

A **TATA** Product

**VOLTAS LIMITED**

*Domestic Projects Group*

## WATER-COOLED ENERGY EFFICIENT VARIABLE SPEED SCREW CHILLERS

**R134a**

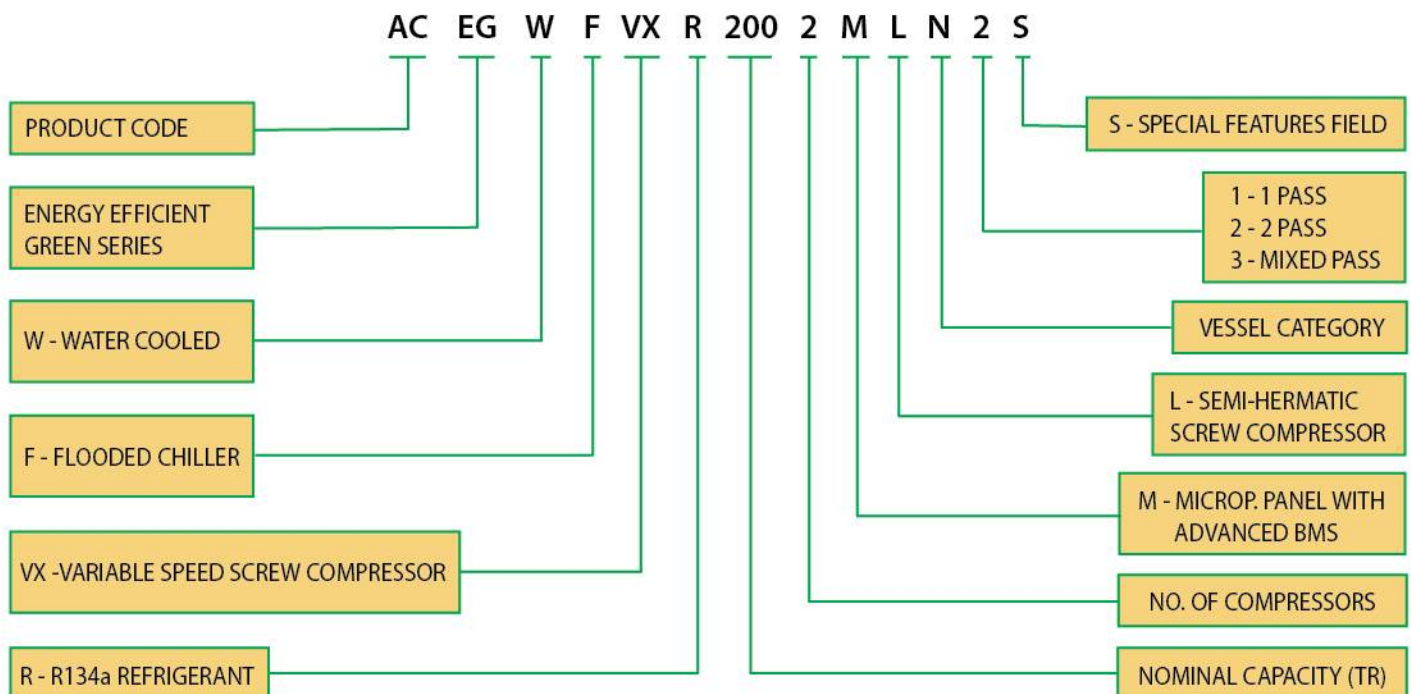


**TECHNOLOGY**  
GREEN • EFFICIENT • SUSTAINABLE

### 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.



## WATER-COOLED ENERGY EFFICIENT VARIABLE SPEED SCREW CHILLERS

### ■ 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 hermetic 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 | • Suction pressure                 |
| • Discharge pressure                | • System voltage                   |
| • Compressor current                | • Compressor elapsed run time      |
| • Oil level fault indication        | • Option of remote/Local operation |
| • Compressor % loading              | • 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.





## WATER-COOLED ENERGY EFFICIENT VARIABLE SPEED SCREW CHILLERS

### 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    | • Compressor over current                  |
| • High discharge pressure | • High winding temperature                 |
| • High oil temperature    | • High refrigerant level                   |
| • Freeze protection       | • Sensor error                             |
| • Low Chilled water flow  | • Single phase and phase reversal          |
| • Low oil level           | • Over/under current and current unbalance |
| • Anti recycle            | • Preventive maintenance due trip          |
| • Self protection (SE-E1) | • 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 maintenance.
- 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	ACEGWVFXR 1001MLP1	ACEGWVFXR 1201MLP2	ACEGWVFXR 1351MLP2	ACEGWVFXR 1601MLP2	ACEGWVFXR 1801MLP2	ACEGWVFXR 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.

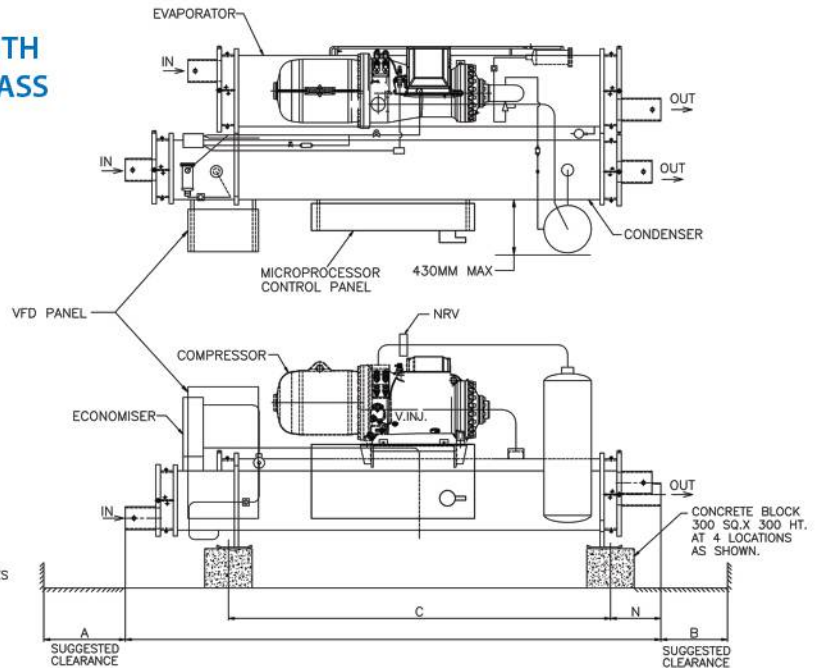
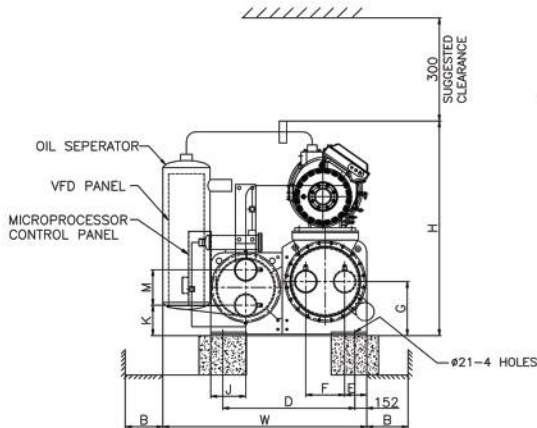
Evaporator Fouling Factor of 0.000018 m<sup>2</sup>k/ Watt and Condenser Fouling Factor of 0.000044 m<sup>2</sup>k/ Watt.

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

**Note3 :** Extended capacity product range available on request.

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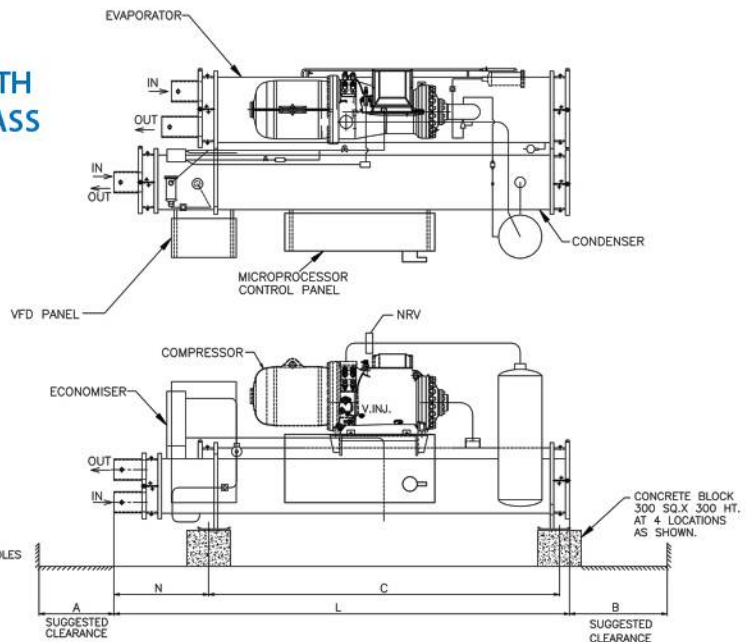
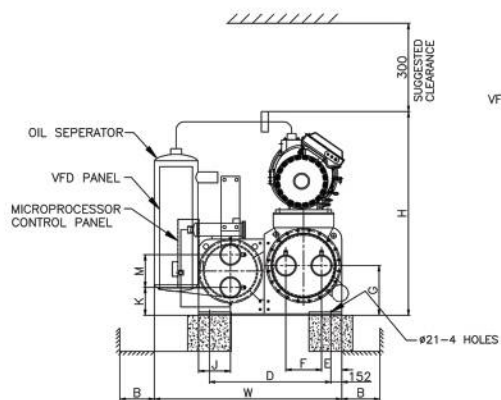
### G. A DRAWING W/C VFD SCREW CHILLER PKG WITH CHILLER 3PASS & CONDENSER 3PASS SINGLE COMPRESSOR



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
ACEGWVXR1001MLP1	1x C1LR3P-1C	1x A3LR3P-1C	4228	1545	1544	4000	750	3277	633	114	254	374	216	231	210	209	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



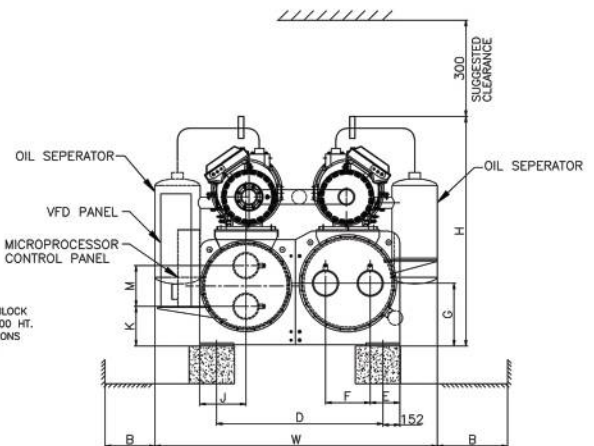
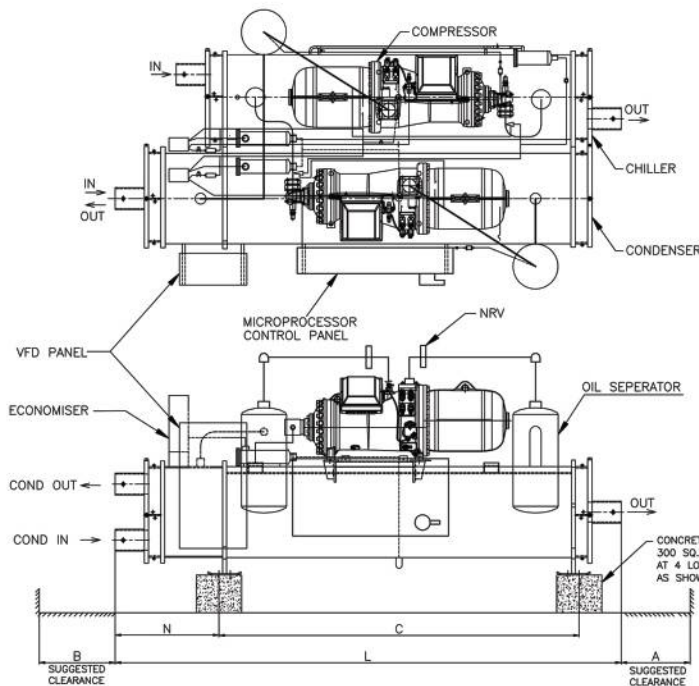
MODEL	EVAPORATOR	CONDENSER	L	W	H	A	B	C	D	E	F	G	J	K	M	N	COND.WATER IN/OUT	CHIL.WATER IN/OUT
ACEGWVXR1201MLP2	1x C1LR2P-1C	1x A3LR2P-1C	4340	1544	1625	4000	750	3277	633	111	260	374	216	234	204	910	125	125
ACEGWVXR1351MLP2	1x J1R2P-1C	1x H2R2P-1C	4356	1633	1623	4000	750	3277	760	124	286	387	241	246	230	926	150	150
ACEGWVXR1601MLP2	1x K1R2P-1C	1x H3R2P-1C	4330	1500	1750	4000	750	3277	815	155	286	413	241	247	230	926	150	150
ACEGWVXR1801MLP2	1x L1R2P-1C	1x H3R2P-1C	4356	1701	1748	4000	750	3277	868	149	349	437	241	246	230	926	150	200

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



# WATER-COOLED ENERGY EFFICIENT VARIABLE SPEED SCREW CHILLERS

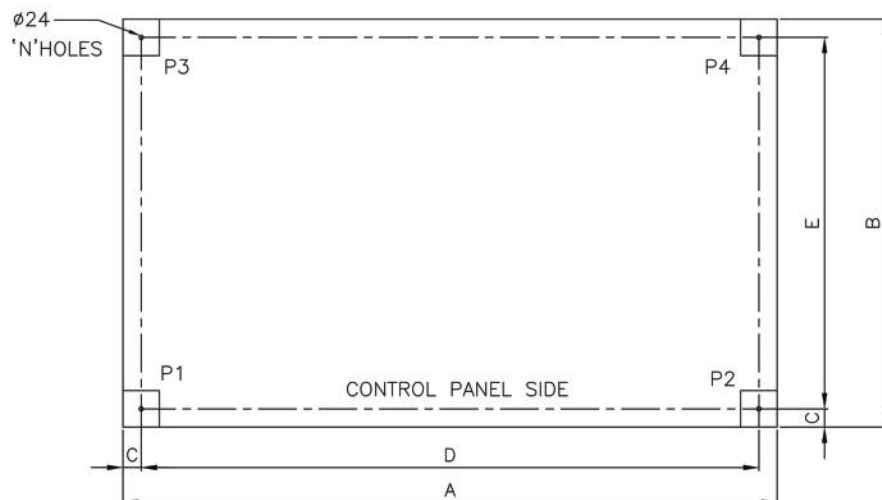
## G. A DRAWING W/C VFD SCREW CHILLER PKG WITH CHILLER 2PASS / 3PASS & CONDENSER 2PASS TWIN COMPRESSOR



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
ACEGWVXR2002MLN3	1xL1R3P-2C	1xJ2R2P-2C	4516	2052	1677	4000	750	3277	918	149	349	437	267	244	286	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



MODEL	A	B	C	D	E	N	LOAD PER POINT - KG.				WEIGHT - KG	
							P1	P2	P3	P4	OP. WT	SHIPPING WT
ACEGWVXR1001MLP1	3527	883	125	3277	633	4	673.75	673.75	673.75	673.75	2695	2487
ACEGWVXR1201MLP2	3527	883	125	3277	633	4	706.25	706.25	706.25	706.25	2825	2617
ACEGWVXR1351MLP2	3527	1010	125	3277	760	4	819.5	819.5	819.5	819.5	3278	3037
ACEGWVXR1601MLP2	3527	1065	125	3277	815	4	882.0	882.0	882.0	882.0	3528	3267
ACEGWVXR1801MLP2	3527	1118	125	3277	868	4	950.25	950.25	950.25	950.25	3801	3513
ACEGWVXR2002MLN3	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 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



COILOTRON (UV FOR AHU COILS)



STP EA ODOUR / H<sub>2</sub>S REMOVAL SYSTEM



AIR HANDLING UNIT

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