

Chiller Pkg.Model	ACEGADXR 100 1MZ	ACEGADXR 130 1MZ	ACEGADXR 160 1MZ	ACEGADXR 180 1MZ	ACEGADXR 200 2MZ	ACEGADXR 230 2MZ	ACEGADXR 260 2MZ	ACEGADXR 300 2MZ	ACEGAFXR 340 2MZ	ACEGAFXR 380 2MZ
** Nominal Capacity (TR)	100	127	160	172	198	224	253	288	340	380
COMPRESSOR										
Compressor Type	Semihermetic Screw									
Qty/unit	1	1	1	1	2	2	2	2	2	2
RPM	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900
Min % Unit Capacity Reduction	25%	25%	25%	25%	12.50%	12.50%	12.50%	12.50%	12.50%	12.50%
Refrigerant	R-134a	R-134a	R-134a	R-134a	R-134a	R-134a	R-134a	R-134a	R-134a	R-134a
EVAPORATOR										
Evaporator Type	DX Shell & Tube								Flooded	
Qty/unit	1	1	1	1	1	1	1	1	2	2
Water Flow - (US gpm)	266	338	426	458	527	596	673	691	904	1011
Water Side Pr. Drop PSI	4.75	6.00	6.82	8.60	5.89	6.79	5.76	10.02	5.50	7.30
**Water Nozzle Sizes (MM)	150	200	200	200	200	250	250	250	250	250
CONDENSER										
Air Cooled Condenser Type	AL Fins & CU. Tube									
Fan Type	Propeller									
Condenser Module Qty	4	5	6	7	7	8	9	10	10	12
Fan Dia (Inch)	36"	36"	36"	36"	36"	36"	36"	36"	36"	36"
No. of Fans	8	10	12	14	14	16	18	20	20	24
Total Air Flow (CFM)	96000	120000	144000	168000	168000	192000	216000	240000	240000	288000
CHILLER PACKAGE PHYSICAL DATA										
Unit Length (MM)	4760	5828	6900	7970	7970	9030	10200	11270	11270	13406
Unit Width (MM)	2236	2236	2236	2236	2236	2236	2236	2236	2236	2236
Unit Height (MM)	2615	2640	2665	2665	2765	2765	2790	2790	2790	2790
Shipping Weight (KG)	4561	5365	6156	6920	8511	9337	10108	11008	12526	14000
Refrigerant Charge (KG)	100	130	160	180	200	230	260	300	465	520

Note1: *Capacity rated for evaporator leaving water temparature 7°C, Evap. water side fouling factor of 0.000018 m²k/W and at design ambient of 35°C.
Power & control supply voltage ranges are 360 - 440 V & 210-240 V respectively and frequency 50Hz.

Note 2: ** Sizing of water piping to be done at site based on operating tonnage & available pump head.

Note3 : Extended capacity product range available on request.

(Product development is a continuous process in Voltas, hence specifications and technical data subject to alterations without notice.)

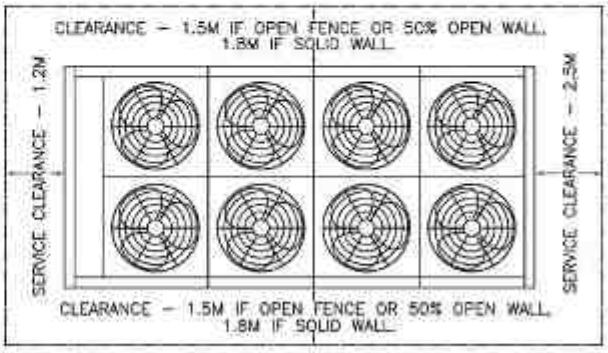
TECHNICAL DATA SHEET - GREEN SERIES A/C SCREW CHILLER PKG.

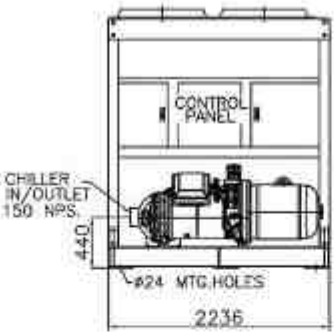
Chiller Pkg.Model	ACGSACDXR 090-1	ACGSACDXR 105-1	ACGSACDXR 120-1	ACGSACDXR 150-1	ACGSACDXR 175-2	ACGSACDXR 210-2	ACGSACDXR 240-2	ACGSACDXR 300-2	ACGSACDXR 360-2
* Nominal Capacity (TR)	89	105	120	150	175	210	240	300	356
COMPRESSOR									
Compressor Type	Semi Hermetic Screw								
Qty/unit	1	1	1	1	2	2	2	2	2
RPM	2900	2900	2900	2900	2900	2900	2900	2900	2900
Min % Unit Capacity Reduction	25%	25%	25%	25%	12.50%	12.50%	12.50%	12.50%	12.50%
Refrigerant	R-134a	R-134a	R-134a	R-134a	R-134a	R-134a	R-134a	R-134a	R-134a
EVAPORATOR									
Evaporator Type	DX - Shell & Tube								
Qty/unit	1	1	1	1	1	1	1	1	1
Water Flow - (US gpm)	237	280	320	400	465	560	640	800	960
Water Side Pr.Drop PSI	6.17	8.52	6.25	8.44	7.41	9.2	10	8	9.8
** Water Nozzle Sizes (mm)	150	150	150	200	200	200	200	250	250
CONDENSER									
Air Cooled Condenser Type	AL Fins & CU. Tube								
Fan Type	Propellor								
Condenser Module Qty	3	3	3	4	5	6	7	8	9
Fan Dia (mm)	914	914	914	914	914	914	914	914	914
CHILLER PACKAGE PHYSICAL DATA									
Unit Length (mm)	3900	3900	3900	4760	5830	6900	7965	9030	10200
Unit Width (mm)	2236	2236	2236	2236	2236	2236	2236	2236	2236
Unit Height (mm)	2570	2570	2570	2595	2595	2645	2645	2645	2660
Shipping Weight (kg)	4140	4747	4747	5624	6666	8311	9377	10876	12487
Refrigerant Charge (kg)	107	126	144	180	210	252	288	360	432

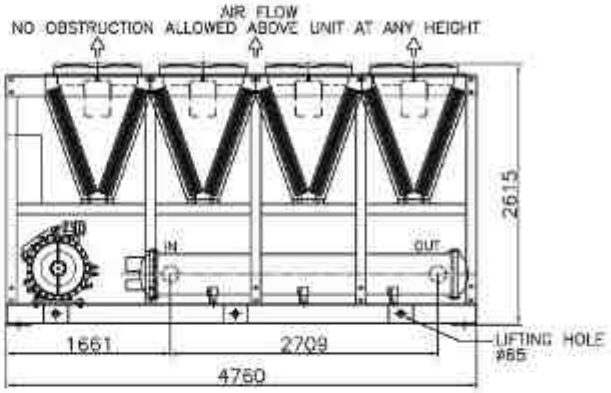
Note1: *Capacity rated for evaporator leaving water temparature 7°C, Evap. water side fouling factor of 0.000018 m^2k/W and at design ambient of 35°C.
Power & control supply voltage ranges are 360 - 440 V & 210-240 V respectively and frequency 50Hz.
Note 2: ** Sizing of water piping to be done at site based on operating tonnage & available pump head.
Note3 : Extended capacity product range available on request.

(Product development is a continuous process in Voltas, hence specifications and technical data subject to alterations without notice.)

G. A DRAWING
MODEL ACEGADXR100 1MZ

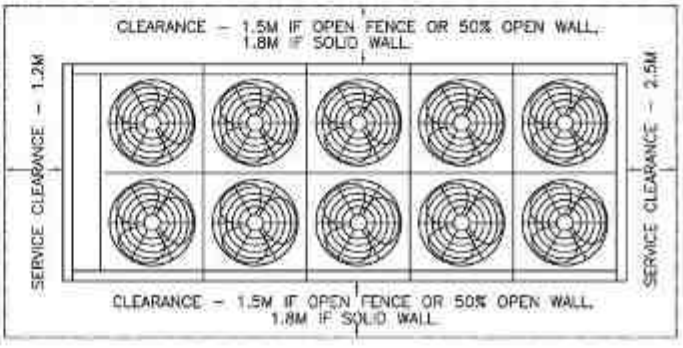


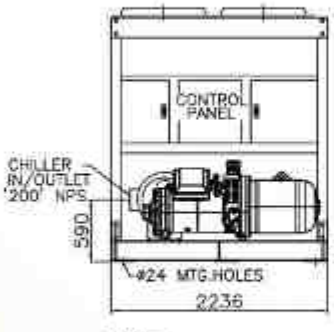


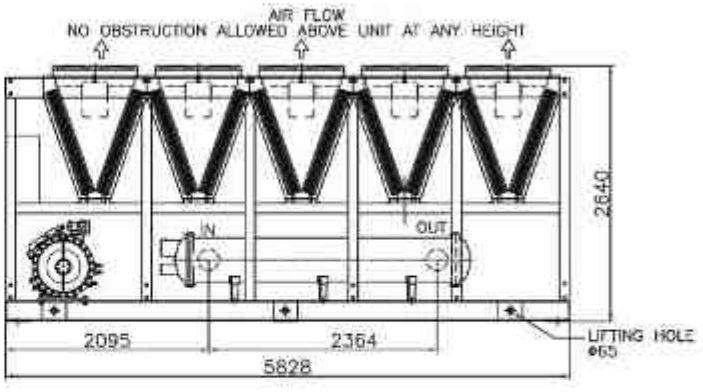


NOTE :
1.DIMENSIONS ARE GIVEN IN MM.
2.WATER NOZZLES FOR CHILLER TO BE PROVIDED WITH END CAP.

G. A DRAWING
MODEL ACEGADXR130 1MZ

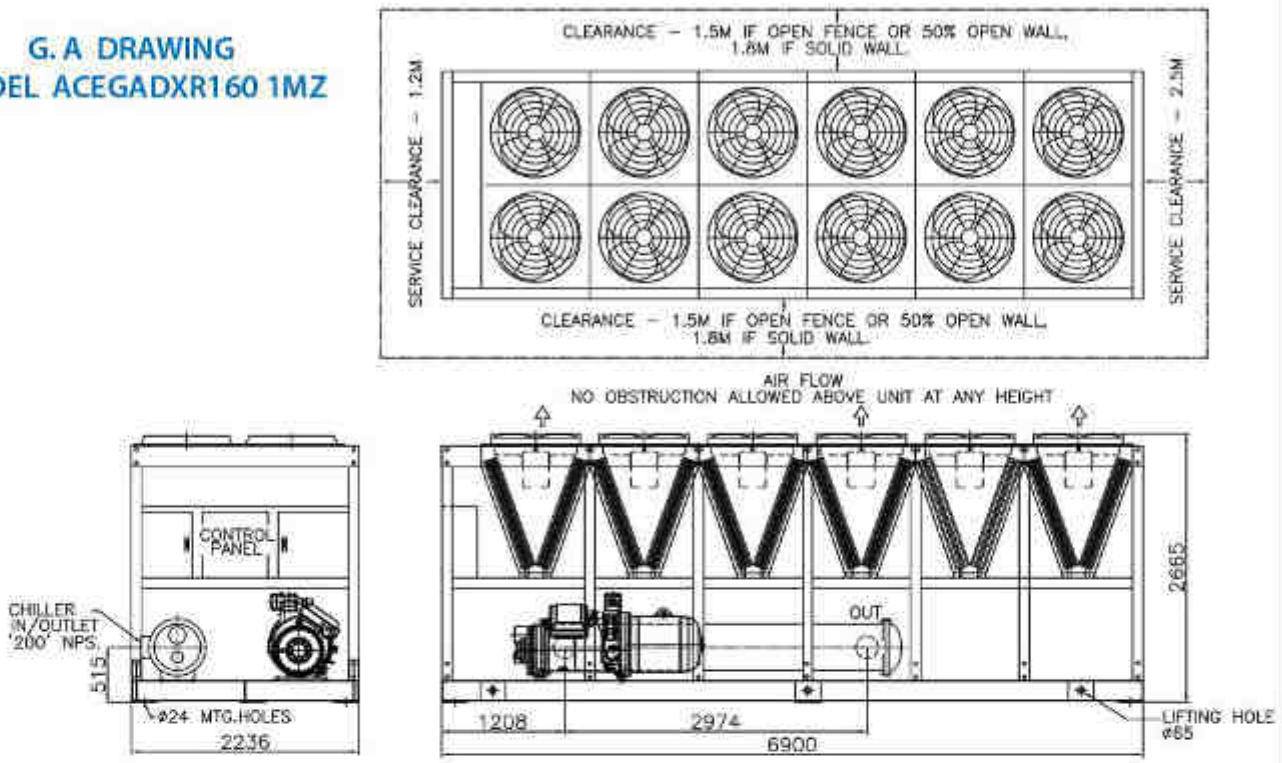






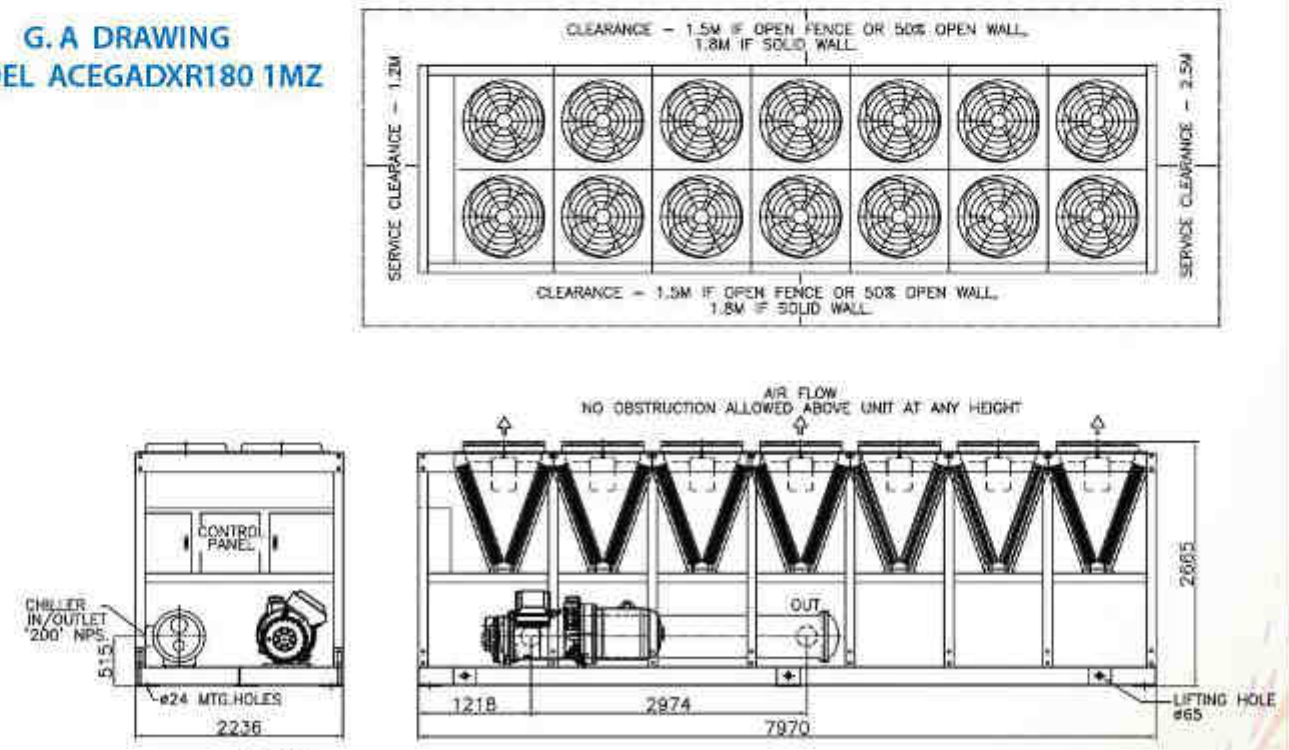
NOTE :
1.DIMENSIONS ARE GIVEN IN MM.
2.WATER NOZZLES FOR CHILLER TO BE PROVIDED WITH END CAP.

G. A DRAWING
MODEL ACEGADXR160 1MZ



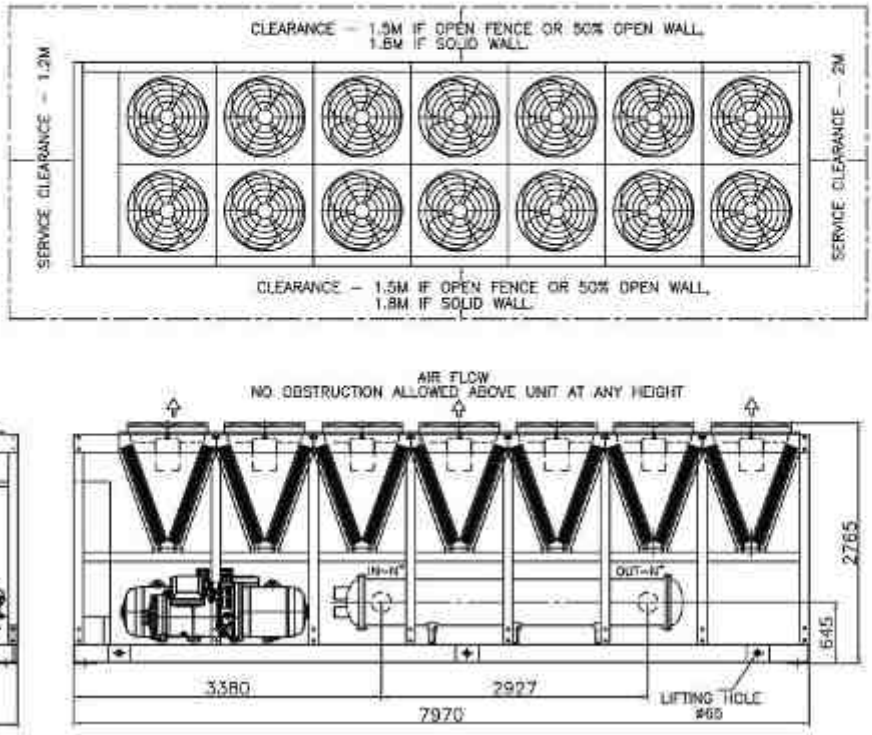
NOTE :
1.DIMENSIONS ARE GIVEN IN MM.
2.WATER NOZZLES FOR CHILLER TO BE PROVIDED WITH END CAP.

G. A DRAWING
MODEL ACEGADXR180 1MZ



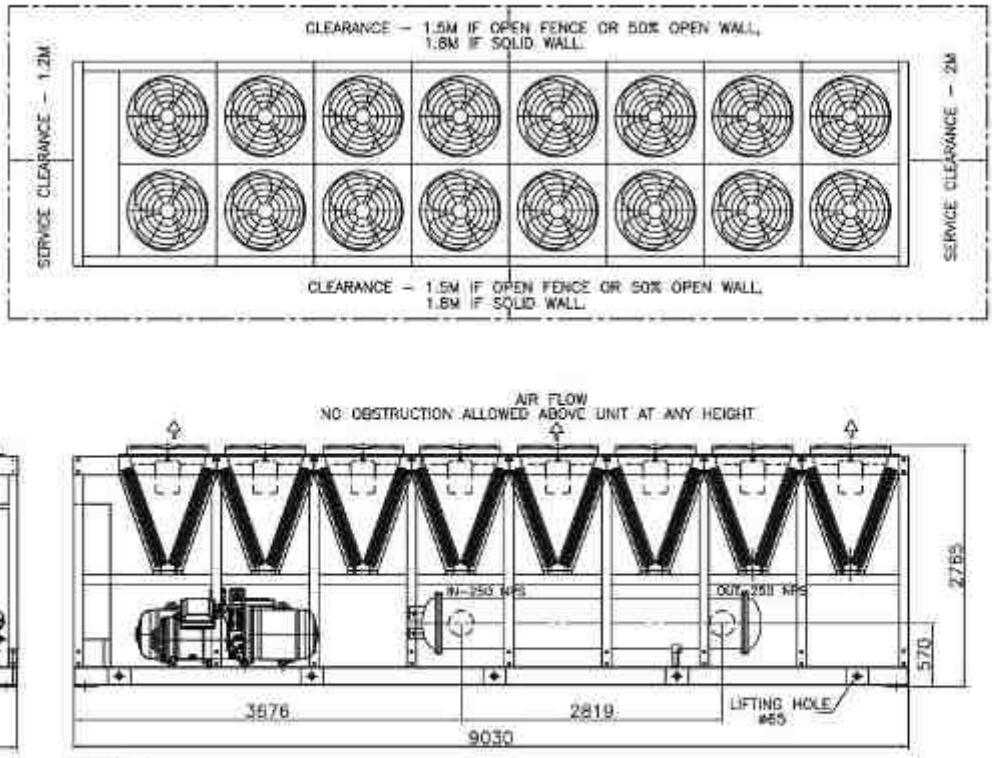
NOTE :
1.DIMENSIONS ARE GIVEN IN MM.
2.WATER NOZZLES FOR CHILLER TO BE PROVIDED WITH END CAP.

G. A DRAWING MODEL ACEGADXR200 2MZ



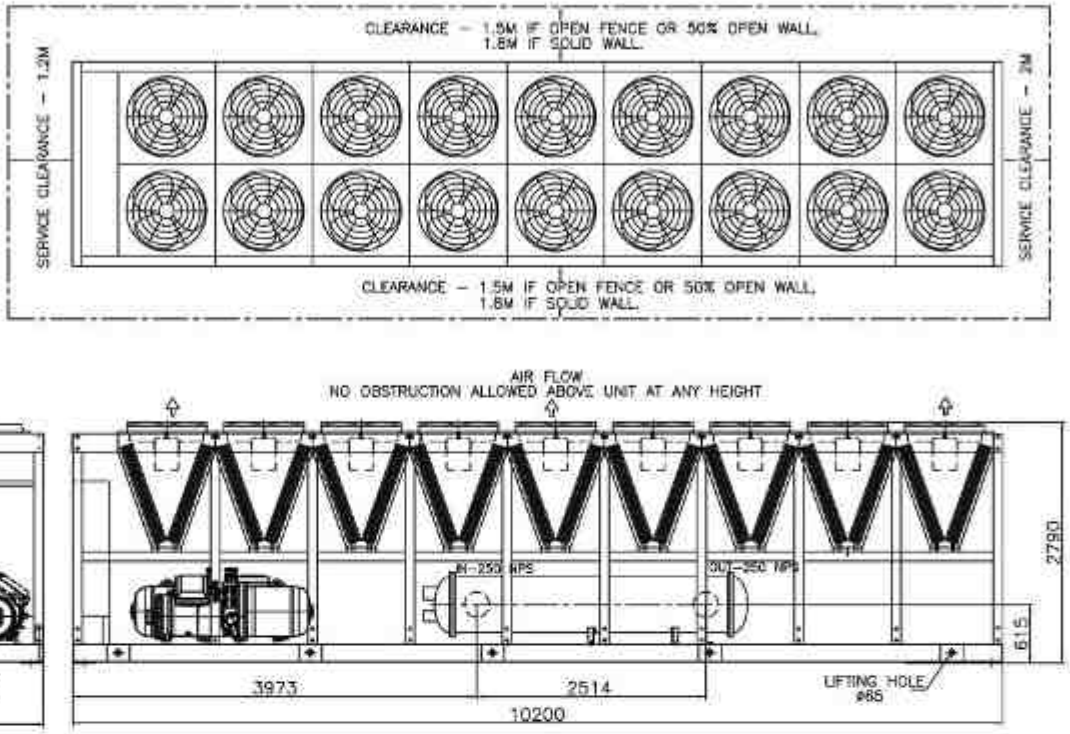
NOTE :
1.DIMENSIONS ARE GIVEN IN MM.
2.WATER NOZZLES FOR CHILLER TO BE PROVIDED WITH END CAP.

G. A DRAWING MODEL ACEGADXR230 2MZ



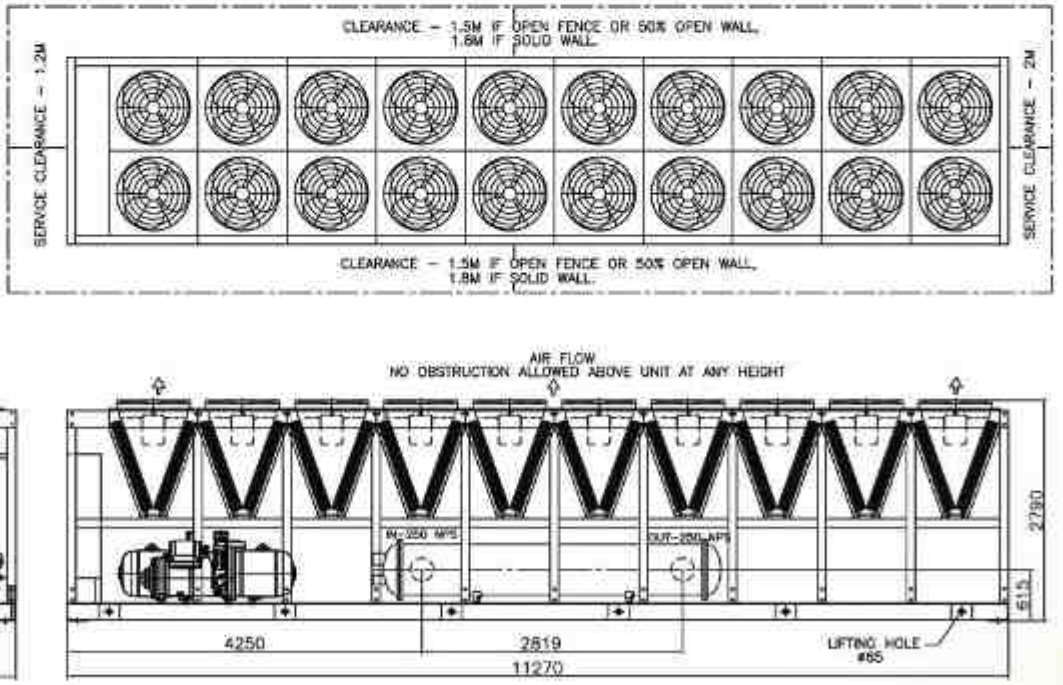
NOTE :
1.DIMENSIONS ARE GIVEN IN MM.
2.WATER NOZZLES FOR CHILLER TO BE PROVIDED WITH END CAP.

G. A DRAWING MODEL ACEGADXR260 2MZ



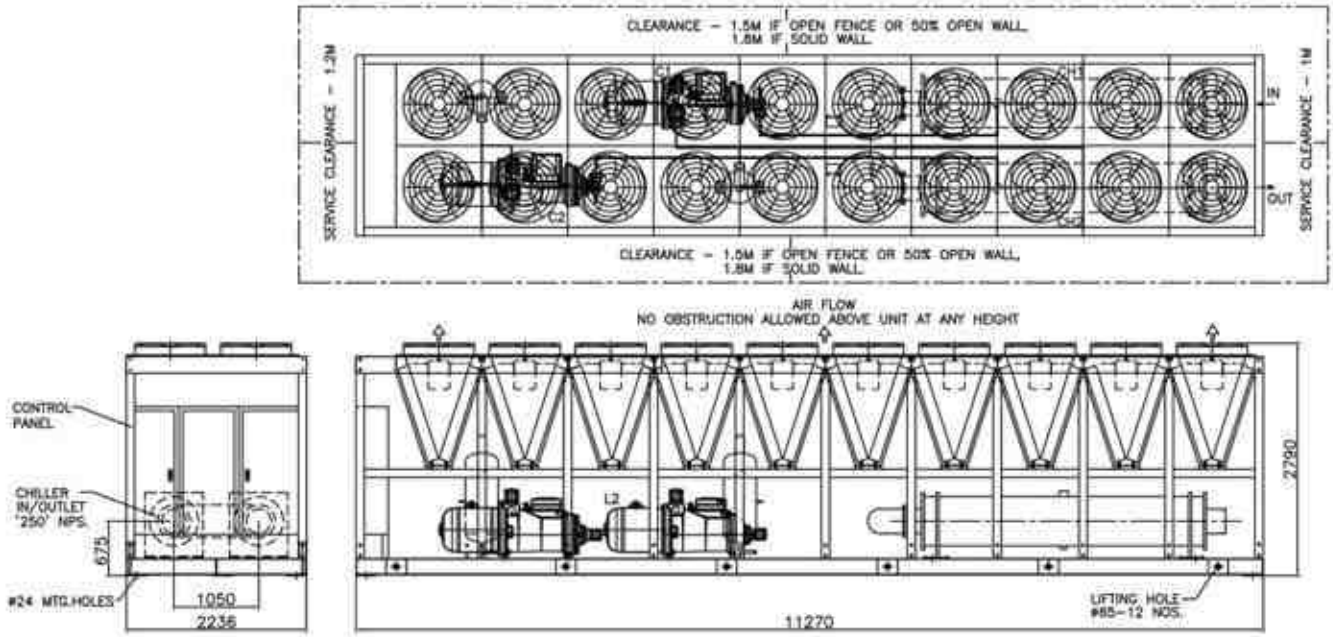
NOTE :
1.DIMENSIONS ARE GIVEN IN MM.
2.WATER NOZZLES FOR CHILLER TO BE PROVIDED WITH END CAP.

G. A DRAWING MODEL ACEGADXR300 2MZ



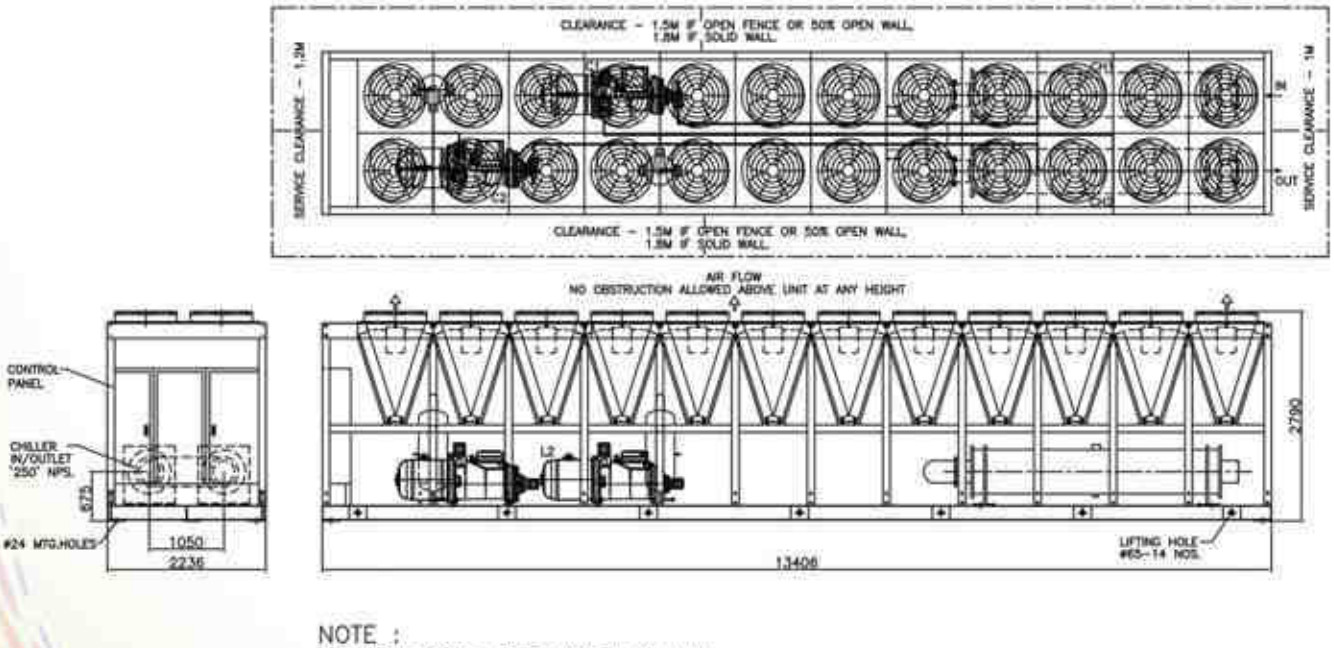
NOTE :
1.DIMENSIONS ARE GIVEN IN MM.
2.WATER NOZZLES FOR CHILLER TO BE PROVIDED WITH END CAP.

G. A DRAWING - MODEL ACEGAFXR340 2MZ



NOTE :
1.DIMENSIONS ARE GIVEN IN MM.
2.WATER NOZZLES FOR CHILLER TO BE PROVIDED WITH END CAP.

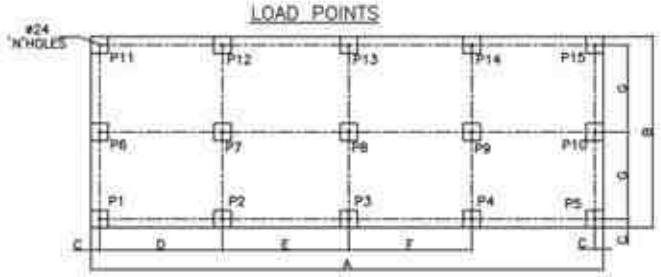
G. A DRAWING - MODEL ACEGAFXR380 2MZ



NOTE :
1.DIMENSIONS ARE GIVEN IN MM.
2.WATER NOZZLES FOR CHILLER TO BE PROVIDED WITH END CAP.

POINT LOAD DIAGRAM - ECBC AIR-COOLED SCREW CHILLER PACKAGE

LOAD POINTS



LOAD POINT LOCATION (MM)

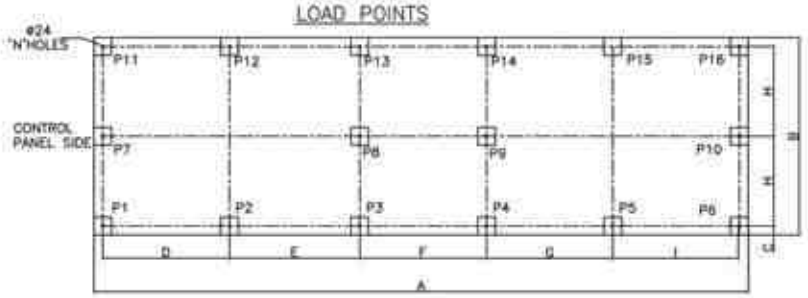
MODEL	A	B	C	D	E	F	G	N
ACEGADXR1001MZ	4760	2236	100	2280	–	–	1018	9
ACEGADXR1301MZ	5828	2236	100	1876	1876	–	1018	12
ACEGADXR1601MZ	6900	2236	125	2217	2217	–	993	12
ACEGADXR1801MZ	7965	2236	125	1930	1928	1928	993	15
ACEGADXR2002MZ	7965	2236	125	1930	1928	1928	993	15
ACEGADXR2302MZ	9030	2236	125	2250	2140	2140	993	15
ACEGADXR2602MZ	10200	2236	125	2780	2195	2195	993	15
ACEGADXR3002MZ	11270	2236	125	2780	2730	2730	993	15
ACEGAFXR3402MZ	11270	2236	125	2678	2780	2780	993	15

LOADING DETAIL

MODEL	KGS PER POINT															TOTAL LOAD KG
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	
ACEGADXR1001MZ	591	459	315	–	–	626	689	420	–	–	659	459	343	–	–	4561
ACEGADXR1301MZ	558	409	343	–	297	591	552	503	–	391	622	425	350	–	324	5365
ACEGADXR1601MZ	640	469	393	–	340	678	633	576	–	449	715	487	402	–	372	6156
ACEGADXR1801MZ	576	476	376	346	285	610	643	545	453	377	647	495	414	355	322	6920
ACEGADXR2002MZ	634	525	416	362	298	976	940	860	689	530	631	534	406	372	338	8511
ACEGADXR2302MZ	695	576	456	397	327	1072	1032	944	756	582	692	586	445	407	370	9337
ACEGADXR2602MZ	753	624	494	430	353	1162	1117	1022	819	628	750	634	482	440	400	10108
ACEGADXR3002MZ	820	679	538	468	385	1266	1216	1113	891	685	816	691	525	480	435	11008
ACEGAFXR3402MZ	588	612	1187	635	634	1052	1089	2067	1038	951	499	464	867	440	403	12526

POINT LOAD DIAGRAM - ECBC AIR-COOLED SCREW CHILLER PACKAGE

LOAD POINTS



LOAD POINT LOCATION (MM)

MODEL	A	B	C	D	E	F	G	H	I	N
ACEGAFXR3802MZ	13406	2236	125	2678	2780	2186	2780	993	2678	16

LOADING DETAIL

MODEL	KGS PER POINT																TOTAL LOAD KG
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	
ACEGAFXR3802MZ	560	900	1000	900	700	650	1100	1800	1500	960	530	600	900	700	700	500	14000

SPECTRUM OF HVAC PRODUCTS & SYSTEMS

PACKAGED & DUCTABLE SPLIT UNIT

VARIABLE REFRIGERANT FLOW SYSTEM (VRF)

ENERGY EFFECIENT
AIR COOLED SCREW CHILLER

ENERGY EFFECIENT
WATER COOLED SCREW CHILLER

AIR COOLED SCROLL CHILLER

WATER COOLED SCROLL CHILLER

AIR COOLED RECIPROCATING CHILLER

WATER COOLED RECIPROCATING CHILLER

DOUBLE EFFECT VAM

CO-GEN VAPOUR ABSORPTION MACHINE (VAM)

PROCESS REFRIGERATION PACKAGE

IAQ & ENERGY REDUCTION SYSTEM

COILOTRON (UV FOR AHU COILS)

STP EA ODOUR / H_2S REMOVAL SYSTEM

AIR HANDLING UNIT

VOLTAS

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Tel: +91 22 6665 6552 / 6792 0469
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NORTH ZONE DELHI (011) 66505550 / 66505659 Chandigarh (0172) 6610124 Jaipur (0141) 6451746 / 6541011 Lucknow (0522) 2237869 / 2236453 **EAST ZONE** KOLKATA (033) 66266245 / 66266265 / 66 Guwahati (03612) 2463073 Bhubaneshwar (0674) 6574044 JAMSHEDPUR (0657) 6622358 Patna (0612) 2500786 **WEST ZONE** MUMBAI (022) 66656754 / 756 Goa (0832) 2463664 Nagpur (0712) 6618846 / 47 Indore (0731) 2498616 Pune (020) 66297457 / 58 Aurangabad (0240) 2320510 AHMEDABAD (079) 66301108 / 10 Ankleshwar (02646) 238199 Silvassa (0260) 2640363 Surat (0261) 6599118 / 2422761 Vadodara (0265) 2332098 **SOUTH ZONE** CHENNAI (044) 66760355 / 66760333 Coimbatore (0422) 2241188 / 2244384 Madurai (0452) 2535818 BENGALURU (080) 67132500 to 04 / 67132637 HYDERABAD (040) 66500400 / 66743019 / 66500451 Vijaywada (0866) 2435282 Visakhapatnam (0891) 2754051 / 2754665 KOCHI (0484) 2359621

Supersede : Prev. Cat.

VL/CHP/AC5CW/01/02/14/1k

A TATA Product

VOLTAS LIMITED
Domestic Projects Group

WATER-COOLED ENERGY EFFICIENT
VARIABLE SPEED SCREW CHILLERS

R134a

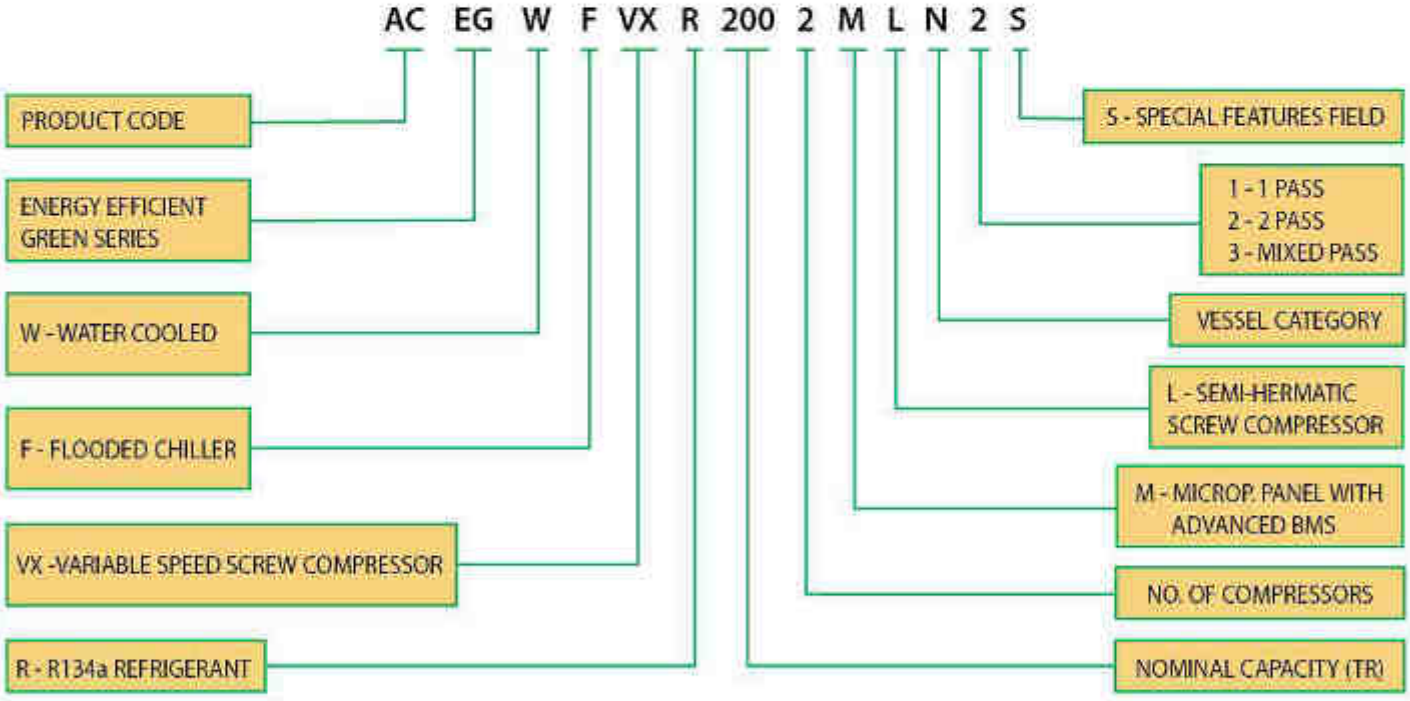
TECHNOLOGY

GREEN • EFFICIENT • SUSTAINABLE

WATER-COOLED ENERGY EFFICIENT VARIABLE SPEED SCREW CHILLERS

Voltas Electro-mechanical & Refrigeration Business Group, an ISO 9001: 2008 company is a pioneer & leader in the field of electromechanical & refrigeration introduces new series of energy efficient Variable Speed Screw Chillers using environment friendly refrigerant R-134a. As a result of commitment to provide customers the latest green technology and 'best value for money', Voltas chillers have become an ideal choice for **Green Building Projects** and other air conditioning applications. The chillers are available in wide range of capacities and each unit is tested in state-of-the art test facility matching international standards prior to delivery, ensuring reliability and optimum performance.

MODEL NOMENCLATURE



Exceptional energy efficiency by design

Today conservation & efficient use of energy resources have become vital for global sustainability. Ministry of Power, Government of India has thus come up with Energy Conservation Building Code (ECBC) incorporating stringent efficiency norms for air conditioning equipments. Voltas' new energy efficient VFD Driven chillers are at par with ECBC equipment efficiency compliance. The achievements in performance of these chillers are due to improvement in basic design, and precise control system and minimization of energy loss in part load by VFD Speed Control, eliminating discharge gas bypass to suction.

■ VFD Series Features :

- **High Efficiency**
  - Improved Integrated Part Load Value (IPLV)
  - Precise Capacity control with VFD
  - Auto adjustable volume ratio (VI)
- **Low Energy Consumption**
  - Low Starting Current with Zero Inrush
  - No Conventional starter required
  - Improved Power Factor
- **Intelligent Built-In System**
  - Electronic Overload Protector
  - Built in Temp Sensors
  - Built in oil level sensors
  - Electronic Expansion valve and driver
- **Low Noise Level**

■ Salient features of Screw compressor :

- High efficiency due to scientific profile design for screws, high speed operation & precision controls.
- Robust & proven construction with double walled single housing and new Slider Technology.
- Stepless capacity control from 100% to 25% for each compressor.
- Two stage ultra fine inbuilt oil separator results in less oil carry over rate.
- Lower noise level due to double walled casting.
- Each compressor is provided with self motor protection module, PTC motor winding protection, oil temperature protection, oil level switch & oil heaters, all guaranteeing reliability & long life .
- Semi hermatic type compressors which are easily serviceable.

■ VFD Features :

- Efficiency – Best in industry
- RFI filter – C3 level
- UL & CE certified
- Provided with Inbuilt harmonics reduction
- Low harmonic distortion : IEEE - 519 compliance (Optional)

Display information

Easily accessible measurements include the following parameters:

- Leaving chilled water temperature
- Discharge pressure
- Compressor current
- Oil level fault indication
- Compressor % loading
- Suction pressure
- System voltage
- Compressor elapsed run time
- Option of remote/Local operation
- Compressor ON/OFF status

- **Electronic Expansion Valve (EXV)–Precise and Efficient Control:**

  EXV are used to maintain precise flow of refrigerant to evaporator under both full load and part load operation of compressor. It can precisely control superheat at the outlet of evaporator with faster response irrespective of wide variation in capacity. EXV is a vast improvement over conventional thermostatic expansion valve and enables reduction of energy loss and improves overall efficiency of chillers.

- **Economiser as provided**

  Greatly improves efficiency of the unit & full load cooling capacity. Additional subcooling is created by expanding one part of liquid refrigerant from condenser to subcool remaining part of total refrigerant in a compact plate type heat exchanger (PHE). Screw compressor is provided with an additional suction port called ECO port which make it possible to suck the refrigerant vapour from PHE to accomplish economizer heat transfer.

- **PLC / Micro-Computer Control Panel**

  Advanced PLC / Micro-Computer control is a standard feature on all Voltas screw chillers. This maintains all analog and digital inputs to achieve precise control of the operational and protective functions of the unit. Direct Digital Control (DDC) allows fingertip user interaction. It's simple to use push button key board and menu driven software provides access to the operating conditions, control set points and alarm history clearly displayed on a 32-A character alpha numeric display.

- **USER-FRIENDLY operation Modes**
  - Programmed Auto Mode: Auto start and stop are programmable for entire year. This minimizes operator intervention. This mode facilitates auto restart on power restoration after a load shedding or grid supply failure.
  - Auto Mode: Start and Stop of the unit is controlled manually by a single button. Subsequent operation of the unit is fully automatic through 'microcomputer control.
  - Test-service Mode: facilitates testing of the unit under supervision .
  - Remote mode (for Hardware BMS): facilitates to start the unit from remote place through hardware BMS. Panel provided with three additional digital outputs & one digital input (Start key) hardware BMS as standard scope of supply.

System Protections:

The following system protection controls will automatically act for protecting the chiller under abnormal conditions and to ensure system reliability and safety.

- Low suction pressure
- High discharge pressure
- High oil temperature
- Freeze protection
- Low Chilled water flow
- Low oil level
- Anti recycle
- Self protection (SE-E1)
- Compressor over current
- High winding temperature
- High refrigerant level
- Sensor error
- Single phase and phase reversal
- Over/under current and current unbalance
- Preventive maintenance due trip
- Over/under voltage and voltage unbalance

Diagnostic Displays

Diagnose mode provide for easy trouble shooting

- Unit trips 50 hrs prior to completion of 8000 hrs as a precautionary measure for preventive maintanance.
- Alarm history of last 10 trips with date, time & cause of failure.
- Protection trips for various vital display parameters.

Adaptive Control

- Discharge/suction pressure limiting is done by Compressor unloading. This offers advantage of chiller running unloaded instead of tripping.
- In case compressor current increases above set value the microcomputer senses the increase & signals the computer to unload thus maintaining current within set value.

Standard Scope of Supply

- Compressor, oil heater, discharge shutoff, discharge check valve, unloader, oil level switch, lubrication oil first charge, shut off valve of economizer connection, liquid injection system, VFD.
- Micro-computer panel with MCC comprising starter, control transformer, motor and package protection devices, and factory wired, under voltage and phase failure relay.
- Communication port for remote connectivity, status and fault indication.
- BMS compatibility with MODBUS / BACnet.
- Single point electrical power connection.
- Integrated pressure relief valve, oil service valve, built-in motor with PTC sensors, discharge temperature sensor, IP 54 Terminal Box for motor.
- Evaporator, water cooled condenser, economizer, secondary oil separator.

Optional Features offered

- Dual mode chillers for thermal storage system.
- Touch Screen HMI.

TECHNICAL DATA SHEET - W/C VARIABLE SPEED SCREW CHILLER PKG. (R134a)

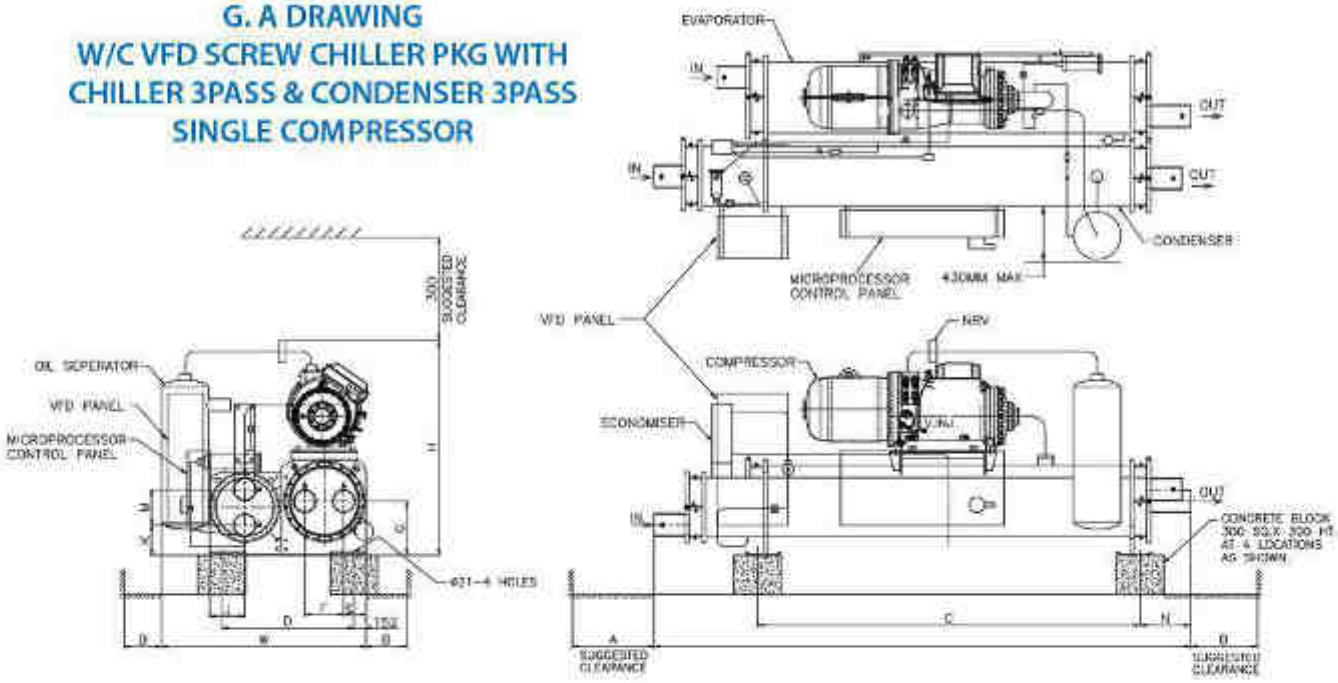
CHILLER PKG. MODEL	ACEGWFVXR 1001MLP1	ACEGWFVXR 1201MLP2	ACEGWFVXR 1351MLP2	ACEGWFVXR 1601MLP2	ACEGWFVXR 1801MLP2	ACEGWFVXR 2002MLN3
*Nominal Capacity (TR)	100	120	135	160	180	197
COMPRESSOR						
Compressor Type	Twin Screw , VFD Driven					
Quantity/unit	1	1	1	1	1	2
Max. allowable RPM @ 80HZ	4744					
Min.allowable RPM @ 20HZ	1200					
Stepless Capacity Control (% Loading Range)	100-25%	100-25%	100-25%	100-25%	100-25%	100-13%
Oil Type	SOLEST 120					
Oil Charge (lts), Per Compressor	18	18	18	23	23	18
Refrigerant	R-134a					
EVAPORATOR						
Evaporator Type	Flooded - Shell & Tube					
Quantity/unit	1	1	1	1	1	1
Water Flow Rate (USgpm)	266	319	359	426	479	524
Water Pr. Drop (KPa)	102	49	39	44	35	50
Water Nozzle NB (inch)	4	5	6	6	8	6
CONDENSER						
Condenser Type	Shell & Tube					
Condenser Quantity/unit	1	1	1	1	1	1
Water Flow Rate (USgpm)	315	380	421	502	565	621
Water Pr. Drop (KPa)	75	34	35	41	49	41
Water Nozzle NB (inch)	5	5	6	6	6	6
VARIABLE FREQUENCY DRIVE						
VFD Output - Amps (380-460V)	177	212	260	260	315	177
Qty. of VFD Per Unit	1	1	1	1	1	2
CHILLER PACKAGE PHYSICAL DATA						
Unit Length (mm)	4228	4340	4356	4330	4356	4516
Width (mm)	1545	1544	1633	1500	1701	2052
Unit Height (mm)	1544	1625	1623	1750	1748	1677
Approx. Shipping WT. (Kg)	2487	2617	3037	3267	3513	4189

Note1 : *Capacity rated for Evaporator water in / out at 12°C / 7°C and Condenser in / out at 30°C / 35°C. Evaporator Fouling Factor of 0.000018 m^2k/ Watt and Condenser Fouling Factor of 0.000044 m^2k/ Watt.

Note2 : Power Supply Voltage 415V, 3 Phase & 50 Hz, Control Supply : 210 - 240 V.

Note3 : Extended capacity product range available on request.

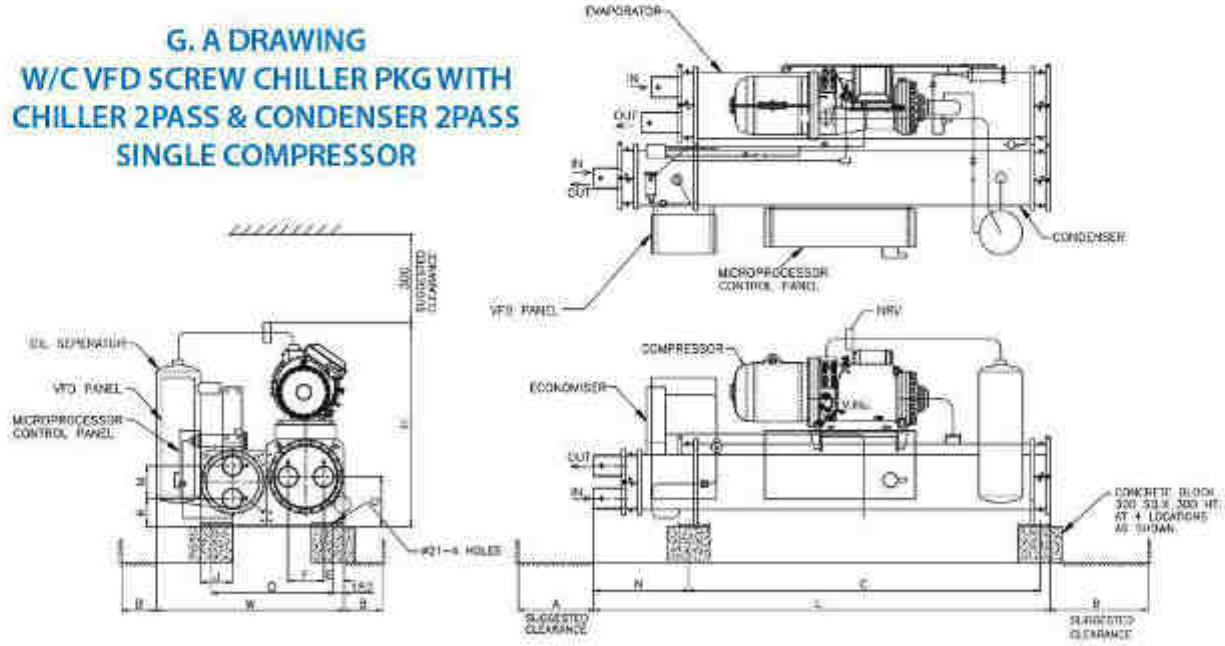
G. A DRAWING
W/C VFD SCREW CHILLER PKG WITH CHILLER 3PASS & CONDENSER 3PASS SINGLE COMPRESSOR



MODEL	EVAPORATOR	CONDENSER	L	W	H	A	B	C	D	E	F	G	J	K	M	N	COND.WATER IN/OUT	CHIL.WATER IN/OUT
ACEDWPVXR1001MLP1	1xCTLR3P-1C	1xA3LR3P-1C	4228	1545	1544	4000	750	3277	635	114	254	374	216	231	210	208	125	100

NOTE :
1.DIMENSIONS ARE GIVEN IN MM.
2.WATER NOZZLES FOR CONDENSER AND CHILLER TO BE PROVIDED WITH END CAP.

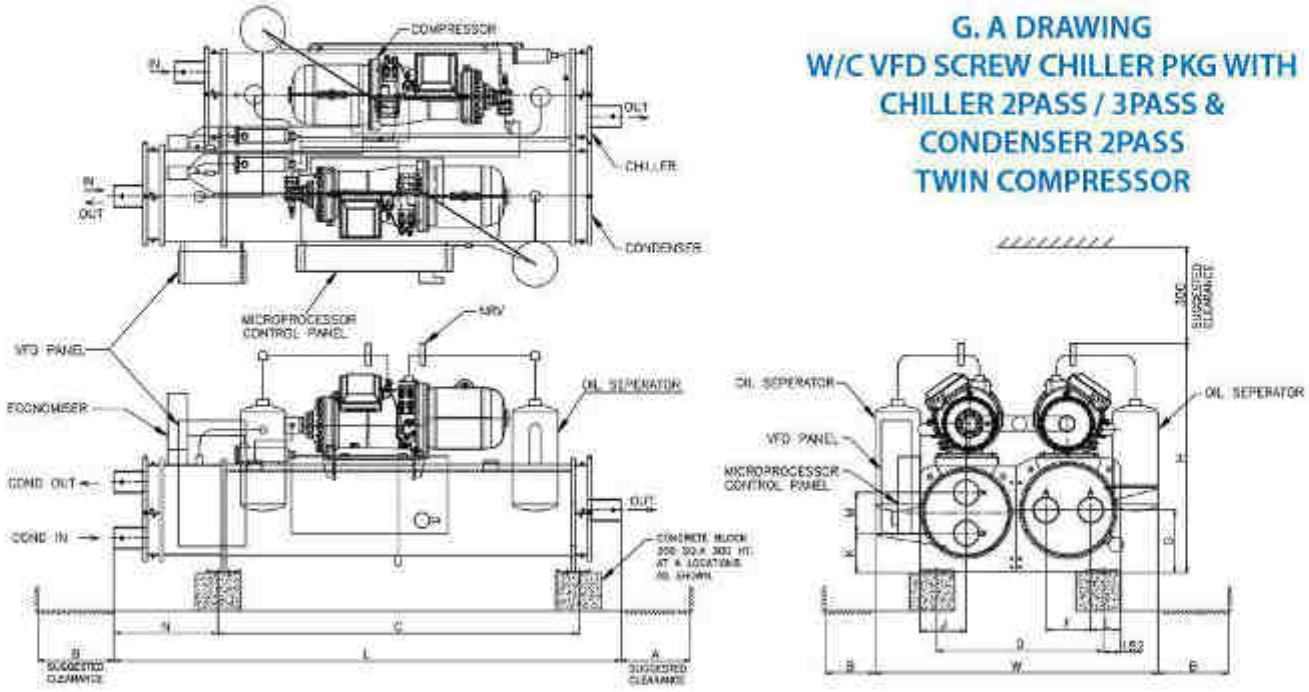
G. A DRAWING
W/C VFD SCREW CHILLER PKG WITH CHILLER 2PASS & CONDENSER 2PASS SINGLE COMPRESSOR



MODEL	EVAPORATOR	CONDENSER	L	W	H	A	B	C	D	E	F	G	J	K	M	N	COND.WATER IN/OUT	CHIL.WATER IN/OUT
ACEDWPVXR1201MLP2	1xC1LR2P-1C	1xA3LR2P-1C	4340	1544	1625	4000	750	3277	633	111	260	374	216	234	204	910	125	125
ACEDWPVXR1351MLP2	1xJ1R2P-1C	1xH2R2P-1C	4356	1633	1623	4000	750	3277	780	124	286	387	241	248	235	826	150	150
ACEDWPVXR1601MLP2	1xK1R2P-1C	1xH3R2P-1C	4330	1690	1750	4000	750	3277	815	158	286	413	241	247	235	826	150	150
ACEDWPVXR1901MLP2	1xL1R2P-1C	1xH3R2P-1C	4356	1701	1748	4000	750	3277	968	148	349	437	241	248	235	826	150	200

NOTE :
1.DIMENSIONS ARE GIVEN IN MM.
2.WATER NOZZLES FOR CONDENSER AND CHILLER TO BE PROVIDED WITH END CAP.

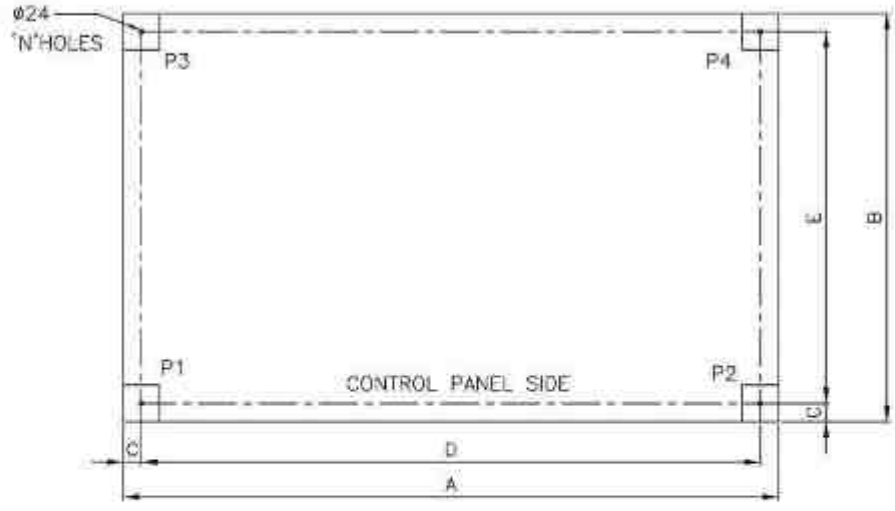
G. A DRAWING
W/C VFD SCREW CHILLER PKG WITH CHILLER 2PASS / 3PASS & CONDENSER 2PASS TWIN COMPRESSOR



MODEL	EVAPORATOR	CONDENSER	L	W	H	A	B	C	D	E	F	G	J	K	M	N	COND.WATER IN/OUT	CHIL.WATER IN/OUT
ACEGWFVXR2002MLN3	1xL1R3P-2C	1xL2R2P-2C	4516	2052	1677	4000	750	3277	918	149	343	437	267	244	386	874	150	150

NOTE :
1.DIMENSIONS ARE GIVEN IN MM.
2.WATER NOZZLES FOR CONDENSER AND CHILLER TO BE PROVIDED WITH END CAP.

POINT LOAD DIAGRAM OF W/C VARIABLE SPEED SCREW CHILLERS



							LOAD PER POINT – KG.				WEIGHT – KG	
MODEL	A	B	C	D	E	N	P1	P2	P3	P4	OP. WT	SHIPPING WT
ACEGWFVXR1001MLP1	3527	883	125	3277	633	4	673.75	673.75	673.75	673.75	2695	2487
ACEGWFVXR1201MLP2	3527	883	125	3277	633	4	706.25	706.25	706.25	706.25	2825	2617
ACEGWFVXR1351MLP2	3527	1010	125	3277	760	4	819.5	819.5	819.5	819.5	3278	3037
ACEGWFVXR1601MLP2	3527	1065	125	3277	815	4	882.0	882.0	882.0	882.0	3528	3267
ACEGWFVXR1801MLP2	3527	1118	125	3277	868	4	950.25	950.25	950.25	950.25	3801	3513
ACEGWFVXR2002MLN3	3527	1193	125	3277	918	4	1135.25	1135.25	1135.25	1135.25	4541	4189

NOTE : Dimensions A, B, C, D & E are in mm.

(Product Development Is A Continuous Process In Voltas, Hence Specifications And Technical Data Subject To Alterations Without Notice.)

SPECTRUM OF HVAC PRODUCTS & SYSTEMS

PACKAGED & DUCTABLE SPLIT UNIT

VARIABLE REFRIGERANT FLOW SYSTEM (VRF)

ENERGY EFFECIENT
AIR COOLED SCREW CHILLER

ENERGY EFFECIENT
WATER COOLED SCREW CHILLER

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WATER COOLED SCROLL CHILLER

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WATER COOLED RECIPROCATING CHILLER

DOUBLE EFFECT VAM

CO-GEN VAPOUR ABSORPTION MACHINE (VAM)

PROCESS REFRIGERATION PACKAGE

IAQ & ENERGY REDUCTION SYSTEM

COILOTRON (UV FOR AHU COILS)

STP EA ODOUR / H_2S REMOVAL SYSTEM

AIR HANDLING UNIT

VOLTAS LIMITED

Domestic Projects Group

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A TATA Enterprise

VOLTAS

Energy Efficient Water-Cooled Screw Chillers

R134a

GREEN • EFFICIENT • SUSTAINABLE

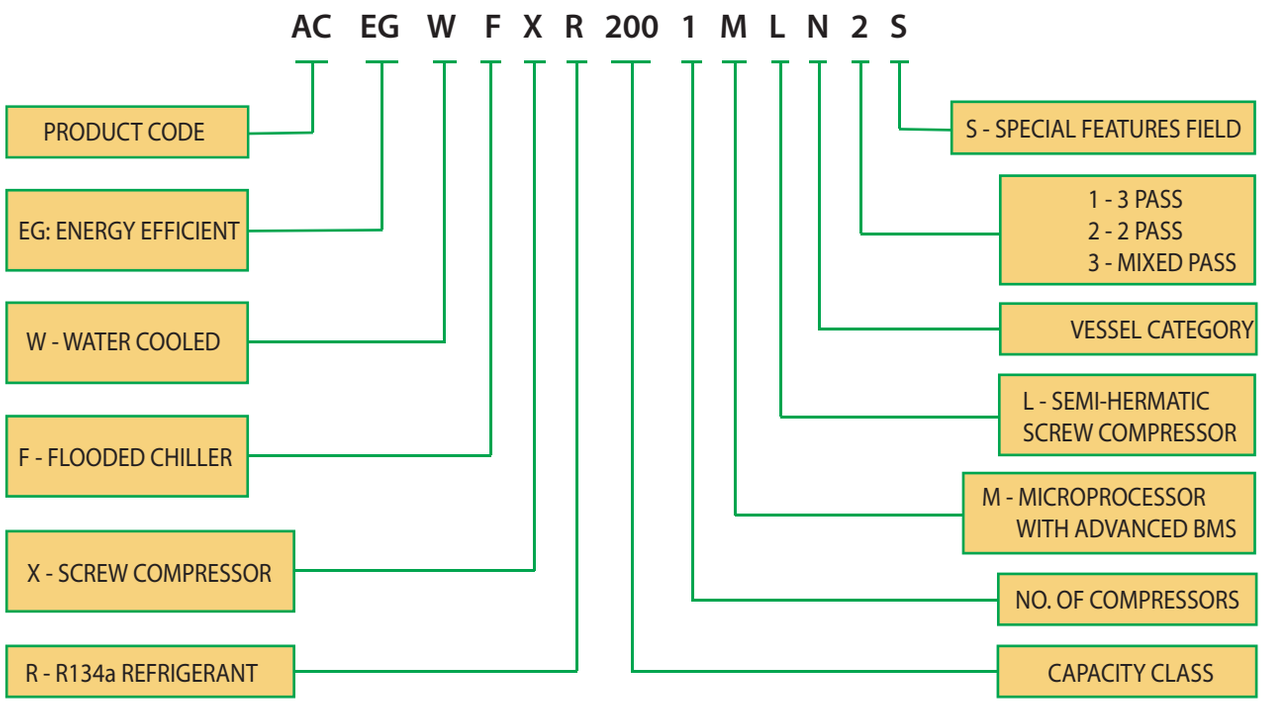
India's Largest Air Conditioning Company

ENERGY-EFFICIENT WATER-COOLED SCREW CHILLERS

Voltas Electro-mechanical and Refrigeration Business Group, an ISO:9001: 2008 company is the pioneer and leader in the field of electro-mechanical and refrigeration. Because of its commitment to provide customers with the latest green technology and 'best value for money', Voltas has introduced a new series of energy-efficient Chillers, using the environment friendly refrigerant R-134a.

The chillers have become an ideal choice for **Green Building Projects** and other air-conditioning applications. Available in a wide range of capacities, each unit is tested in a state-of-the-art AHRI (R) certified facility, matching international standards, prior to their delivery - thus ensuring reliability and optimum performance.

MODEL NOMENCLATURE



WIDEST RANGE

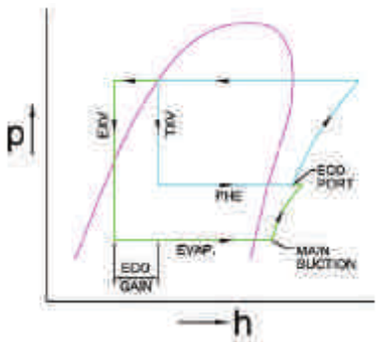
ECBC Series : 100 TR to 450 TR

AHRI Certified : 210 TR to 450 TR

POWERFUL FEATURES:

Exceptional Energy Efficiency by Design

- **Basic equipments** are designed to operate compressors on a comparatively better suction pressure and an optimum discharge pressure, to maximize efficiency benefit.
- **Compressor** with step-less capacity control mechanism, operates in response to the chilled water outlet temperature, and precisely matches the part-load requirements without hunting.
- **Electronic expansion** with controller and sensors, respond quickly to the variable operating conditions and enhances efficiency.
- **Compressor** staging has been programmed to save energy, by running adequate numbers of compressors at maximum efficiencies, even at different loads.
- **Economizer** greatly improves efficiency of the unit and full-load cooling capacity. Additional sub cooling is created by expanding one part of liquid refrigerant from condenser, to sub cool remaining part of total refrigerant, in a compact plate-type heat exchanger (PHE).
- **The Economizer's** working process is depicted in the diagram.
- **Screw compressor** is provided with an additional suction port called ECO port, which makes it possible to suck the refrigerant vapour from PHE, to accomplish economizer heat transfer.



Screw Compressors Mean Efficiency and Reliability

Screw Compressors are sourced from industry's best manufacturers, and are tested in accordance with ARI / Eurovent standards. The Compressors are known for efficiency, ruggedness, reliability and consistent part-load operations.

Salient features of these compressors are:

- Compressor is suitable to operate at 415V, most suited for Indian Operating Electrical Environment.
- High-efficiency due to scientific profile design of screws, high-speed operation and precision controls.
- Step-less capacity control from 100% to 25% for each compressor.
- These are semi-hermetic type compressors and hence, easily serviceable.
- Robust and proven construction with double-walled, single-housing and new slider technology.
- Each compressor is provided with a self-motor protection module, PTC motor winding protection, oil temperature protection, oil level switch and oil heaters - all these guaranty reliability and long life.
- Multistage and ultrafine, inbuilt oil-sepa rator results in less oil carryover rate.
- Double casing structure with high strength inner ribs ensures Lower sound level.

Oil Separation & Recovery system:

- Chiller is provided with additional Secondary oil separator to minimize the oil carry over.
- Unique Oil separator design ensures high filtration efficiency at varying load conditions & low pressure drop.
- ***Oil Supplied by pressure differential hence oil pump is not required.***

Electronic Expansion Valve (EXV) – Precise and Efficient Control

EXVs are used to maintain a precise flow of refrigerant to the evaporator, under both full-load and part-load operation of the compressor. It can precisely control superheat at the outlet of the evaporator with faster response, irrespective of the wide variation in capacity. EXVs are an improvement over conventional thermostatic expansion valves and enable reduction of energy loss and hence, improve overall efficiency of chillers.

The EXV operation is controlled by an electronic controller module, which is user-friendly and provides multiple application options. It is provided with battery back-up so that in case of a power failure, EXV can close positively and stop any liquid flood-back to compressor.

Water-cooled Condenser

Advanced design tools like HTRI® are used in water-cooled screw chillers for sizing of heat exchangers. The unit is made compact with advanced high heat flux tubes and designed for optimum performance.

- Doubly Enhanced & highly efficient finned copper tubes
- Impingement Protection at Hot gas Inlet ,eliminates vibration, noise
- Two or Three water passes available
- Removable water heads
- Victaulic Groove Water Connections
- Relief valves
- Manufacturing of shell from high-grade steel
- Condenser design as per ASME section VIII Div 1

Flooded Chiller – Maximising efficiency

The evaporators are manufactured using imported and highly efficient, compact ridged inner-finned copper tubes, which are mechanically expanded for better fitment.

Chillers are fabricated and pressure-tested, as per relevant standards for pressure vessels. Each chiller model design is validated by special design software and optimized for efficiency, refrigerant / water velocities and pressure drops.

Micro-computer Control Panel

Advanced micro-computer control is a standard feature on all Voltas Screw Chillers. This maintains all analog and digital inputs to achieve precise control of the operational and protective functions of the unit. **Direct Digital Control (DDC)** allows fingertip user interaction. The easy-to-use, push-button key board and menu-driven software provides access to operating conditions, control set points and alarm history, displayed on a alpha-numeric LCD.

User-friendly Operation Modes

- Programmed Auto Mode: Auto-start and stop are programmable for an entire year. This minimizes operator interface and facilitates auto-restart on power restoration after load shedding or grid supply failure.
- Auto Mode: Start-and-Stop of the unit is controlled manually by a single button. Subsequent operation of the unit is fully automatic through microcomputer control.
- Test-service Mode: Facilitates testing of the unit under supervision.
- Remote mode (for Hardware BMS): Facilitates switching the unit on/off from a remote location through Hardware BMS. Panels are provided with three additional digital outputs and one digital input (start key) hardware BMS, as a standard scope of supply.
- BMS Compatibility with Modus/BACnet

Display Information

Easily accessible measurements include the following parameters:

- Entering / Leaving chilled water temperature
- Entering / Leaving cooling water temperature
- Number of compressor starts
- Suction pressure
- Remote / Local operation option
- Discharge pressure.
- Oil level fault indication.
- System voltage
- Compressor ON / OFF status
- Compressor current for each compressor.
- Compressor load percentage for each compressor
- Compressor elapsed run time for each compressor.
- Discharge gas temperature.

System Protections

The following system protection controls will automatically act for protecting the chiller under abnormal conditions, and ensure system reliability and safety.

- Low suction pressure
- Compressor over current, for each compressor.
- High discharge pressure.
- High winding temperature.
- High discharge gas temperature.
- Freeze protection
- Sensor error
- Chilled water flow
- Single phase and phase reversal.
- Low oil level
- Over / under current and current imbalance
- Anti recycle
- Preventive maintenance due trip
- Over / under voltage and voltage imbalance.

Diagnostic Displays

The diagnose mode provides for easy trouble – shooting.

- Unit trips 50 hours prior to completion of 8000 hours, as a precautionary measure, for preventive maintenance.
- Alarm history of last 10 trips with date, time and causes of failures.
- Protection trips for various vital parameters.

Adaptive Control

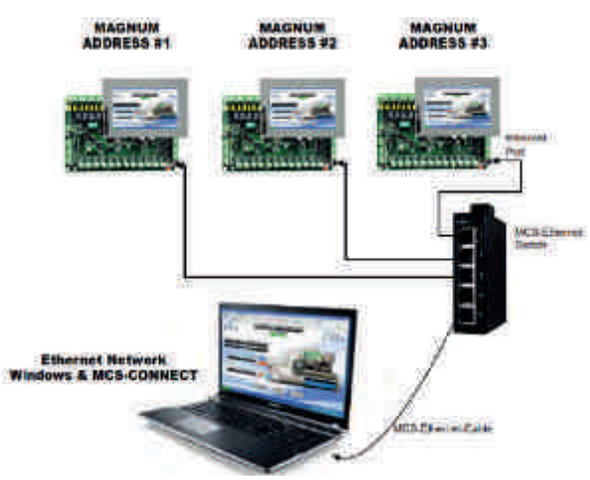
- Discharge / suction pressure limiting is done by unloading. This offers the advantages of chiller running unloaded, instead of tripping.
- In case the compressor current increases above set valve, the microcomputer senses the increase and signals the computer to unload, thus maintaining current within set value.

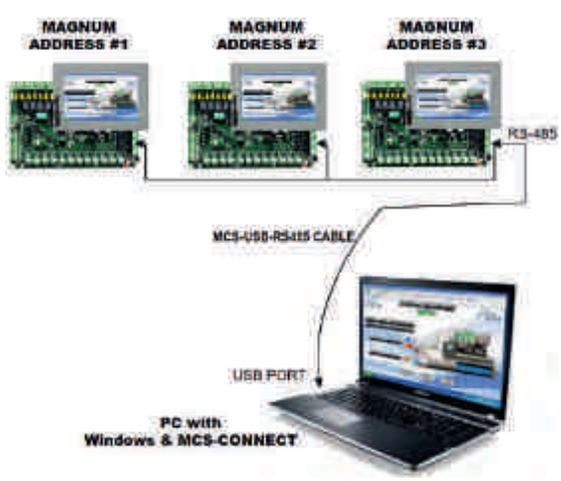
Voltas countrywide after – sales service

- A nationwide service network backs every unit.
- After the initial warranty period, Voltas offers annual maintenance service schemes.

Optional Features offered:

- Dual – mode chillers for thermal storage system
- Remote Monitoring
- Chiller Plant Manager





TECHNICAL SPECIFICATIONS

Series-ACEGWFXR*	0801MLB2	1001MLB2	1001MLN2	1001MLP1	1001ML	1002MLB2	1002MLP1	1201MLB2	1201MLP2
NOMINAL CAPACITY									
TR	83.4	103.2	103.7	107.2	106.8	99.8	100.8	115.2	117.8
COMPRESSOR									
Compressor Type	Semi HermeticTwin Screw								
Capacity Control Mechanism	Slide Valve								
Capacity Control (%)	Stepless (25~100)								
Quantity/Unit	1	1	1	1	1	2	2	1	1
RPM	2950	2950	2950	2950	2950	2950	2950	2950	2950
EVAPORATOR									
Evaporator Type	Flooded Shell and Tube								
Water Nozzle size (NB,mm)	125	125	125	100	150	125	100	125	125
Number of pass (Water Side)	2	2	2	3	2	2	3	2	2
CONDENSER									
Condenser Type	Shell and Tube								
Water Nozzle size (NB,mm)	100	100	100	125	150	100	125	100	100
Number of pass (Water Side)	2	2	2	3	3	2	3	2	2
CHILLER PACKAGE PHYSICAL DATA									
Length (mm)	4172	4172	4172	4228	4332	4172	4228	4172	4340
Width (mm)	1496	1496	1496	1545	1634	1713	1773	1496	1544
Height (mm)	1524	1524	1524	1574	1612	1523	1523	1543	1593
Shipping Weight (kg)	2215	2215	2261	2657	2939	2496	2938	2298	2739
Operating Weight (kg)	2353	2353	2421	2865	3185	2633	3146	2435	2948

(Product development is a continuous process in Voltas, hence specifications and technical data subject to alterations without notice.)

Note 1: Nominal Cooling Capacities indicated are at AHRI Conditions.
Note 2 : Power Voltage 415 V,Control supply Voltage 230V & Frequency 50 Hz,3 Phase,other Voltage on Request.
Note 3: Unit turndown for twin compressor unit is 12.5%.
Note 4: Evaporator and Condenser Water Nozzles provided with grooves suitable for Victaulic Connections.

TECHNICAL SPECIFICATIONS

Series-ACEGWFXR*	1201ML	1351MLB2	1351MLN2	1351MLP2	1351MLS1	1501MLB2	1501MLN2	1501MLP2
NOMINAL CAPACITY								
TR	116.1	131.7	133.5	134.5	136.3	150.1	151.4	151.8
COMPRESSOR								
Compressor Type	Semi HermeticTwin Screw							
Capacity Control Mechanism	Slide Valve							
Capacity Control (%)	Stepless (25~100)							
Quantity/Unit	1	1	1	1	1	1	1	1
RPM	2950	2950	2950	2950	2950	2950	2950	2950
EVAPORATOR								
Evaporator Type	Flooded Shell and Tube							
Water Nozzle size (NB,mm)	150	125	125	150	150	125	150	150
Number of pass (Water Side)	3	2	2	2	3	2	2	2
CONDENSER								
Condenser Type	Shell and Tube							
Water Nozzle size (NB,mm)	150	100	100	150	150	100	150	150
Number of pass (Water Side)	3	2	2	2	3	2	2	2
CHILLER PACKAGE PHYSICAL DATA								
Length (mm)	4350	4172	4340	4356	4349	4340	4356	4356
Width (mm)	1660	1496	1544	1633	1660	1558	1647	1674
Height (mm)	1707	1543	1593	1631	1707	1638	1676	1752
Shipping Weight (kg)	3286	2374	2769	3057	3322	2961	3248	3513
Operating Weight (kg)	3553	2533	2978	3298	3583	3169	3489	3775

Note 1: Nominal Cooling Capacities indicated are at AHRI Conditions.
Note 2 : Power Voltage 415 V,Control supply Voltage 230V & Frequency 50 Hz,3 Phase,other Voltage on Request.
Note 3: Unit turndown for twin compressor unit is 12.5%.
Note 4: Evaporator and Condenser Water Nozzles provided with grooves suitable for Victaulic Connections.

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TECHNICAL SPECIFICATIONS

Series-ACEGWFXR*	1501ML	1502MLB2	1502ML	1701MLB2	1701MLN2	1701MLP2	1751ML	1801MLB2
NOMINAL CAPACITY								
TR	152.6	149.7	159.8	161.9	162.8	164.2	167.9	174.7
COMPRESSOR								
Compressor Type	Semi HermeticTwin Screw							
Capacity Control Mechanism	Slide Valve							
Capacity Control (%)	Stepless (25~100)							
Quantity/Unit	1	2	2	1	1	1	1	1
RPM	2950	2950	2950	2950	2950	2950	2950	2950
EVAPORATOR								
Evaporator Type	Flooded Shell and Tube							
Water Nozzle size (NB,mm)	150	125	150	150	150	200	200	150
Number of pass (Water Side)	3	2	3	2	2	2	3	2
CONDENSER								
Condenser Type	Shell and Tube							
Water Nozzle size (NB,mm)	150	100	150	150	150	150	150	150
Number of pass (Water Side)	3	2	3	2	2	2	3	2
CHILLER PACKAGE PHYSICAL DATA								
Length (mm)	4385	4340	4385	4356	4356	4356	4465	4356
Width (mm)	1752	1773	2052	1647	1674	1701	1837	1647
Height (mm)	1817	1523	1702	1676	1752	1817	1854	1676
Shipping Weight (kg)	4016	3082	4143	3292	3557	3773	4474	3302
Operating Weight (kg)	4373	3290	4494	3532	3818	4061	4927	3543

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Note 1: Nominal Cooling Capacities indicated are at AHRI Conditions.
Note 2 : Power Voltage 415 V,Control supply Voltage 230V & Frequency 50 Hz,3 Phase,other Voltage on Request.
Note 3: Unit turndown for twin compressor unit is 12.5%.
Note 4: Evaporator and Condenser Water Nozzles provided with grooves suitable for Victaulic Connections.

TECHNICAL SPECIFICATIONS

Series-ACEGWFXR*	1801MLN2	1801MLP2	1801MLS1	2101MLB2	2101MLN2	2101MLP2	2101ML	2251MLB2
NOMINAL CAPACITY								
TR	175.4	176.5	180	200.6	203	204.7	207.7	219.7
COMPRESSOR								
Compressor Type	Semi HermeticTwin Screw							
Capacity Control Mechanism	Slide Valve							
Capacity Control (%)	Stepless (25~100)							
Quantity/Unit	1	1	1	1	1	1	1	1
RPM	2950	2950	2950	2950	2950	2950	2950	2950
EVAPORATOR								
Evaporator Type	Flooded Shell and Tube							
Water Nozzle size (NB,mm)	150	200	200	150	200	200	200	150
Number of pass (Water Side)	2	2	3	2	2	2	3	2
CONDENSER								
Condenser Type	Shell and Tube							
Water Nozzle size (NB,mm)	150	150	150	150	150	150	200	150
Number of pass (Water Side)	2	2	3	2	2	2	3	2
CHILLER PACKAGE PHYSICAL DATA								
Length (mm)	4356	4356	4465	4356	4316	4316	4479	4316
Width (mm)	1674	1701	1837	1674	1752	1780	1889	1873
Height (mm)	1752	1817	1854	1952	2017	2054	2054	2050
Shipping Weight (kg)	3567	3783	4490	3601	4109	4377	4905	3921
Operating Weight (kg)	3828	4071	4937	3863	4461	4773	5446	4183

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Note 1: Nominal Cooling Capacities indicated are at AHRI Conditions.
Note 2 : Power Voltage 415 V,Control supply Voltage 230V & Frequency 50 Hz,3 Phase,other Voltage on Request.
Note 3: Unit turndown for twin compressor unit is 12.5%.
Note 4: Evaporator and Condenser Water Nozzles provided with grooves suitable for Victaulic Connections.

TECHNICAL SPECIFICATIONS

Series-ACEGWFXR*	2251MLN2	2251MLP2	2251MLS1	2202MLB2	2202MLN2	2202MLP2	2202MLS1	2402MLB2
NOMINAL CAPACITY								
TR	222.2	224.4	227.4	205.6	209.3	211.3	215.9	227
COMPRESSOR								
Compressor Type	Semi HermeticTwin Screw							
Capacity Control Mechanism	Slide Valve							
Capacity Control (%)	Stepless (25~100)							
Quantity/Unit	1	1	1	2	2	2	2	2
RPM	2950	2950	2950	2950	2950	2950	2950	2950
EVAPORATOR								
Evaporator Type	Flooded Shell and Tube							
Water Nozzle size (NB,mm)	200	200	200	150	200	200	200	200
Number of pass (Water Side)	2	2	3	2	2	2	3	2
CONDENSER								
Condenser Type	Shell and Tube							
Water Nozzle size (NB,mm)	150	150	200	150	150	150	200	150
Number of pass (Water Side)	2	2	3	2	2	2	3	2
CHILLER PACKAGE PHYSICAL DATA								
Length (mm)	4316	4316	4479	4356	4316	4316	4479	4356
Width (mm)	1951	1979	2087	1949	2052	2103	2205	2001
Height (mm)	2115	2152	2152	1695	1760	1797	1797	1772
Shipping Weight (kg)	4429	4697	5230	3941	4449	4717	5250	4400
Operating Weight (kg)	4781	5093	5766	4203	4801	5113	5786	4698

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Note 1: Nominal Cooling Capacities indicated are at AHRI Conditions.
Note 2 : Power Voltage 415 V,Control supply Voltage 230V & Frequency 50 Hz,3 Phase,other Voltage on Request.
Note 3: Unit turndown for twin compressor unit is 12.5%.
Note 4: Evaporator and Condenser Water Nozzles provided with grooves suitable for Victaulic Connections.

TECHNICAL SPECIFICATIONS

Series-ACEGWFXR*	2402MLN2	2402MLP2	2402MLP1	2402ML	2501MLB2	2501MLN2	2501MLP2	2501MLS2
NOMINAL CAPACITY								
TR	229.9	230.3	232.6	232.4	245.1	247.2	248.6	251
COMPRESSOR								
Compressor Type	Semi HermeticTwin Screw							
Capacity Control Mechanism	Slide Valve							
Capacity Control (%)	Stepless (25~100)							
Quantity/Unit	2	2	2	2	1	1	1	1
RPM	2950	2950	2950	2950	2950	2950	2950	2950
EVAPORATOR								
Evaporator Type	Flooded Shell and Tube							
Water Nozzle size (NB,mm)	200	200	200	200	200	200	200	250
Number of pass (Water Side)	2	2	3	3	2	2	2	2
CONDENSER								
Condenser Type	Shell and Tube							
Water Nozzle size (NB,mm)	150	200	150	200	150	150	200	200
Number of pass (Water Side)	2	2	3	3	2	2	2	2
CHILLER PACKAGE PHYSICAL DATA								
Length (mm)	4316	4429	4465	4523	4316	4316	4429	4327
Width (mm)	2103	2154	2154	2306	1951	1979	2036	2170
Height (mm)	1809	1809	1809	1859	2115	2152	2152	2202
Shipping Weight (kg)	4968	5116	5116	6025	4572	4848	4996	5902
Operating Weight (kg)	5382	5581	5581	6650	4933	5262	5461	6531

Note 1: Nominal Cooling Capacities indicated are at AHRI Conditions.
Note 2 : Power Voltage 415 V,Control supply Voltage 230V & Frequency 50 Hz,3 Phase,other Voltage on Request.
Note 3: Unit turndown for twin compressor unit is 12.5%.
Note 4: Evaporator and Condenser Water Nozzles provided with grooves suitable for Victaulic Connections.

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TECHNICAL SPECIFICATIONS

Series-ACEGWFXR*	2501MLS1	2502MLB2	2502MLN2	2502MLP2	2502MLS2	2502MLS1	2802MLB2	2802MLN2
NOMINAL CAPACITY								
TR	254	243.8	246.8	246.9	248.6	251.2	262	265.6
COMPRESSOR								
Compressor Type	Semi HermeticTwin Screw							
Capacity Control Mechanism	Slide Valve							
Capacity Control (%)	Stepless (25~100)							
Quantity/Unit	1	2	2	2	2	2	2	2
RPM	2950	2950	2950	2950	2950	2950	2950	2950
EVAPORATOR								
Evaporator Type	Flooded Shell and Tube							
Water Nozzle size (NB,mm)	200	200	200	200	250	200	200	200
Number of pass (Water Side)	3	2	2	2	2	3	2	2
CONDENSER								
Condenser Type	Shell and Tube							
Water Nozzle size (NB,mm)	200	150	150	200	200	200	150	200
Number of pass (Water Side)	3	2	2	2	2	3	2	2
CHILLER PACKAGE PHYSICAL DATA								
Length (mm)	4523	4316	4316	4429	4327	4523	4316	4429
Width (mm)	2170	2052	2103	2154	2305	2306	2052	2154
Height (mm)	2202	1760	1797	1797	1847	1859	1760	1797
Shipping Weight (kg)	5902	4662	4938	5086	5992	5992	4958	4382
Operating Weight (kg)	6530	5023	5352	5551	6621	6621	5319	5846

(Product development is a continuous process in Voltas, hence specifications and technical data subject to alterations without notice.)

Note 1: Nominal Cooling Capacities indicated are at AHRI Conditions.
Note 2 : Power Voltage 415 V,Control supply Voltage 230V & Frequency 50 Hz,3 Phase,other Voltage on Request.
Note 3: Unit turndown for twin compressor unit is 12.5%.
Note 4: Evaporator and Condenser Water Nozzles provided with grooves suitable for Victaulic Connections.

TECHNICAL SPECIFICATIONS

Series-ACEGWFXR*	2802MLP2	2802MLS1	3002MLB2	3002MLN2	3002MLP2	3002MLP1	3002ML	3202MLB2
NOMINAL CAPACITY								
TR	266.8	273.7	296.5	297.6	299.9	303.2	304.8	314.9
COMPRESSOR								
Compressor Type	Semi HermeticTwin Screw							
Capacity Control Mechanism	Slide Valve							
Capacity Control (%)	Stepless (25~100)							
Quantity/Unit	2	2	2	2	2	2	2	2
RPM	2950	2950	2950	2950	2950	2950	2950	2950
EVAPORATOR								
Evaporator Type	Flooded Shell and Tube							
Water Nozzle size (NB,mm)	250	200	200	200	250	200	200	200
Number of pass (Water Side)	2	3	2	2	2	3	3	2
CONDENSER								
Condenser Type	Shell and Tube							
Water Nozzle size (NB,mm)	200	200	150	200	200	200	200	150
Number of pass (Water Side)	2	3	2	2	2	3	3	2
CHILLER PACKAGE PHYSICAL DATA								
Length (mm)	4429	4523	4316	4429	4302	4492	4564	4316
Width (mm)	2204	2357	2052	2154	2255	2255	2393	2052
Height (mm)	1847	1859	1817	1854	1904	1904	2009	1817
Shipping Weight (kg)	5683	6578	5256	5679	6359	6359	7198	5297
Operating Weight (kg)	6184	7258	5617	6144	6940	6940	7927	5658

Note 1: Nominal Cooling Capacities indicated are at AHRI Conditions.
Note 2 : Power Voltage 415 V,Control supply Voltage 230V & Frequency 50 Hz,3 Phase,other Voltage on Request.
Note 3: Unit turndown for twin compressor unit is 12.5%.
Note 4: Evaporator and Condenser Water Nozzles provided with grooves suitable for Victaulic Connections.

(Product development is a continuous process in Voltas, hence specifications and technical data subject to alterations without notice.)

TECHNICAL SPECIFICATIONS

Series-ACEGWFXR*	3202MLN2	3202MLP2	3202MLS1	3302MLP2	3512ML	3512MLB2	3512MLN2	3512MLP2
NOMINAL CAPACITY								
TR	321.5	325.9	333.5	319.2	357.5	346.9	350.3	351.8
COMPRESSOR								
Compressor Type	Semi HermeticTwin Screw							
Capacity Control Mechanism	Slide Valve							
Capacity Control (%)	Stepless (25~100)							
Quantity/Unit	2	2	2	2	2	2	2	2
RPM	2950	2950	2950	2950	2950	2950	2950	2950
EVAPORATOR								
Evaporator Type	Flooded Shell and Tube							
Water Nozzle size (NB,mm)	200	250	200	250	200	200	250	250
Number of pass (Water Side)	2	2	3	2	3	2	2	2
CONDENSER								
Condenser Type	Shell and Tube							
Water Nozzle size (NB,mm)	200	200	200	200	250	200	200	200
Number of pass (Water Side)	2	2	3	2	3	2	2	2
CHILLER PACKAGE PHYSICAL DATA								
Length (mm)	4429	4302	4564	4302	4600	4429	4302	4328
Width (mm)	2154	2255	2393	2255	2601	2154	2255	2357
Height (mm)	1854	1904	2009	1904	2071	1854	1904	1904
Shipping Weight (kg)	5720	6400	7235	6981	8533	5786	6465	6936
Operating Weight (kg)	6185	6981	7968	5970	9457	6250	7046	7591

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Note 1: Nominal Cooling Capacities indicated are at AHRI Conditions.
Note 2 : Power Voltage 415 V,Control supply Voltage 230V & Frequency 50 Hz,3 Phase,other Voltage on Request.
Note 3: Unit turndown for twin compressor unit is 12.5%.
Note 4: Evaporator and Condenser Water Nozzles provided with grooves suitable for Victaulic Connections.

TECHNICAL SPECIFICATIONS

Series-ACEGWFXR*	3512MLP1	3752MLB2	3752MLN2	3752MLP2	3752MLS1	4102MLB2	4102MLN2	4102MLP2
NOMINAL CAPACITY								
TR	357.7	373.3	377.2	378.9	385.8	399.1	403.2	410.1
COMPRESSOR								
Compressor Type	Semi HermeticTwin Screw							
Capacity Control Mechanism	Slide Valve							
Capacity Control (%)	Stepless (25~100)							
Quantity/Unit	2	2	2	2	2	2	2	2
RPM	2950	2950	2950	2950	2950	2950	2950	2950
EVAPORATOR								
Evaporator Type	Flooded Shell and Tube							
Water Nozzle size (NB,mm)	200	200	250	250	200	200	250	250
Number of pass (Water Side)	3	2	2	2	3	2	2	2
CONDENSER								
Condenser Type	Shell and Tube							
Water Nozzle size (NB,mm)	200	200	200	200	250	200	200	200
Number of pass (Water Side)	3	2	2	2	3	2	2	2
CHILLER PACKAGE PHYSICAL DATA								
Length (mm)	4564	4429	4302	4328	4328	4429	4302	4327
Width (mm)	2357	2154	2255	2357	2601	2154	2255	2393
Height (mm)	1904	2054	2104	2104	2271	2054	2104	2209
Shipping Weight (kg)	6936	5921	6600	6956	8668	6006	6685	7438
Operating Weight (kg)	7591	6385	7181	7611	9592	6470	7266	8189

Note 1: Nominal Cooling Capacities indicated are at AHRI Conditions.
Note 2 : Power Voltage 415 V,Control supply Voltage 230V & Frequency 50 Hz,3 Phase,other Voltage on Request.
Note 3: Unit turndown for twin compressor unit is 12.5%.
Note 4: Evaporator and Condenser Water Nozzles provided with grooves suitable for Victaulic Connections.

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TECHNICAL SPECIFICATIONS

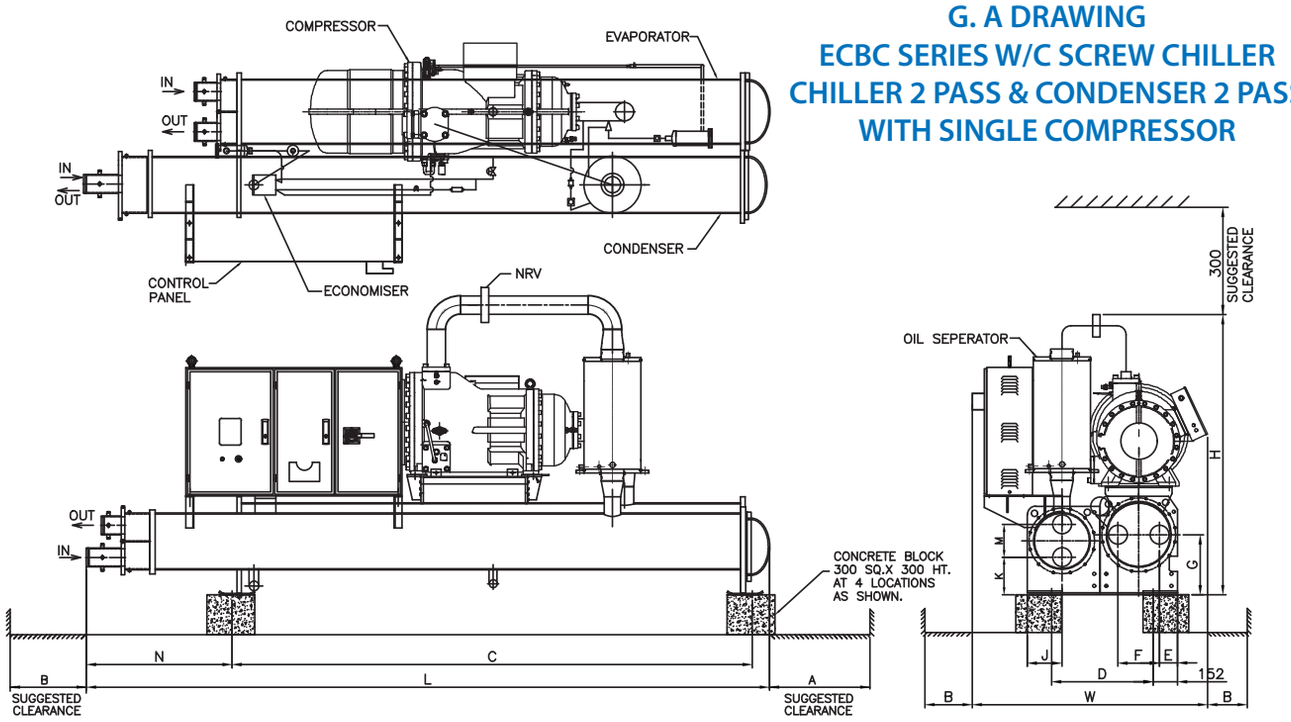
AHRI CERTIFIED

Series-ACEGWFXR*	4102MLP1	4102ML	4502MLB2	4502MLN2	4502MLP2	4502MLS1
NOMINAL CAPACITY						
TR	412.2	414.8	430.6	436.6	436.7	444.7
COMPRESSOR						
Compressor Type	Semi HermeticTwin Screw					
Capacity Control Mechanism	Slide Valve					
Capacity Control (%)	Stepless (25~100)					
Quantity/Unit	2	2	2	2	2	2
RPM	2950	2950	2950	2950	2950	2950
EVAPORATOR						
Evaporator Type	Flooded Shell and Tube					
Water Nozzle size (NB,mm)	200	200	250	250	250	200
Number of pass (Water Side)	3	3	2	2	2	3
CONDENSER						
Condenser Type	Shell and Tube					
Water Nozzle size (NB,mm)	200	250	200	200	200	250
Number of pass (Water Side)	3	3	2	2	2	3
CHILLER PACKAGE PHYSICAL DATA						
Length (mm)	4564	4557	4302	4327	4327	4557
Width (mm)	2393	2717	2255	2393	2393	2717
Height (mm)	2209	2331	2104	2209	2209	2331
Shipping Weight (kg)	7438	9386	6875	7687	7788	9324
Operating Weight (kg)	8189	11046	7685	8388	8529	11046

(Product development is a continuous process in Voltas, hence specifications and technical data subject to alterations without notice.)

Note 1: Nominal Cooling Capacities indicated are at AHRI Conditions.
Note 2 : Power Voltage 415 V,Control supply Voltage 230V & Frequency 50 Hz,3 Phase,other Voltage on Request.
Note 3: Unit turndown for twin compressor unit is 12.5%.
Note 4: Evaporator and Condenser Water Nozzles provided with grooves suitable for Victaulic Connections.

G. A DRAWING
ECBC SERIES W/C SCREW CHILLER
CHILLER 2 PASS & CONDENSER 2 PASS
WITH SINGLE COMPRESSOR



MODEL	L	W	H	A	B	C	D	E	F	G	J	K	M	N	*N1	**N2
ACEGWFXR0801MLB2	4172	1496	1524	4000	750	3277	572	114	204	349	200	215	235	762	100	125
ACEGWFXR1001MLB2	4172	1496	1524	4000	750	3277	572	114	204	349	200	215	235	762	100	125
ACEGWFXR1001MLN2	4172	1496	1524	4000	750	3277	572	114	204	349	200	215	235	762	100	125
ACEGWFXR1201MLB2	4172	1496	1543	4000	750	3277	572	114	204	349	200	215	235	762	100	125
ACEGWFXR1201MLP2	4340	1544	1593	4000	750	3277	633	111	260	374	216	234	204	910	125	125
ACEGWFXR1351MLB2	4172	1496	1543	4000	750	3277	572	114	204	349	200	215	235	762	100	125
ACEGWFXR1351MLN2	4340	1544	1593	4000	750	3277	633	111	260	374	216	234	204	910	125	125
ACEGWFXR1351MLP2	4356	1633	1631	4000	750	3277	760	124	286	387	241	246	230	926	150	150
ACEGWFXR1501MLB2	4340	1588	1638	4000	750	3277	633	111	260	374	216	234	204	910	125	125
ACEGWFXR1501MLN2	4356	1647	1676	4000	750	3277	760	124	286	387	241	246	230	926	150	150
ACEGWFXR1501MLP2	4356	1674	1752	4000	750	3277	815	155	286	412	241	246	230	926	150	150
ACEGWFXR1701MLB2	4356	1647	1676	4000	750	3277	760	124	286	387	241	246	230	926	150	150
ACEGWFXR1701MLN2	4356	1674	1752	4000	750	3277	815	155	286	412	241	246	230	926	150	150
ACEGWFXR1701MLP2	4356	1701	1817	4000	750	3277	868	149	349	437	241	246	230	926	150	200
ACEGWFXR1801MLB2	4356	1647	1676	4000	750	3277	760	124	286	387	241	246	230	926	150	150
ACEGWFXR1801MLN2	4356	1674	1752	4000	750	3277	815	155	286	412	241	246	230	926	150	150
ACEGWFXR1801MLP2	4356	1701	1817	4000	750	3277	868	149	349	437	241	246	230	926	150	200
ACEGWFXR2101MLB2	4356	1674	1952	4000	750	3277	815	155	286	412	241	246	230	926	150	150
ACEGWFXR2101MLN2	4316	1752	2017	4000	750	3277	918	149	349	437	267	244	286	874	150	200
ACEGWFXR2101MLP2	4316	1780	2054	4000	750	3277	976	181	349	463	267	244	286	874	150	200
ACEGWFXR2251MLB2	4356	1873	2050	4000	750	3277	815	155	286	412	241	246	230	926	150	150
ACEGWFXR2251MLN2	4316	1951	2115	4000	750	3277	918	149	349	437	267	244	286	874	150	200
ACEGWFXR2251MLP2	4316	1979	2152	4000	750	3277	976	181	349	463	267	244	286	874	150	200
ACEGWFXR2501MLB2	4316	1951	2115	4000	750	3277	918	149	349	437	267	244	286	874	150	200
ACEGWFXR2501MLN2	4316	1979	2152	4000	750	3277	976	181	349	463	267	244	286	874	150	200
ACEGWFXR2501MLP2	4429	2036	2152	4000	750	3277	1033	181	349	463	298	257	309	974	200	200
ACEGWFXR2501MLS2	4327	2170	2202	4000	750	3277	1192	194	375	488	356	288	350	847	200	250

*N1: Condenser water nozzle in/out

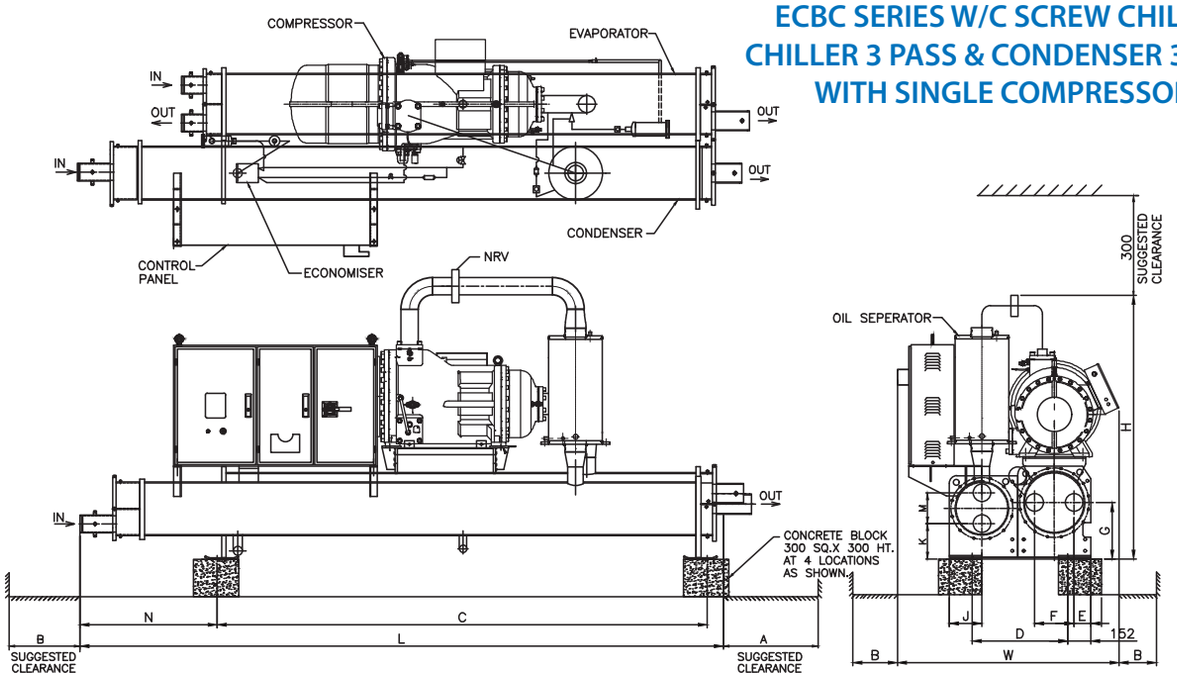
**N2: Evaporator water nozzle in/out

Note :

1. Dimensions are given in MM.
2. Water Nozzles for Condenser and Chiller to be provided with end cap.
3. Product development is continuous process in Voltas, hence details mentioned are subject to alteration without notice.

For Execution, insist for certified drawings

G. A DRAWING
ECBC SERIES W/C SCREW CHILLER
CHILLER 3 PASS & CONDENSER 3 PASS
WITH SINGLE COMPRESSOR



MODEL	L	W	H	A	B	C	D	E	F	G	J	K	M	N	*N1	**N2
ACEGWFXR1001ML	4332	1634	1612	4000	750	3277	759	124	286	387	241	227	268	250	150	150
ACEGWFXR1001MLP1	4228	1545	1574	4000	750	3277	633	144	254	374	216	231	210	209	125	100
ACEGWFXR1201ML	4350	1660	1707	4000	750	3277	815	146	305	412	241	227	268	267	150	150
ACEGWFXR1351MLS1	4349	1660	1707	4000	750	3277	815	146	305	412	241	227	268	267	150	150
ACEGWFXR1501ML	4385	1752	1817	4000	750	3277	918	152	343	438	267	247	279	282	150	150
ACEGWFXR1751ML	4465	1837	1854	4000	750	3277	1033	164	384	463	298	260	305	339	150	200
ACEGWFXR1801MLS1	4465	1837	1854	4000	750	3277	1033	164	384	463	298	260	305	339	150	200
ACEGWFXR2101ML	4479	1889	2054	4000	750	3277	1084	164	384	463	324	266	343	339	200	200
ACEGWFXR2251MLS1	4479	2087	2152	4000	750	3277	1084	164	384	463	324	266	343	339	200	200
ACEGWFXR2501MLS1	4523	2170	2202	4000	750	3277	1192	177	409	488	356	271	384	352	200	200

*N1: Condenser water nozzle in/out

**N2: Evaporator water nozzle in/out

Note :

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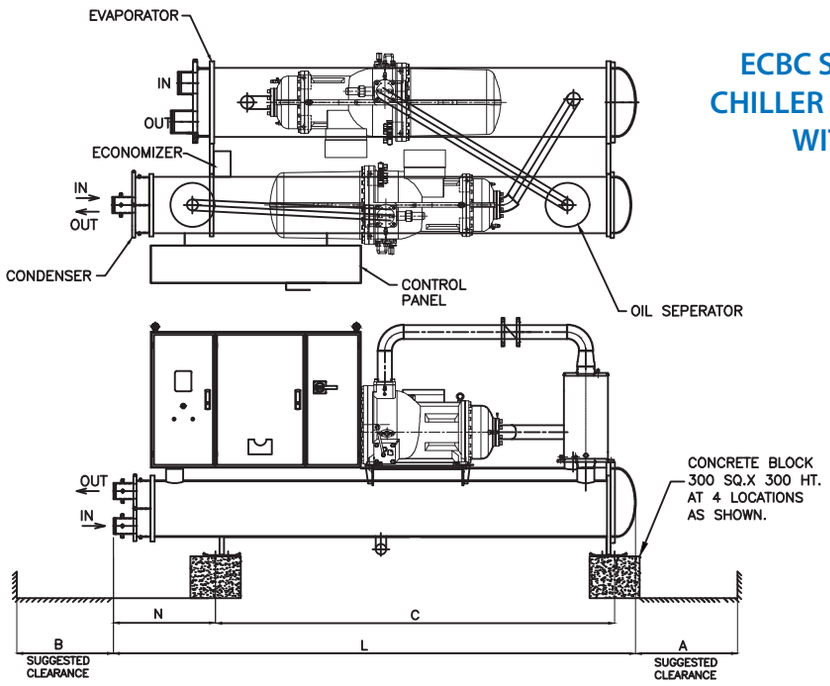
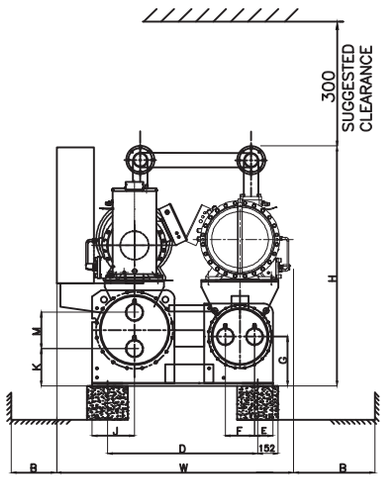
G. A DRAWING
ECBC SERIES W/C SCREW CHILLER
CHILLER 2 PASS & CONDENSER 2 PASS
WITH TWIN COMPRESSOR





MODEL	L	W	H	A	B	C	D	E	F	G	J	K	M	N	*N1	**N2
ACEGWFXR1002MLB2	4172	1713	1523	4000	750	3277	812	114	204	349	200	215	235	762	100	125
ACEGWFXR1502MLB2	4340	1773	1523	4000	750	3277	873	111	260	374	216	234	204	910	125	125
ACEGWFXR2202MLB2	4356	1949	1695	4000	750	3277	1055	155	286	412	241	246	230	926	150	150
ACEGWFXR2202MLN2	4316	2052	1760	4000	750	3277	1158	149	349	437	267	244	286	874	150	200
ACEGWFXR2202MLP2	4316	2103	1797	4000	750	3277	1216	181	349	463	267	244	286	874	150	200
ACEGWFXR2402MLB2	4356	2001	1772	4000	750	3277	1151	149	349	437	267	244	286	874	150	200
ACEGWFXR2402MLN2	4316	2103	1809	4000	750	3277	1216	181	349	463	267	244	286	874	150	200
ACEGWFXR2402MLP2	4429	2154	1809	4000	750	3277	1273	181	349	463	298	257	309	974	200	200
ACEGWFXR2502MLB2	4316	2052	1760	4000	750	3277	1158	149	349	437	267	244	286	874	150	200
ACEGWFXR2502MLN2	4316	2103	1797	4000	750	3277	1216	181	349	463	267	244	286	874	150	200
ACEGWFXR2502MLP2	4429	2154	1797	4000	750	3277	1273	181	349	463	298	257	309	974	200	200
ACEGWFXR2502MLS2	4327	2305	1847	4000	750	3277	1432	194	375	488	356	288	350	847	200	250
ACEGWFXR2802MLB2	4316	2052	1760	4000	750	3277	1158	149	349	437	267	244	286	874	150	200
ACEGWFXR2802MLN2	4429	2154	1797	4000	750	3277	1273	181	349	463	298	257	309	974	200	200
ACEGWFXR2802MLP2	4429	2204	1847	4000	750	3277	1324	194	375	488	298	257	309	974	200	250
ACEGWFXR3002MLB2	4316	2052	1817	4000	750	3277	1158	149	349	437	267	244	286	874	150	200
ACEGWFXR3002MLN2	4429	2154	1854	4000	750	3277	1273	181	349	463	298	257	309	974	200	200
ACEGWFXR3002MLP2	4302	2255	1904	4000	750	3277	1273	194	375	488	298	237	349	834	200	250
ACEGWFXR3202MLB2	4316	2052	1817	4000	750	3277	1158	149	349	437	267	244	286	874	150	200
ACEGWFXR3202MLN2	4429	2154	1854	4000	750	3277	1273	181	349	463	298	257	309	974	200	200
ACEGWFXR3202MLP2	4302	2255	1904	4000	750	3277	1273	194	375	488	298	237	349	834	200	250
ACEGWFXR3302MLP2	4302	2255	1904	4000	750	3277	1273	194	375	488	298	237	349	834	200	250
ACEGWFXR3512MLB2	4429	2154	1854	4000	750	3277	1273	181	349	463	298	257	309	974	200	200
ACEGWFXR3512MLN2	4302	2255	1904	4000	750	3277	1273	194	375	488	298	237	349	834	200	250
ACEGWFXR3512MLP2	4328	2357	1904	4000	750	3277	1482	200	413	514	356	288	349	847	200	250
ACEGWFXR3752MLB2	4429	2154	2054	4000	750	3277	1273	181	349	463	298	257	309	974	200	200
ACEGWFXR3752MLN2	4302	2255	2104	4000	750	3277	1273	194	375	488	298	237	349	834	200	250
ACEGWFXR3752MLP2	4328	2357	2104	4000	750	3277	1482	200	413	514	356	288	349	847	200	250
ACEGWFXR4102MLB2	4429	2154	2054	4000	750	3277	1273	181	349	463	298	257	309	974	200	200
ACEGWFXR4102MLN2	4302	2255	2104	4000	750	3277	1273	194	375	488	298	237	349	834	200	250
ACEGWFXR4102MLP2	4327	2393	2209	4000	750	3277	1517	211	438	532	356	288	349	847	200	250
ACEGWFXR4502MLB2	4302	2255	2104	4000	750	3277	1273	194	375	488	298	237	349	834	200	250
ACEGWFXR4502MLN2	4327	2393	2209	4000	750	3277	1517	211	438	532	356	288	349	847	200	250
ACEGWFXR4502MLP2	4327	2393	2209	4000	750	3277	1517	211	438	532	356	288	349	847	200	250

*N1: Condenser water nozzle in/out

**N2: Evaporator water nozzle in/out

Note :

1. Dimensions are given in MM.
2. Water Nozzles for Condenser and Chiller to be provided with end cap.
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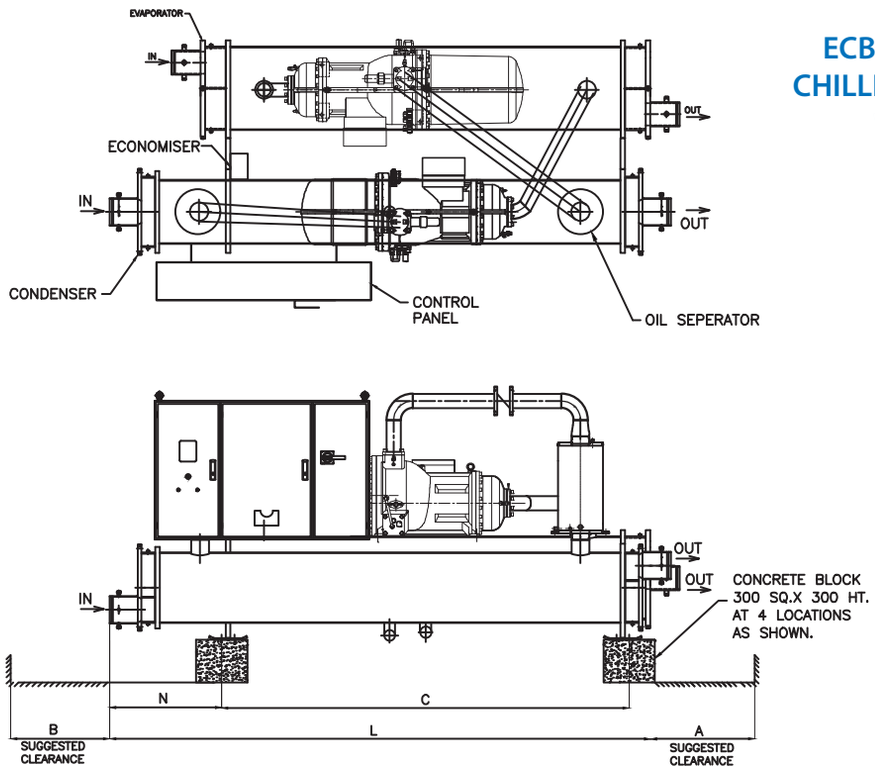
For Execution, insist for certified drawings

G. A DRAWING
ECBC SERIES W/C SCREW CHILLER
CHILLER 3 PASS & CONDENSER 3 PASS
WITH TWIN COMPRESSOR



MODEL	L	W	H	A	B	C	D	E	F	G	J	K	M	N	*N1	**N2
ACEGWFXR1002MLP1	4228	1773	1523	4000	750	3277	873	114	254	374	216	231	210	209	125	100
ACEGWFXR1502ML	4385	2052	1702	4000	750	3277	1158	152	343	438	267	247	279	282	150	150
ACEGWFXR2202ML	4555	2300	1890	4000	750	3277	1405	176	410	489	356	285	384	395	200	200
ACEGWFXR2202MLS1	4479	2205	1797	4000	750	3277	1324	164	384	463	324	266	343	339	200	200
ACEGWFXR2402ML	4523	2306	1859	4000	750	3277	1432	177	409	488	356	271	384	352	200	200
ACEGWFXR2402MLP1	4465	2154	1809	4000	750	3277	1273	164	384	463	298	260	305	339	150	200
ACEGWFXR2502MLS1	4523	2306	1859	4000	750	3277	1432	177	409	488	356	271	384	352	200	200
ACEGWFXR2802MLS1	4523	2357	1859	4000	750	3277	1482	186	442	514	356	271	384	352	200	200
ACEGWFXR3002ML	4564	2393	2009	4000	750	3277	1517	189	483	532	356	271	384	392	200	200
ACEGWFXR3002MLP1	4492	2255	1904	4000	750	3277	1375	177	409	488	324	266	343	352	200	200
ACEGWFXR3202MLS1	4564	2393	2009	4000	750	3277	1517	189	483	532	356	271	384	392	200	200
ACEGWFXR3512ML	4600	2601	2071	4000	750	3277	1734	189	483	532	467	310	509	392	250	200
ACEGWFXR3512MLP1	4564	2357	1904	4000	750	3277	1482	186	442	514	356	271	384	352	200	200
ACEGWFXR3512MLS1	4600	2601	2071	4000	750	3277	1734	189	483	532	467	610	509	392	250	200
ACEGWFXR3752MLS1	4600	2601	2271	4000	750	3277	1734	189	483	532	467	310	509	392	250	200
ACEGWFXR4102ML	4557	2717	2331	4000	750	3277	1854	220	530	590	467	316	496	347	250	200
ACEGWFXR4102MLP1	4564	2393	2209	4000	750	3277	1517	189	483	532	356	271	384	392	200	200
ACEGWFXR4502MLS1	4557	2717	2331	4000	750	3277	1854	220	530	590	467	316	496	347	250	200

*N1: Condenser water nozzle in/out

**N2: Evaporator water nozzle in/out

Note :

1. Dimensions are given in MM.
2. Water Nozzles for Condenser and Chiller to be provided with end cap.
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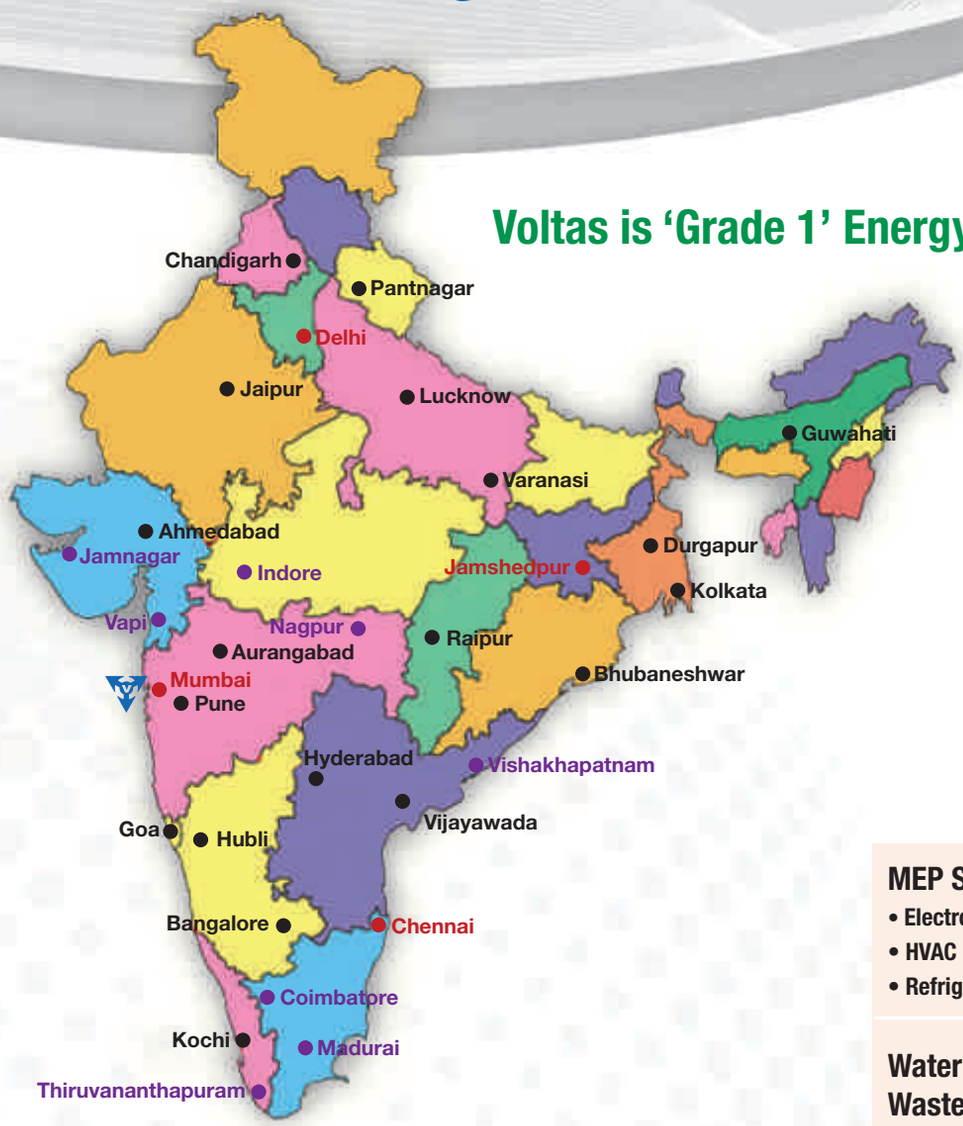
For Execution, insist for certified drawings

Voltas Customer Care

Comprehensive After-sales Solutions



MAIN PLANT
SALES HEADQUARTERS
ZONAL OFFICES
BRANCH OFFICES
AREA OFFICES

Voltas is 'Grade 1' Energy Service Company (ESCO)

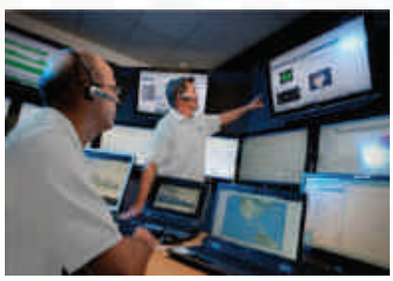
Voltas National Network

Easy Access • Quick Satisfaction

Customer Care
1800 233 1202 or 1800 266 0100

MEP Services : • Electro-mechanical Services • HVAC • Refrigeration	✓ Operations & Maintenance ✓ AMC Retrofit & Revamp ✓ Spares
Water and Wastewater Management	✓ Operations & Maintenance ✓ AMC Retrofit & Revamp ✓ Spares
Value Added Services	✓ Indoor Air Quality ✓ Energy Management ✓ TAB

Enabling better service through technology



Remote Monitoring

Digital Service Reports

24x7 Helpdesk

PRODUCT RANGE

VARIABLE REFRIGERANT FLOW SYSTEM (VRF)

WATER COOLED CENTRIFUGAL CHILLER

ENERGY EFFICIENT
WATER COOLED SCREW CHILLER

ENERGY EFFICIENT
AIR COOLED SCREW CHILLER

PACKAGED & DUCTABLE SPLIT UNIT

CO-GEN VAPOUR ABSORPTION MACHINE (VAM)

DOUBLE EFFECT VAM

AIR COOLED SCROLL CHILLER

WATER COOLED SCROLL CHILLER

PROCESS REFRIGERATION PACKAGE

IAQ & ENERGY REDUCTION SYSTEM

STP EA ODOUR / H_2S REMOVAL SYSTEM

VOLTAS

VOLTAS LIMITED
Domestic Projects Group, Voltas House 'B', 3rd floor, T. B. Kadam Marg, Chinchpokli, Mumbai-400 033, India
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WCSCW/01/2017/2k

TUV NORD ISO 9001

VOLTAS LIMITED
EM&R Business Group

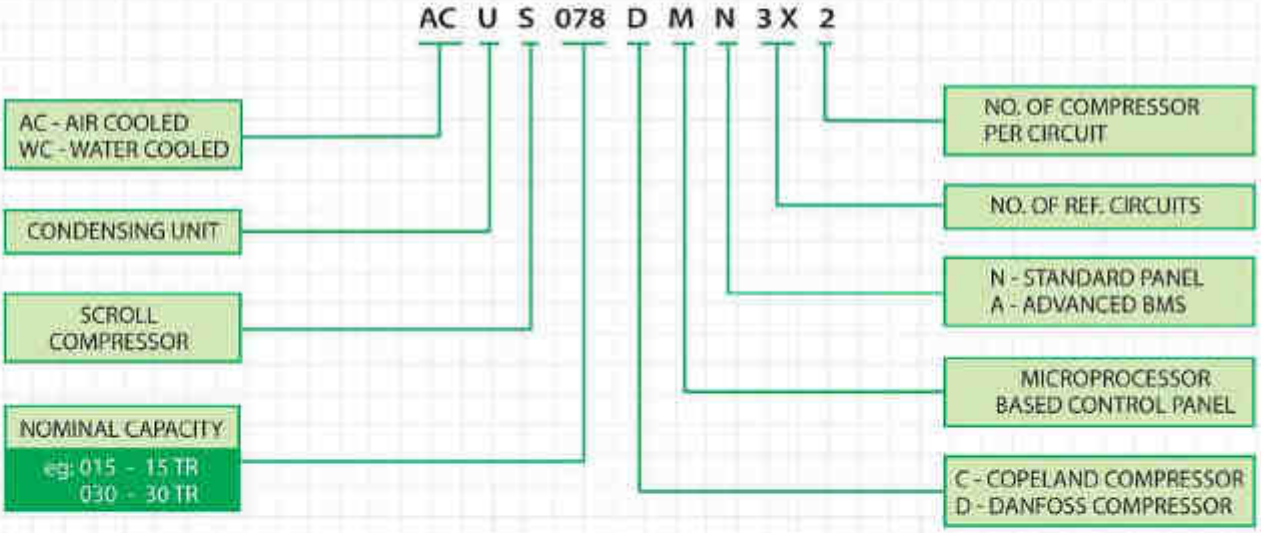
A TATA Enterprise

WATER-COOLED SCROLL CONDENSING UNIT

AIR-COOLED SCROLL CONDENSING UNIT

Electro-mechanical & Refrigeration Business Group of Voltas, an ISO 9001 company, is pioneer and leader in India in the field of electromechanical & refrigeration. As a result of its commitment to provide customers the technology that suits their requirements and 'best value for money', Voltas Condencing Units with Scroll Compressors have become an ideal choice for various air conditioning applications and are available in wide range of capacities.

MODEL NOMENCLATURE



FEATURES

Hermatic Scroll Compressor

- Sourced from reputed international manufacturer
- Enhanced relaibility and extended life with no contact scroll design and motor, cooled by suction gas
- Higher energy effeciency in hermatic design
- Oil sight glass & drain port available
- Crankcase heaters provided
- Tandem design available in higher capacity units with proper design of suction & discarge header and oil equilization circuit

Compressor Drive

- Squirrel cage induction motor Total Enclosed Fan Cooled (TEFC) or Screen Protected Drip Proof (SPDP) constructions are available

Water Cooled Condensers

- Manufactured incorporating latest technology from world renowned heat exchanger manufacturer
- State of art technology makes the unit highly compact and heat energy efficient, using most advanced IGT tubes

Air Cooled Condensers

- Air cooled condensers are manufactured using IGT tubes with slotted louvered fins resulting compact units
- Each coil pneumatically tested
- High effeciency multiple blade fans driven by IP 55 motors
- Smallest footprint saves your space by V configuration of unit structure

Microprocessor Control Panel for user-friendly operation

- Three mode options are available: Programmed Mode, Auto Mode & Test Service Mode
  - Programmed Mode : Auto start & stop, programmable for entire year. This minimises operator interface This mode facilitates auto restart on power restoration after a load shedding or grid supply failure
  - Auto Mode : Manual single button to be used for start and stop, reset operation sequence is programmed automatically
  - Test Service Mode : Facilitates testing of the unit under supervision, for service or default detection
- All operating parameters & safety limits can be pre set as per customer application

Standard Microprocessor Panel

LCD and Key Pad of Microprocessor

Displays with diagnostic capabilities

- Digital Display of all vital parameters such as
  - Room temperature
  - Suction, Discharge & Oil Pressure of compressor
  - Current
  - Voltage
  - Compressor run hours

Capacity Control & reduction in energy consumption

- The electronic temperature sensor measures the temperature precisely and provide feedbacks to microprocessor. Based on this precise data and actual load requirements, microprocessor monitors individual compressor ON/OFF cycling for optimum operation to best effeciency of the plant

Safety & Protection

- Microcomputer Motor Protction device (µMPD) and Microcomputer Voltage Protection Device (µVPD) protect condensing unit from phase unbalance, phase loss, phase reversal, overload, under/over voltage and supply failure
- Programmed safety features available using sensitive, accurate temperature transducers & pressure switches which protects the system from:
  - High Pressure
  - Anti Recycle
  - Low Room Air Temperature
  - Low Pressure
  - Sensor Error
- Maintenance trip for compressor 50 hours before completion of 8000 hours of operation
- Alarm history of last 5 faults with date, time and cause of failure

Optional Features offered

- Dual mode chillers for thermal storage system
- Communication port RS 485 for remote connectivity, status and fault indication
- Advanced BMS compatibility with ASCII or RTu MODBUS protocol can be linked to Integrated Building Management Systems (IBMS)
- Limited hardware BMS for remote control and operation

AIR-COOLED SCROLL CONDENSING UNIT

TECHNICAL DATA SHEET (R 22)

UNIT MODEL	ACUS013DMN1X1	ACUS026DMN2X1	ACUS039DMN3X1	ACUS052DMN2X2	ACUS078DMN3X2
*Nominal cooling capacity -TR	13	26	39	52	78
COMPRESSOR					
Compressor type	Hermatic scroll				
Compressor model	SM185	SM185	SM185	SM185	SM185
Compressor qty.	1	2	3	4	6
RPM	2900	2900	2900	2900	2900
Unit capacity reduction steps in %	100	100 /50	100 /66/33	100 /75/50/25	100 /83.3/66.7/ 50/33.3/16.7
Oil type	Mineral / 160 P				
Oil charge / compr (Ltr.)	6.6	6.6	6.6	6.6	6.6
Unit max. starting current -amps at 400 volts	175	206.6	231.6	263.2	319.8
Max. allowable operating current per compr. -amps at 400Volts	35	35	35	35	35
CONDENSER					
Condenser module	9AB12	9AV20-16FPI	9AV35-3ckt 16FPI	9AV20-16FPI	9AV20-16FPI
Condenser module XQTY.	1	1	1	2	3
Fan qty.	4	2	2	4	6
Total CFM	10,000	26,000	24,000	52,000	78,000
UNIT DIMENSION & WEIGHTS					
Length.(MM)	2400	2536	2536	2642	3710
Width .(MM)	650	1270	1270	2236	2236
Height.(MM)	1390	2310	2310	2335	2335
Operating Wt. (KG.)	1035	1343	1675	2386	3280

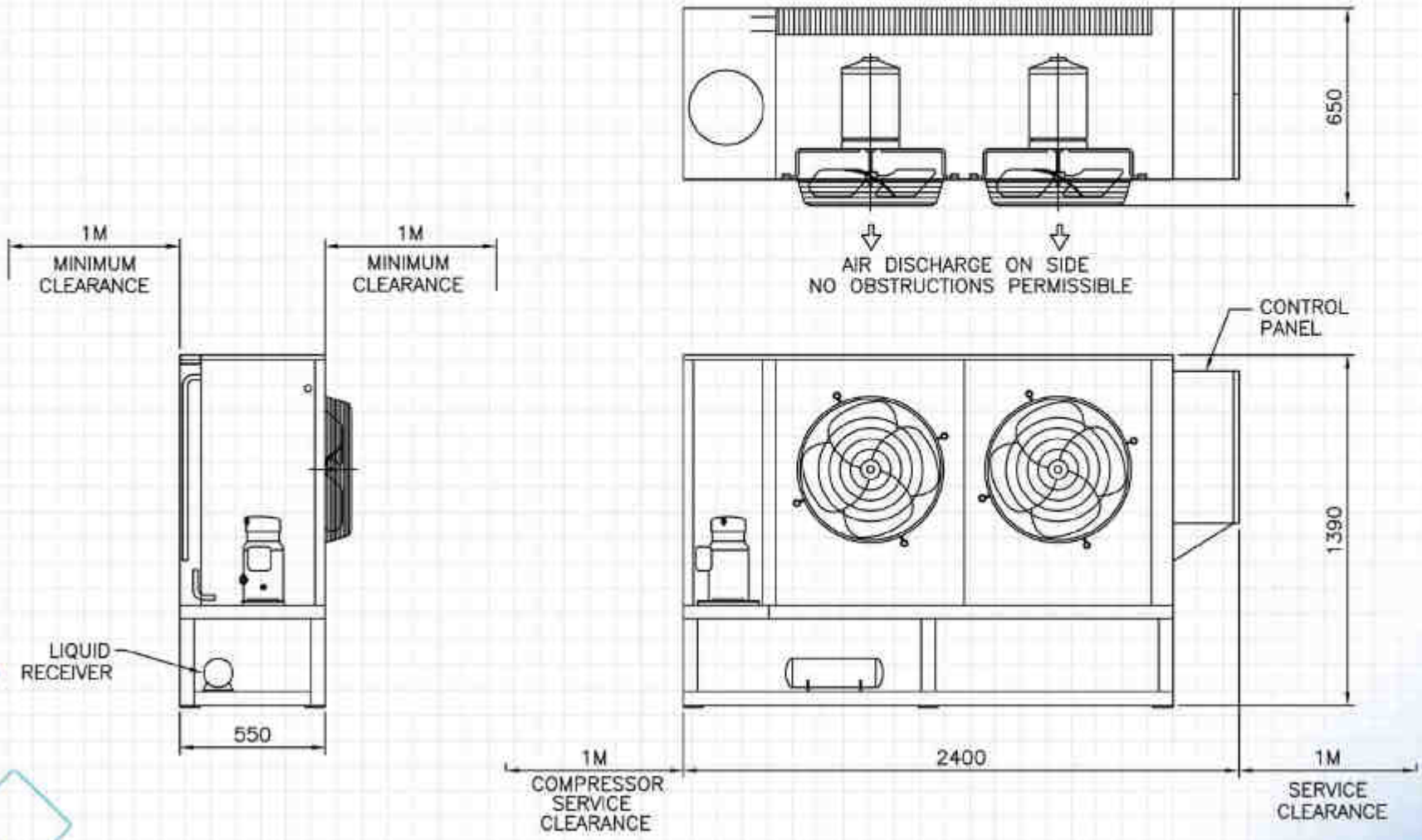
*Capacity rated at design ambient of 35 °C and for SST of 7.2 35 °C

Power & control supply voltage is 340 - 440 V & 210-240 V respectively and frequency 50Hz

Note : For higher ambient application pl. refer to EM&R BG Engg.

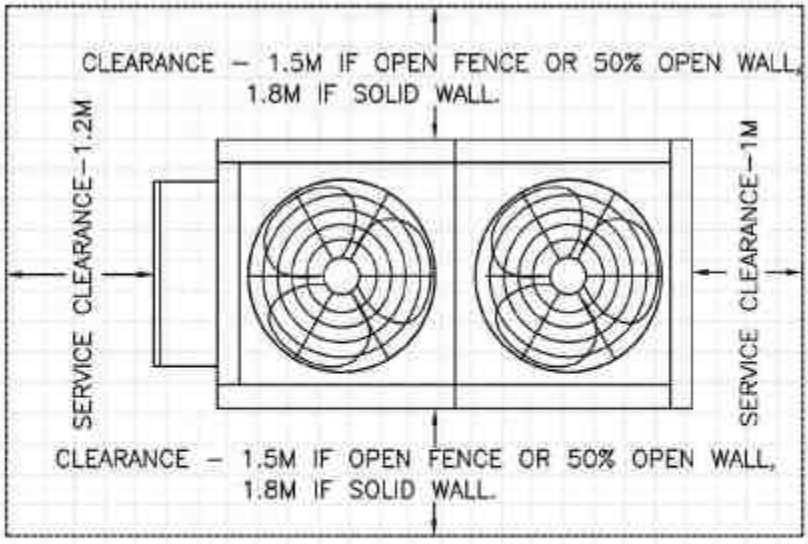
G. A DRAWING OF A/C SCROLL CONDENSING UNIT

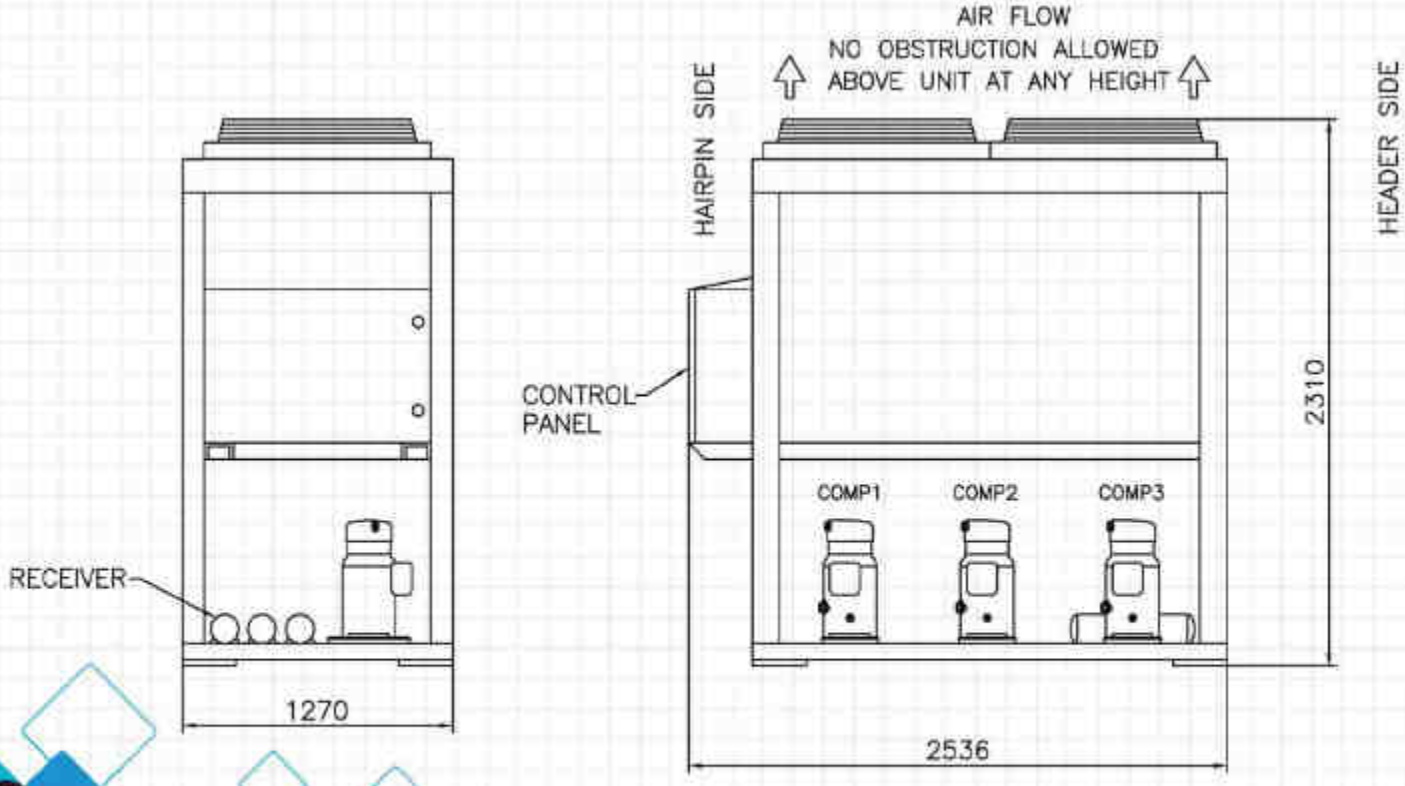
MODEL	ACUS013DMN1X1
COND.COIL	9AB12 – 1 NO.
COMPRESSOR	1x SM185
FANxHPXQTY.	ø24"X0.5X2 NOS.



G. A DRAWING OF A/C SCROLL CONDENSING UNIT

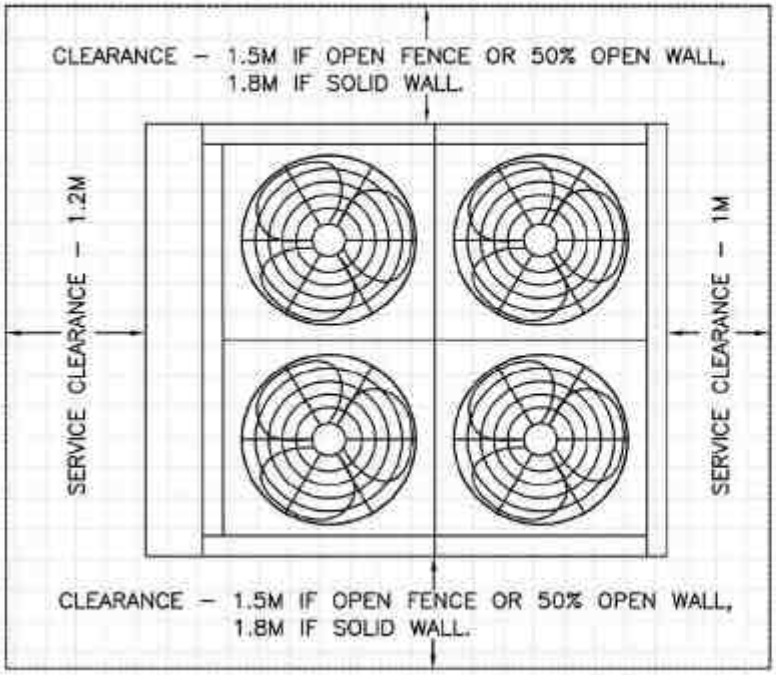
MODEL	ACUS026DMN2X1	ACUS039DMN3X1
COND.COIL	1x9AV20	1x9AV35-3CKT
COMPRESSOR	2XSM185	3XSM185
FANxHPXQTY.	ø34x3x2	ø34x3x2

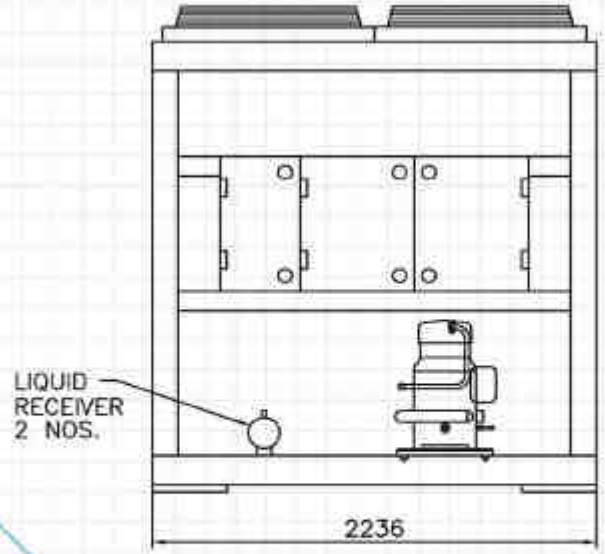


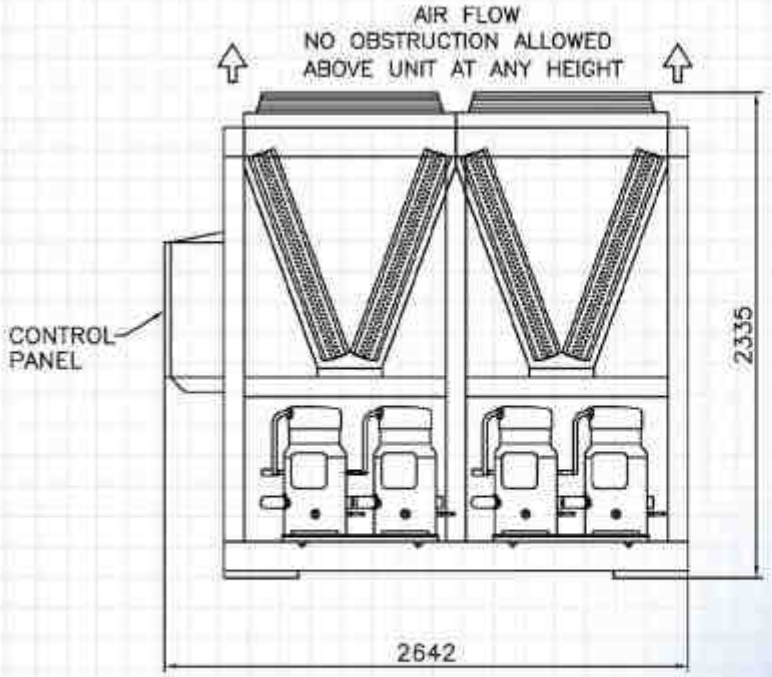


G. A DRAWING OF A/C SCROLL CONDENSING UNIT

MODEL	ACUS052DMN2X2
COND.COIL	2x9AV20
COMPRESSOR	4XSM185
FANxHPXQTY.	ø34x3x4

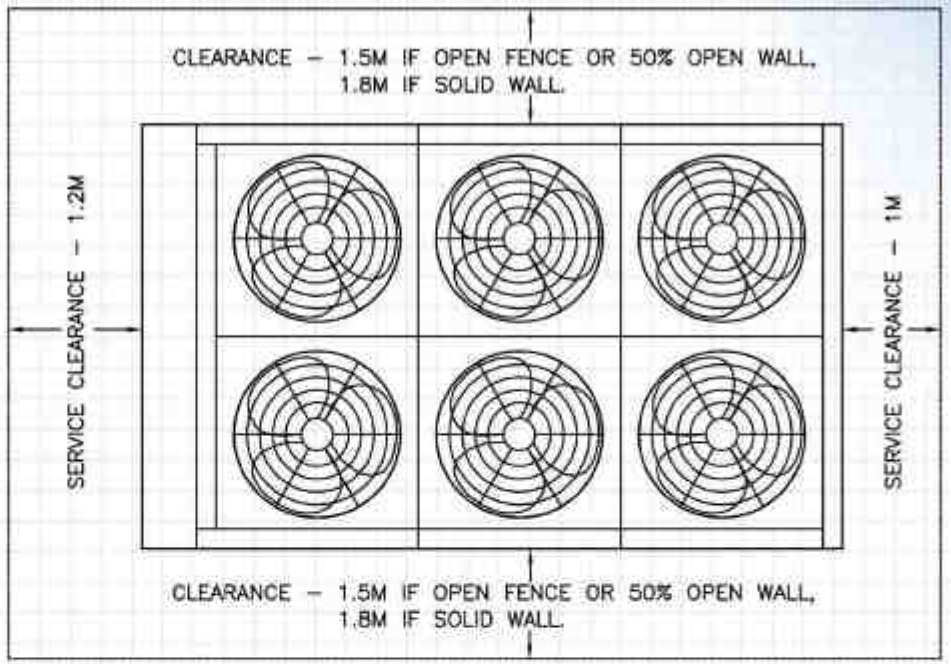


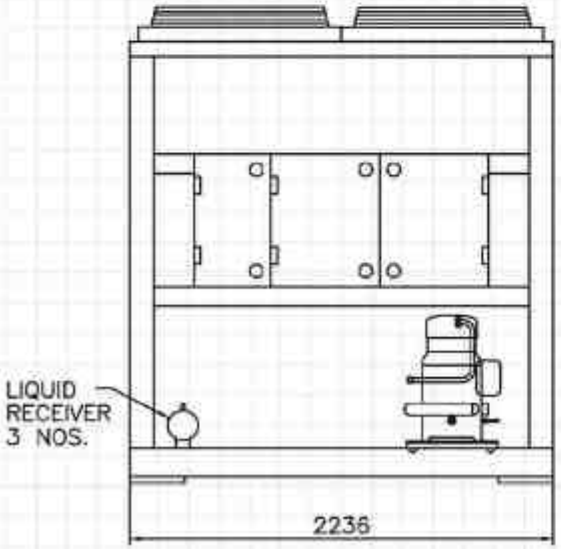


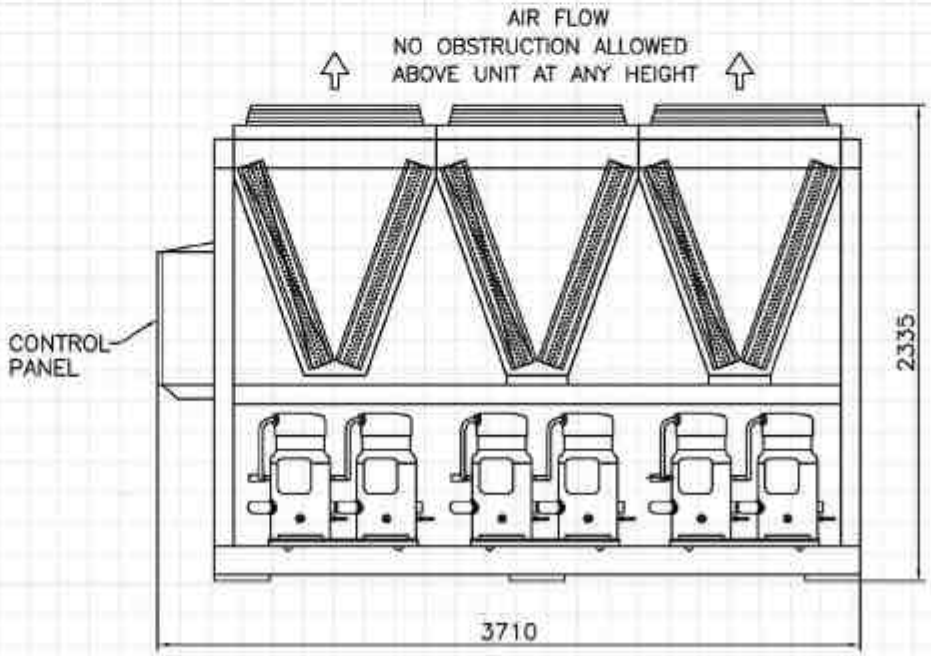


G. A DRAWING OF A/C SCROLL CONDENSING UNIT

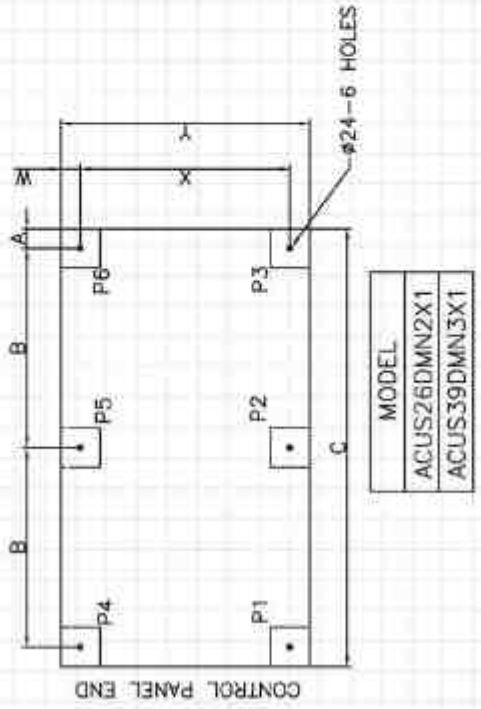
EQUIPMENT	MODEL
	ACUS078DMN3X2
COND.COIL	3x9AV20
COMPRESSOR	6XSM185
FANxHPXQTY.	ø34x3x6



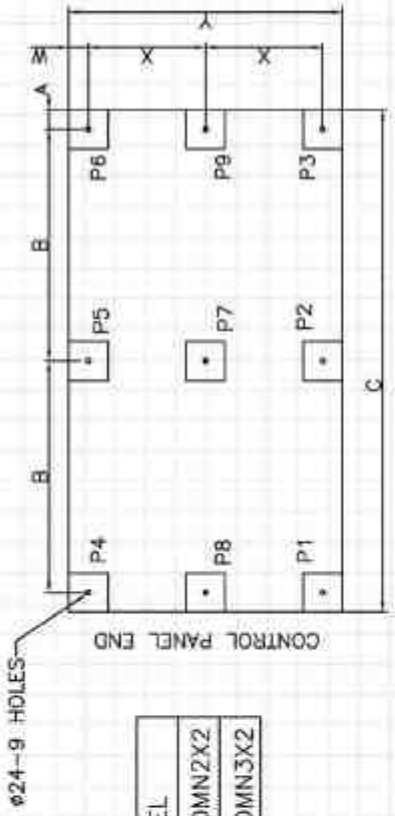




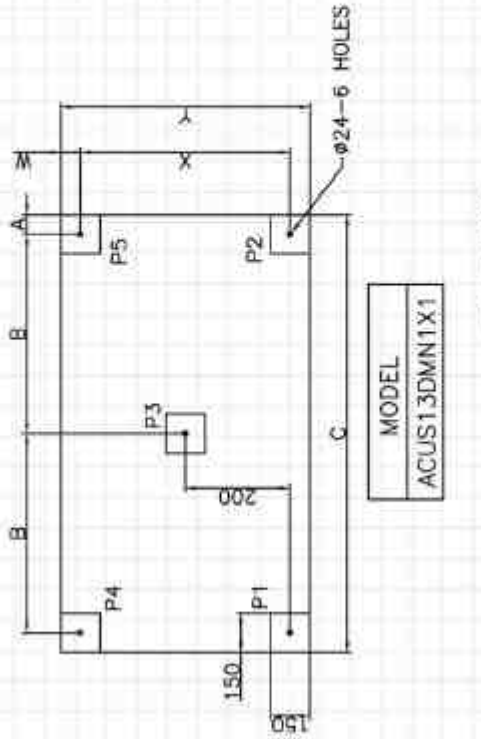
POINT LOAD DIAGRAM OF A/C SCROLL CONDENSING UNIT



MODEL
ACUS26DMN2X1
ACUS39DMN3X1



MODEL
ACUS052DMN2X2
ACUS078DMN3X2



MODEL
ACUS13DMN1X1

MODEL	PAD LOCATION IN MM.						LOAD PER POINT — KG.								
	A	B	C	W	X	Y	P1	P2	P3	P4	P5	P6	P7	P8	P9
ACUS013DMN1X1	75	975	2100	75	400	550	180	180	240	210	195	—	—	—	—
ACUS026DMN2X1	75	1043	2236	75	1120	1270	157	137	108	157	152	167	467	—	—
ACUS039DMN3X1	75	1043	2236	75	1120	1270	255	110	100	260	210	190	550	—	—
ACUS052DMN2X2	100	1068	2336	100	1018	2236	254	254	254	254	254	254	354	254	254
ACUS078DMN3X2	100	1603	3406	100	1018	2236	370	370	370	370	370	370	370	345	345

WATER-COOLED SCROLL CONDENSING UNIT

TECHNICAL DATA SHEET (R 22)					
UNIT MODEL	WCUS014DMN1X1	WCUS028DMN2X1	WCUS042DMN3X1	WCUS056DMN2X2	WCUS084DMN3X2
*Nominal cooling capacity -TR	14	28	42	56	84
COMPRESSOR					
Compressor Typee	Hermatic scrol				
Compressor model	SM185	SM185	SM185	SM185	SM185
Compressor qty.	1	2	3	4	6
RPM	2900	2900	2900	2900	2900
Unit capacity reduction steps in %	100.00	100/ 50	100/ 66/33	100 /75/50/25	100/83.3/66.7 /50/33.3/16.7
Oil type	Mineral / 160 P				
Oil charge/compr.,Liter	6.6	6.6	6.6	6.6	6.6
Unit starting current -amps at 400 volts	175	206.6	231.6	263.2	319.8
Max. allowable operating current per compr. -amps at 400volts	35	35	35	35	35
CONDENSER					
Condenser Module	09018TX -4P	09018TX -4P	09018TX -4P	9036	9036
Condenser module qty/unit	1	2	3	2	3
Cond. Water flow rate (USGPM)	54	108	162	216	324
UNIT DIMENSION & WEIGHTS					
Length.(MM)	1316	1500	1900	2500	2500
Width.(MM)	500	850	850	850	1300
Height.(MM)	1120	1150	1150	1400	1500
Operating wt.(KG)	661	1072	1450	1580	2352

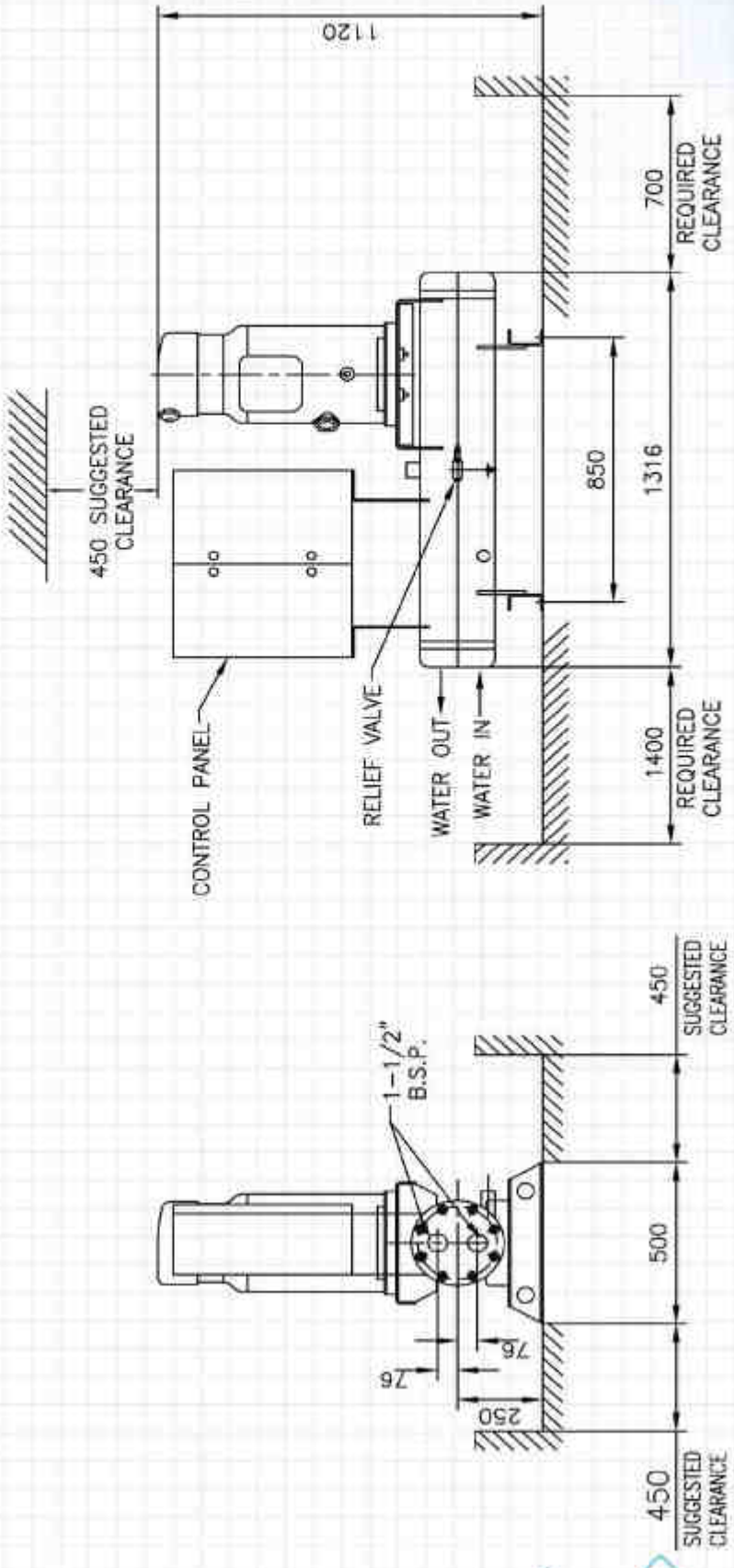
*Capacity rated at design condenser water inlet temp.of 32 °C,water side fouling factor of 0.000044 m2.deg.C/W & for SST of 7.2 °C ;

Power & control supply voltage is 340 - 440 V & 210-240 V respectively and frequency 50Hz

Note : For higher ambient application pl. refer to EM&R BG Engg.

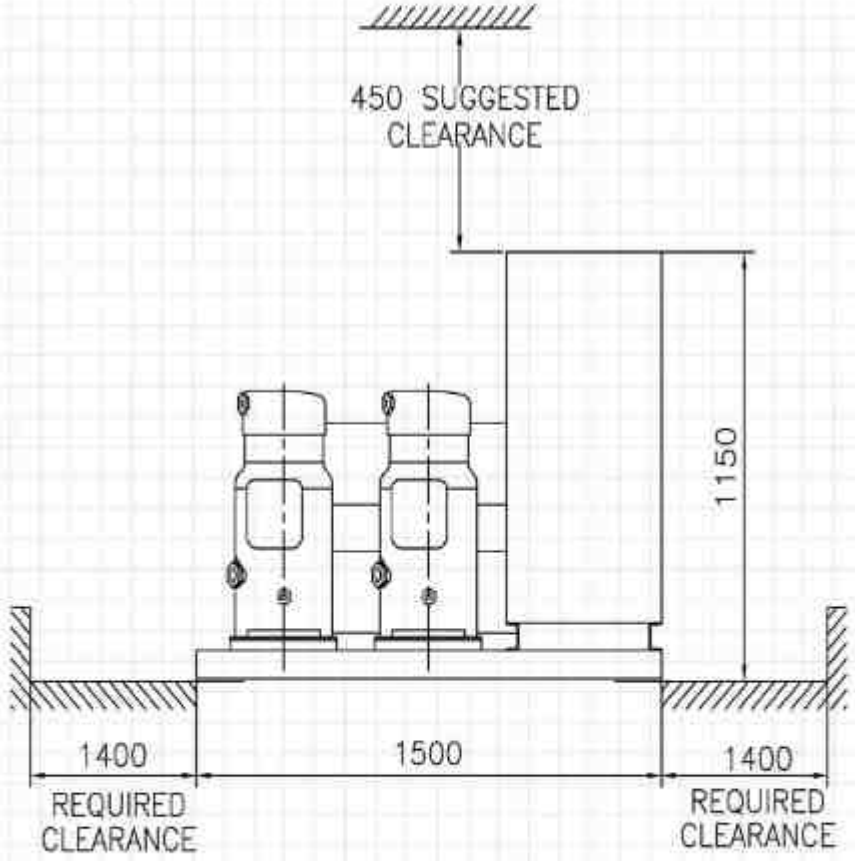
G. A DRAWING OF W/C SCROLL CONDENSING UNIT

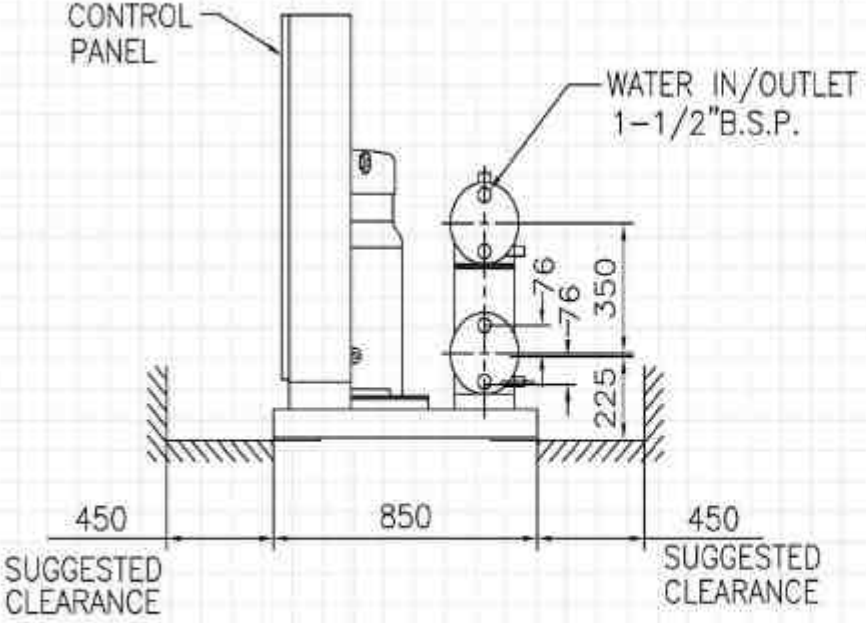
MODEL	WCUS014DMN1X1
CONDENSER W/C	1x09018TX-4P
COMPRESSOR	1xSM185



G. A DRAWING OF W/C SCROLL CONDENSING UNIT

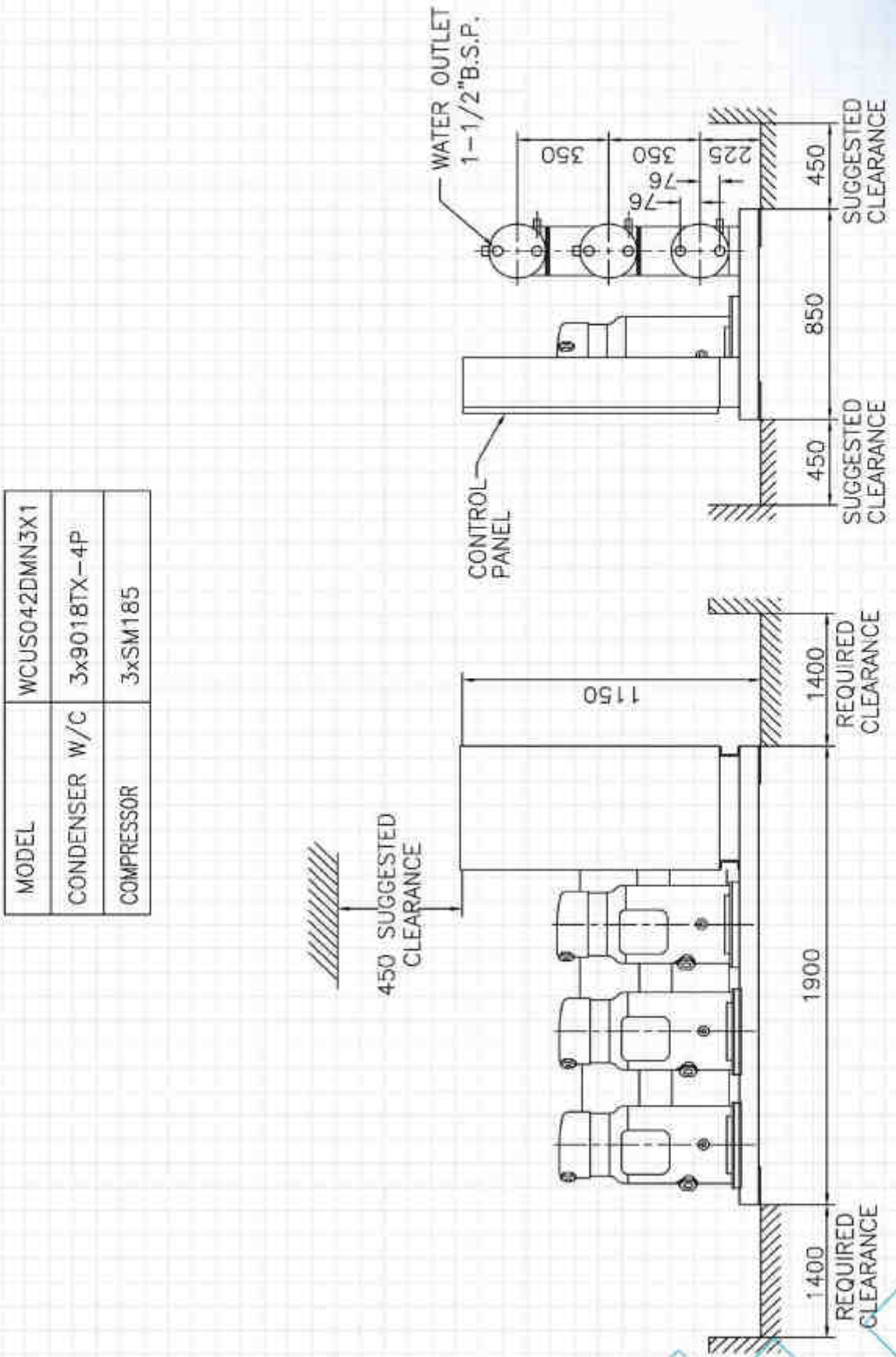
MODEL	WCUS028DMN2X1
CONDENSER W/C	2x9018TX-4P
COMPRESSOR	2xSM185





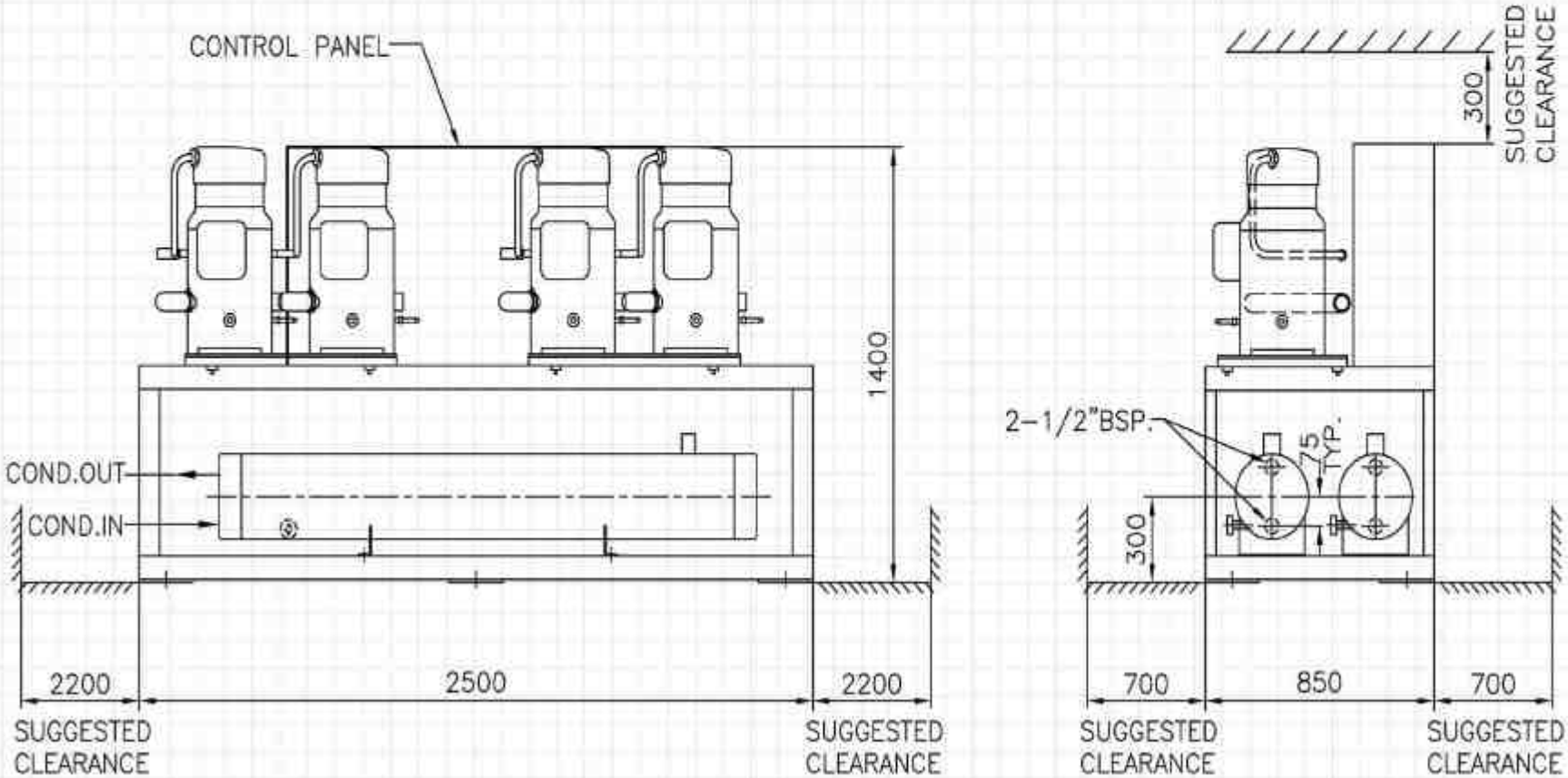
G. A DRAWING OF W/C SCROLL CONDENSING UNIT

MODEL	WCUS042DMN3X1
CONDENSER W/C	3x9018TX-4P
COMPRESSOR	3xSM185



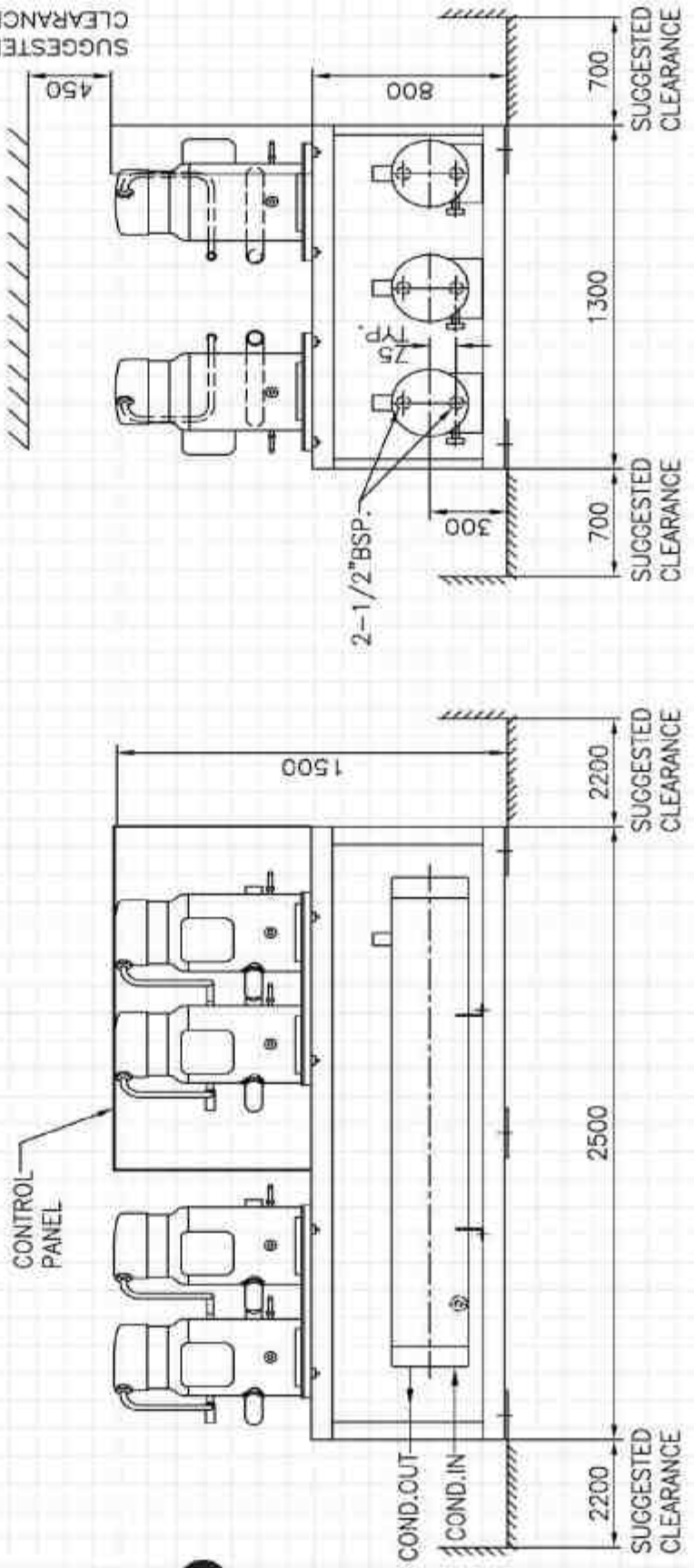
G. A DRAWING OF W/C RECIPROCATING CONDENSING UNIT

MODEL	WCUS056DMN2X2
CONDENSER W/C	2x09036
COMPRESSOR	4XSM185

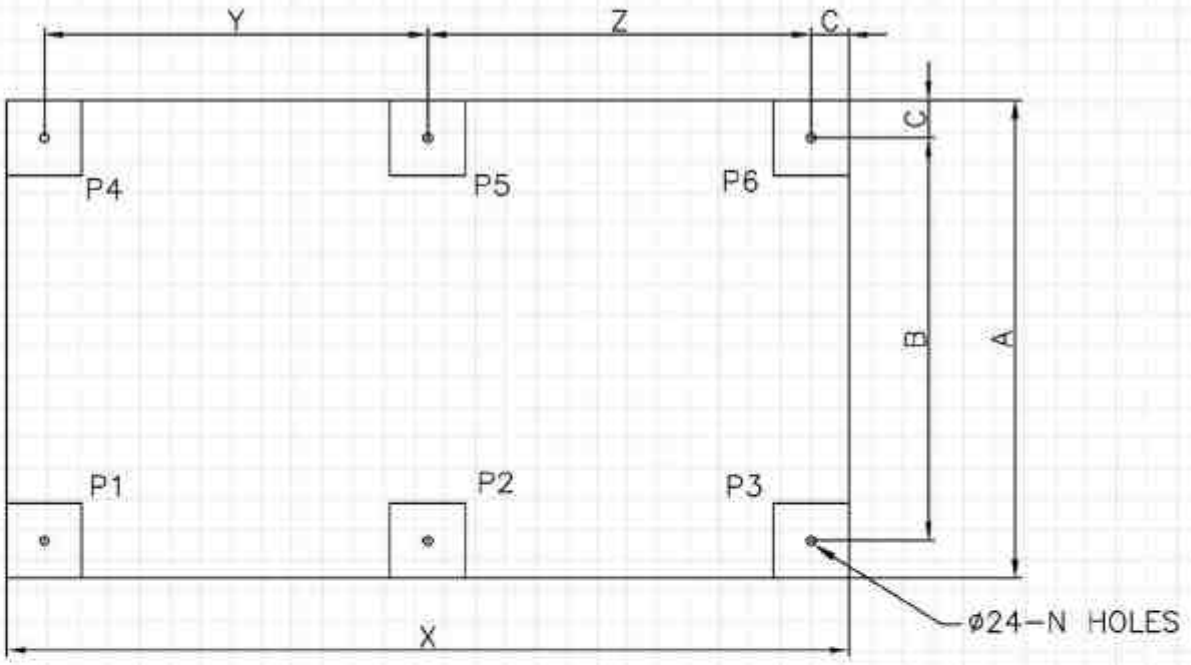


G. A DRAWING OF W/C RECIPROCATING CONDENSING UNIT

MODEL	WCUS084DMN3X2
CONDENSER W/C	3x09036
COMPRESSOR	6XSM185



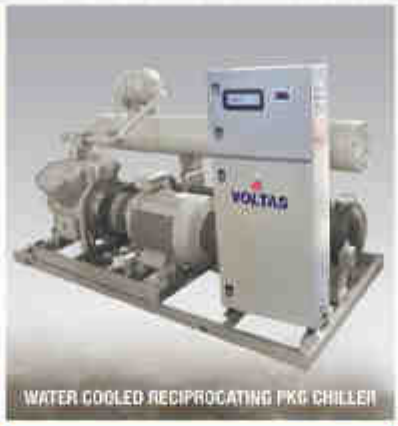
POINT LOAD DIAGRAM OF W/C RECIPROCATING CONDENSING UNIT

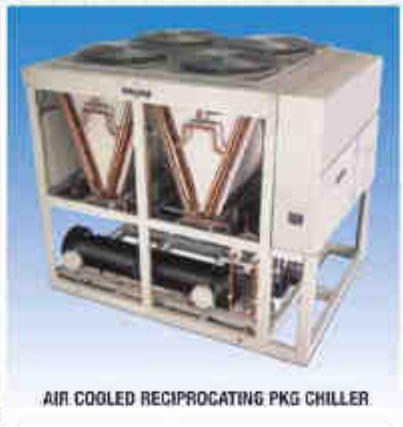


MODEL	LOAD PER POINT — KG.												
	A	B	C	X	Y	Z	N	P1	P2	P3	P4	P5	P6
WCUS014DMN1X1	—	400	—	—	850	—	4	164	—	159	159	—	179
WCUS028DMN2X1	850	700	75	1500	1350	—	4	258	—	258	278	—	278
WCUS042DMN3X1	850	700	75	1900	875	875	6	245	175	245	290	215	280
WCUS056DMN2X2	850	650	100	2500	1075	1075	6	280	330	280	230	230	230
WCUS084DMN3X2	1300	1100	100	2500	1150	1150	6	417	417	417	417	367	317

HVAC PRODUCT RANGE

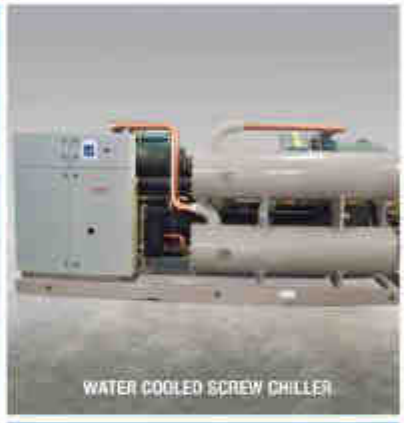

AIR COOLED SCROLL PKG CHILLER


WATER COOLED RECIPROCATING PKG CHILLER


AIR COOLED RECIPROCATING PKG CHILLER


ENERGY EFFICIENT
AIR COOLED SCREW CHILLER


ENERGY EFFICIENT
WATER COOLED SCREW CHILLER


WATER COOLED SCREW CHILLER


WATER COOLED SCROLL CHILLER


CO-GEN VAPOUR ABSORPTION MACHINE (VAM)


DOUBLE EFFECT VAM


PACKAGED & DUCTABLE SPLIT UNITS


VARIABLE REFRIGERANT FLOW SYSTEM (VRF)


AIR HANDLING UNIT (AHU)

ALL INDIA CONTACT NUMBERS

OFFICE	TELEPHONE	FAX
NORTHERN REGION		
DELHI (Branch)	011 66505550	66505697
	011 66505570	26950081
Chandigarh	0172 2663669	2604625
Gurgaon	0124 5060504	
Jaipur	0141 25179983	2213728
Jalandhar	0181 2227687	
LUCKNOW (Branch)	0522 2238538	2238532
	0522 2237856	
Dehradun	0135 2750401	
WESTERN REGION		
AHMEDABAD (Branch)	079 66301107	66301199
	079 66301108	
Ankleshwar	02646 238199	
Rajkot	0281 2578124	
Silvassa	0260 2640363	
Surat	0261 2422761	
Vadodara	0265 2351706	2332098
MUMBAI (Branch)	022 66656757	66656797
	022 66656761	66656768
Goa	0832 2463664	
Indore	0731 2498616	
Nagpur	0712 5618846	
Nasik	0253 2455169	
PUNE (Branch)	020 66046602	66046600
	020 66046603-5	66046601
Aurangabad	0240 2320510	

OFFICE	TELEPHONE	FAX
EASTERN REGION		
JAMSHEDPUR (Branch)	0657 2431062	2432201
	0657 2434322	
Patna	0612 2232717	
Raipur	0771 5059303	
KOLKATA (Branch)	033 66266283	22300108
	033 66266264	
Bhubaneshwar	09437178427	
Cuttack	0671 2332366	
Guwahati	0361 2340519	
SOUTHERN REGION		
BANGALORE (Branch)	080 67132500	22270172
	080 67132504	22998508
Mangalore	0824 2453316	
CHENNAI (Branch)	044 66760349	24342178
	044 66760375	
Coimbatore	0422 2241188	2218771
	0422 2244384	
Madurai	0452 2535818	
HYDERABAD (Branch)	040 66500407	66203882
	040 66500451	
Vijaywada	0866 2435282	2431507
Vishakhapatnam	0891 2754051	2570864
	0891 2754665	
KOCHI (Branch)	0484 2359621	2357129
	0484 2359648	
Calicut	0495 2770503	
Thiruvananthapuram	0471 2338873	

Backed by Voltas countrywide after sales service.

VOLTAS

INTEGRATING SYSTEMS.

INCOMPARABLE VALUE.

www.voltas.com

Voltas Limited, Electro-mechanical & Refrigeration Business Group.

Voltas House 'B', T. B. Kadam Marg, Chinchpokli, Mumbai-400 033, India. Tel: +91 22 6665 6666

A TATA Product

VOLTAS

Air-Cooled Scroll Chillers

with refrigerant R407C & R22

VOLTAS

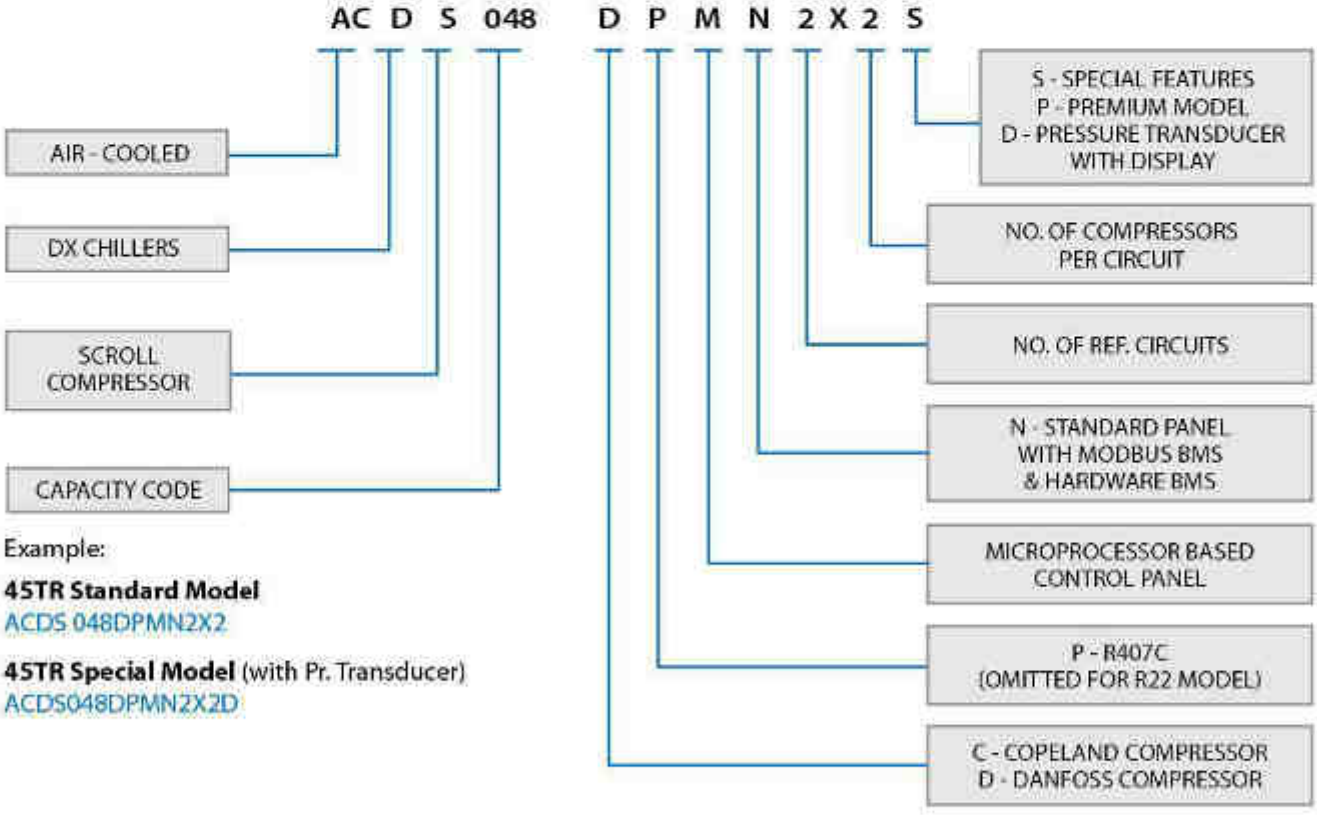
AIR-COOLED SCROLL CHILLER

Voltas is the pioneer and a leading provider of integrated end-to-end solutions in the field of electromechanical and refrigeration. We are committed to provide customers with technology that suits their needs and have introduced a wide variety of air-cooled and water-cooled scroll chillers with R 22 and R 407 C refrigerant options.

With ISO 9001 standard certified factories, Voltas possesses total capability in the manufacture of scroll chillers. These chillers are available in a wide range of capacities from 12 TR to 90 TR. They are easy to install and commission and can handle varying cooling requirements, aided by multiple compressor configurations.

Voltas scroll chillers have become an ideal choice for various air conditioning applications including, office spaces, banks, hotels, hospitals, shopping malls, multiplexes, commercial complexes and process cooling requirements.

MODEL NOMENCLATURE



Example:

45TR Standard Model
ACDS 048DPMN2X2

45TR Special Model (with Pr. Transducer)
ACDS048DPMN2X2D

FEATURES

- Scroll Compressor with R 22 & R 407 C Refrigerant Options
- Energy Efficiency
- Modular Design
- Application Flexibility
- Low Noise & compact
- Easy-to-use Microprocessor Panel & Controls

POWERFUL FEATURES:

Voltas chillers are available in a wide range of models, with R 407C & R 22 refrigerants.

SCROLL CHILLERS								
Air - Cooled Chillers (Nominal Capacity)								
R407C	11 TR	22 TR	34 TR	45 TR	56 TR	68 TR	75 TR	87 TR
R22	12 TR	24 TR	36 TR	48 TR	60 TR	72 TR	80 TR	90 TR

Energy Efficiency

A range of sophisticated components such as highly energy efficient imported compressor, superior design of water- cooled condenser & chiller , internally grooved, cross-hatched copper tube coil with matched circuitry, and a microprocessor controller, results in low power consumption.

Higher energy efficiency – Tandem compressor models

Scroll chillers from 48 TR to 90 TR use compressors operating in tandem. This improves the operating efficiency during part load periods, since the entire condenser area is utilized for the heat rejection even though only one compressor may be in operation.

Capacity Modulation

Multiple compressors are used in most of the models, with independent refrigerant circuits. The microprocessor controller ensures that only the required number of compressors operate during part load conditions, there by saving power.

Operating Reliability

The compressor is a no contact scroll design with the motor cooled by the suction gas. Higher capacity scroll chillers use tandem compressors with suction gas distribution restrictor which allows balanced operation of compressor. The chillers are charged & tested in the factory prior to despatch ,enhancing operating reliability.

Quiet Operations

The chillers use ultra quiet, high efficiency scroll compressors. The condenser fans are designed for low noise levels.

Easy to install

The chillers are pre-wired, fully charged and run tested at the factory, saving installation and start up time.

Voltas Countrywide After Sales Service

A nationwide service networks backs every unit. After the initial warranty period, Voltas offers annual service schemes. More than 90% of the customers have opted for these schemes. You cannot get a better insurance.

MICROPROCESSOR - BASED CONTROLLER

Specially designed controller has multiple features with following benefits:

Touch Screen

Three modes of operation :

- **Local mode :** Start / Stop & control through
- **Remote mode :** Remote Start / Stop through Digital input connected through cables.
- **BMS Mode :** Remote data access through MODBUS RTU protocol. Available communication port RS485 can be linked to Building Management System (BMS).
- **MMI :** Touch Pad / Key Pad with 32 character LCD Display.

Equalization of Compressor Runtime :

- The Micro processor Controller ensures equal running of compressors in multiple compressors units. This ensures longer life of compressors.

Safety & Protection :

- Microcomputer Motor Protection Device **(MPD)** : Protects chiller from
  - *Phase unbalance* • *Phase loss* • *Phase reversal* • *Overload* • *Underload*

- Microcomputer Voltage Protection Device **(VPD)** : Protects chiller from
  - *Phase loss* • *Phase reversal*

- Safety features protect the system from :
  - *Freezing* • *Low Pressure* • *Anti Recycle* • *Low Chilled Water Temperature*
  - *High Pressure* • *Sensor Error* • *Low Water Flow in condenser, Chiller*

Touch Pad :

- Provides user friendly interface with graphical display
- Gives visual annunciation for safety trips
- Sturdy design for all environment
  - *4.3" Resistive Touch Screen* • *65536 colours TFT - LCD Display* • *Resolution : 480 x 272*
  - *Humidity : 10% - 85% non condensing* • *Operating Temperature : -20°C to + 60°C*
  - *Protection level : IP55 (surface)*

Self diagnosis Function

- Digital Display of all digital inputs & output such as Outlet temperature for Chillers, Current, Voltage & Compressor run hours, low water flow, etc.
- Diagnose mode for easy trouble shooting – shows alarm history for the last 100 trips with Date, Time & Cause of failure.

Controls & Interlocks

- The chilled water pump is interlock with compressors.
- The safety controls are preset at factory while operating controls are field adjustable, depending on actual operating requirements.

Optional Features:

- Dual-mode chillers for thermal storage system.
- Condenser Coil with anti-corrosion coating.
- Suction & discharge pressure transducers & pressure display.
- Control Panel as per NEMA standard.

TECHNICAL DATA A/C SCROLL CHP (R407C)								
Unit Model No.	ACDS 012DPMN 1X1	ACDS 024DPMN 2X1	ACDS 036DPMN 3X1	ACDS 048DPMN 2X2	ACDS 060DPMN 3X1	ACDS 072DPMN 3X2	ACDS 080DPMN 2X2	ACDS 090DPMN 2X2
* Nom. Capacity (TR)	11	22	34	45	56	68	75	87
COMPRESSOR								
Compressor Type	Hermatic Scroll							
Compressor Qty.	1	2	3	4	3	6	4	4
Rpm	2900	2900	2900	2900	2900	2900	2900	2900
Unit Capacity Reduction Steps in %	100/50	100/50	100/66.7/33.3	100/75/50/25	100/66.7/33.3	100/83.3/66.7 /50/33.3/16.7	100/75/50/25	100/75/50/25
Max. Allowable Operating Current Per Compr. (Amps At 400 volts)	35	35	35	35	69	35	69	72
Operating Current per Compr.- Amps	23	23	23	23	37	23	37	44
EVAPORATOR								
Evaporator Type	Shell & Tube - DX							
Water Flow Rate (USgpm)	29	59	90	120	149	180	200	225
**Water Nozzle Size NB (mm)	65	65	80	100	100	125	125	150
CONDENSER								
Condenser Type	Fin & Tube							
Fan Qty.	2	2	2	4	4	4	4	6
Total CFM	11,000	22,000	26,000	42,000	44,000	48,000	52,000	66,000
UNIT DIMENSION								
Length (mm)	2500	2535	2535	2625	2625	2625	2625	3900
Width (mm)	650	1270	1270	2236	2236	2236	2236	2236
Height (mm)	1400	2340	2340	2340	2400	2440	2400	2400

Note1 : *Capacity rated for evap. inlet water temp 12° C, leaving water temp 7° C & and at design ambient of 35° C. Evap. Water side fouling factor of 0.000018 m²°C/W.
Power & control supply voltage is 360 - 440 V & 210-240 V respectively and frequency is 50Hz.

Note 2 : ** Size of water piping to be done at site to be determined based on operating tonnage & available pump head .

Note 3 : For chilled water outlet allowable temperature range is 5°C to 12°C. For other temperature, higher ambient / other duty / flow application please refer to Voltas Sales Team.

VOLTAS

AIR-COOLED SCROLL CHILLER

TECHNICAL DATA A/C SCROLL CHP (R22)								
Unit Model No.	ACDS 012DMN 1X1	ACDS 024DMN 2X1	ACDS 036DMN 3X1	ACDS 048DMN 2X2P	ACDS 060DMN 3X1	ACDS 072DMN 3X2	ACDS 080DMN 2X2	ACDS 090DMN 2X2P
* Nom. Capacity (TR)	12	24	36	48	60	72	80	90
COMPRESSOR								
Compressor Type	Hermatic Scroll							
Compressor Qty.	1	2	3	4	3	6	4	4
Rpm	2900	2900	2900	2900	2900	2900	2900	2900
Unit Capacity Reduction Steps in %	100/50	100/50	100/66.7/33.3	100/75/50/25	100/66.7/33.3	100/83.3/66.7 /50/33.3/16.7	100/75/50/25	100/75/50/25
Max. Allowable Operating Current Per Compr. (Amps At 400 volts)	35	35	35	35	69	35	69	72
Operating Current per Compr.- Amps	23	23	23	23	37	23	37	44
EVAPORATOR								
Evaporator Type	Shell & Tube - DX							
Water Flow Rate (USgpm)	32	64	96	128	160	192	213	237
**Water Nozzle Size NB (mm)	65	65	80	100	100	125	125	150
CONDENSER								
Condenser Type	Fin & Tube							
Fan Qty.	2	2	2	4	4	4	4	6
Total CFM	11,000	22,000	26,000	42,000	44,000	48,000	52,000	66,000
UNIT DIMENSION								
Length (mm)	2500	2535	2535	2625	2625	2625	2625	3900
Width (mm)	650	1270	1270	2236	2236	2236	2236	2236
Height (mm)	1400	2340	2340	2340	2400	2440	2400	2400

Note1 : *Capacity rated for evap. inlet water temp 12° C, leaving water temp 7° C & and at design ambient of 35° C. Evap. Water side fouling factor of 0.000018 m^2 °C/W.

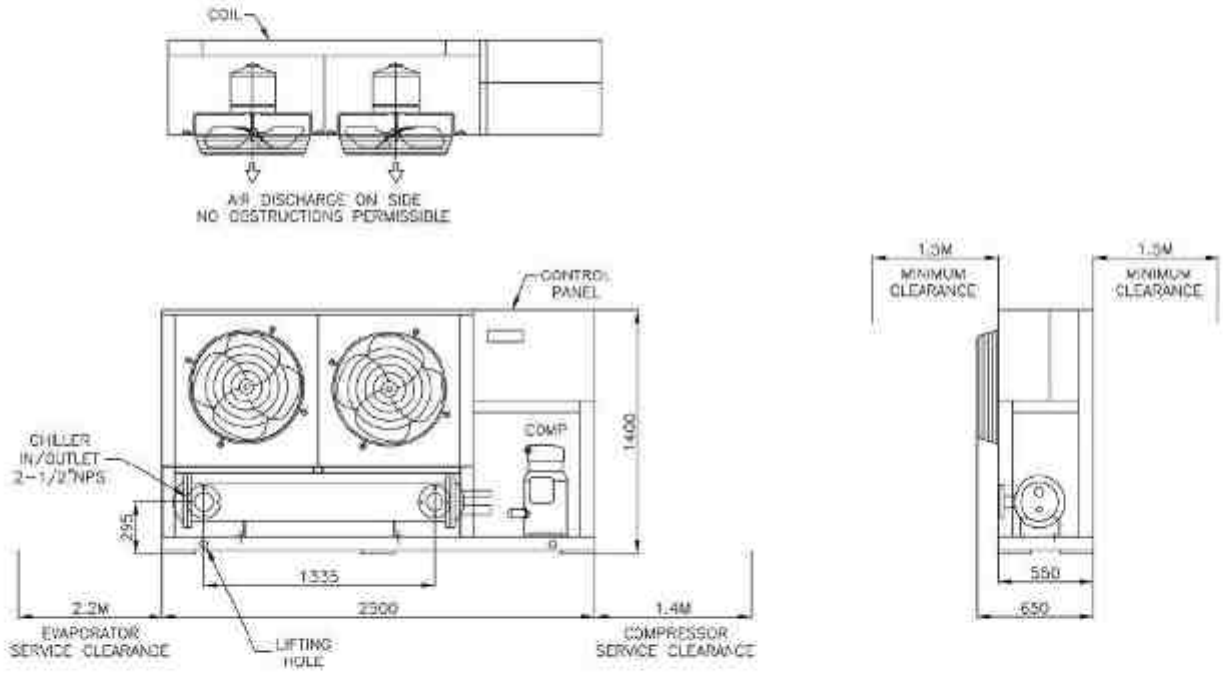
Power & control supply voltage is 360 - 440 V & 210-240 V respectively and frequency is 50Hz.

Note 2 : ** Size of water piping to be done at site to be determined based on operating tonnage & available pump head .

Note 3 : For chilled water outlet allowable temperature range is 5°C to 12°C. For other temperature, higher ambient / other duty / flow application please refer to Voltas Sales Team.

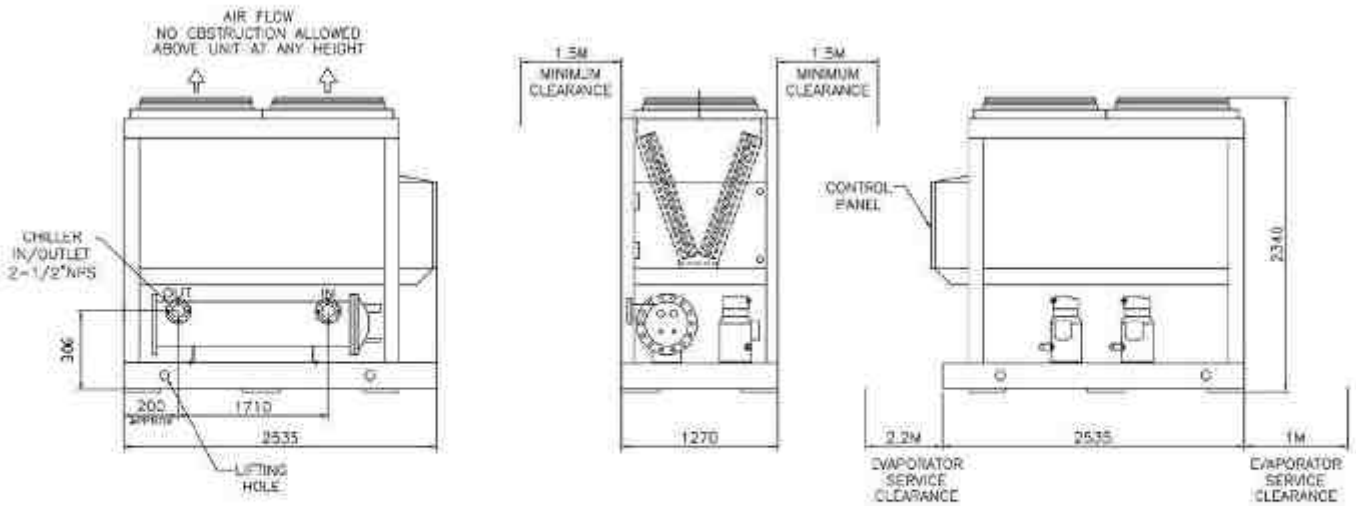
G. A DRAWING OF CHILLER PACKAGE MODEL

ACDS012DPMN1X1 | ACDS012DMN1X1



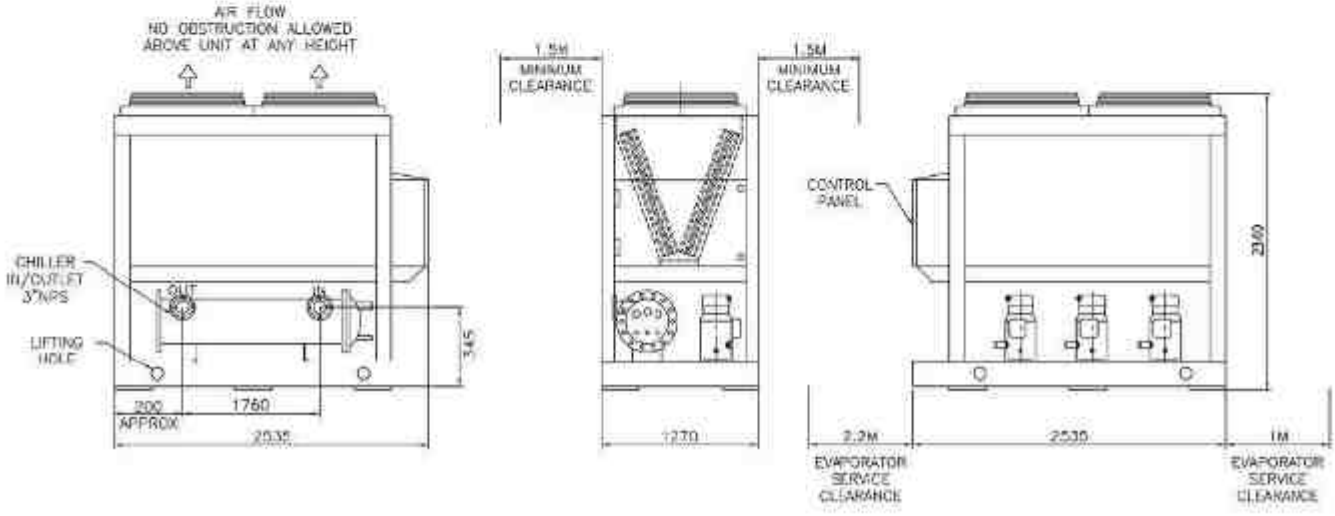
G. A DRAWING OF CHILLER PACKAGE MODEL

ACDS024DPMN2X1 | ACDS024DMN2X1



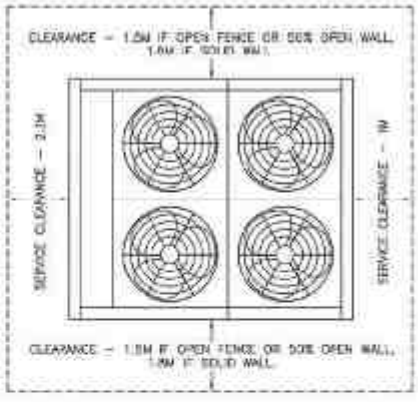
G. A DRAWING OF CHILLER PACKAGE MODEL

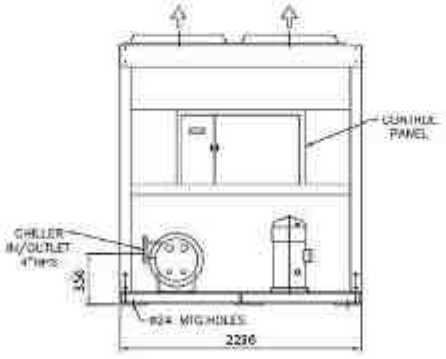
ACDS036DPMN3X1 | ACDS036DMN3X1

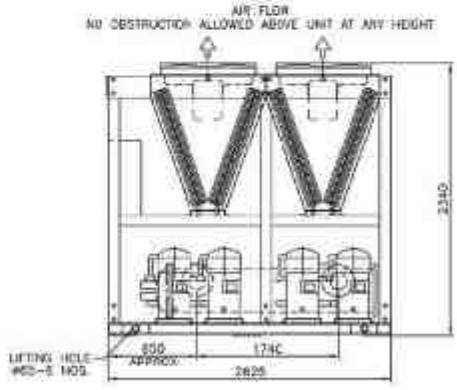


G. A DRAWING OF CHILLER PACKAGE MODEL

ACDS048DPMN2X2 | ACDS048DMN2X2P

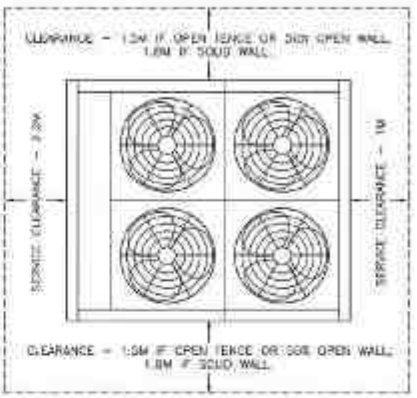


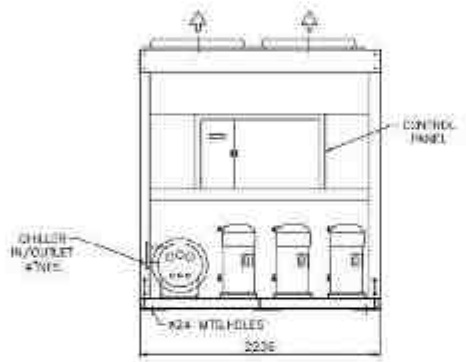


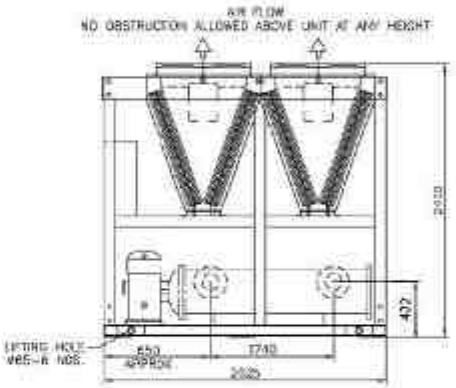


G. A DRAWING OF CHILLER PACKAGE MODEL

ACDS060DPMN3X1 | ACDS060DMN3X1

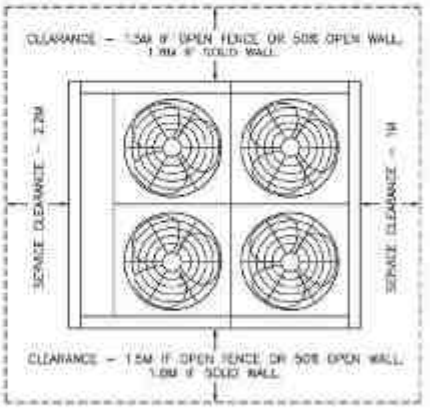


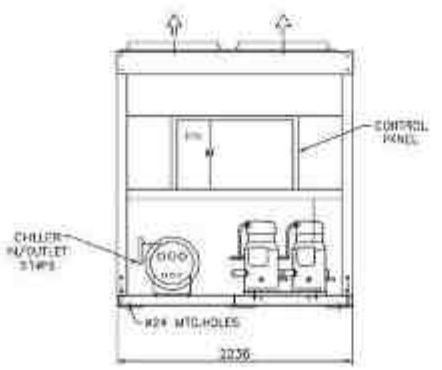


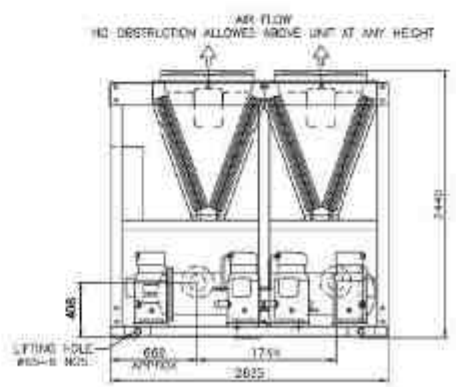


G. A DRAWING OF CHILLER PACKAGE MODEL

ACDS072DPMN3X2 | ACDS072DMN3X2

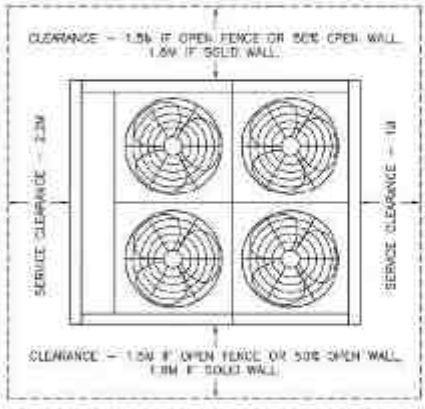


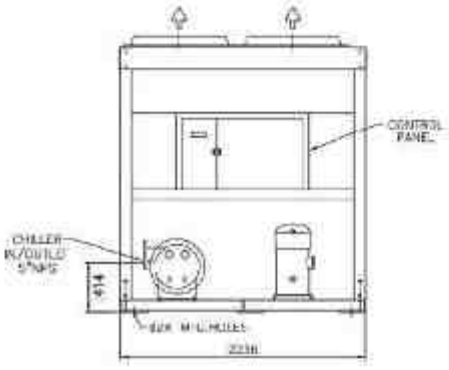


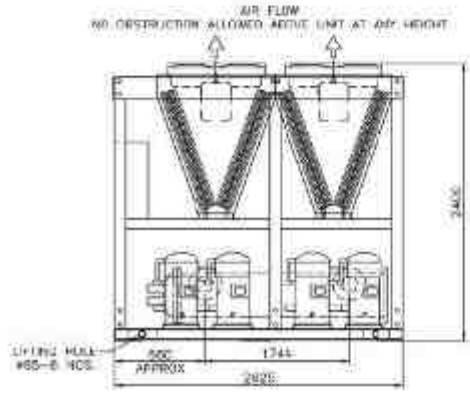


G. A DRAWING OF CHILLER PACKAGE MODEL

ACDS080DPMN2X2 | ACDS080DMN2X2

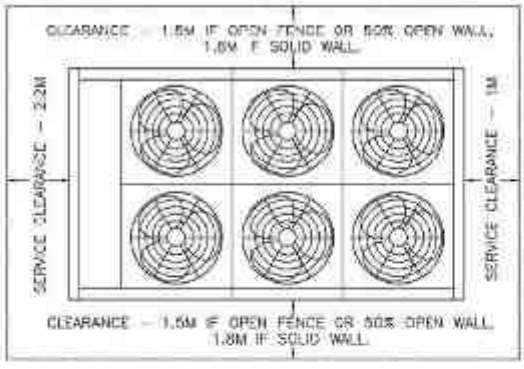


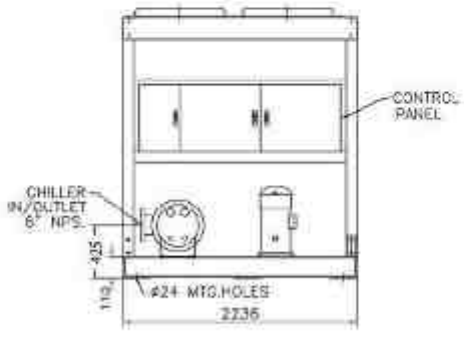


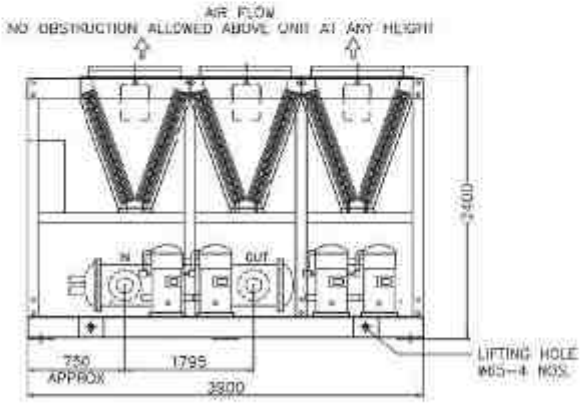


G. A DRAWING OF CHILLER PACKAGE MODEL

ACDS090DPMN2X2 | ACDS090DMN2X2P

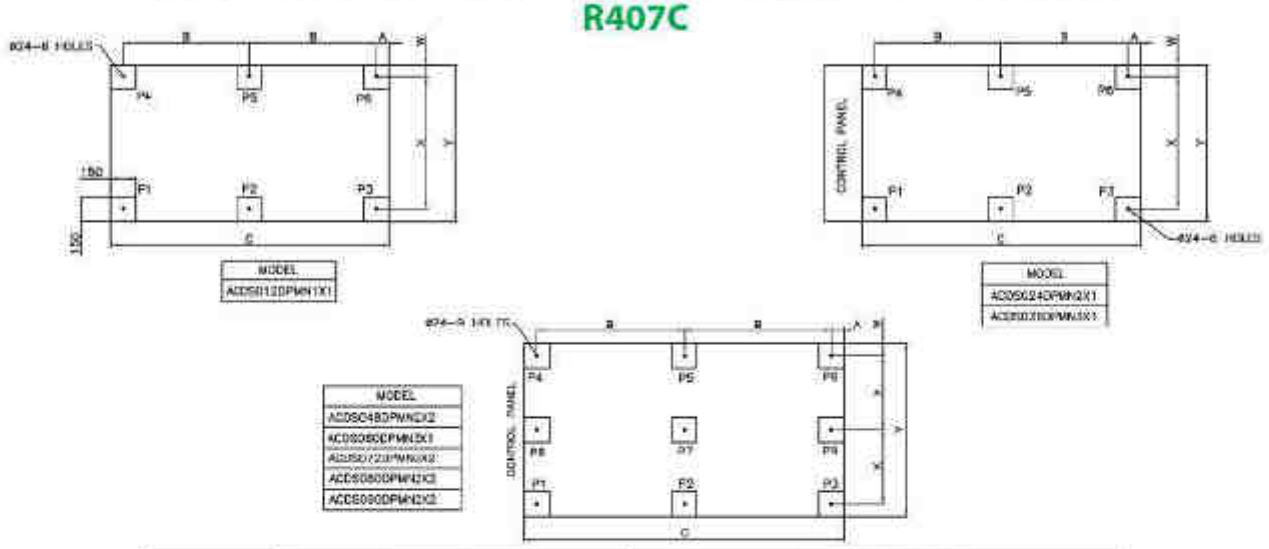






POINT LOAD DRAWING OF AIR-COOLED SCROLL CHILLING PACKAGE

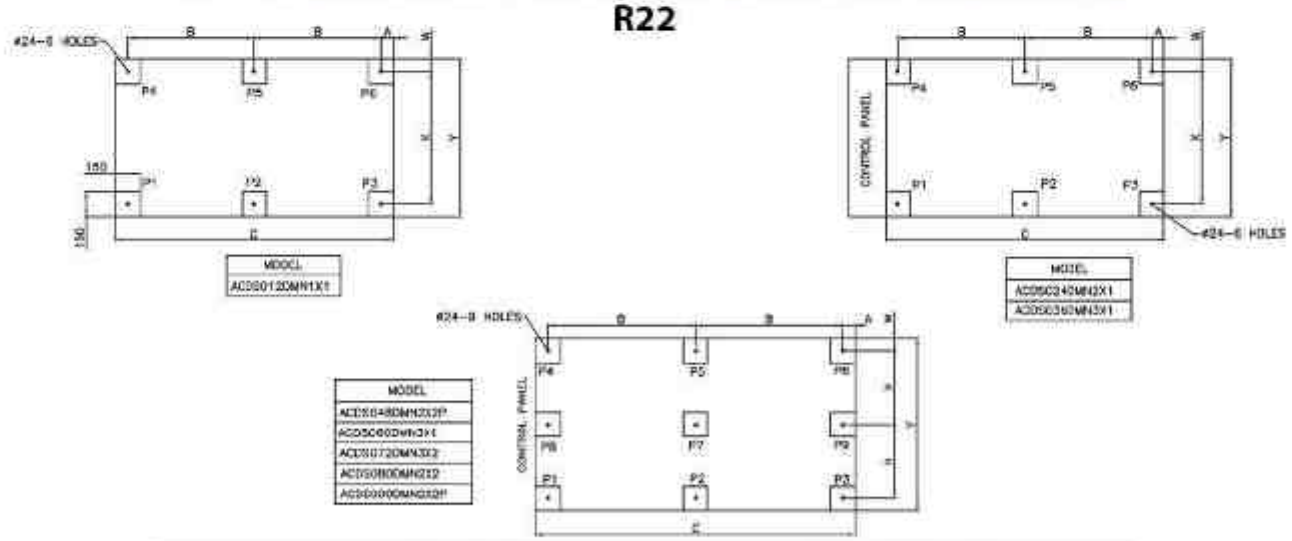
R407C



MODEL	PAD LOCATION IN MM						OPERATING WEIGHT PER POINT (KG.)								
	A	B	C	W	X	Y	P1	P2	P3	P4	P5	P6	P7	P8	P9
ACDS0120PMN1X1	75	1175	2500	75	400	550	109.8	109.8	109.8	109.8	109.8	109.8	–	–	–
ACDS0240PMN2X1	100	1167.5	2535	100	1070	1270	176.3	176.3	176.3	176.3	176.3	176.3	–	–	–
ACDS0360PMN3X1	100	1167.5	2535	100	1070	1270	233.5	233.5	233.5	233.5	233.5	233.5	–	–	–
ACDS0480PMN2X2	100	1212.5	2625	100	1018	2236	227.5	227.5	227.5	227.5	227.5	227.5	227.5	227.5	227.5
ACDS0600PMN3X1	100	1212.5	2625	100	1018	2236	281.5	281.5	281.5	281.5	281.5	281.5	281.5	281.5	281.5
ACDS0720PMN3X2	100	1212.5	2625	100	1018	2236	304	304	304	304	304	304	304	304	304
ACDS0840PMN2X3	100	1212.5	2625	100	1018	2236	292	292	292	292	292	292	292	292	292
ACDS0900PMN3X2	100	1850	3900	100	1018	3236	372	372	372	372	372	372	372	372	372

POINT LOAD DRAWING OF AIR-COOLED SCROLL CHILLING PACKAGE

R22



MODEL	PAD LOCATION IN MM						OPERATING WEIGHT PER POINT (KG.)								
	A	B	C	W	X	Y	P1	P2	P3	P4	P5	P6	P7	P8	P9
ACDS0120MN1X1	75	1175	2500	75	400	550	109.8	109.8	109.8	109.8	109.8	109.8	–	–	–
ACDS0240MN2X1	100	1167.5	2535	100	1070	1270	176.3	176.3	176.3	176.3	176.3	176.3	–	–	–
ACDS0360MN3X1	100	1167.5	2535	100	1070	1270	233.5	233.5	233.5	233.5	233.5	233.5	–	–	–
ACDS0480MN2X2P	100	1212.5	2625	100	1018	2236	227.5	227.5	227.5	227.5	227.5	227.5	227.5	227.5	227.5
ACDS0600MN3X1	100	1212.5	2625	100	1018	2236	281.5	281.5	281.5	281.5	281.5	281.5	281.5	281.5	281.5
ACDS0720MN3X2	100	1212.5	2625	100	1018	2236	304	304	304	304	304	304	304	304	304
ACDS0840MN2X3	100	1212.5	2625	100	1018	2236	292	292	292	292	292	292	292	292	292
ACDS0900MN3X2P	100	1850	3900	100	1018	3236	372	372	372	372	372	372	372	372	372

Note: Product development is a continuous process in Voltas, hence specifications and technical data are subject to alterations without notice

SPECTRUM OF HVAC PRODUCTS & SYSTEMS

PACKAGED & DUCTABLE SPLIT UNIT

VARIABLE REFRIGERANT FLOW SYSTEM (VRF)

ENERGY EFFECIENT
AIR COOLED SCREW CHILLER

ENERGY EFFECIENT
WATER COOLED SCREW CHILLER

AIR COOLED SCROLL CHILLER

WATER COOLED SCROLL CHILLER

AIR COOLED RECIPROCATING CHILLER

WATER COOLED RECIPROCATING CHILLER

DOUBLE EFFECT VAM

CO-GEN VAPOUR ABSORPTION MACHINE (VAM)

PROCESS REFRIGERATION PACKAGE

IAQ & ENERGY REDUCTION SYSTEM

COILOTRON (UV FOR AHU COILS)

STP EA ODOUR / H_2S REMOVAL SYSTEM

AIR HANDLING UNIT

Supersede : Prev. Cat.

VOLTAS

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NORTH ZONE DELHI (011) 66505550 / 66505659 Chandigarh (0172) 6610124 Jaipur (0141) 6451746 / 6541011 Lucknow (0522) 2237869 / 2236453 **EAST ZONE** KOLKATA (033) 66266245 / 66266265 / 66 Guwahati (03612) 2463073 Bhubaneshwar (0674) 6574044 JAMSHEDPUR (0657) 6622358 Patna (0612) 2500786 **WEST ZONE** MUMBAI (022) 66656754 / 756 Goa (0832) 2463664 Nagpur (0712) 6618846 / 47 Indore (0731) 2498616 Pune (020) 66297457 / 58 Aurangabad (0240) 2320510 AHMEDABAD (079) 66301108 / 10 Ankleshwar (02646) 238199 Silvassa (0260) 2640363 Surat (0261) 6599118 / 2422761 Vadodara (0265) 2332098 **SOUTH ZONE** CHENNAI (044) 66760355 / 66760333 Coimbatore (0422) 2241188 / 2244384 Madurai (0452) 2535818 BENGALURU (080) 67132500 to 04 / 67132637 HYDERABAD (040) 66500400 / 66743019 / 66500451 Vijaywada (0866) 2435282 Visakhapatnam (0891) 2754051 / 2754665 KOCHI (0484) 2359621

VL/CHP/ACSC/01/12/13/1k

Voltas Customer Care

Life Cycle Support

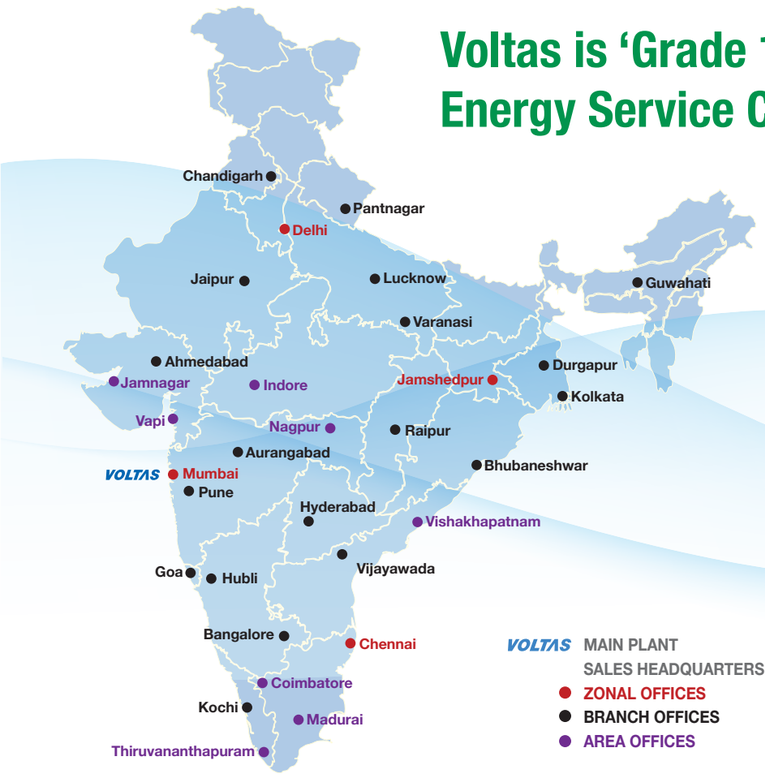
Through MANAGED Services

Remote Monitoring

Digital Service Reports

24x7 Helpdesk

Voltas is 'Grade 1' Energy Service Company (ESCO)



Voltas National Network

Easy Access • Quick Satisfaction

Customer Care
9100660100

MEP Services :

- Electro-mechanical Services
- HVAC
- Refrigeration

Water and Wastewater Management

Value Added Services

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NORTH ZONE: DELHI (011) 66505659/66505678/66505680/66505657 CHANDIGARH (0172) 4111800 JAIPUR (0141) 6541011 LUCKNOW 8840739788 **EAST ZONE:** KOLKATA (033) 66266268 / 662662283 / 66266262 BHUBANESHWAR (0674) 2747868 PATNA (0612) 2500786 RAIPUR (077) 14033886 **WEST ZONE:** MUMBAI (022) 66656754/ 66656756 / 66656757 / 66656759 / 66656760 NAGPUR (0712) 6456894 AHMEDABAD (079) 66301102 / 6630 1107 PUNE (020) 66297446 INDORE (0731) 2498616 **SOUTH ZONE:** CHENNAI (044) 66760357 / 66760315 / 66760346 BENGALURU (080) 22535648 HYDERABAD (040) 66743007 COCHIN (0484) 6605527.

India's Largest Air Conditioning Company

VOLTAS
A TATA Product

Centrifugal Chiller

PERMASYN MOTOR

TOTAL HARMONIC 5%

R134a

AHRI CERTIFIED

ASHRAE 90.1 COMPLIANT

PROFILE

Voltas, a member of the Tata Group, is India's No.1 air conditioning company and one of the world's premier engineering solutions providers and project specialists.

Founded in India in 1954, Voltas Limited offers premier cooling and ***engineering solutions*** for a wide spectrum of industries in areas such as ***heating, ventilation and air conditioning, refrigeration, electro-mechanical projects, textile machinery, mining and construction equipment, water management & treatment, cold chain solutions, building management systems, electrification and indoor air quality.***

The Company's strengths lies principally in:

- Management and execution of electro-mechanical projects, Including ***air conditioning*** and ***refrigeration***
- Sourcing, installation and servicing of diverse technology-based systems serving Indian industry through representation of global technology leaders

Organization

Voltas' operations have been organized into three independent business-specific clusters. Each of these has its own facilities for market coverage and service to customers.

Unitary Cooling Products

- ***Air Conditioners***
- ***Commercial Refrigeration***
- ***Water Coolers & Dispensers***

Domestic Projects Group

- ***Electrical, Mechanical & Refrigeration Solutions***
- ***Electrical & Mechanical Solutions (international)***
- ***Electrical Projects Business - focusing on Rural Electrification (Distribution / Improvement)***
- ***Water Management Business Division - Large Capacity STP (MLD), Effluent treatment, Rural Water Supply Scheme***
- ***Customer Care - Life Cycle Management through managed services***

Engineering Products and Services

- ***Textile Machinery***
- ***Mining & Construction Equipment***

Projects

Over the years, Voltas has built up a substantial reputation and is actively engaged in ***turnkey projects*** in fields such as electro-mechanical works comprising ***HVAC, electrical systems for buildings, plumbing, fire fighting, ELV and specialized systems, building security and other Utilities, electrical power projects, environmental and water pollution control, pumping stations and water supply, and water and waste water treatment projects.*** The Company has ISO 9001 - 2015 standards certification in its projects businesses, and has successfully undertaken and executed prestigious high-value projects in the Middle East, Far East and South East Asia, CIS countries, Africa and India.

Manufacturing

With state-of-the-art Manufacturing facilities at Vadodara and Pantnagar and upcoming factories at Tirupati & Sanand, Voltas possesses total capability in the manufacturing of ***room air conditioners, commercial air-conditioning and refrigeration equipment, water coolers, commercial refrigerators, visicoolers etc***. Also, we have forayed into home appliances segment under the new brand ***Voltbek Home Appliances Pvt. Ltd.*** by launching ***refrigerators, washing machines, microwave ovens and dishwashers*** with our new manufacturing unit coming up at Sanand, Gujrat.

Sales & service

Voltas' sales and service operations cover:

- In-house manufactured products, including air conditioning equipment and unitary cooling products
- Products of principals represented, including textile machinery and mining and construction equipment In all these sectors, the company demonstrates its specialised engineering expertise, as well as its extensive network for global sourcing.

AWARDS & RECOGNITION

Voltas was recognised by the ***Dun & Bradstreet Best Corporate Award 2018*** *in the 'Consumer Durables & Appliances' category*

Voltas received the ***Best Fulfilment Partner Award*** *at the* ***Reliance Retail Annual Partners Award 2018.*** *Award received by* ***MD & CEO, Mr. Pradeep Bakshi*** *and Modern Trade team.*

Voltas was honoured in Green Building Category at the ***'4th Smart Cities India 2018 Awards'*** *held in* ***2018*** *for the* ***'Paryavaran Bhavan' Project'.***

Voltas has been ranked by the Brand Trust Report India Study 2018 as ***"India's most Trusted Air Conditioner Brand"*** *in a study covering 9000 brands across 16 cities*

2018
- Voltas ***"India's Most Trusted Air Conditioner Brand"***
- Strategy Leaders Summit & Awards 2018.
- MEP Contractor and Plumbing Project of the Year award.

2017
- ***Indywood Built in India Excellence award***
- ***IGBC*** - 'Gold' rating for Voltas Limited Office at Coimbatore.

2016
- ***Winner of Eco Times'*** Best Corporate Brands 2016

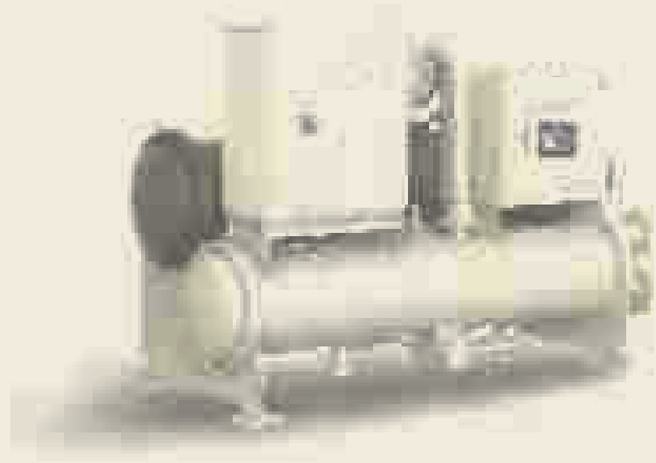
2015
- ***Dun & Bradstreet Corporate Awards***
- ***Top Taxpayers' Award*** Dept. of Central Excise & Service Tax
- ***EFFIE Award (silver)*** for Effectiveness in Advertising

2014
- ***Tata Group's Excellence in Communications Award***
- ***World Advertising Research Centre*** Asia Awards Gold Prize
- ***National Energy Conservation Award***
  Govt. of India Ministry of Power

Voltas was recognised as the ***'Best Brand in Digital Marketing Excellence*** *in Consumer Durables Category' at* ***DigiXX 2018***

Voltas Domestic Projects Group recognized at ***Indywood Built In India Excellence Awards 2018***

2008 / 2010 / 2011 / 2012 / 2013
- ***MEP Middle East Awards***
- ***MEP Contractor of the Year***
- ***MEP Project Manager of the Year' and 'Health & Safety'.***
- ***Silver LEED certification***
- ***Bry-Air Award for excellence in product Design for VAM***



CONTENT

VLCVE Series Permanent Magnet Synchronous Inverter Centrifugal Chiller

Voltas is the pioneer and a leading provider of integrated end-to-end solutions, in the field of electro-mechanical and refrigeration. We are committed to provide customer with technology that suits their needs and have introduced the first high speed and high-power permanent magnet synchronous inverter centrifugal chiller.

This chiller integrates the advanced air conditioning technologies of Voltas. When compared to common centrifugal chillers, its annual comprehensive energy efficiency is 65% higher, with 40% power saving.

It is exceptionally energy-saving, reliable and adaptive and can be widely applied in large buildings, hospitals, schools, supermarkets and factories or used to reconstruct the current air conditioning system for energy conservation.

Voltas has a wide range of Products and equipment for the various applications meeting high standards of quality, efficiency, reliability and industrial norms. With in-house Engineering and Manufacturing of major components like Compressors, condensers, chillers, pressure vessels and automation components, we offer complete customize solution to fulfill all expectations of customer for reliable operations of the system. With ISO 9001: 2015 standard certified factories, Voltas possesses total capability on the manufacturing of the chillers.

Nomenclature

VLCVE	510	PIE	KIE	-	-	-	-
1	2	3	4	5	6	7	8

1	Model	**VLCVE** - Permanent magnet synchronous inverter centrifugal chiller
2	Compressor code	—
3	Evaporator code	—
4	Condenser code	—
5	Special functions	R- Partial heat recovery; Q- Total heat recovery; Absence- No special function
6	Type of startup cabinet	D- Diode inverter startup; Absence- Inverter; 4-quardant inverter startup
7	Number of compressors	2 – double; Absence – single
8	Power spec.	G-10000V; Absence – 400V;

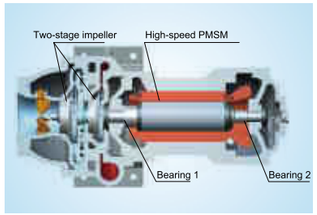
Product Features

Core Technology, High Efficiency

High-speed Direct-drive Two-stage Impeller

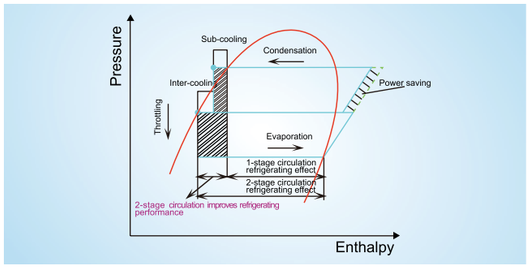
Voltas's magnetic bearing inverter centrifugal chiller adopts high-speed motor to directly drive the 2-stage impeller structure. We eliminate speed-up gears and 2 radial bearings to reduce mechanical loss and improve energy efficiency. Compressor is compact and reliable. Volume and weight of the compressor is only 40% of the same capacity conventional compressor.

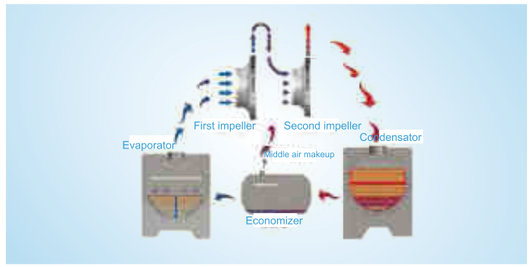
Speed-up wheelwork is eliminated. Without the high-frequency noise of gears, compressor's operating sound is much lower. That is 8dBA lower than that of a conventional unit.



Two-stage Compression Technology

Two-stage compression with flash gas ecomonizer is more efficient when compared to single-stage compression. The refrigerating efficiency is improved by 5-6%. It has lower running speed, higher reliability, and longer service life. In addition, two-stage compression enables large flow angle for impeller outlet, large surge margin and wider operating range.

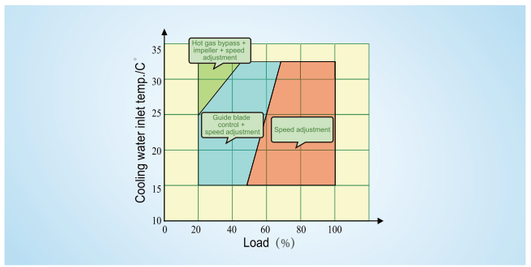




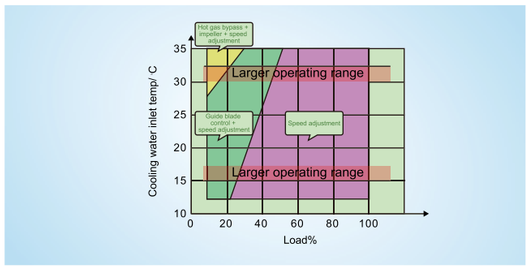
Wide Operating Range

Two-stage compression and the patent diffuser technology have greatly expanded the unit's operating range. It can operate stably when entering cooling water temperature is 12-35°C. It can realize stepless regulation at 10-100% load.

Conventional inverter centrifugal chiller adopts variable rotation speed + guide vane to adjust cooling capacity and will begin to turn down the guide vane at 50-60% load, which is not energy-efficient. In comparison, Voltas permanent magnet synchronous inverter centrifugal chiller can adjust its rotation speed at 25-100% load, which can reduce the throttling loss of guide vane and improve energy efficiency.



Conventional Inverter Centrifugal Chiller

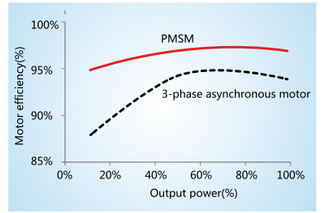


Permanent Magnet Inverter Centrifugal Chiller

Core Components, Stable and Reliable

High-speed Permanent Magnet Synchronous Inverter Motor (PMSM)

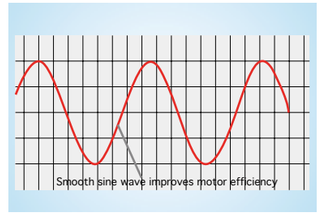
It's the world's first high-power and high-speed PMSM that is dedicated for refrigerating centrifugal compressor. The power of motor is more than 400 kW and the rotational speed is above 18000 rpm. It is compact and lightweight. A 400kW high-speed PMSM weighs the same as a 75kW AC induction motor.
The motor has low startup current, only 1/5 of the star-delta startup current. Within the operating range, motor efficiency is above 96% all the time and 97.5% to the maximum.



By adopting spiral refrigerant injection cooling technology to cool down motor stator and rotor, motor's temperature can be controlled at around 40°C, ensuring efficient operation. Under partial load, motor generates little heat. It can work efficiently when the entering cooling water temperature is 12°C.

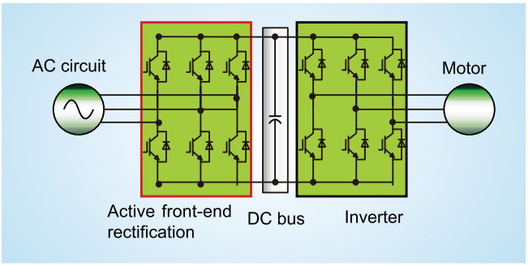
On-board Sine-wave Inverter (DIODE INVERTER)

Sine-wave inverter is built with the unit. To satisfy the requirement of a closed compressor system, the inverter adopts high-speed permanent magnet with no position sensor. It can detect the position of motor rotor without probe. It is directly installed on the unit, which will save floor space for customers. In addition, the inverter adopts refrigerant cooling and the copper piping is simple and reliable. With PWM controllable rectification technology, the inverter can output smooth sine wave to improve motor efficiency, which allows the unit to be reliably used for data processing rooms, hospitals, scientific research institutes, factories or special areas that are sensitive to electromagnetic interference. The diode inverter has high power density, which makes it economic and reliable. It has complete protection and voltage harmonic THD is less than 5%. It can be widely applied in large office buildings, schools, hotels, shopping malls, etc.



4-quadrant Inverter Technology

The chiller adopts 4-quadrant green inverter and IGBT transistor instead of diode for rectification. Power output time and method are both in better control and harmonic wave is well limited. It adopts closed-loop vector control without sensor to realize stable operation under high-speed running of the motor.
Because of PWM controllable rectification technology and the three-phase power factor correction technology, power factor and system efficiency are up to 0.995 and 97% respectively.
Total harmonic wave distortion factor is smaller than 5%. It is especially suitable to scientific research institutes, hospitals, factories and schools where low harmonic wave interference is necessary.



Low Viscosity Vane Diffuser

Unique low viscosity vane diffuser design and airfoil guide vane can effectively turn high-speed gas into high static pressure gas so as to realize high-efficiency pressure recover. In partial load, vane diversion reduces backflow loss, which has improved the partial load performance and expanded the unit's operating range. The unit's partial load performance is improved by more than 8%.

Control Center with Colorful Touch Screen Display

CAN Bus Communication

Network is highly reliable. The sending and receiving interface circuit of CAN bus is provided by the specialized CAN transceiver. At any moment, even if multiple nodes are sending data to the bus at the same time, the bus will not be short-circuited, so the malfunction of a single node will not transfer to the other nodes. What's more, in case of severe failure, the faulty nodes of CAN bus can be shut down automatically so that other nodes can still operate normally.

Second-generation Controller

Synchronous parameter backup: Large refrigerating equipment is accompanied with many operation parameters and has strict requirement for the accuracy of parameter setting. If one unit is replaced, it's hard to retrieve the original data. The second-generation controller will solve this problem with its synchronous parameter backup function. All the control units will process and copy the parameters and make sure the data are consistent. If one unit is replaced, the new unit will obtain relevant parameters from other units. There's no need to set parameters manually, which is convenient for debugging and maintenance.

Operation with no display: Because commercial units serve a wide range of users, it must be highly reliable to avoid causing widespread impact. The unit must still function properly in case of minor failures. The second-generation controller can guarantee normal operation without display. If the touch screen is faulted, the unit can still operate normally with no display.

Black box data recording: Central air conditioners have a large number of real-time data. Since the data is very valuable, it's necessary to obtain the data of the complete service period. The second-generation controller is equipped with data sampling algorithm to achieve the maximum effective data. It also adopts Flash fragmentation algorithm to realize the balance of chip loss. Through these strategies, it can obtain a great number of operation data for analysis.

Integrated main board: The original main control board, sub-control board, EXV drive board, PT100 detection board are integrated into one control board, which has reduced the communication nodes and improved the unit's reliability. Fewer wires, higher efficiency, less faulty nodes; it features high degree of integration and strong compatibility.

All DC

The control circuits adopt low-voltage DC24V control for safety concern. It is applicable to a wider power range. The control system doesn't need to separate 50/60Hz. High EMC performance, without 220V interference, good electromagnetic compatibility; the electric system occupies a small space and has high power density.

Product Specification

Model			VLCVE210HG4GG4	VLCVE210HG3GG3	VLCVE220HG2GG2	VLCVE220HG1GG1	VLCVE310LG1HG1	VLCVE320MH4HH2
Cooling capacity		kW	879	967	1055	1231	1406	1582
		RT	250	275	300	350	400	450
EER		W/W	6.17	6.09	6.46	6.36	6.47	6.59
IPLV		W/W	10.06	10.31	10.37	10.77	10.95	10.70
Power supply		V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Power input		kW	142.5	158.8	163.3	193.5	217.4	240.1
RLA		A	218.6	243.7	250.6	296.9	333.6	368.5
Compressor	Type	-	Centrifugal					
	Starting mode	-	Variable frequency drives					
	Quantity	-	1	1	1	1	1	1
Refrigerant charge		kg	350	375	400	425	450	550
Refrigeration oil	Type	-	No.68 synthetic fatty oil					
	Charge volume	L	30	30	30	40	40	40
Evaporator	Type	-	Flooded					
	Fouling factor	㎡·℃/kW	0.018	0.018	0.018	0.018	0.018	0.018
	Water flow rate	L/s	37.89	41.68	45.47	53.05	60.62	68.20
		GPM	600.6	660.7	720.8	840.9	961.0	1081.0
	Pressure drop	kPa	58.3	58.4	58.4	62.6	57.3	62.4
		ft.WG	19.1	19.2	19.2	20.5	18.8	20.5
	Connection pipe	mm	DN200	DN200	DN200	DN200	DN200	DN250
Condenser	Type	-	Shell and tube					
	Fouling factor	㎡·℃/kW	0.044	0.044	0.044	0.044	0.044	0.044
	Water flow volume	L/s	47.27	52.09	56.37	65.90	75.14	84.32
		GPM	749.3	825.7	893.5	1045.0	1191.0	1337.0
	Pressure drop	kPa	54.2	54.4	53.6	58.0	53.1	62.6
		ft.WG	17.8	17.8	17.6	19	17.4	20.5
	Connection pipe	mm	DN200	DN200	DN200	DN200	DN200	DN250
Sound pressure level(Max.)		dB(A)	80	80	80	82	82	82
Dimension	Outline (LxWxH)	mm	3770x1590x1850	3770x1590x1850	3770x1590x1850	3770x1590x1850	3850x1810x2220	4300x1850x2150
	Package (LxWxH)	mm	3900x1750x2050	3900x1750x2050	3900x1750x2050	3900x1750x2050	3950x1950x2350	4450x1950x2350
Net/Gross/Operating weight		kg	5150/5450/5700	5240/5540/5800	5500/5800/6050	5700/6000/6600	6100/6450/6400	6800/7200/7650
Loading quantity	40'GP/40'HQ	set	1	1	1	1	1	1

Model			VLCVE320MH3HH1	VLCVE410MH2JH2	VLCVE410MH1JH1	VLCVE510PIEKIE	VLCVE510PIDKID	VLCVE520PICKIC
Cooling capacity		kW	1758	1934	2110	2285	2461	2637
		RT	500	550	600	650	700	750
EER		W/W	6.48	6.67	6.58	6.66	6.57	6.73
IPLV		W/W	10.96	10.88	11.12	10.94	11.14	10.90
Power supply		V/Ph/Hz	400/3/50	00/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Power input		kW	271.3	289.9	320.6	343.2	374.6	391.3
RLA		A	416.4	444.9	492.0	526.6	574.9	600.4
Compressor	Type	-	Centrifugal					
	Starting mode	-	Variable frequency drives					
	Quantity	-	1	1	1	1	1	1
Refrigerant charge		kg	575	600	625	650	675	700
Refrigeration oil	Type	-	No.68 synthetic fatty oil					
	Charge volume	L	40	40	40	40	40	40
Evaporator	Type	-	Flooded					
	Fouling factor	㎡·℃/kW	0.018	0.018	0.018	0.018	0.018	0.018
	Water flow rate	L/s	75.78	83.36	90.93	98.51	106.10	113.70
		GPM	1201.0	1321.0	1442.0	1562.0	1682.0	1802.0
	Pressure drop	kPa	62.5	68.2	67.9	62.0	60.3	64.9
		ft.WG	20.5	22.4	22.3	20.3	19.8	21.3
	Connection pipe	mm	DN250	DN250	DN250	DN250	DN250	DN250
Condenser	Type	-	Shell and tube					
	Fouling factor	㎡·℃/kW	0.044	0.044	0.044	0.044	0.044	0.044
	Water flow volume	L/s	93.90	102.90	112.50	121.67	131.20	140.10
		GPM	1489.0	1631.0	1783.0	1928.0	2080.0	2221.0
	Pressure drop	kPa	65.6	63.3	62.8	56.7	56.8	57.8
		ft.WG	21.5	20.7	20.6	18.6	18.6	18.9
	Connection pipe	mm	DN250	DN250	DN250	DN250	DN250	DN250
Sound pressure level(Max.)		dB(A)	85	85	85	85	88	88
Dimension	Outline (LxWxH)	mm	4300x1850x2150	4250x1910x2210	4250x1910x2210	4550x2010x2300	4550x2010x2300	4550x2010x2300
	Package (LxWxH)	mm	4450x1950x2350	4400x2100x2450	4400x2100x2450	4700x2100x2500	4700x2100x2500	4700x2100x2500
Net/Gross/Operating weight		kg	6880/7280/7750	7710/8160/8600	7820/8270/8750	8860/9360/9900	8970/9470/10050	9270/9770/10400
Loading quantity	40'GP/40'HQ	set	1	1	1	1	1	1

Product Specification

Model			VLCVE520PIBKIB	VLCVE520PIAKIA	VLCVE610QJCMJD	VLCVE610QJBMJC	VLCVE620QJAMJB	VLCVE620RJAMJA
Cooling capacity		kW	2813	2989	3164	3340	3516	3868
		RT	800	850	900	950	1000	1100
EER		W/W	6.72	6.63	6.83	6.75	6.84	6.75
IPLV		W/W	11.10	11.24	11.30	11.45	11.16	11.44
Power supply		V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Power input		kW	418.6	450.8	463.3	494.8	514	573
RLA		A	642.4	691.8	711.0	758.3	788.9	879.3
Compressor	Type	-	Centrifugal					
	Starting mode	-	Variable frequency drives					
	Quantity	-	1	1	1	1	1	1
Refrigerant charge		kg	725	730	900	925	950	975
Refrigeration oil	Type	-	No.68 synthetic fatty oil					
	Charge volume	L	40	40	50	50	50	50
Evaporator	Type	-	Flooded					
	Fouling factor	㎡·℃/kW	0.018	0.018	0.018	0.018	0.018	0.018
	Water flow rate	L/s	121.10	128.80	136.40	144.00	151.60	166.70
		GPM	1922.0	2042.0	2162.0	2282.0	2403.0	2643.0
	Pressure drop	kPa	60.2	61.8	60.2	59.2	59.3	60.1
		ft.WG	19.8	20.3	19.7	19.4	19.4	19.7
	Connection pipe	mm	DN250	DN250	DN300	DN300	DN300	DN300
Condenser	Type	-	Shell and tube					
	Fouling factor	㎡·℃/kW	0.044	0.044	0.044	0.044	0.044	0.044
	Water flow volume	L/s	149.50	159.20	167.90	177.40	186.50	205.50
		GPM	2370.0	2523.0	2661.0	2813.0	2956.0	3257.0
	Pressure drop	kPa	58.1	59.9	65.4	66.2	66.2	67.4
		ft.WG	19.1	19.7	21.5	21.7	21.7	22.1
	Connection pipe	mm	DN250	DN250	DN300	DN300	DN300	DN300
Sound pressure level(Max.)		dB(A)	88	88	88	88	88	88
Dimension	Outline (LxWxH)	mm	4550x2010x2300	4550x2010x2300	4980x2210x2500	4980x2210x2500	4980x2210x2500	4980x2310x2600
	Package (LxWxH)	mm	4700x2100x2500	4700x2100x2500	5100x2370x2750	5100x2370x2750	5100x2370x2750	5100x2600x2850
Net/Gross/Operating weight		kg	9370/9870/10500	9480/9980/10600	10730/11230/12150	10860/11360/12250	11010/11510/12500	11670/12170/13200
Loading quantity	40'GP/40'HQ	set	1	1	1	1	1	1

Notes:

1. Above model selection is applicable to the condition in which leaving chilled water temperature is 6.7℃ and entering cooling water temperature is 29.4℃.
2. Standard unit's water side bearing pressure is 1.0MPa; 1.6MPa is an available option.
3. Fouling factors of chilled water and cooling water are 0.018 ㎡·℃/kW and 0.044 ㎡·℃/kW respectively.
4. Above water flow is indicated according to AHRI 550/590-2015; IPLV is the test value obtained based on the working condition specified in AHRI 550/590-2015.
5. For compressor using inverter starter, starting current < rated current; power factor is 0.99; cooling capacity: 250~600RT. The diode inverter startup cabinet (type code: D) is the standard part for the unit, while the four-quadrant inverter startup cabinet (type code: null) is the optional one.
6. The unit's performance parameters may be changed without prior notice due to product improvement.

Operation Range

Chilled water		Cooling water	
Outlet temperature(℃)	Temperature difference between inlet and outlet (℃)	Inlet temperature (℃)	Temperature difference between inlet and outlet (℃)
5~15	2.5~8	12~35	3.5~8

If customer requires higher temperature difference, please consult VOLTAS.

Product Installation

Installation Environment and Foundation

Installation Environment

- The unit should not be installed in a place with corrosive or inflammable or explosive substances or oil mist. Otherwise, the unit will not function normally or will have shorter service life. What's worse, it may cause fire hazard or severe injury. If it is installed together with a heater such as boiler, it is necessary to consider the effect of thermal radiation.
- Select a location where ambient temperature is below 40°C and is drafty (High temperature will cause malfunction and accelerate corrosion). When ambient temperature is 40°C, relative humidity should be below 90%. It is not allowed to install or store the unit outside or in the open air.
- Select a location that is with little dust.
- The location should be bright for the convenience of maintenance and inspection.
- In order to maintain, inspect and clean the heat exchange tubes of condenser and evaporator, there should be enough space around the unit (See diagram of Maintenance Space of the corresponding unit for the specific dimensions).
- For the ease of lifting and overhaul, it is necessary to install travelling crane or derrick car and make sure that the machine room is high enough.
- The surrounding of the unit and the whole machine room should be able to be drained completely.
- If the unit is installed outdoors or at the seaside, a chemical plant, iron and steel plant, paper mill, tannery or printing and dyeing mill or a place where there is high concentration of corrosive gas or salty mist, special design is needed for the unit because corrosive substances may enter the unit's tubes through the cooling water tower. Please contact the local sales office. The location of cooling water tower should be away from waste discharge outlet.

Installation Foundation

The rotor of centrifugal compressor has passed strict static balance and dynamic balance tests, so its dynamic load against the foundation is very small. Please see table "Foundation Dimensions". To prevent unit's footings from being corroded, please be sure that there is good drainage around the unit and the unit's steel base plate is flat and smooth. Specifically:

- The maximum drop difference (level difference) between each foundation surface should be less than 3mm.
- For the convenience of maintenance and inspection, the foundation should be 100mm higher than the ground.
- Drain ditch should be set around the unit.
- There should be no gap between the steel base plate and the unit's soleplate. Insert adjusting pad between the steel base plate and the concrete foundation. Adjust the steel base plate to level (Their height difference should be 0.5mm per meter.)
- Lift up the unit and place a rubber plate on the steel base plate to reduce vibration. And then place the unit on the rubber plate. The steel base plate and adjusting pad should be reinforced by second grouting.

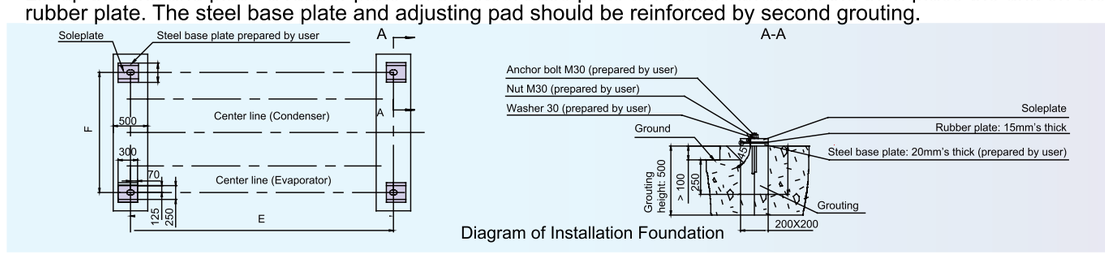


Diagram of Installation Foundation

Unit Foundation Dimension(mm)

Model and dimension	E	F	Model and dimension	E	F
VLCVE210HG4GG4D	2990	1335	VLCVE510PIEKIE	3590	1760
VLCVE210HG3GG3D	2990	1335	VLCVE510PIDKID	3590	1760
VLCVE220HG2GG2D	2990	1335	VLCVE520PICKIC	3590	1760
VLCVE220HG1GG1D	2990	1335	VLCVE520PIBKIB	3590	1760
VLCVE310LG1HG1D	2990	1560	VLCVE520PIAKIA	3590	1760
VLCVE320MH4HH2D	3290	1595	VLCVE610QJCMJD	3990	1960
VLCVE320MH3HH1D	3290	1595	VLCVE610QJBMJC	3990	1960
VLCVE410MH2JH2D	3290	1655	VLCVE620QJAMJB	3990	1960
VLCVE410MH1JH1D	3290	1655	VLCVE620RJAMJA	3990	2060

Diagram of Components

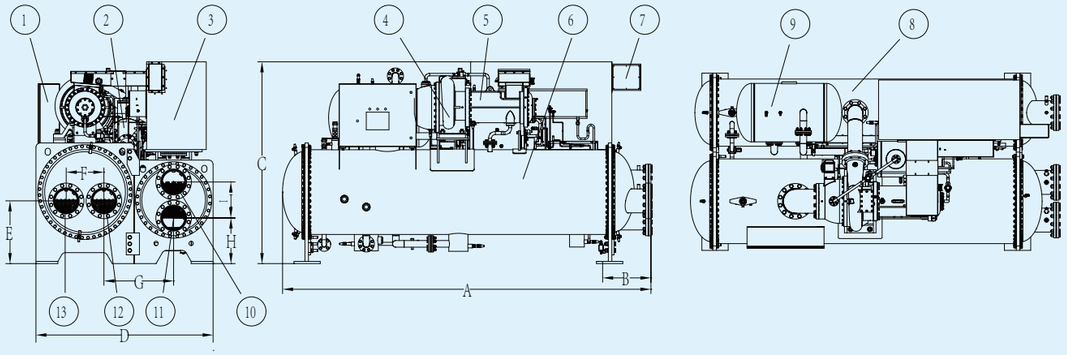


Diagram of Components and Outline Dimensions

No.	Name	No.	Name
1	Electric control cabinet	8	Condenser
2	Oil tank	9	Flash type evaporator
3	Inverter	10	Leaving cooling water
4	Compressor	11	Entering cooling water
5	Motor	12	Entering chilled water
6	Evaporator	13	Leaving chilled water
7	Owner's Wiring Terminal		

Dimensions of centrifugal chiller (mm)

Model	A	B	C	D	E	F	G	H	I	Chilled water port	Cooling water port
VLCVE210HG4GG4D	3770	500	1850	1590	615	350	640	330	350	DN200	DN200
VLCVE210HG3GG3D	3770	500	1850	1590	615	350	640	330	350	DN200	DN200
VLCVE220HG2GG2D	3770	500	1850	1590	615	350	640	330	350	DN200	DN200
VLCVE220HG1GG1D	3770	500	1850	1590	615	350	640	330	350	DN200	DN200
VLCVE310LG1HG1D	3850	520	2220	1810	675	420	735	450	350	DN200	DN200
VLCVE320MH4HH2D	4300	570	2150	1850	765	430	740	370	405	DN250	DN250
VLCVE320MH3HH1D	4300	570	2150	1850	765	430	740	370	405	DN250	DN250
VLCVE410MH2JH2D	4250	570	2210	1910	765	430	770	430	415	DN250	DN250
VLCVE410MH1JH1D	4250	570	2210	1910	765	430	770	430	415	DN250	DN250
VLCVE510PIEKIE	4550	570	2300	2010	815	480	770	510	430	DN250	DN250
VLCVE510PIDKID	4550	570	2300	2010	815	480	770	510	430	DN250	DN250
VLCVE520PICKIC	4550	570	2300	2010	815	480	770	510	430	DN250	DN250
VLCVE520PIBKIB	4550	570	2300	2010	815	480	770	510	430	DN250	DN250
VLCVE520PIAKIA	4550	570	2300	2010	815	480	770	510	430	DN250	DN250
VLCVE610QJCMJD	4980	570	2500	2210	965	500	885	550	470	DN300	DN300
VLCVE610QJBMJC	4980	570	2500	2210	965	500	885	550	470	DN300	DN300
VLCVE620QJAMJB	4980	570	2500	2210	965	500	885	550	470	DN300	DN300
VLCVE620RJAMJA	4980	590	2700	2310	1015	580	895	550	470	DN300	DN300

Dimension of Installation and Maintenance Space

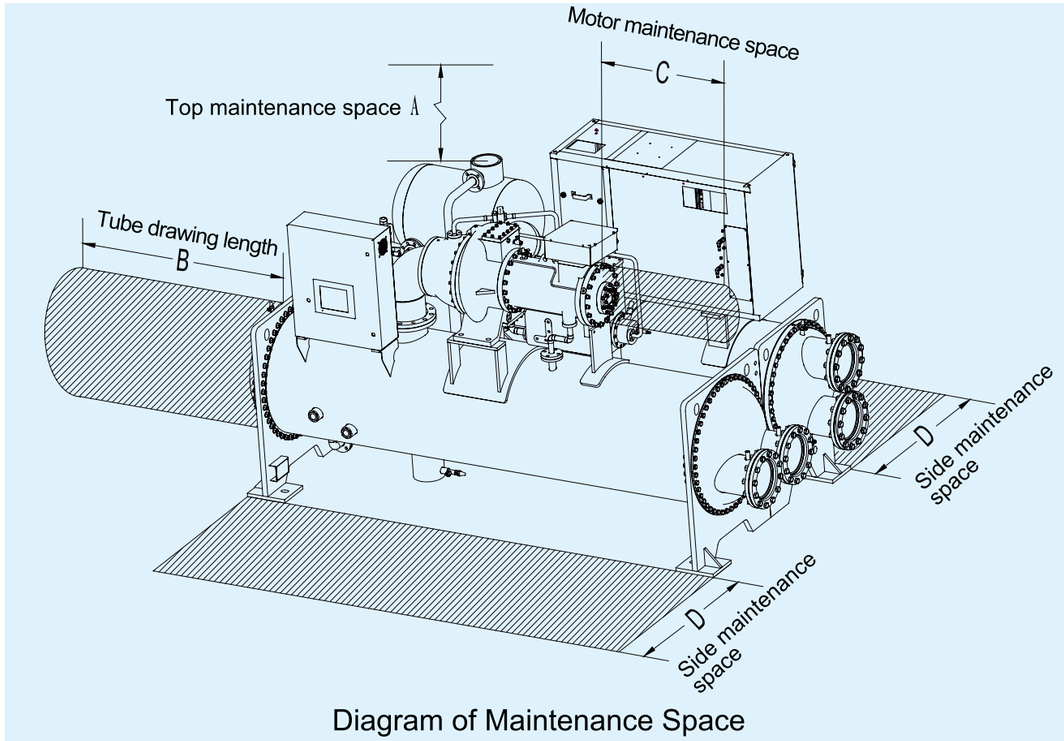


Diagram of Maintenance Space

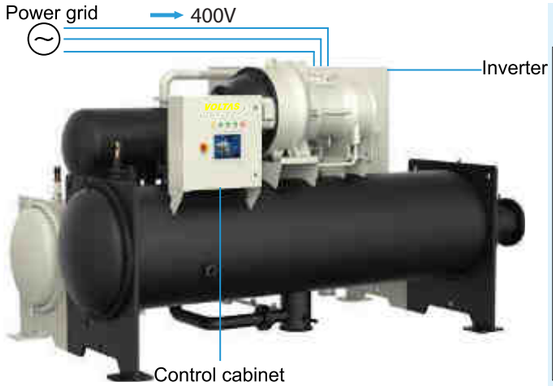
Dimensions of Installation and Maintenance Space (mm)

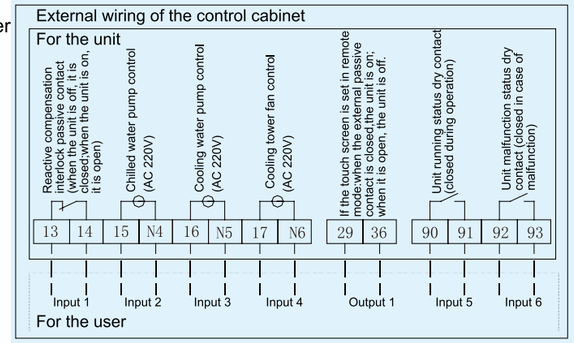
Model	A	B	C	D
VLCVE210HG4GG4D	1500	3500	1500	1220
VLCVE210HG3GG3D	1500	3500	1500	1220
VLCVE220HG2GG2D	1500	3500	1500	1220
VLCVE220HG1GG1D	1500	3500	1500	1220
VLCVE310LG1HG1D	1500	3500	1500	1220
VLCVE320MH4HH2D	1500	3500	1500	1220
VLCVE320MH3HH1D	1500	3500	1500	1220
VLCVE410MH2JH2D	1500	3500	1500	1220
VLCVE410MH1JH1D	1500	3500	1500	1220
VLCVE510PIEKIE	1500	3800	1500	1220
VLCVE510PIDKID	1500	3800	1500	1220
VLCVE520PICKIC	1500	3800	1500	1220
VLCVE520PIBKIB	1500	3800	1500	1220
VLCVE520PIAKIA	1500	3800	1500	1220
VLCVE610QJCMJD	1500	4200	1650	1320
VLCVE610QJBMJC	1500	4200	1650	1320
VLCVE620QJAMJB	1500	4200	1650	1320
VLCVE620RJAMJA	1500	4200	1650	1320

Electrical Installation

Electrical Installation of 4-quadrant Inverter

Diagram of External Wiring for the Unit (Low Voltage)

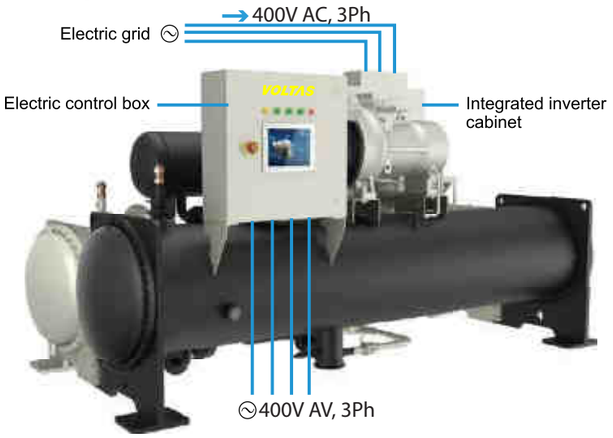


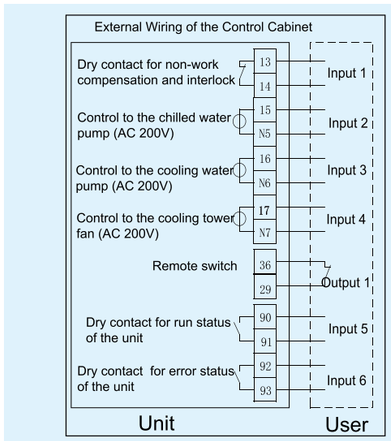


Wiring instructions:
(1) For 400V unit, the power cable from the customer's power distribution cabinet to the on-board inverter startup cabinet should use power of 400V 3P~50Hz. See the above diagram for the wiring. The power cable should enter from the side or bottom of the inverter startup cabinet and the cable size varies as per the change of unit power.
(2) It is the signal control line from the main control cabinet of the chiller to the water pump control cabinet and remote switch. The cable size should be equal to or above 1.5mm².
(3) The unit adopts PWM controllable rectification 4-quadrant inverter technology. Harmonic distortion rate<5%, so there's no need to add additional harmonic handling device.
(4) Power factor>0.99, so there's no need to do reactive compensation. For the reactive compensation of design system, calculate separately; otherwise the unit may not function normally due to over-compensation.

Electrical Installation of Diode Inverter

Diagram of External Wiring for the Unit (VLCVE21 OHG4GG40-VLCVE220HG1GG10)

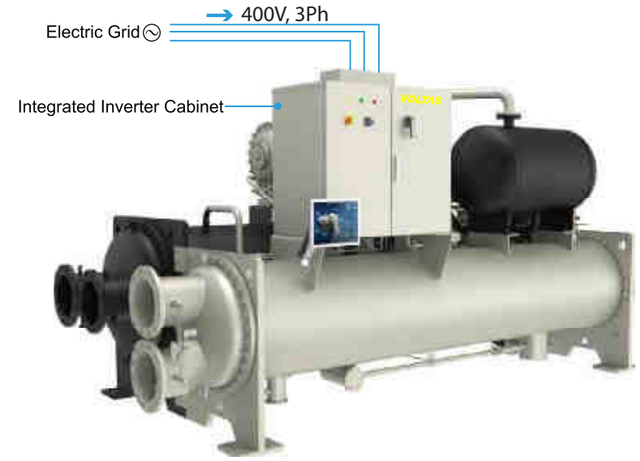




Wiring instructions:
(1) For 400V unit, the power cable from the customer's power distribution cabinet to the on-board inverter should use power of 400V 3P~50Hz. See the above diagram for the wiring. The power cable should enter from the top of the on-board inverter and the cable size varies as per the change of unit power.
(2) Power for the electric control box: 400V, 3N~, 50Hz, 4kW;
(3) It is the signal control line from the main control cabinet of the chiller to the water pump control cabinet and remote switch. The cable size should be equal to or above 1.5mm².
Note: The water pump control cabinet should be prepared by the user. Please refer to the diagram attached inside the cabinet.

Electrical Installation of Diode Inverter

Diagram of External Wiring for the Unit (VLCVE310LG1 HG1 D-VLCVE410MH1JH10)



Wiring instructions:
(1) For 400V unit, the power cable from the customer's power distribution cabinet to the on-board inverter should use power of 400V 3P~50Hz. See the above diagram for the wiring. The power cable should enter from the top of the on-board inverter and the cable size varies as per the change of unit power.
(2) It is the signal control line from the on-board inverter to the water pump control cabinet and remote switch. The cable size should be equal to or above 1.5mm².
Note: The water pump control cabinet should be prepared by the user. Please refer to the diagram attached inside the cabinet.

Scope of Supply

S= Standard Supply; O= Owner's Supply; P= Purchased Supply

Item	QTY	Spec.	Type
Main unit	1	Set	S
Refrigerant	See Table of Spec.	R134a	S
Lubricating oil	Check with manufacturer for more details	68# synthesis lipid lubricating oil	S
Inverter startup cabinet	1	Set	S
Oil filter	1	PC	P

Note: If long-distance monitoring or other functions are needed, please purchase related accessories.

VLCCE Series Magnet Bearing Inverter Centrifugal Chiller

Voltas VLCCE Series Magnetic Bearing Inverter Centrifugal chiller was developed by Voltas. It is a permanent magnet synchronous inverter centrifugal chiller that adopts magnetic bearing technology. Its cooling capacity is 100 RT – 1100RT. The application of permanent magnet synchronous motor (PMSM), 2 stage compression, motor direct-drive impeller, and 4-quadrant inverter has greatly improved the chiller's energy saving performance. Meanwhile, magnet bearing is adopted for oil-free operations. The reliable microcomputer control system, group control technology and building communication interfaces have also contributed to the fine operation quality. It is applicable for Hotels, office buildings, business clubs, etc.

Voltas Magnetic Bearing Inverter Centrifugal Chiller

The essential part of the chiller is the magnetic bearing centrifugal compressor that consist of impeller, motor, magnetic bearing, displacement sensor, bearing controller and motor driver. It utilizes magnetic field to keep the rotor suspended so that there won't be mechanical friction during rotation. By using magnetic bearing, lubricating system is no longer necessary in a refrigerating compressor. Thus, central air conditioners are more energy-efficient.

Voltas has a wide range of Products and equipment for the various applications meeting high standards of quality, efficiency, reliability and industrial norms. With in-house Engineering and Manufacturing of major components like Compressors, condensers, chillers, pressure vessels and automation components, we offer complete customize solution to fulfill all expectations of customer for reliable operations of the system. With ISO 9001:2015 standard certified factories, Voltas possesses total capability on the manufacturing of the chillers.

Nomenclature

VLCCE	220	FE4	EE4	-	-
1	2	3	4	5	6

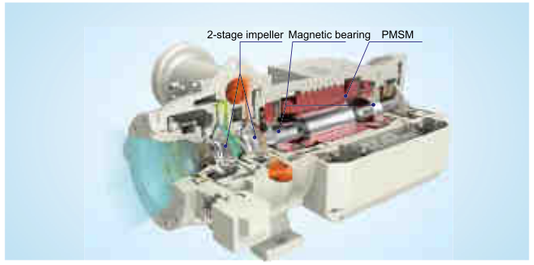
1	Model	**VLCCE** - Magnetic bearing centrifugal chiller
2	Compressor code	—
3	Evaporator code	—
4	Condenser code	—
5	Number of compressors	Absence – single; 2 - double
6	Power spec.	Absence – 400V; G-10kV

Product Features

Core Technology, High Efficiency

PMSM Direct-Drive Impeller

Voltas's magnetic bearing inverter centrifugal chiller adopts high-speed motor to directly drive the 2-stage impeller structure. We eliminated speed-up gears and 2 radial bearings to reduce mechanical loss and improve energy efficiency.

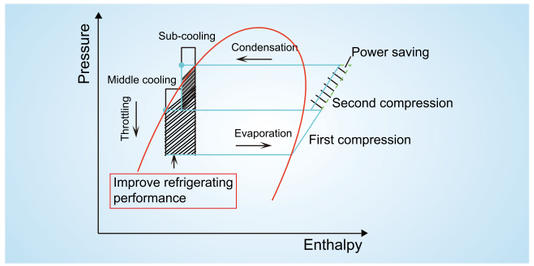


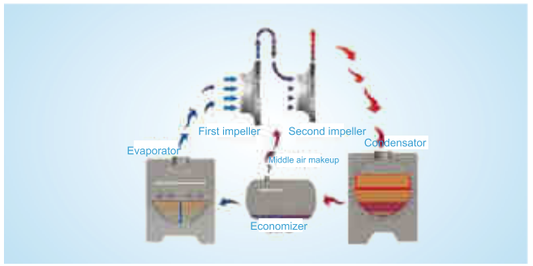
Magnetic Bearing

The compressor adopts magnetic bearing so that rotor can be suspended during operation. Because compressor is running in oil-free condition, the refrigeration cycle doesn't have lubricating oil, which has avoided the heat exchange efficiency decrease caused by oil film coated on heat exchanging tubes. Heat exchange is more efficient and the product is more reliable during its entire service life.

Two-stage Compression Technology

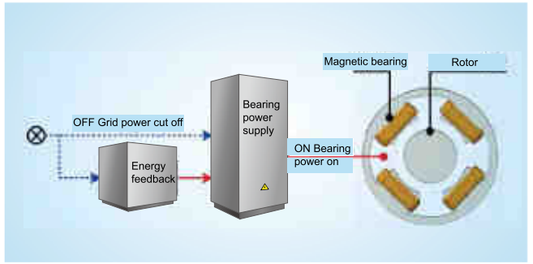
Two-stage compression with flash gas ecomonizer is more efficient when compared to single-stage compression. The refrigerating efficiency is improved by 5-6%. In addition, two-stage compression enables large flow angle for impeller outlet, large surge margin and wider operating range.





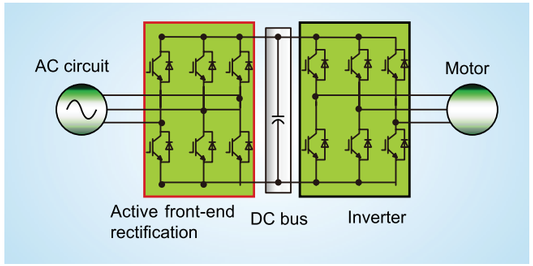
Power-off Energy Feedback

In case of power failure, motor will act as an electric generator to keep the bearing controller stably suspended through energy feedback until the motor stops running. Meanwhile, the backup radial bearing of compressor will support the compressor's rotor after power failure so as to prevent the rotor from touching any metal surface.



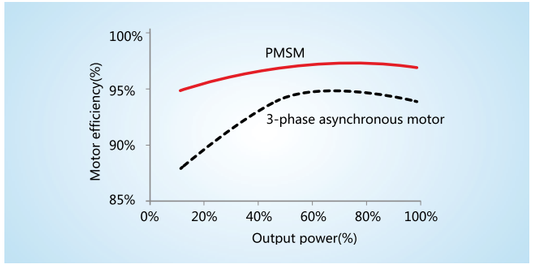
4-quadrant Inverter Technology

The chiller adopts 4-quadrant green inverter and IGBT transistor instead of diode for rectification. Power output time and method are both in better control and harmonic wave is well limited. It adopts closed-loop vector control without sensor to realize stable operation under high-speed running of the motor.
Because of PWM controllable rectification technology and the three-phase power factor correction technology, power factor and system efficiency are up to 0.995 and 97% respectively.
Total harmonic wave distortion factor is smaller than 5%. It is especially suitable to scientific research institutes, hospitals, factories and schools where low harmonic wave interference is necessary.



Permanent Magnet Synchronous Motor

This chiller adopts permanent magnet synchronous motor. The motor's rotor has a permanent magnet, with little excitation loss. Motor efficiency is over 95% and the highest efficiency is up to 97.5%.
Since the power density is high, when compared to asynchronous motor with the same power, PMSM features small size and light weight. The weight of a 400kW PMSM is equal to a 75kW AC induction motor. The unit adopts spiral type refrigerant injection cooling technology to completely cool down the stator and rotor of motor and keep the motor's temperature field in balance. Motor's temperature can be controlled at 40°C.



Core Components, Stable and Reliable

Compact Structure

The compressor adopts high-speed motor to directly drive the 2-stage impeller. Speed-up wheelwork is cancelled and the entire refrigeration system has one moving part only—the impeller. With only one moving part, the unit is more reliable.

Precise Control

It adopts high-precision magnetic bearing control technology. The precision is 2μm, thus accurate positioning and high reliability.

Strict Tests

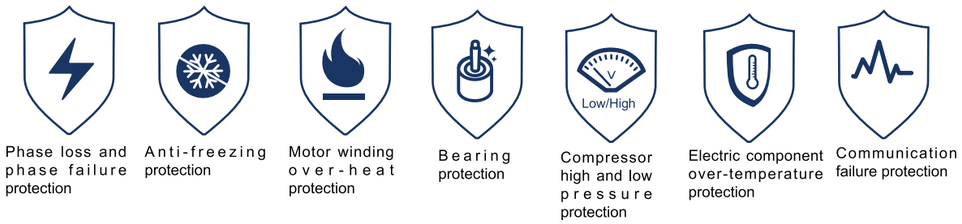
Components are strictly tested before entering the factory. Impellers are made of high-strength aluminum alloy, which is highly anti-corrosive. They must pass strict tests after manufacturing. Heat exchangers are designed in strict accordance with relevant codes of pressure vessels and tested in 1.5 times of working pressure. The machine will take complete performance tests and reliability tests before leaving the factory.

No Need of Maintenance

The compressor adopts magnetic bearing to keep the rotor suspended so that there won't be mechanical friction during rotation. Because there is no structural surge, low running noise, the bearing doesn't need maintenance during service life. There is no need to manage and control the lubricant, which helps improve unit reliability.

Multiple Protections

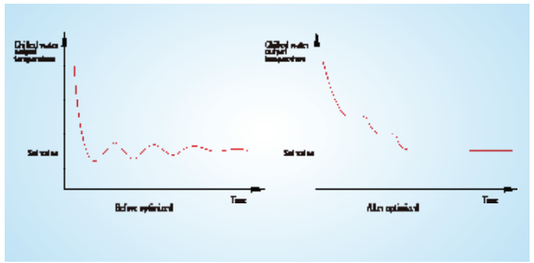
The unit is with bearing protection, motor winding overheat protection, surge protection, low pressure protection, high pressure protection, anti-freezing protection, water flow switch protection, phase loss and phase failure protection, electric component over-temperature protection, and different kinds of communication failure protection, etc.



Intelligent Control, Real-time Protection

Self-adjusting Technology and Stable Operation

The control system can not only adjust load according to cold water leaving temperature but also predict and compensate the change of air conditioning load based on the change rate of cold water entering temperature. The unit can achieve faster load adjustment and stable water leaving temperature.
When the unit is under bad working condition, it will adjust the running parameters to keep itself running rather than frequently stop. The unit can operate stably and reliably to satisfy customers' refrigerating demand.



Color Touch Screen Display Control Center

The touch screen display control center is a reliable micro-computer control system that provides users with a convenient, efficient and visualized operating screen, with real-time monitoring, data recording, safe protection, etc.
- 12'' 1024 x 768 touch screen
- Chinese and English languages
- Clear display, easy to operate

High-performance Digital Single Processing Platform

The control system adopts high-performance 32-bit CPU and DSP digital signal processor. The excellent data collection accuracy and data processing capability ensure timely and precise system control. The unit also adopts the intelligent Fuzzy-PID compound control algorithm, which is a control method comprising the intelligent technology, fuzzy technology and PID control algorithm, ensuring fast response and stable performance.

Authority Classification with Passwords

Control center has access passwords for operators so that set values won't be changed without authorization. Access authority is classified to user access and manufacturer access. User password is used to start up unit and enter the interface of user parameter setting. It is managed and can be changed by the user. Manufacturer password is used to enter the interface of manufacture parameter setting. Any change of the manufacture parameters may affect unit's reliability; therefore it must be kept by professional engineering and debugging personnel.

Soft Load-on and Soft Shut-down

Unit's control system can control the load-on gradually by capacity control and electric current limit so that unit won't be on and off frequently.
When unit is going to shut down, the control system will turn down the inlet guide vane (IGV) to a preset value and then disconnect power. This can effectively reduce impact on the unit and extend the starter's service life.

Control Center with Colorful Touch Screen Display

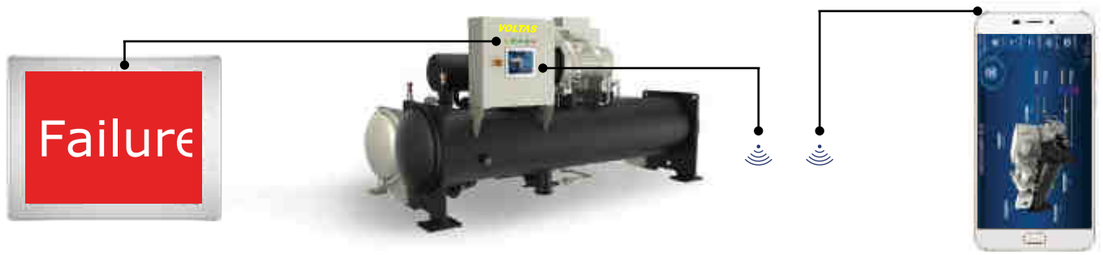
CAN Bus Communication

Network is highly reliable. The sending and receiving interface circuit of CAN bus is provided by the specialized CAN transceiver. At any moment, even if multiple nodes are sending data to the bus at the same time, the bus will not be short-circuited, so the malfunction of a single node will not transfer to the other nodes. What's more, in case of severe failure, the faulty nodes of CAN bus can be shut down automatically so that other nodes can still operate normally.

Second-generation Controller

Synchronous parameter backup: Large refrigerating equipment is accompanied with many operation parameters and has strict requirement for the accuracy of parameter setting. If one unit is replaced, it's hard to retrieve the original data. The second-generation controller will solve this problem with its synchronous parameter backup function. All the control units will process and copy the parameters and make sure the data are consistent. If one unit is replaced, the new unit will obtain relevant parameters from other units. There's no need to set parameters manually, which is convenient for debugging and maintenance.

Operation with no display: Because commercial units serve a wide range of users, it must be highly reliable to avoid causing widespread impact. The unit must still function properly in case of minor failures. The second-generation controller can guarantee normal operation without display. If the touch screen is faulted, the unit can still operate normally with no display.



Black box data recording: Central air conditioners have a large number of real-time data. Since the data is very valuable, it's necessary to obtain the data of the complete service period. The second-generation controller is equipped with data sampling algorithm to achieve the maximum effective data. It also adopts Flash fragmentation algorithm to realize the balance of chip loss. Through these strategies, it can obtain a great number of operation data for analysis.

Integrated main board: The original main control board, sub-control board, EXV drive board, PT100 detection board are integrated into one control board, which has reduced the communication nodes and improved the unit's reliability. Fewer wires, higher efficiency, less faulty nodes; it features high degree of integration and strong compatibility.

All DC

The control circuits adopt low-voltage DC24V control for safety concern. It is applicable to a wider power range. The control system doesn't need to separate 50/60Hz. High EMC performance, without 220V interference, good electromagnetic compatibility; the electric system occupies a small space and has high power density.

Product Specification

Model			VLCCE210FE5EE5	VLCCE220FE4EE4	VLCCE220FE3EE3	VLCCE230GE2FE2	VLCCE230GE1FE1	VLCCE310HG5GG5
Cooling capacity		kW	352	457	527	633	703	791
		RT	100	130	150	180	200	225
EER		W/W	5.81	5.87	5.76	6.16	6.04	6.12
IPLV		W/W	9.84	9.41	9.76	9.98	10.24	9.72
Power supply		V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Power input		kW	60.52	77.87	91.56	102.7	116.4	129.3
RLA		A	92.9	119.5	140.5	157.7	178.7	198.4
Compressor	Type	-	Centrifugal					
	Starting mode	-	Variable frequency drives					
	Quantity	-	1	1	1	1	1	1
Refrigerant charge		kg	210	235	250	280	300	320
Evaporator	Type	-	Flooded					
	Fouling factor	㎡・℃/kW	0.018	0.018	0.018	0.018	0.018	0.018
	Water flow rate	L/s	15.16	19.7	22.73	27.28	30.31	34.1
		GPM	240.3	312.3	360.4	432.5	480.5	540.6
	Pressure drop	kPa	30.5	31.4	31.2	31.9	31.5	57.1
		ft.WG	10	10.3	10.2	10.5	10.3	18.7
	Connection pipe	mm	DN150	DN150	DN150	DN150	DN150	DN200
Condenser	Type	-	Shell and tube					
	Fouling factor	㎡・℃/kW	0.044	0.044	0.044	0.044	0.044	0.044
	Water flow volume	L/s	19.07	24.75	28.64	34.04	37.93	42.59
		GPM	302.3	392.4	454.0	539.6	601.2	675.1
	Pressure drop	kPa	35.5	36.2	34.9	33.9	33.9	53.7
		ft.WG	11.6	11.9	11.5	11.1	11.1	17.6
	Connection pipe	mm	DN150	DN150	DN150	DN150	DN150	DN200
Sound pressure level(Max.)		dB(A)	78	78	78	78	78	78
Dimension	Outline (LxWxH)	mm	3320x1140x1900	3320x1140x1900	3320x1140x1900	3330x1180x1900	3330x1180x1900	3770x1590x1950
	Package (LxWxH)	mm	3500x1360x2100	3500x1360x2100	3500x1360x2100	3500x1400x2100	3500x1400x2100	3900x1750x2050
Net/Gross/Operating weight		kg	2695/2995/3050	3329/3629/3700	3500/3800/3900	3738/4038/4200	3905/4205/4350	4796/5196/5300
Loading quantity	40'GP/40'HQ	set	1	1	1	1	1	1

Model			VLCCE310HG4GG4	VLCCE310HG3GG3	VLCCE320HG2GG2	VLCCE320HG1GG1	VLCCE410MH4HH2	VLCCE410MH3HH1
Cooling capacity		kW	879	967	1055	1231	1406	1582
		RT	250	275	300	350	400	450
EER		W/W	6.16	6.06	6.34	6.24	6.42	6.48
IPLV		W/W	10.03	10.27	10.16	10.58	10.16	10.50
Power supply		V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Power input		kW	142.7	159.6	166.4	197.2	219.1	244.2
RLA		A	219.0	244.9	255.3	302.7	336.2	374.7
Compressor	Type	-	Centrifugal					
	Starting mode	-	Variable frequency drives					
	Quantity	-	1	1	1	1	1	1
Refrigerant charge		kg	350	375	400	425	450	550
Evaporator	Type	-	Flooded					
	Fouling factor	㎡・℃/kW	0.018	0.018	0.018	0.018	0.018	0.018
	Water flow rate	L/s	37.89	41.68	45.47	53.05	60.62	68.20
		GPM	600.6	660.7	720.8	840.9	961.0	1081.0
	Pressure drop	kPa	57.0	56.8	56.8	57.0	50.8	52.0
		ft.WG	18.7	18.6	18.6	18.7	16.7	17
	Connection pipe	mm	DN200	DN200	DN200	DN200	DN200	DN250
Condenser	Type	-	Shell and tube					
	Fouling factor	㎡・℃/kW	0.044	0.044	0.044	0.044	0.044	0.044
	Water flow volume	L/s	47.28	52.13	56.51	66.07	75.22	84.51
		GPM	749.4	826.3	895.8	1047.0	1192.0	1340.0
	Pressure drop	kPa	53.6	53.9	53.3	53.6	51.3	54.7
		ft.WG	17.6	17.7	17.5	17.6	16.8	17.9
	Connection pipe	mm	DN200	DN200	DN200	DN200	DN200	DN250
Sound pressure level(Max.)		dB(A)	78	78	78	78	80	80
Dimension	Outline (LxWxH)	mm	3770x1590x1950	3770x1590x1950	3770x1590x1950	3770x1590x1950	4300x1850x2330	4300x1850x2330
	Package (LxWxH)	mm	3900x1750x2050	3900x1750x2050	3900x1750x2050	3900x1750x2050	3950x1950x2350	4450x1950x2350
Net/Gross/Operating weight		kg	4833/5233/5350	4941/5341/5450	5008/5408/5600	5146/5646/5700	6335/6835/7150	6410/6910/7250
Loading quantity	40'GP/40'HQ	set	1	1	1	1	1	1

Model			VLCCE410MH1HH1	VLCCE510MH2JH2	VLCCE510MH1JH1	VLCCE520PIEKIE	VLCCE520PIDKID	VLCCE610PICKIC
Cooling capacity		kW	1758	1934	2110	2285	2461	2637
		RT	500	550	600	650	700	750
EER		W/W	6.37	6.64	6.55	6.67	6.58	6.76
IPLV		W/W	10.76	10.84	11.08	10.84	11.08	10.95
Power supply		V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Power input		kW	276.1	291.2	322.1	342.6	374	389.9
RLA		A	423.5	447.0	494.3	447.0	494.3	598.7
Compressor	Type	-	Centrifugal					
	Starting mode	-	Variable frequency drives					
	Quantity	-	1	1	1	1	1	1
Refrigerant charge		kg	575	600	625	650	675	700
Evaporator	Type	-	Flooded					
	Fouling factor	㎡·℃/kW	0.018	0.018	0.018	0.018	0.018	0.018
	Water flow rate	L/s	75.78	83.36	90.93	83.36	90.93	113.70
		GPM	1201.0	1321.0	1442.0	1562.0	1682.0	1802.0
	Pressure drop	kPa	49.3	68.2	67.9	68.2	67.9	61.8
		ft.WG	16.2	22.4	22.3	20.3	19.8	20.3
	Connection pipe	mm	DN250	DN250	DN250	DN250	DN250	DN250
Condenser	Type	-	Shell and tube					
	Fouling factor	㎡·℃/kW	0.044	0.044	0.044	0.044	0.044	0.044
	Water flow volume	L/s	94.12	103.00	112.50	103.00	112.50	140.10
		GPM	1492.0	1632.0	1784.0	1928.0	2080.0	2220.0
	Pressure drop	kPa	65.9	63.3	62.8	63.3	62.8	57.7
		ft.WG	21.6	20.8	20.6	18.6	18.6	18.9
	Connection pipe	mm	DN250	DN250	DN250	DN250	DN250	DN250
Sound pressure level(Max.)		dB(A)	80	80	80	82	82	82
Dimension	Outline (LxWxH)	mm	4250x1850x2330	4250x1910x2210	4250x1910x2210	4550x2010x2300	4550x2010x2300	4550x2010x2300
	Package (LxWxH)	mm	4450x1950x2350	4400x2100x2450	4400x2100x2450	4700x2100x2500	4700x2100x2500	4700x2100x2500
Net/Gross/Operating weight		kg	6400/6900/7250	7604/8104/8550	7720/8220/8650	8754/9254/9800	8863/9363/9900	9164/9664/10250
Loading quantity	40'GP/40'HQ	set	1	1	1	1	1	1

Model			VLCCE610PIBKIB	VLCCE610PIAKIA	VLCCE630QJCMJD	VLCCE620QJBMJC	VLCCE710QJAMJB	VLCCE710RJAMJA
Cooling capacity		kW	2813	2989	3164	3340	3516	3868
		RT	800	850	900	950	1000	1100
EER		W/W	6.75	6.66	6.72	6.94	6.95	6.85
IPLV		W/W	11.15	11.28	11.56	11.71	11.33	11.61
Power supply		V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Power input		kW	406.6	448.8	470.8	481.3	505.9	564.6
RLA		A	639.5	688.7	721.6	770.9	776.4	866.5
Compressor	Type	-	Centrifugal					
	Starting mode	-	Variable frequency drives					
	Quantity	-	1	1	1	1	1	1
Refrigerant charge		kg	725	730	900	925	950	975
Evaporator	Type	-	Flooded					
	Fouling factor	㎡·℃/kW	0.018	0.018	0.018	0.018	0.018	0.018
	Water flow rate	L/s	121.20	128.80	136.40	144.00	151.60	166.70
		GPM	1922.0	2042.0	2162.0	2282.0	2403.0	2643.0
	Pressure drop	kPa	60.8	63.1	60.2	59.2	59.3	60.1
		ft.WG	20	20.7	19.7	19.4	19.4	19.7
	Connection pipe	mm	DN250	DN250	DN300	DN300	DN300	DN300
Condenser	Type	-	Shell and tube					
	Fouling factor	㎡·℃/kW	0.044	0.044	0.044	0.044	0.044	0.044
	Water flow volume	L/s	149.40	159.10	168.20	140.10	186.10	205.10
		GPM	2369.0	2521.0	2666.0	2819.0	2950.0	3251.0
	Pressure drop	kPa	58.1	59.9	65.7	66.5	66	67.1
		ft.WG	19	19.6	21.5	21.8	21.6	22
	Connection pipe	mm	DN250	DN250	DN300	DN300	DN300	DN300
Sound pressure level(Max.)		dB(A)	82	82	82	84	84	84
Dimension	Outline (LxWxH)	mm	4550x2010x2300	4550x2010x2300	4980x2210x2500	4980x2210x2500	4980x2210x2500	4980x2310x2600
	Package (LxWxH)	mm	4700x2100x2500	4700x2100x2500	5100x2370x2750	5100x2370x2750	5100x2370x2750	5100x2600x2850
Net/Gross/Operating weight		kg	9284/9784/10400	9374/9874/10500	10591/11091/12000	10719/11219/12150	10850/11350/12300	11506/12006/13050
Loading quantity	40'GP/40'HQ	set	1	1	1	1	1	1

Note:
1. Above model selection is applicable to the condition in which leaving chilled water temperature is 6.7℃ and entering cooling water temperature is 29.4℃ .
2. Standard unit's water side bearing pressure is 1.0MPa; 1.6MPa is an available option.
3. Scale factors of chilled water and cooling water are 0.018 ㎡·℃/kW and 0.044 ㎡·℃/kW respectively.
4. Above water flow is indicated according to AHRI 550/590-2015; IPLV is the test value obtained based on the working condition specified in AHRI 550/590-2015.
5. For compressor using inverter starter, starting current < rated current; power factor is 0.995.
6. The unit's performance parameters may be changed without prior notice due to product improvement.

Operation Range

Operating condition of nominal cooling (water temperature)				Operating range (water temperature)			
Chilled water		Cooling water		Chilled water		Cooling water	
Inlet(°C)	Outlet(°C)	Inlet(°C)	Outlet(°C)	Outlet(°C)	I/O difference(°C)	Inlet(°C)	I/O difference(°C)
12.2	6.7	29.4	34.9	5~15	2.5~8	12~35	3.5~8

Product Installation

In order to guarantee normal operation and prevent any malfunction, the installation work must be done by professional technicians who are familiar with air conditioning knowledge and have rich experience in air conditioning installation. Before installation, please read carefully the installation manual.

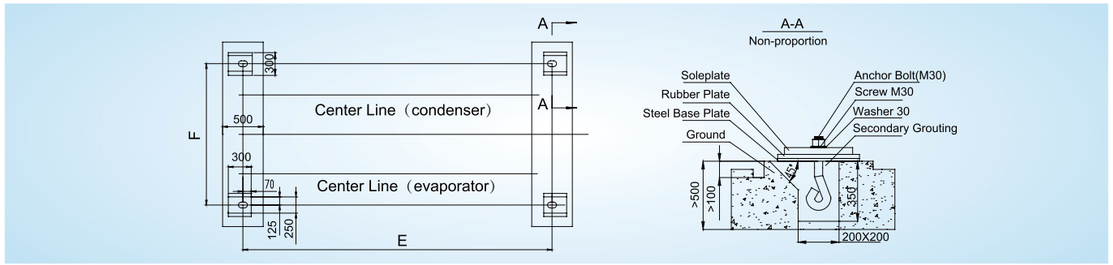
Installation Environment and Foundation

Installation Environment

- Select a location where ambient temperature is within the range of 0~40°C and relative humidity is below 90%.
- Install the unit indoors with ventilation facilities. Avoid rains and sunlight.
- The unit should be kept away from fire and inflammables. If it is installed together with a heater such as boiler, it is necessary to consider the effect of thermal radiation.
- The location should be bright for the convenience of maintenance and inspection.
- Select a location that is with little dust. (Dust will lead to electric malfunction)
- In order to maintain, inspect and clean the heat exchange tubes of condenser and evaporator, there should be enough space around the unit (See diagram of Maintenance Space for the specific dimensions).
- For easy lifting and overhaul, it is necessary to install travelling crane or derrick car and make sure that the machine room is high enough.
- If the unit is installed outdoors or at the seaside or a chemical plant where there is high concentration of corrosive gas, special design is needed for the unit. Please contact the local sales office.

Installation Foundation

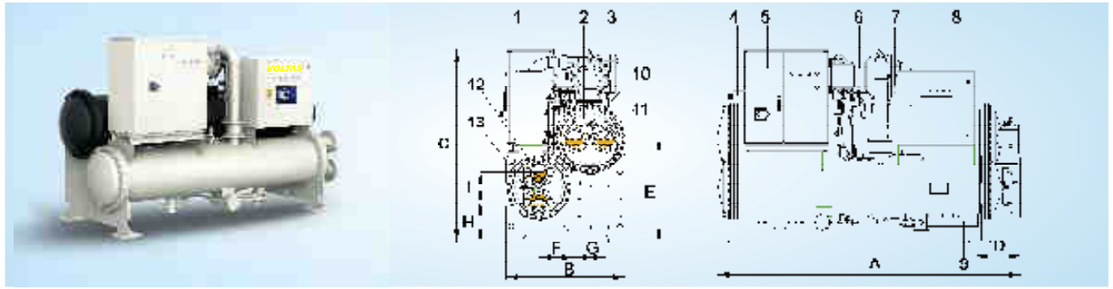
The foundation of the unit must be made of cement or steel and should be able to bear the unit's operating weight. Its upper surface must be level. It's better to set drain ditch for the foundation. Please refer to the diagram of installation foundation. The unit should be placed on the foundation.
The steel base plate and damping rubber plate should be reinforced by second grouting after the chiller is installed with anchor bolts. Anchor bolts should be about 100mm above the installation surface.



Unit Foundation Dimension(mm)

Model	E	F	Model	E	F
VLCCE210FE5EE5	2617	980	VLCCE410MH3HH1	3290	1595
VLCCE220FE4EE4	2617	980	VLCCE 420MH2JH2	3290	1655
VLCCE220FE3EE3	2617	980	VLCCE 420MH1JH1	3290	1655
VLCCE230GE2FE2	2617	1020	VLCCE 510PIEKIE	3590	1760
VLCCE230GE1FE1	2617	1020	VLCCE 510PIDKID	3590	1760
VLCCE310HG5GG5	2990	1335	VLCCE 520PICKIC	3590	1760
VLCCE310HG4GG4	2990	1335	VLCCE 520PIBKIB	3590	1760
VLCCE310HG3GG3	2990	1335	VLCCE 520PIAKIA	3590	1760
VLCCE320HG2GG2	2990	1335	VLCCE 530QJCMJD	3990	1960
VLCCE320HG1GG1	2990	1335	VLCCE 610QJBMJC	3990	1960
VLCCE410LG1HG1	2990	1560	VLCCE 610QJAMJB	3990	1960
VLCCE410MH4HH2	3290	1595	VLCCE 610RJAMJA	3990	2060

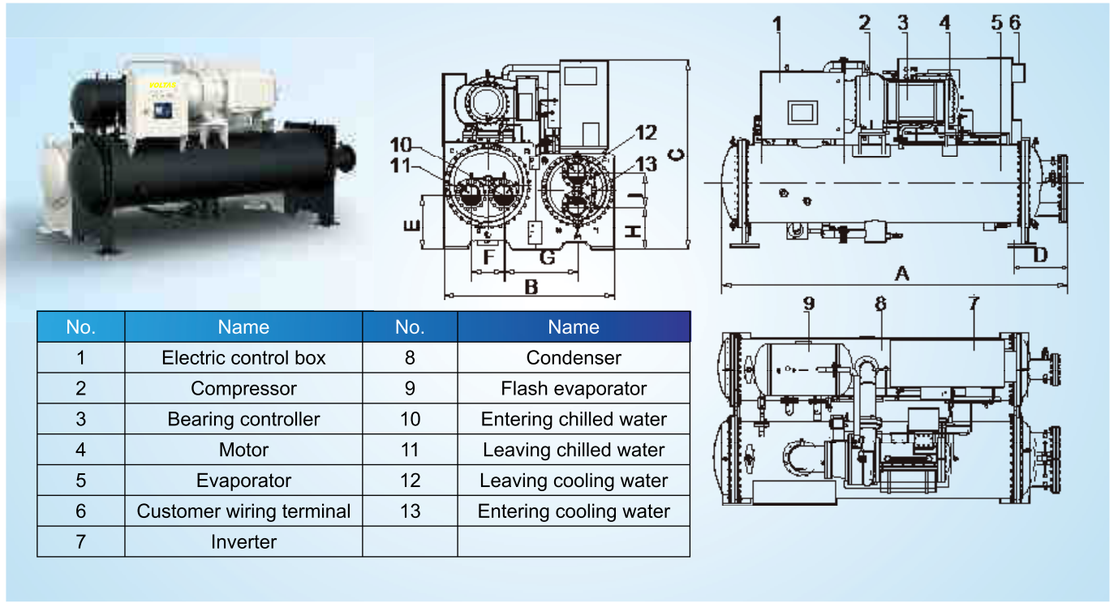
Diagram of Components



No.	Name	No.	Name
1	Condenser	8	Electric control box
2	Evaporator	9	Flash evaporator
3	Bearing controller	10	Leaving chilled water
4	Customer wiring terminal	11	Entering chilled water
5	Inverter	12	Leaving cooling water
6	Motor	13	Entering cooling water
7	Compressor		

Dimensions of centrifugal chiller (mm)

Model	A	B	C	D	E	F	G	H	I	Chilled water port	Cooling water port
VLCCE210FE5EE5	3350	1140	1900	450	990	345	300	375	290	DN150	DN150
VLCCE220FE4EE4	3350	1140	1900	450	990	345	300	375	290	DN150	DN150
VLCCE220FE3EE3	3350	1140	1900	450	990	345	300	375	290	DN150	DN150
VLCCE230GE2FE2	3350	1180	1900	450	990	345	300	375	290	DN150	DN150
VLCCE230GE1FE1	3350	1180	1900	450	990	345	300	375	290	DN150	DN150

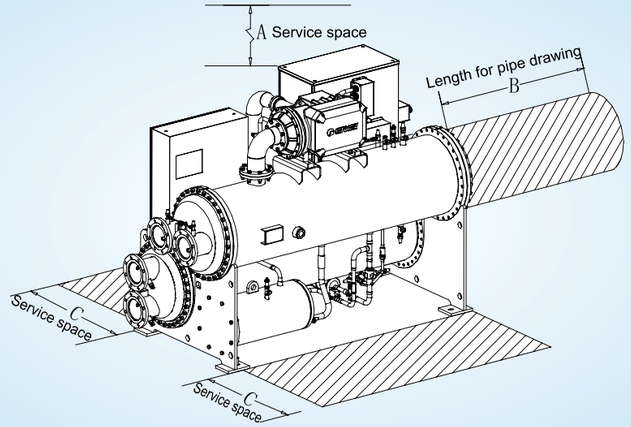


No.	Name	No.	Name
1	Electric control box	8	Condenser
2	Compressor	9	Flash evaporator
3	Bearing controller	10	Entering chilled water
4	Motor	11	Leaving chilled water
5	Evaporator	12	Leaving cooling water
6	Customer wiring terminal	13	Entering cooling water
7	Inverter		

Dimensions of centrifugal chiller (mm)

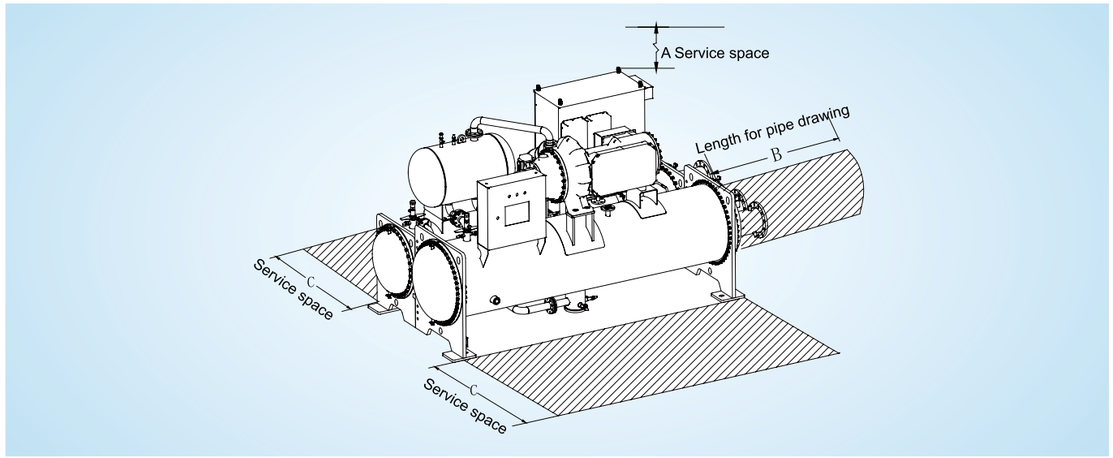
Model	A	B	C	D	E	F	G	H	I	Chilled water port	Cooling water port
VLCCE310HG5GG5	3770	1590	1850	500	615	350	640	330	350	DN200	DN200
VLCCE310HG4GG4	3770	1590	1850	500	615	350	640	330	350	DN200	DN200
VLCCE310HG3GG3	3770	1590	1850	500	615	350	640	330	350	DN200	DN200
VLCCE320HG2GG2	3770	1590	1850	500	615	350	640	330	350	DN200	DN200
VLCCE320HG1GG1	3770	1590	1850	500	615	350	640	330	350	DN200	DN200
VLCCE410LG1HG1	3850	1810	2220	520	675	420	735	450	350	DN200	DN200
VLCCE410MH4HH2	4300	1850	2150	570	765	430	740	370	405	DN250	DN250
VLCCE410MH3HH1	4300	1850	2150	570	765	430	740	370	405	DN250	DN250
VLCCE420MH2JH2	4250	1910	2210	570	765	430	770	430	415	DN250	DN250
VLCCE420MH1JH1	4250	1910	2210	570	765	430	770	430	415	DN250	DN250
VLCCE510PIEKIE	4550	2010	2300	570	815	480	770	510	430	DN250	DN250
VLCCE510PIDKID	4550	2010	2300	570	815	480	770	510	430	DN250	DN250

Dimension of Installation and Maintenance Space



Dimension of Installation and Maintenance Space (mm)

Model	A	B	C	D
VLCCE210FE5EE5	500	2800	600	1000
VLCCE220FE4EE4	500	2800	600	1000
VLCCE220FE3EE3	500	2800	600	1000
VLCCE230GE2FE2	500	2800	600	1000
VLCCE230GE1FE1	500	2800	600	1000



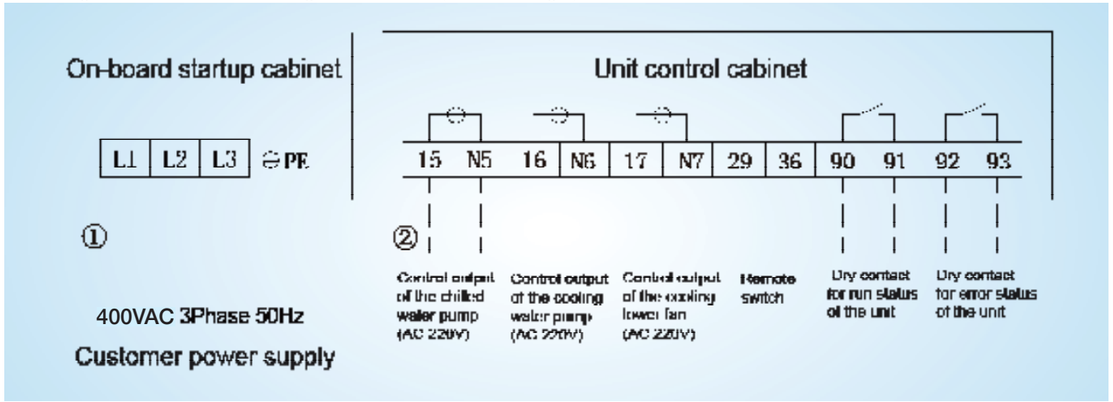
Dimension of Installation and Maintenance Space (mm)

Model	A	B	C	D
VLCCE310HG5GG5	600	3200	700	1000
VLCCE310HG4GG4	600	3200	700	1000
VLCCE310HG3GG3	600	3200	700	1000
VLCCE320HG2GG2	600	3200	700	1000
VLCCE320HG1GG1	600	3200	700	1000
VLCCE 410LG1HG1	1500	3500	1500	1220
VLCCE410MH4HH2	1500	3500	1500	1220
VLCCE410MH3HH1	1500	3500	1500	1220
VLCCE 420MH2JH2	1500	3500	1500	1220
VLCCE 420MH1JH1	1500	3500	1500	1220
VLCCE510PIEKIE	1500	3800	1500	1220
VLCCE510PIDKID	1500	3800	1500	1220

Electrical Installation

Electrical Installation of 4-quadrant Inverter

Diagram of External Wiring for the Unit (Low Voltage)



Wiring instructions:
(1) Line 1 represents the power cable between customer's power distribution cabinet and chiller's inverter startup cabinet. The required power supply is 400V 3~ 50Hz. The power cable shall enter from the side or bottom of the inverter startup cabinet and the cable size varies as per the change of unit power.
(2) Line 2 represents the signal control line from the chiller's main control cabinet to the water pump control cabinet and remote switch, unit running status and unit malfunction status. The cable size should be equal to or above 1.5mm^2.
Note: The water pump control cabinet should be prepared by the user. Please refer to the diagram attached inside the cabinet.

VLCE Series Centrifugal Chiller

Voltas VLCE Series centrifugal chiller adopts R134a eco-friendly refrigerant, and it is equipped with features like high energy efficiency, safe, reliable and stable operation, wide adjustment range, long service life, simple operation and maintenance, and low noise. This series has passed AHRI certification and can be widely applied in large office buildings, hospitals, schools, shopping malls, industrial processing, or refrigerant places that demand high-temperature cooling water or low-temperature chilled water.

Voltas has a wide range of Products and equipment for the various applications meeting high standards of quality, efficiency, reliability and industrial norms. With in-house Engineering and Manufacturing of major components like Compressors, condensers, chillers, pressure vessels and automation components, we offer complete customize solution to fulfill all expectations of customer for reliable operations of the system. With ISO 9001: 2015 standard certified factories, Voltas possesses total capability on the manufacturing of the chillers.

Nomenclature

VLC	V	E	510	PIE	KIE	-	-	-	-
1	2	3	4	5	6	7	8	9	10

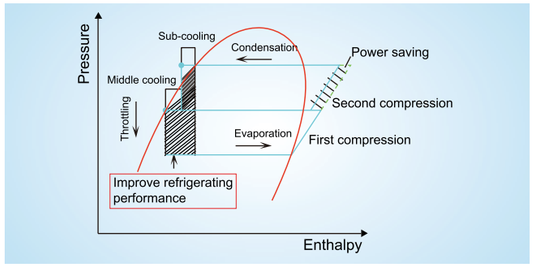
No.	Code meaning	Options
1	Model	**VLC- Centrifugal chiller**
2		C- Magnetic bearing; V- Permanent magnet inverter; Absence-Fixed frequency
3		E- Cooling only (absence for magnetic bearing); P- Heat pump H- Heating only; I- Ice making; S- PV power; T- High temperature
4	Compressor	--
5	Evaporator	--
6	Condenser	--
7	Special functions	R- Partial heat recovery; Q- Total heat recovery; Absence- no special function
8	Type of startup cabinet	T- Autotransformer startup; Fixed-frequency: star-delta startup **(400V), direct** startup (6kV/10kV)
9	Number of compressors	2- Double compressors; Absence- Single compressor
10	Power	G- 10000V; Absence- 400V

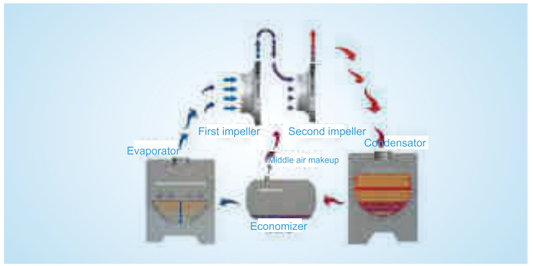
Product Features

Core Technology, High Efficiency

Two-stage Compression Technology

When compared to single-stage compression, two-stage compression technology has the following advantages:
(1) 5~6% higher efficiency in refrigeration;
(2) Lower running speed, higher reliability, and longer service life for compressor;
(3) Large flow angle for impeller outlet, large surge margin and wider operating range;





Multiple Noise Reduction Technologies

The high-strength gear case to reduce vibration; 4-grade precision wheelwork to diminish mechanical friction; double-layer soundproof component; injection noise reduction design; different measures are taken to reduce the operating noise.

Double Independent Systems

For units with large cooling capacity, double compressors are adopted. The entire system is equal to the combination of two centrifugal chillers. Two systems are independent from one another; refrigerant of one side won't affect the refrigerant of the other side, thus high reliability; two compressors work independently, which will greatly improve the unit's partial load capacity and compressors' overall performance. In addition, the heat exchanger countercurrent single-flow shell and tube design lowers the water pressure, which can satisfy the demand of small water flow system.

System Positive Pressure Design

System maintains positive pressure so that non-condensable gas will not enter the system during operation. The system is cleaner without the need to add an air extractor. Compared to negative pressure design, the unit is more compact and space saving an air purge unit.

Core Components, Stable and Reliable

Semi-hermetic Motor

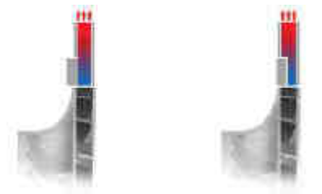
This is an efficient closed type motor that adopts injection cooling with liquefied refrigerant. It will not only lower the risk of refrigerant and lubricant leakage but also restrain heat dissipation, saving the cost for cooling devices in the machine room.

High-efficiency Heat Exchanger

Heat exchangers are especially design for centrifugal chillers. They can keep refrigerant distribution in balance, maintain a proper temperature field, and improve heat exchange efficiency. They are highly efficient, not only lowering the heat transfer resistance but also increasing the cooling capacity and energy efficiency ratio.
To ensure the reliability, both the evaporator and the condenser adopt 3V-grooved tube plate design. The bottom of condenser is made with sub-cooler, which uses high-efficiency sub-cooling tubes. Maximum sub-cooling can be 5°C.

Variable Section Diffuser

The rear side of the impeller is designed with variable section diffuser. Under partial load, its axial movement is used to change the width of the airflow passage, so that the flow area of the diffuser is reduced, thereby improving the airflow velocity and stability, reducing airflow backflow, effectively improving the surge point of the unit, expanding the unit's operating range, reducing noise and vibration of the unit at full load and partial load.



Full load Partial load

On-board Startup Cabinet

Wiring is completed before ex-factory. User just needs to provide the power line, which has simplified the wiring procedure at user side. The startup cabinet is directly built on the unit, which is space-saving and making the structure more compact.

Control Center with Colorful Touch Screen Display

CAN Bus Communication

Network is highly reliable. The sending and receiving interface circuit of CAN bus is provided by the specialized CAN transceiver. At any moment, even if multiple nodes are sending data to the bus at the same time, the bus will not be short-circuited, so the malfunction of a single node will not transfer to the other nodes. What's more, in case of severe failure, the faulty nodes of CAN bus can be shut down automatically so that other nodes can still operate normally.

Second-generation Controller

Synchronous parameter backup: Large refrigerating equipment is accompanied with many operation parameters and has strict requirement for the accuracy of parameter setting. If one unit is replaced, it's hard to retrieve the original data. The second-generation controller will solve this problem with its synchronous parameter backup function. All the control units will process and copy the parameters and make sure the data are consistent. If one unit is replaced, the new unit will obtain relevant parameters from other units. There's no need to set parameters manually, which is convenient for debugging and maintenance.

Operation with no display: Because commercial units serve a wide range of users, it must be highly reliable to avoid causing widespread impact. The unit must still function properly in case of minor failures. The second-generation controller can guarantee normal operation without display. If the touch screen is faulted, the unit can still operate normally with no display.

Black box data recording: Central air conditioners have a large number of real-time data. Since the data is very valuable, it's necessary to obtain the data of the complete service period. The second-generation controller is equipped with data sampling algorithm to achieve the maximum effective data. It also adopts Flash fragmentation algorithm to realize the balance of chip loss. Through these strategies, it can obtain a great number of operation data for analysis.

Integrated main board: The original main control board, sub-control board, EXV drive board, PT100 detection board are integrated into one control board, which has reduced the communication nodes and improved the unit's reliability. Fewer wires, higher efficiency, less faulty nodes; it features high degree of integration and strong compatibility.

All DC

The control circuits adopt low-voltage DC24V control for safety concern. It is applicable to a wider power range. The control system doesn't need to separate 50/60Hz. High EMC performance, without 220V interference, good electromagnetic compatibility; the electric system occupies a small space and has high power density.

Product Specification

Model			VLCE310LG2HG2	VLCE311LG1HG1	VLCE320MH4HH2	VLCE321MH3HH1	VLCE330MH2JH2	VLCE331MH1JH1
Cooling capacity		kW	1231	1406	1582	1758	1934	2110
		RT	350	400	450	500	550	600
EER		W/W	6.10	6.09	6.38	6.42	6.54	6.55
IPLV		W/W	6.64	6.63	6.69	6.97	6.91	7.11
Power supply		V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Power input		kW	201.7	230.9	248.0	273.8	295.7	322.1
RLA		A	344.40	394.20	423.40	467.50	504.80	549.80
Compressor	Type	-	Centrifugal					
	Starting mode	-	Y- △					
	Quantity	-	1	1	1	1	1	1
Refrigerant charge volume		kg	425	450	550	575	600	625
Refrigeration oil	Type	-	No.68 synthetic fatty oil					
	Charge volume	L	50	50	50	50	50	50
Evaporator	Type	-	Flooded					
	Fouling factor	㎡・℃/kW	0.018	0.018	0.018	0.018	0.018	0.018
	Water flow rate	L/s	53.05	60.62	68.2	75.78	83.36	90.93
		GPM	840.9	961	1081	1201.0	1321.0	1442.0
	Pressure drop	kPa	54.2	57.3	62.4	62.5	68.2	67.9
		ft.WG	17.8	18.8	20.5	20.5	22.4	22.3
	Connection pipe	mm	DN200	DN200	DN250	DN250	DN250	DN250
Condenser	Type	-	Shell and tube					
	Fouling factor	㎡・℃/kW	0.044	0.044	0.044	0.044	0.044	0.044
	Water flow volume	L/s	66.28	75.77	84.69	94.02	103.20	112.50
		GPM	1051	1201	1343	1490.0	1635.0	1784.0
	Pressure drop	kPa	62.7	62.8	63.1	65.8	63.5	62.8
		ft.WG	20.6	20.6	20.7	21.6	20.8	20.6
	Connection pipe	mm	DN200	DN200	DN250	DN250	DN250	DN250
Sound pressure level(Max.)		dB(A)	82	82	82	82	82	82
Dimension	Outline (LxWxH)	mm	3850x1810x2220	3850x1810x2220	4300x1850x2310	4300x1850x2310	4250x1910x2370	4250x1910x2370
	Package (LxWxH)	mm	3950x1950x2450	3950x1950x2450	4400x1900x2550	4400x1900x2550	4400x2000x2600	4400x2000x2601
Net/Gross/Operating weight		kg	6800/7100/7450	7100/7400/7750	7300/7800/8200	7500/8000/8400	7850/8350/8800	8100/8600/9100
Loading quantity	40'GP/40'HQ	set	1	1	1	1	1	1

Model			VLCE410PIEKIE	VLCE411PIDKID	VLCE420PICKIC	VLCE421PIBKIB	VLCE510PIAKIA	VLCE511QJCMJD
Cooling capacity		kW	2285	2461	2637	2813	2989	3164
		RT	650	700	750	800	850	900
EER		W/W	6.40	6.44	6.50	6.53	6.50	6.52
IPLV		W/W	6.82	7.02	6.94	7.12	7.09	6.98
Power supply		V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Power input		kW	357.1	382.2	405.7	430.8	459.8	485.3
RLA		A	609.60	652.40	692.60	735.30	784.90	828.50
Compressor	Type	-	Centrifugal					
	Starting mode	-	Y- △					
	Quantity	-	1	1	1	1	1	1
Refrigerant charge volume		kg	650	675	750	775	800	900
Refrigeration oil	Type	-	No.68 synthetic fatty oil					
	Charge volume	L	60	60	60	60	80	80
Evaporator	Type	-	Flooded					
	Fouling factor	㎡・℃/kW	0.018	0.018	0.018	0.018	0.018	0.018
	Water flow rate	L/s	98.51	106.1	113.7	121.2	128.8	136.4
		GPM	1562.0	1682.0	1802.0	1922.0	2042.0	2162.0
	Pressure drop	kPa	63.3	61.5	64.9	60.2	61.8	60.2
		ft.WG	20.8	20.2	21.3	19.8	20.3	19.7
	Connection pipe	mm	DN250	DN250	DN250	DN250	DN250	DN300
Condenser	Type	-	Shell and tube					
	Fouling factor	㎡・℃/kW	0.044	0.044	0.044	0.044	0.044	0.044
	Water flow volume	L/s	122.30	131.60	140.80	150.10	159.60	168.90
		GPM	1938.0	2086.0	2232.0	2379.0	2529.0	2677.0
	Pressure drop	kPa	57.2	57	58.2	58.5	60.2	66.1
		ft.WG	18.8	18.7	19.1	19.2	19.7	21.7
	Connection pipe	mm	DN250	DN250	DN250	DN250	DN250	DN300
Sound pressure level(Max.)		dB(A)	83	83	83	83	84	84
Dimension	Outline (LxWxH)	mm	4550x2010x2390	4550x2010x2390	4550x2010x2390	4550x2010x2390	4550x2010x2390	4980x2210x2610
	Package (LxWxH)	mm	4700x2100x2600	4700x2100x2600	4700x2100x2600	4700x2100x2600	4700x2100x2600	5100x2300x2850
Net/Gross/Operating weight		kg	9600/10100/10700	9850/10350/10950	10100/10600/11300	10350/10950/11550	10800/11300/12050	12000/12600/13450
Loading quantity	40'GP/40'HQ	set	1	1	1	1	1	1

Model			VLCE512QJBMJC	VLCE520QJAMJB	VLCE521RJAMJA	VLCE522RJAMJA	VLCE610SKNQKN	VLCE611SKMQKM
Cooling capacity		kW	3340	3516	3692	3868	4219	4571
		RT	950	1000	1050	1100	1200	1300
EER		W/W	6.54	6.55	6.60	6.60	6.54	6.57
IPLV		W/W	7.12	6.93	7.07	7.19	6.95	7.16
Power supply		V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Power input		kW	510.7	536.8	559.4	586.0	645.1	695.7
RLA		A	871.90	916.40	954.90	1000.00	1101.30	1187.70
Compressor	Type	-	Centrifugal					
	Starting mode	-	Y-△				soft starting	
	Quantity	-	1	1	1	1	1	1
Refrigerant charge		kg	925	950	950	975	1250	1300
Refrigeration oil	Type	-	No.68 synthetic fatty oil					
	Charge volume	L	80	80	80	80	100	100
Evaporator	Type	-	Flooded					
	Fouling factor	㎡・℃/kW	0.018	0.018	0.018	0.018	0.018	0.018
	Water flow rate	L/s	144.00	151.60	159.10	166.70	181.90	197.00
		GPM	2282.0	2403.0	2523.0	2643.0	2883.0	3123.0
	Pressure drop	kPa	59.2	59.3	55.4	60.1	56	55.9
		ft.WG	19.4	19.4	18.2	19.7	18.4	18.4
	Connection pipe	mm	DN300	DN300	DN300	DN300	DN350	DN350
Condenser	Type	-	Shell and tube					
	Fouling factor	㎡・℃/kW	0.044	0.044	0.044	0.044	0.044	0.044
	Water flow volume	L/s	178.20	187.50	196.70	206.10	225.10	243.70
		GPM	2825.0	2973.0	3118.0	3267.0	3568.0	3863.0
	Pressure drop	kPa	66.7	66.9	62.4	67.7	42	41.4
		ft.WG	21.9	21.9	20.5	22.2	13.8	13.6
	Connection pipe	mm	DN300	DN300	DN300	DN300	DN350	DN350
Sound pressure level(Max.)		dB(A)	84	84	84	84	85	85
Dimension	Outline (LxWxH)	mm	4980x2210x2610	4980x2210x2610	4980x2310x2710	4980x2310x2710	5250x2530x2880	5250x2530x2880
	Package (LxWxH)	mm	5100x2300x2850	5100x2300x2850	5100x2300x2950	5100x2300x2950	5600x2900x3100	5600x2900x3100
Net/Gross/Operating weight		kg	12250/12850/13750	12500/13100/14000	13156/13756/14750	13429/14029/15050	16600/17200/18700	17000/17600/19150
Loading quantity	40'GP/40'HQ	set	1	1	1	1	1	1

Model			VLCE620SKLQKL	VLCE621TKNRKN-G	VLCE630TKMRKM-G	VLCE631TKLRKL-G	VLCE710TLNRLL-G	VLCE711TLMSLP-G	VLCE720TLLRLO-G
Cooling capacity		kW	4922	5274	5626	5977	6329	6680	7032
		RT	1400	1500	1600	1700	1800	1900	2000
EER		W/W	6.52	6.55	6.62	6.65	6.66	6.68	6.66
IPLV		W/W	6.95	7.13	7.08	7.24	7.12	7.27	7.13
Power supply		V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Power input		kW	755.0	805.2	849.8	898.8	950.3	1000.0	1056.0
RLA		A	1288.80	52.20	55.10	58.30	61.60	64.90	68.50
Compressor	Type	-	Centrifugal						
	Starting mode	-	Soft starting	Direct starting					
	Quantity	-	1	1	1	1	1	1	1
Refrigerant charge		kg	1350	1400	1450	1500	1600	1650	1800
Refrigeration oil	Type	-	No.68 synthetic fatty oil						
	Charge volume	L	100	100	100	100	120	120	120
Evaporator	Type	-	Flooded						
	Fouling factor	㎡・℃/kW	0.018	0.018	0.018	0.018	0.018	0.018	0.018
	Water flow rate	L/s	212.20	227.30	242.50	257.60	272.80	288.00	303.10
		GPM	3364.0	3604.0	3844.0	4084.0	4325.0	4565.0	4805.0
	Pressure drop	kPa	56.9	54.4	45.5	45.5	56.9	56.1	56.9
		ft.WG	18.7	17.8	14.9	14.9	18.7	18.4	18.7
	Connection pipe	mm	DN350	DN350	DN350	DN350	DN400	DN400	DN400
Condenser	Type	-	Shell and tube						
	Fouling factor	㎡・℃/kW	0.044	0.044	0.044	0.044	0.044	0.044	0.044
	Water flow volume	L/s	262.70	281.30	299.60	318.20	336.80	355.40	374.30
		GPM	4165.0	4459.0	4750.0	5044.0	5339.0	5634.0	5933.0
	Pressure drop	kPa	44.2	42.9	44.4	44.4	63.7	62.6	60.9
		ft.WG	14.5	14.1	14.6	14.6	20.9	20.5	20
	Connection pipe	mm	DN350	DN400	DN400	DN400	DN450	DN450	DN450
Sound pressure level(Max.)		dB(A)	85	85	85	85	86	86	86
Dimension	Outline (LxWxH)	mm	5250x2530x2880	5400x2750x3000	5400x2750x3000	5400x2750x3000	5800x2750x3100	5800x2750x3100	5800x2750x3100
	Package (LxWxH)	mm	5600x2900x3100	5800x3200x3200	5800x3200x3200	5800x3200x3200	6400x3100x3300	6400x3100x3300	6400x3100x3300
Net/Gross/Operating weight		kg	17400/18000/19600	18600/19400/21250	19000/19800/21500	19500/20300/22050	23500/24300/26150	24000/24800/26800	24500/25300/27450
Loading quantity	40'GP/40'HQ	set	1	1	1	1	1	1	1

Model			VLCE721ULNSLN-G	VLCE730ULMSLM-G	VLCE731ULLSLL-G	VLCE610UN4SN4-2-G	VLCE611UN3SN3-2-G	VLCE620UN2SN2-2-G	VLCE621UN1SN1-2-G
Cooling capacity		kW	7384	7735	8087	8438	9142	9845	10550
		RT	2100	2200	2300	2400	2600	2800	3000
EER		W/W	6.68	6.70	6.71	6.68	6.67	6.68	6.72
IPLV		W/W	7.27	7.17	7.30	8.19	8.18	8.20	8.24
Power supply		V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Power input		kW	1105.0	1155.0	1205.0	1263.0	1371.0	1474.0	1570.0
RLA		A	71.70	74.90	78.20	81.90	88.90	95.60	101.80
Compressor	Type	-	Centrifugal						
	Starting mode	-	Direct starting						
	Quantity	-	1	1	1	2	2	2	2
Refrigerant charge volume		kg	2000	2100	2200	2300	2500	2700	2800
Refrigeration oil	Type	-	No.68 synthetic fatty oil						
	Charge volume	L	120	120	120	200	200	200	200
Evaporator	Type	-	Flooded						
	Fouling factor	㎡・℃/kW	0.018	0.018	0.018	0.018	0.018	0.018	0.018
	Water flow rate	L/s	318.30	333.40	348.60	363.70	394.10	424.40	454.70
		GPM	5045.0	5286.0	5526.0	5766.0	6247.0	6727.0	7208.0
	Pressure drop	kPa	58.2	58.0	58.0	43.7	43.9	43.5	43.2
		ft.WG	19.1	19	19	14.3	14.4	14.3	14.2
	Connection pipe	mm	DN400	DN400	DN400	DN500	DN500	DN500	DN500
Condenser	Type	-	Shell and tube						
	Fouling factor	㎡・℃/kW	0.044	0.044	0.044	0.044	0.044	0.044	0.044
	Water flow volume	L/s	392.80	411.40	430.00	448.90	486.40	523.80	560.70
		GPM	6227.0	6521.0	6816.0	7116.0	7711.0	8303.0	8889.0
	Pressure drop	kPa	59.8	59.2	60.8	40.1	39.9	39.7	39.7
		ft.WG	19.6	19.4	20.0	13.2	13.1	13.0	13.0
	Connection pipe	mm	DN450	DN450	DN450	DN500	DN500	DN500	DN500
Sound pressure level(Max.)		dB(A)	86	86	86	88	88	88	88
Dimension	Outline (LxWxH)	mm	5800x3000x3300	5800x3000x3300	5800x3000x3300	7600x2460x2850	7600x2460x2850	7600x2660x2950	7600x2660x2950
	Package (LxWxH)	mm	6400x3350x3350	6400x3350x3350	6400x3350x3350	8000x3360x3360	8000x3360x3360	8000x3360x3360	8000x3360x3360
Net/Gross/Operating weight		kg	26000/26800/29300	26600/27400/30000	26900/27700/30400	32000/33000/35750	33000/34000/36950	34000/35000/38150	35000/36000/39250
Loading quantity	40'GP/40'HQ	set	1	1	1	1	1	1	1

Notes:
1. Above model selection is applicable to the condition in which leaving chilled water temperature is 6.7℃ and entering cooling water temperature is 29.4℃ .
2. VLCE610UN4SN4-2-G~VLCE621UN1SN1-2-G adopt independent dual-system structure.
3. Above water flow is indicated according to AHRI 550/590-2015; IPLV is the test value obtained based on the working condition specified in AHRI 550/590-2015.
4. Fouling factors of chilled water and cooling water are 0.018 ㎡/• ℃ /kW and 0.044㎡• ℃ /kW respectively.
5. For special working condition, please contact Voltas local sales office.
6. Standard unit's water side bearing pressure is 1.0MPa; 1.6MPa is an available option.
7. The unit's performance parameters may be changed without prior notice due to product improvement. For the specific parameters, please refer to product nameplate.
8. The product models are not for EU.

Operation Range

Chilled water		Cooling water	
Outlet temperature(℃)	Temperature difference between inlet and outlet (℃)	Inlet temperature (℃)	Temperature difference between inlet and outlet (℃)
5~15	2.5~8	12~35	3.5~8

If customer requires higher temperature difference, please consult VOLTAS.

Product Installation

Installation Environment and Foundation

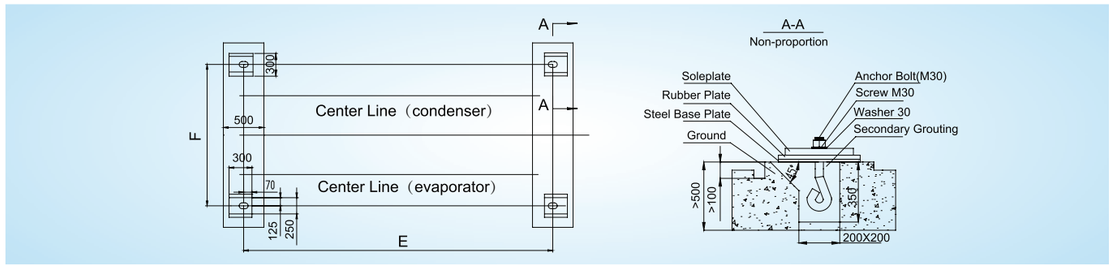
Installation Environment

- The refrigerating unit should be kept away from fire and inflammables. If it is installed together with a heater such as boiler, it is necessary to consider the effect of thermal radiation.
- Select a location where ambient temperature is below 40°C and is drafty (High temperature will cause malfunction and accelerate corrosion). When ambient temperature is 40°C, relative humidity should be below 90%. It is not allowed to install or store the unit outside or in the open air.
- Select a location that is with little dust. (Dust will lead to electric malfunction)
- The location should be bright for the convenience of maintenance and inspection.
- In order to maintain, inspect and clean the heat exchange tubes of condenser and evaporator, there should be enough space around the unit (See diagram of Maintenance Space for the specific dimensions).
- For easy lifting and overhaul, it is necessary to install travelling crane or derrick car and make sure that the machine room is high enough.
- The surrounding of the unit and the whole machine room should be able to be drained completely.
- Avoid direct sunlight.
  Note: Please contact the manufacturer if the unit is to be installed 1000m or more above sea level.

Installation Foundation

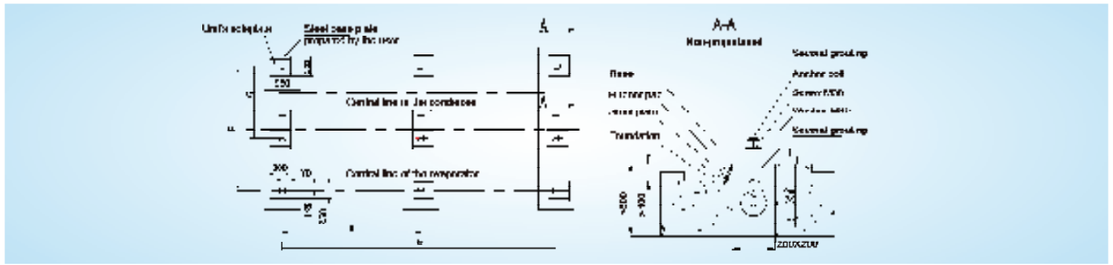
The rotor of the centrifugal refrigerating compressor has undergone strict static balance and dynamic balance tests, so the dynamic load of compressor on the foundation is very small. For dimensions of the foundation, please refer to “Dimensions of the Foundation”. In order to prevent the footing of the unit from being corroded, please ensure smooth drainage around the unit. The surface of the foundation must be smooth and flat. See the following requirements:

- The maximum drop difference (level difference) between each foundation surface should be less than 3mm.
- For the convenience of maintenance and inspection, the foundation should be 100 higher than the ground.
- Drain ditch should be set around the unit.
- There should be no gap between the steel base plate and the unit’s soleplate. Insert adjusting pad between the steel base plate and the concrete foundation. Adjust the steel base plate to level (Their height difference should be 0.5mm per meter.)
- Lift up the unit and place a rubber plate on the steel base plate to reduce vibration. And then place the unit on the rubber plate.
- The steel base plate and adjusting pad should be reinforced by second grouting.



Unit Foundation Dimension(mm)

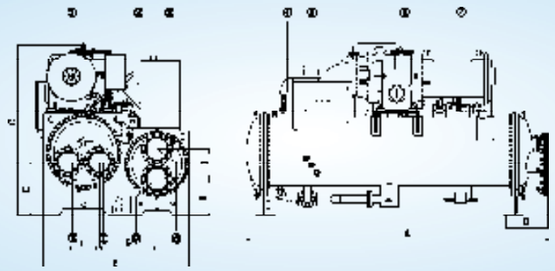
Model	E	F	Model	E	F
VLCE310LG2HG2	2990	1560	VLCE521RJAMJA	3990	2060
VLCE311LG1HG1	2990	1560	VLCE522RJAMJA	3990	2060
VLCE320MH4HH2	3590	1595	VLCE610SKNQKN	4190	2280
VLCE321MH3HH1	3590	1595	VLCE611SKMQKM	4190	2280
VLCE330MH2JH2	3590	1655	VLCE620SKLQKL	4190	2280
VLCE331MH1JH1	3590	1655	VLCE621TKNRKN-G	4190	2500
VLCE410PIEKIE	3590	1760	VLCE630TKMRKM-G	4190	2500
VLCE411PIDKID	3590	1760	VLCE631TKLRKL-G	4190	2500
VLCE420PICKIC	3590	1760	VLCE710TLNRLL-G	4590	2500
VLCE421PIBKIB	3590	1760	VLCE711TLMRLP-G	4590	2500
VLCE510PIAKIA	3590	1760	VLCE720TLLRLO-G	4590	2500
VLCE511QJCMJD	3990	1960	VLCE721ULNSLN-G	4590	2750
VLCE512QJBMJC	3990	1960	VLCE730ULMSLM-G	4590	2750
VLCE520QJAMJB	3990	1960	VLCE731ULLSLL-G	4590	2750



Unit Foundation Dimension(mm)

Model	E	F	G	H	I
VLCE610UN4SN4-2-G	6290	2710	1120	3060	250
VLCE611UN3SN3-2-G	6290	2710	1120	3060	250
VLCE620UN2SN2-2-G	6290	2710	1120	3060	250
VLCE621UN1SN1-2-G	6290	2710	1120	3060	250

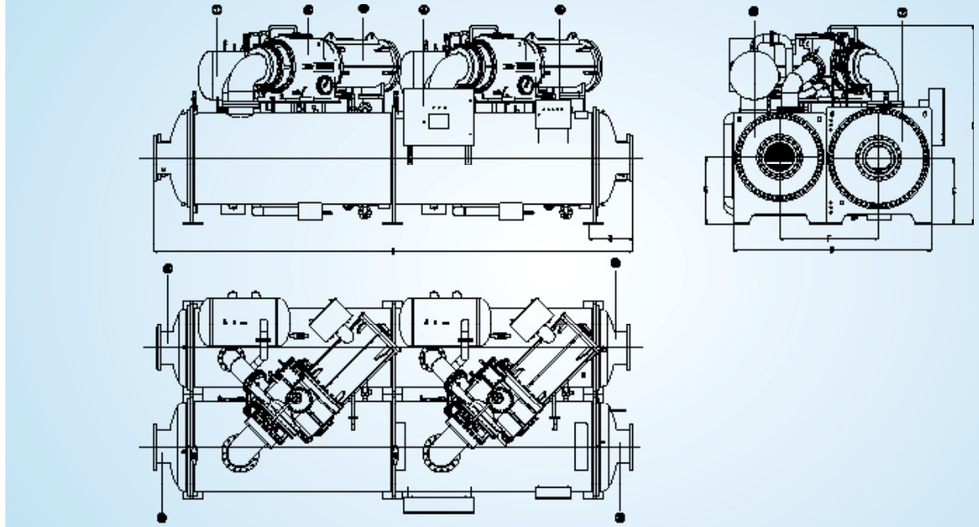
Diagram of Components



No.	Name	No.	Name
1	Evaporator	7	Motor
2	Condenser	8	Leaving cooling water
3	Startup cabinet	9	Entering cooling water
4	Flash evaporator	10	Entering chilled water
5	Electric control cabinet	11	Leaving chilled water
6	Compressor		

Dimensions of centrifugal chiller (mm)

Model	A	B	C	D	E	F	G	H	I	Chilled water port	Cooling water port
VLCE310LG2HG2	3850	1810	2220	520	675	420	735	450	350	DN200	DN200
VLCE311LG1HG1	3850	1810	2220	520	675	420	735	450	350	DN200	DN200
VLCE320MH4HH2	4300	1850	2310	570	765	430	740	370	405	DN250	DN250
VLCE321MH3HH1	4300	1850	2310	570	765	430	740	370	405	DN250	DN250
VLCE330MH2JH2	4250	1910	2370	570	765	430	770	430	415	DN250	DN250
VLCE331MH1JH1	4250	1910	2370	570	765	430	770	430	415	DN250	DN250
VLCE410PIEKIE	4550	2010	2390	570	815	480	770	510	430	DN250	DN250
VLCE411PIDKID	4550	2010	2390	570	815	480	770	510	430	DN250	DN250
VLCE420PICKIC	4550	2010	2390	570	815	480	770	510	430	DN250	DN250
VLCE421PIBKIB	4550	2010	2390	570	815	480	770	510	430	DN250	DN250
VLCE510PIAKIA	4550	2010	2390	570	815	480	770	510	430	DN250	DN250
VLCE511QJCMJD	4980	2210	2610	570	965	500	885	550	470	DN300	DN300
VLCE512QJBMJC	4980	2210	2610	570	965	500	885	550	470	DN300	DN300
VLCE520QJAMJB	4980	2210	2610	570	965	500	885	550	470	DN300	DN300
VLCE521RJAMJA	4980	2310	2710	590	1015	580	895	550	470	DN300	DN300
VLCE522RJAMJA	4980	2310	2710	590	1015	580	895	550	470	DN300	DN300
VLCE610SKNQKN	5250	2530	2880	640	1015	630	950	650	530	DN350	DN350
VLCE611SKMQKM	5250	2530	2880	640	1015	630	950	650	530	DN350	DN350
VLCE620SKLQKL	5250	2530	2880	640	1015	630	950	650	530	DN350	DN350
VLCE621TKNRKN-G	5400	2750	3000	660	1000	630	1060	650	650	DN350	DN400
VLCE630TKMRKM-G	5400	2750	3000	660	1000	630	1060	650	650	DN350	DN400
VLCE631TKLRKL-G	5400	2750	3000	660	1000	630	1060	650	650	DN350	DN400
VLCE710TLNRLL-G	5800	2750	3100	770	950	650	1030	660	650	DN400	DN450
VLCE711TLMRLP-G	5800	2750	3100	770	950	650	1030	660	650	DN400	DN450
VLCE720TLLRLO-G	5800	2750	3100	770	950	650	1030	660	650	DN400	DN450
VLCE721ULNSLN-G	5800	3000	3300	650	1105	700	1170	745	650	DN400	DN450
VLCE730ULMSLM-G	5800	3000	3300	650	1105	700	1170	745	650	DN400	DN450
VLCE731ULLSLL-G	5800	3000	3300	650	1105	700	1170	745	650	DN400	DN450

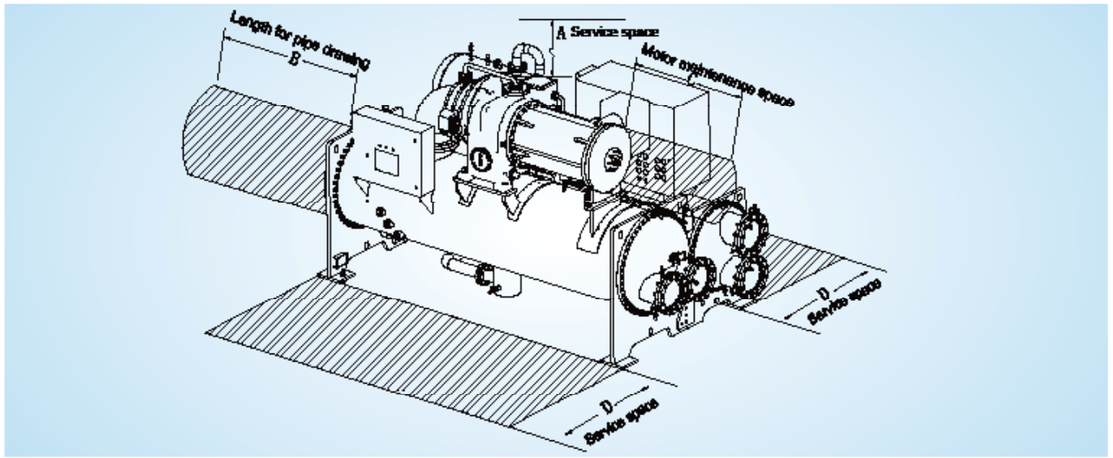


No.	Name	No.	Name
1	Flash Evaporator	8	Evaporator
2	Compressor	9	Entering cooling water
3	Motor	10	Leaving cooling water
4	Main control cabinet	11	Entering chilled water
5	Oil pump control cabinet	12	Leaving chilled water
6	Condenser		

Dimensions of centrifugal chiller (mm)

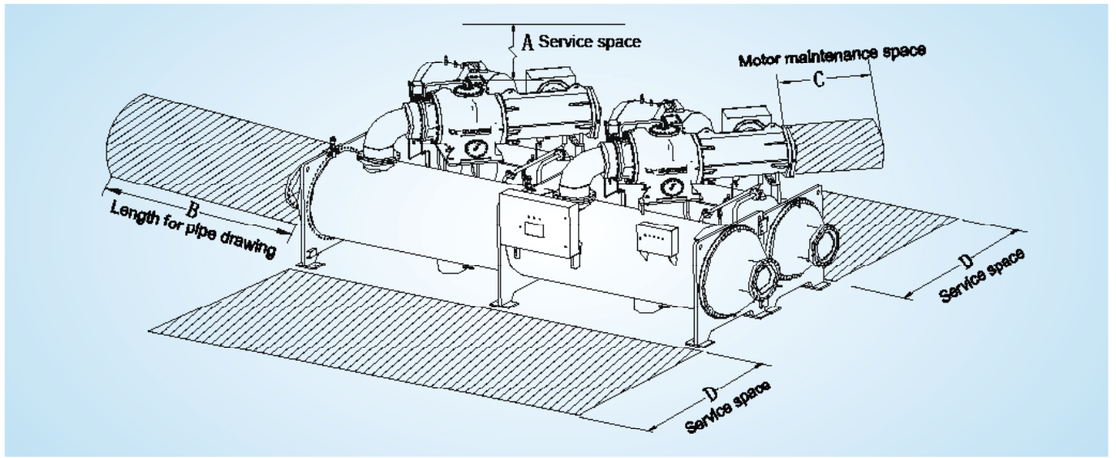
Model	A	B	C	D	E	F	G	H	I	Chilled water port	Cooling water port
VLCE610RN2QN2-2-G	7600	2960	3150	698	1025	1560	1045	DN500	DN500	DN200	DN200
VLCE611RN1QN1-2-G	7600	2960	3150	698	1025	1560	1045	DN500	DN500	DN200	DN200
VLCE612SN2RN2-2-G	7600	2960	3150	698	1025	1560	1045	DN500	DN500	DN250	DN250
VLCE620SN1RN1-2-G	7600	2960	3150	698	1025	1560	1045	DN500	DN500	DN250	DN250

Dimension of Installation and Maintenance Space



Dimension of Installation and Maintenance Space (mm)

Model	A	B	C	D
VLCE310LG2HG2	1500	3500	1500	1220
VLCE311LG1HG1	1500	3500	1500	1220
VLCE320MH4HH2	1500	3500	1500	1220
VLCE321MH3HH1	1500	3500	1500	1220
VLCE330MH2JH2	1500	3500	1500	1220
VLCE331MH1JH1	1500	3500	1500	1220
VLCE410PIEKIE	1500	3800	1500	1220
VLCE411PIDKID	1500	3800	1500	1220
VLCE420PICKIC	1500	3800	1500	1220
VLCE421PIBKIB	1500	3800	1500	1220
VLCE510PIAKIA	1500	3800	1500	1220
VLCE511QJCMJD	1500	4200	1650	1220
VLCE512QJBMJC	1500	4200	1650	1220
VLCE520QJAMJB	1500	4200	1650	1220
VLCE521RJAMJA	1500	4200	1650	1220
VLCE522RJAMJA	1500	4200	1650	1220
VLCE610SKNQKN	1500	4400	1800	1320
VLCE611SKMQKM	1500	4400	1800	1320
VLCE620SKLQKL	1500	4400	1800	1320
VLCE621TKNRKN-G	1500	4400	1800	1320
VLCE630TKMRKM-G	1500	4400	1800	1320
VLCE631TKLRKL-G	1500	4400	1800	1320
VLCE710TLNRLL-G	1500	4800	1800	1520
VLCE711TLMRLP-G	1500	4800	1800	1520
VLCE720TLLRLO-G	1500	4800	1800	1520
VLCE721ULNSLN-G	1500	4800	1800	1520
VLCE730ULMSLM-G	1500	4800	1800	1520
VLCE731ULLSLL-G	1500	4800	1800	1520

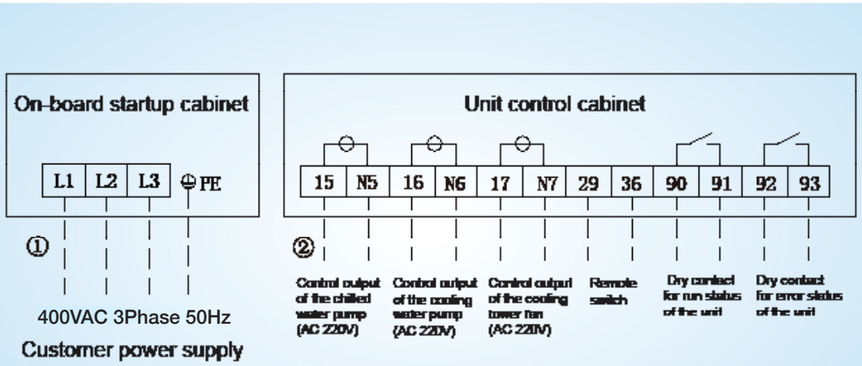


Dimension of Installation and Maintenance Space (mm)

Model	A	B	C	D
VLCE610UN4SN4-2-G	1500	6500	1800	1320
VLCE611UN3SN3-2-G	1500	6500	1800	1320
VLCE620UN2SN2-2-G	1500	6500	1800	1320
VLCE621UN1SN1-2-G	1500	6500	1800	1320

Electrical Installation

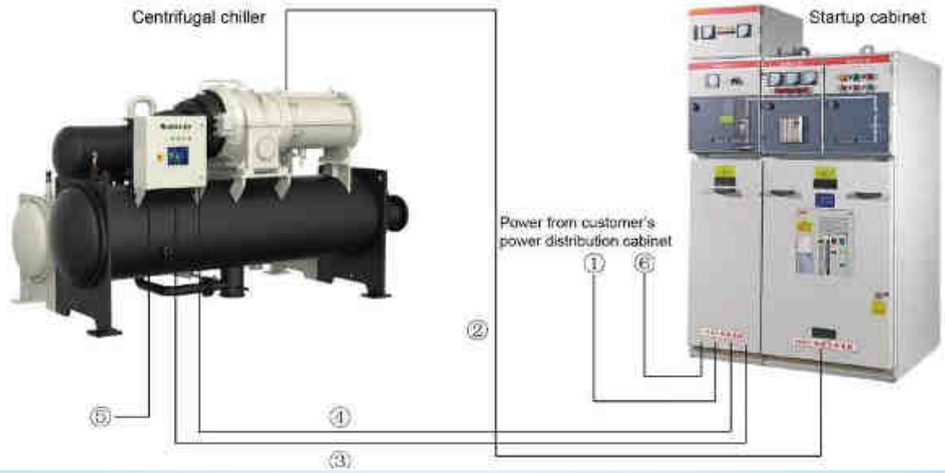
Diagram of Engineering Wiring for Low Voltage Centrifugal Chiller

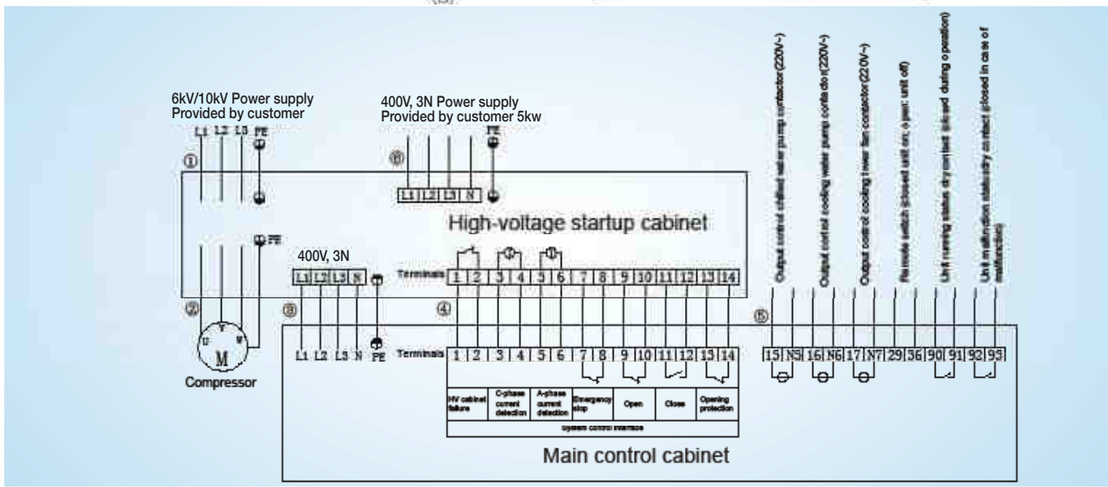


Wiring Diagram for Low Voltage Centrifugal Chiller

Wiring instructions:
(1) Line 1 represents the power cable between customer's power distribution cabinet and chiller's startup cabinet (3-phase, with ground wire). The required power supply is 400V 3P~50Hz.The power cable shall enter from the top or bottom of the startup cabinet and the cable size varies as per the change of unit power.
(2) Line 2 represents the signal control line from the chiller's main control cabinet to the water pump control cabinet and remote switch. The cable size should be 1.0mm^2.
Note: The water pump control cabinet should be prepared by the user. Please refer to the diagram attached inside the cabinet.

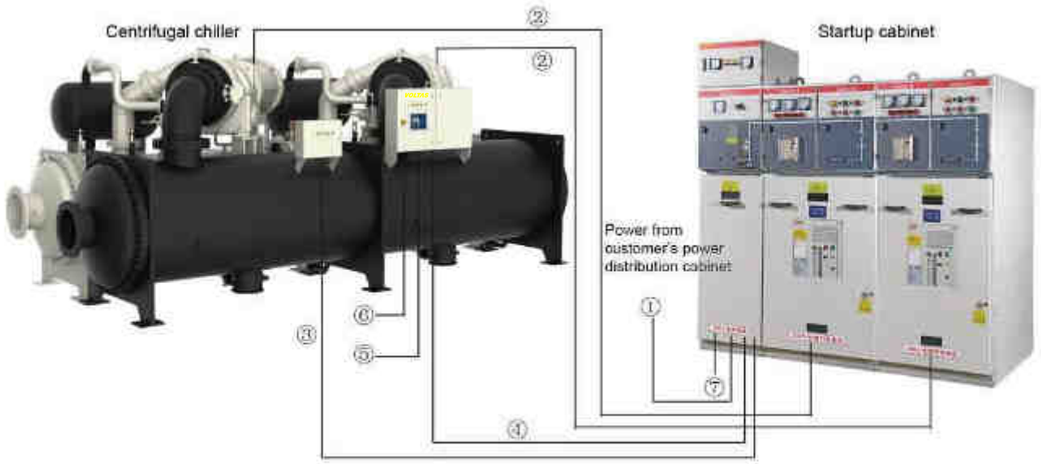
Wiring Diagram for High Voltage Centrifugal Chiller

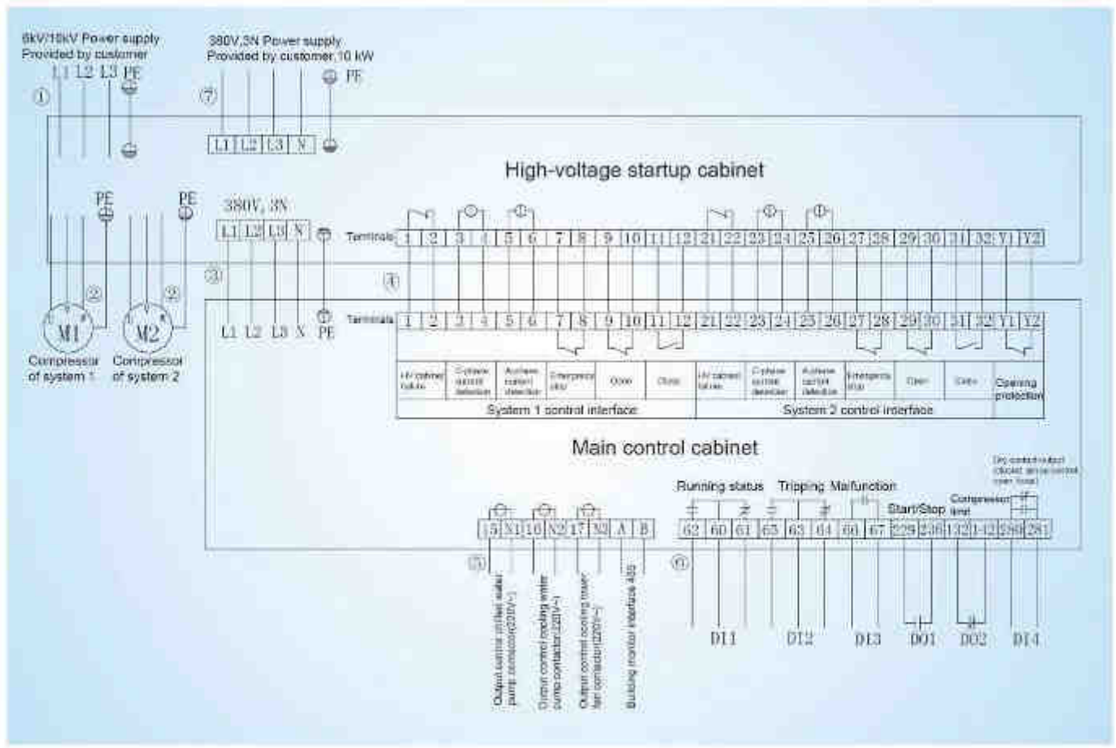




Wiring instructions:
(1) Line 1 represents the power cable between the power distribution cabinet and the startup cabinet (3 phase with ground wire). The required power supply is 10kV, 3P~50Hz.The way of power cable entering the startup cabinet is determined based on actual circumstance and the cable size varies as per the change of unit power.
(2) Line 2 represents the power cable between the startup cabinet and the main motor of centrifugal chiller. The cable should leave from the bottom of startup cabinet and the cable size varies as per the change of unit power.
(3) Line 3 represents the power cable between the high-voltage cabinet (400V) and the control cabinet of the chiller (3 phase with neutral wire and ground wire). The cable size should be equal to or more than 2.5mm^2. Power specification is 400V 3N~50Hz.
(4) Line 4 represents the signal control line between the startup cabinet and the main control cabinet. The size of the cables connecting terminals "3", "4", "5", "6" should be 2.5mm^2. For other cables, the size should be equal to or more than 1.5mm^2. (If the cable is more than 50m's long, use a thicker power cable.)
(5) Line 5 represents the signal control line from the main control cabinet to the water pump control cabinet and remote switch. The cable size should be equal to or more than 1.5mm^2. (Note: water pump control cabinet is provided by the user.)
(6) Line 6 represents the low-voltage control power line from customer's low-voltage power distribution cabinet to the high-voltage startup cabinet. The size of the cables should be equal to or more than 2.5mm^2.

Wiring Diagram for Dual-system Centrifugal Chiller





Wiring instructions:
(1) Line 1 represents the power cable between customer's power distribution cabinet and the startup cabinet (3 phase with ground wire). The required power supply is **10kV, 3P~50Hz**. The way of power cable entering the startup cabinet is determined based on actual circumstance and the cable size varies as per the change of unit power.
(2) Line 2 represents the power cable between the startup cabinet and the main motor of centrifugal chiller. The way of power cable leaving the startup cabinet is determined based on actual circumstance and the cable size varies as per the change of unit power.
(3) Line 3 represents the power cable between the high-voltage cabinet (400V) and the oil pump control cabinet of the chiller (3 phase with neutral wire and ground wire). The cable size should be 4.0mm^2. Power specification is 400V 3N~50Hz. If heat dissipation of the environment is not good, we recommend using power cable of 6.0mm^2.
(4) Line 4 represents the signal control line between the startup cabinet and the main control cabinet (see the diagram). The size of the cables connecting terminals "3", "4", "5", "6" and "23", "24", "25", "26" should be 2.5mm^2. For other cables, the size should be equal to or more than 1.5mm^2.
(5) Line 5 represents the signal control line from the main control cabinet to the water pump control cabinet and remote monitor (see the diagram). The cable size should be equal to or more than 1.5mm^2. (Note: water pump control cabinet is provided by the user.)
(6) Line 6 is from the main control cabinet to the interface of customer instrument control system.
(7) Line 7 represents the low-voltage control power line from customer's low-voltage power distribution cabinet to the high-voltage startup cabinet. The size of the cables should be equal to or more than 4.0mm^2. If heat dissipation of the environment is not good, we recommend using power cable of 6.0mm^2.

Scope of Supply

S= Standard Supply; O= Owner's Supply; P= Purchased Supply

Item	QTY	Spec.	Type	Applicable scope
Main unit	1	Set	S	
Refrigerant	See Table of Spec.	R134a	S	
Lubricating oil	Check with manufacturer for more details	Number 68 synthesis lipid lubricating oil	S	
Low-voltage startup cabinet	1	Set	S	Applicable to 400V unit
High-voltage startup cabinet	1	Set	P	Applicable to 6kV or 10kV unit
Oil filter	1	PC	P	

Note

Note