



VOLTAS LIMITED
EM&R Business Group

WATER-COOLED SCREW CHILLERS (100 TR - 330 TR)



ENVIRONMENTALLY
FRIENDLY
REFRIGERANT

A **TATA** Enterprise

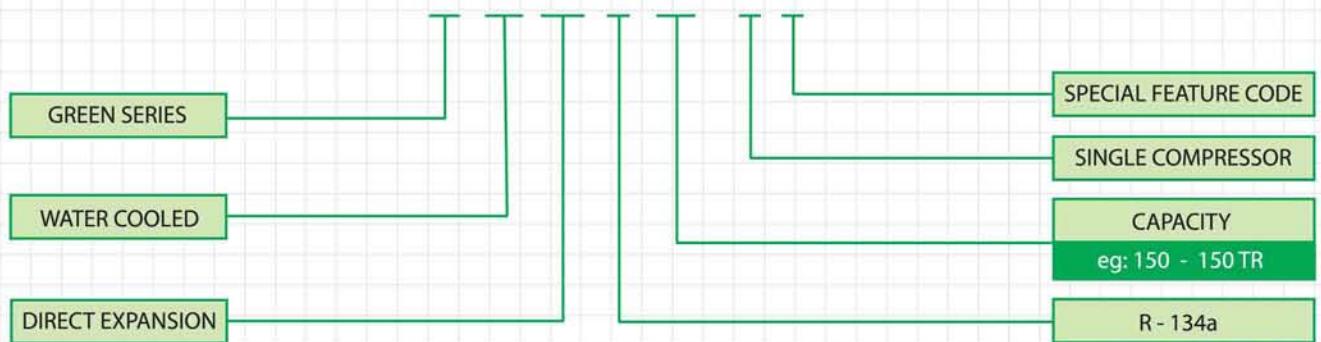


WATER-COOLED SCREW CHILLERS

Voltas, India's largest pioneer and the leader in the field of air-conditioning & refrigeration, is introducing Green Water Chillers, Green Chiller is a screw chiller working on environment friendly refrigerant R-134a. This makes the chiller most suitable for various applications and also Green Building Projects.

MODEL NOMENCLATURE

GS WC DX R 150 - 1 F



FEATURES

Compact semi-hermetic screw compressors are incorporated in the chiller packages. These screw compressors are manufactured by a reputed foreign manufacturer on high precision and sophisticated machining centers to impact accuracy of profile cutting and longevity of operation. The important features of the chiller packages are:

Screw Compressor

- Semi-hermetic design
- Long life dual screw design
- Wide Capacity range
- High efficiency due to developed profile, high speed & patented precision manufacture
- Robust & proven construction elements with double walled single housing New Slider Technology
- Stepless capacity control from 100% to 25% for each compressor
- U wire low pressure bearing chamber (Patented design relieves bearing load & increases viscosity)
- Multistage ultra fine inbuilt oil separator
- Economizer with sliding suction position
- Lower sound level due to double walled casting.



Water Cooled Condenser

The condensers are compact due to use of latest and advanced high efficiency inner grooved tubes. Depending on number of compressors in the chiller package, same numbers of independent circuits of refrigeration are created. This offers high flexibility of operation in multiple circuits in the event that one circuit is not operative.



Evaporator

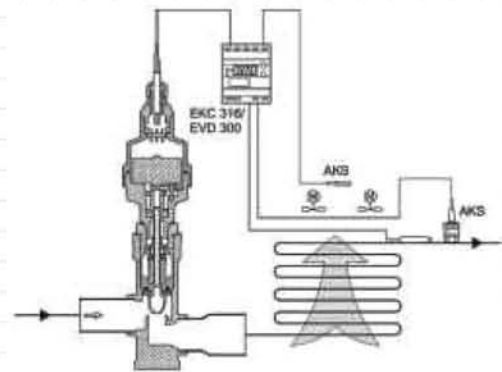
The evaporators are manufactured using imported inner tubes for improving heat transfer co-efficient and making the evaporators as small as possible. Due to better design, pressure drops are also maintained low.

Economizer :

Economizer of brazed plate type imported from reputed manufacturer/s is used in the system. This improves cycle efficiency and also increases capacity substantially without requiring higher size compressor.

Electronic Expansion Valve :

Electronic Expansion Valves are used to maintain precise flow of refrigerant to evaporator under both full load and part load operation of compressor. Electronic Valve maintains precise control of superheat at the outlet of evaporator with faster control irrespective of wide variation of capacity. Conventional Thermostatic valve are unable to control superheat over wide range of capacity regulation.



Micro-computer Control Panel :

Advanced micro-computer control is a standard feature on all Voltas water cooled 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. Its simple to use push button key board and menu driven software provide access to operating conditions, control set points and alarm history clearly displayed on prominent multiline thirty two character alpha numeric display. Easy installation allows remote reading of operating parameter updates. The micro-computer ensures the chiller owner state-of-the-art efficiency and reliability.



Standard Microprocessor Panel

LCD and Key Pad of Microprocessor

USER-FRIENDLY operation Modes :

Based on situations, the control operation can be chosen from any one of the following options:

- Programmed Auto Mode: Auto start and stop are programmable for entire year. This minimizes operator interface. 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 micro-computer control.
- Manual (Test) Mode: Facilities testing of the unit under supervision.



WATER-COOLED SCREW CHILLERS

Display information

Easily accessible measurements include the following parameters :

- Leaving chilled water temp
- Discharge pressure
- Compressor current, each compressor
- Number of compressor start
- Oil level fault indication
- Suction pressure
- System voltage
- Compressor elapsed run time, each compressor
- Compressor ON/OFF status
- Compressor load%, each compressor

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
- Over/under voltage and voltage unbalance
- Single phase and phase reversal
- Chilled water Low differential pressure switch
- Low oil level
- Compressor run error
- Power loss
- High winding temperature
- High oil temperature
- Freeze protection
- Sensor error
- Over/under current and current unbalance
- Preventive maintenance due trip
- Compressor over current, each compressor
- Anti recycle

Diagnostic Displays

Diagnose mode provide for easy trouble shooting

- Trip for maintenance requirements 50 hours before completion of 8000 of operation.
- Alarm history of last 10 trips with date time & causes of failures.
- Different protection trips display parameter.

Adaptive Control

- Discharge/suction pressure limiting by unloading to avoid tripping on HP/LP. This offers advantage of chiller running unloaded instead of tripping.
- In case of compressor current starts increase above set current value the microcomputer senses the increase & instructs the compressor to unload to bring down compressor current within set value.
- In case of low suction protection, before the suction pressure approaches the trip limit, compressor is given command to unload the compressor and not let the package reach the trip limit.



Reduction in Energy Cost

- Electronic temperature and pressure sensors monitor the set operating parameters very precisely and make the unit run efficiently.
- Electronic Expansion with sophisticated controller controls the refrigerant flow to the evaporator precisely to varied loads and maintains higher efficiency of operation.
- Stepless Capacity control mechanism operates in response to the chilled water outlet temperature and matches compressor load to the system load correctly.
- Compressor staging has been programmed to save energy by running adequate numbers of compressors required to suit variable load.
- Suitable fan cycling based on discharged pressure valve is incorporated for saving energy consumption.



Electronic Expansion Valve



Electronic Controller Module

Standard Scope of supply

- Compressor is with oil heater, discharge check valve, start unloader, oil level control, ester oil first charge, shutoff valve for economizer connection, liquid injection system.
- Micro-computer panel with MCC comprising starter, control transformer, motor and package protection devices, and factory wired, under voltage and phase failure relay.
- 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.
- Microprocessor monitoring of
 - Current of each compressor
 - No. of starts and elapsed time
 - Supply voltage
 - Chilled water outlet temperature
 - High oil temperature, freeze, suction pressure, discharge pressure
- Evaporator, condenser, economizer.

Optional Features Offered

- Monitoring of return chilled water temperature
- Dual mode chillers for thermal storage system
- Hardware BMS for remote ON/OFF
- Software BMS compatibility with MODBUS / RTU protocol



WATER-COOLED SCREW CHILLERS

TECHNICAL DATA SHEET (R134a)

Chiller Pkg. Model	GSWCDXR 100-1	GSWCDXR 120-1	GSWCDXR 150-1	GSWCDXR 170-1	GSWCDXR 200-1	GSWCDXR 240-1	GSWCDXR 300-1	GSWCDXR 330-1
* Nom. Tonnage (Tr.)	98	118	151	164	196	236	302	325
COMPRESSOR								
Compr. Type	Semi-hermatic Screw Compressor							
Model Description	8591-140Y	9561-160Y	9581-210Y	9591-240Y	8591-140Y	9561-160Y	9581-210Y	9591-240Y
Quantity Per Unit	1	1	1	1	2	2	2	2
Min. Percentage Unit Capacity Reduction	25%	25%	25%	25%	12.50%	12.50%	12.50%	12.50%
Rpm	2900	2900	2900	2900	2900	2900	2900	2900
Oil Type	BSE170	BSE170	BSE170	BSE170	BSE170	BSE170	BSE170	BSE170
Oil Charge, Lit	19	35	35	35	19	35	35	35
First Compr. Starting Current (Rotor Lock) (Amps At 400volts)	665A D PW / 1023 A D	436A Y / 1364 A D	586A Y / 1853 A D	650A Y / 2029 A D	665A D PW / 1023 A D	436A Y / 1364 A D	586A Y / 1853 A D	650A Y / 2029 A D
Max. Allowable Operating Current Per Compr. (Amps At 400volts)	214	280	320	360	214	280	320	360
EVAPORATOR								
Type	DX	DX	DX	DX	DX	DX	DX	DX
Model Description	ERDX105 2P-1M	ERDX120 2P-1M	ERDX150 2P-1M	ERDX175 2P-1	ERDX210 2P-2	ERDX240 2P-2	ERDX300 2P-2	ERDX340 2P-2
Quantity Per Unit	1	1	1	1	1	1	1	1
Water Flow Rate (Cubic Mtr./hr.)	60.50	72.60	90.75	102.85	121.01	145.20	181.15	205.71
Water Pr. Drop (Psi.)	5.7	7.1	7.82	5.78	6.9	8.17	6.51	8.22
Water Connection Sizes (Inch)	6	6	8	8	8	8	10	10
CONDENSER								
Condenser Model	09126	09166	09176	09176	09126	09166	09176	09176
Condenser Qty.	1	1	1	1	2	2	2	2
Water Flow Rate (Gpm.)	366.00	435.00	558.00	609.00	732.00	870.00	1116.00	1218.00
Water Pr. Drop (Psi.)	2.80	2.80	3.05	3.50	2.80	2.80	3.05	3.50
Water Connection Sizes (Inch.)	6	6	6	6	6	6	6	6
CHILLER PKG. UNIT DIMENSION								
Unit Length (Mtr.)	3500	3560	3560	3860	4300	4500	4600	4600
Unit Depth (Mtr.)	1100	1200	1200	1200	1700	1800	1800	1900
Unit Height (Mtr.)	2125	2340	2400	2400	1700	1700	1800	1900
Refrigerant Charge Qty. (Kgs)	98	118	151	164	196	236	302	325

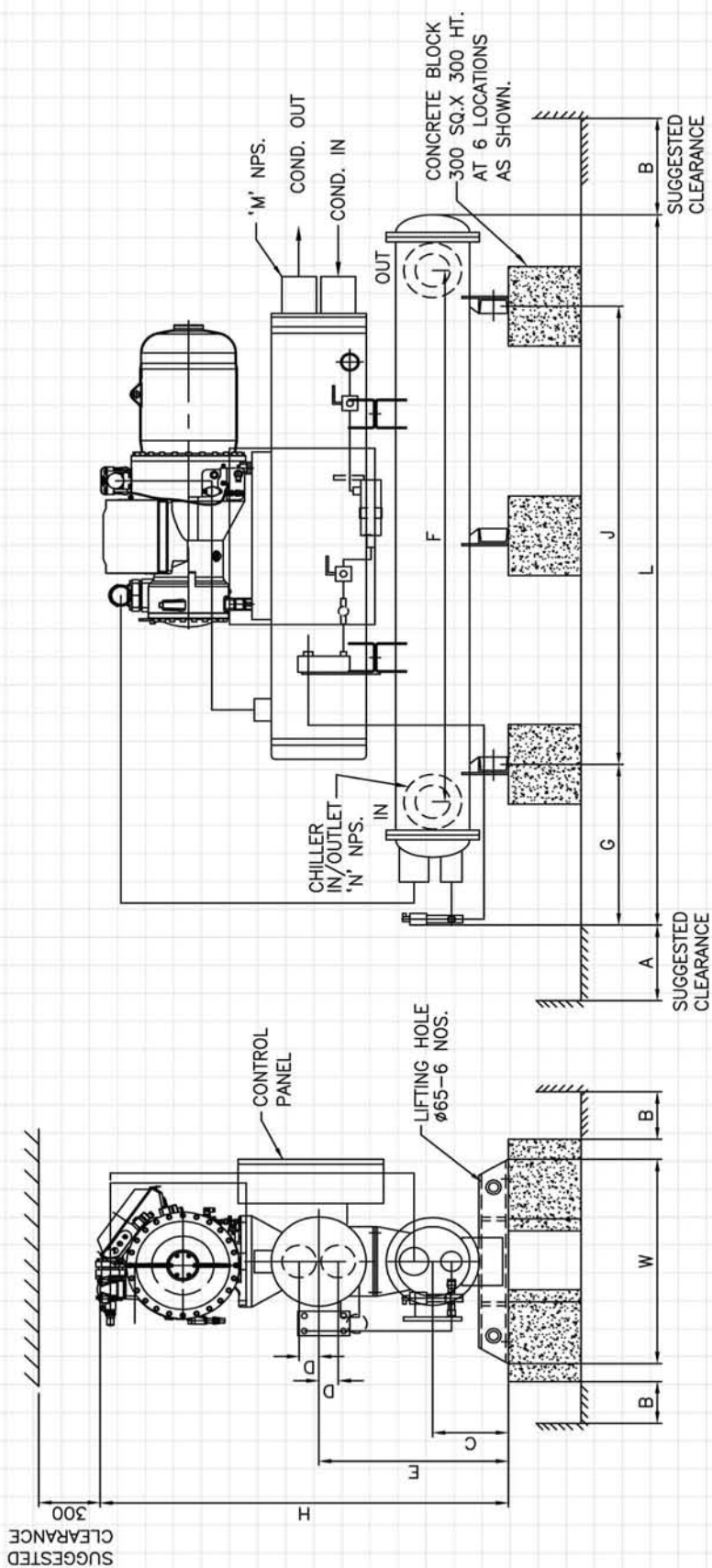
*Capacity rated for evaporator leaving water temperature 7^o C, Evap.water side fouling factor of 0.000018 m2.deg. C/W and Cond. water inlet temp. of 29.4^o. C & cond. water side fouling factor of 0.000044 m2.deg.C/W . Power & control supply voltage is 360 - 440 V & 210-240 V respectively and frequency 50Hz

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

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



G. A. DRAWING 100 TR - 170 TR

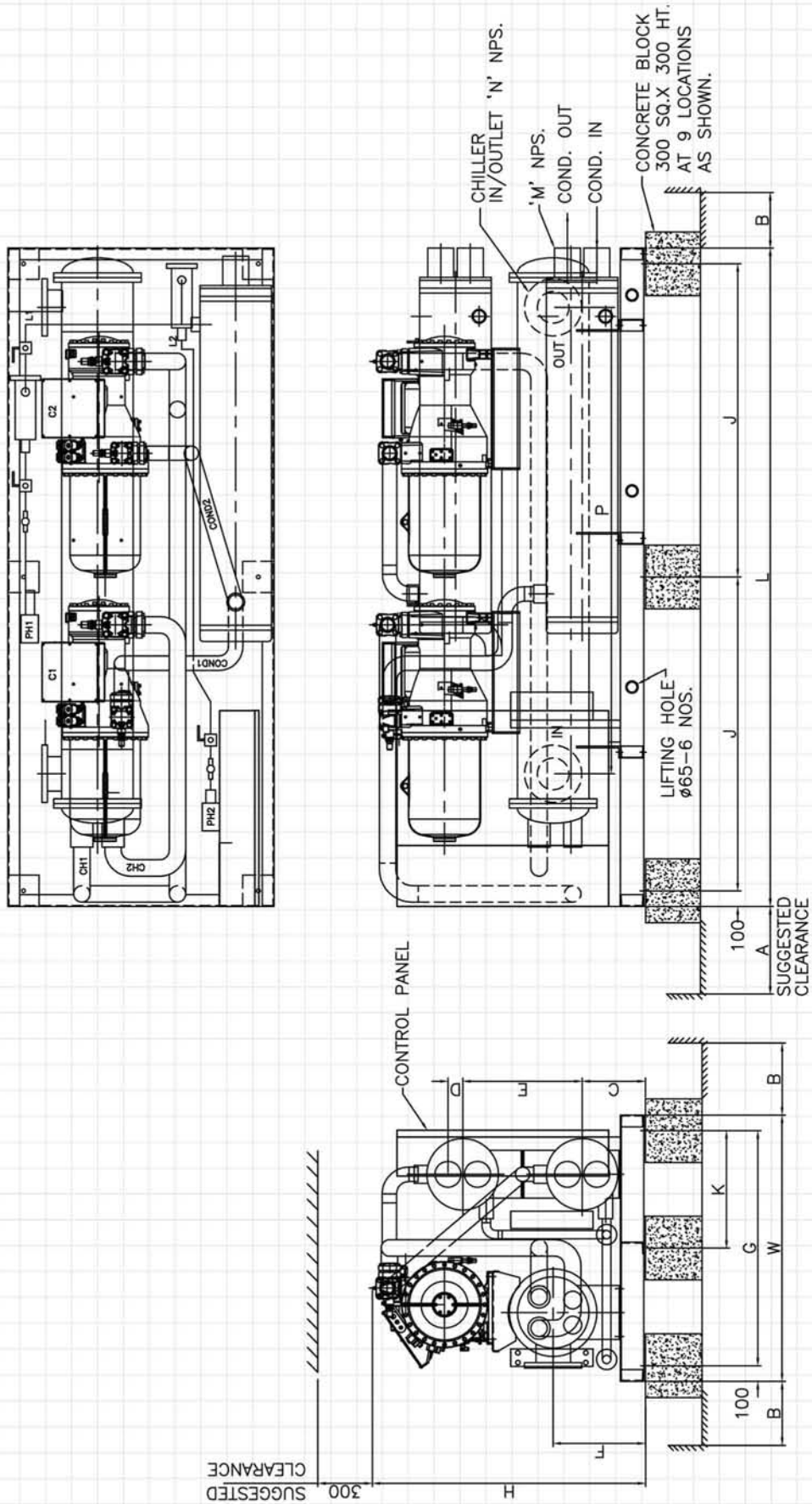


MODEL	COMPRESSOR	EVAPORATOR	CONDENSER	L	W	H	A	B	C	D	E	F	G	J	N"NPS.	M"NPS.
GSWCDXR100-1	1xC8H8591-140Y	1xERDX1052P-1M	1x09126-1	3500	1100	2125	2200	750	425	94	1175	2403	900	2110	150	150
GSWCDXR120-1	1xC8H9561-160Y	1xERDX1202P-1M	1x09166-1	3560	1200	2340	2200	750	450	94	1225	2364	950	2110	150	150
GSWCDXR150-1	1xC8H9581-210Y	1xERDX1502P-1M	1x09176-1	3560	1200	2400	2200	750	450	105	1225	2364	875	2200	200	150
GSWCDXR170-1	1xC8H9591-240Y	1xERDX1752P-1	1x09176-1	3860	1200	2400	2500	750	450	105	1225	2670	1025	2200	200	150



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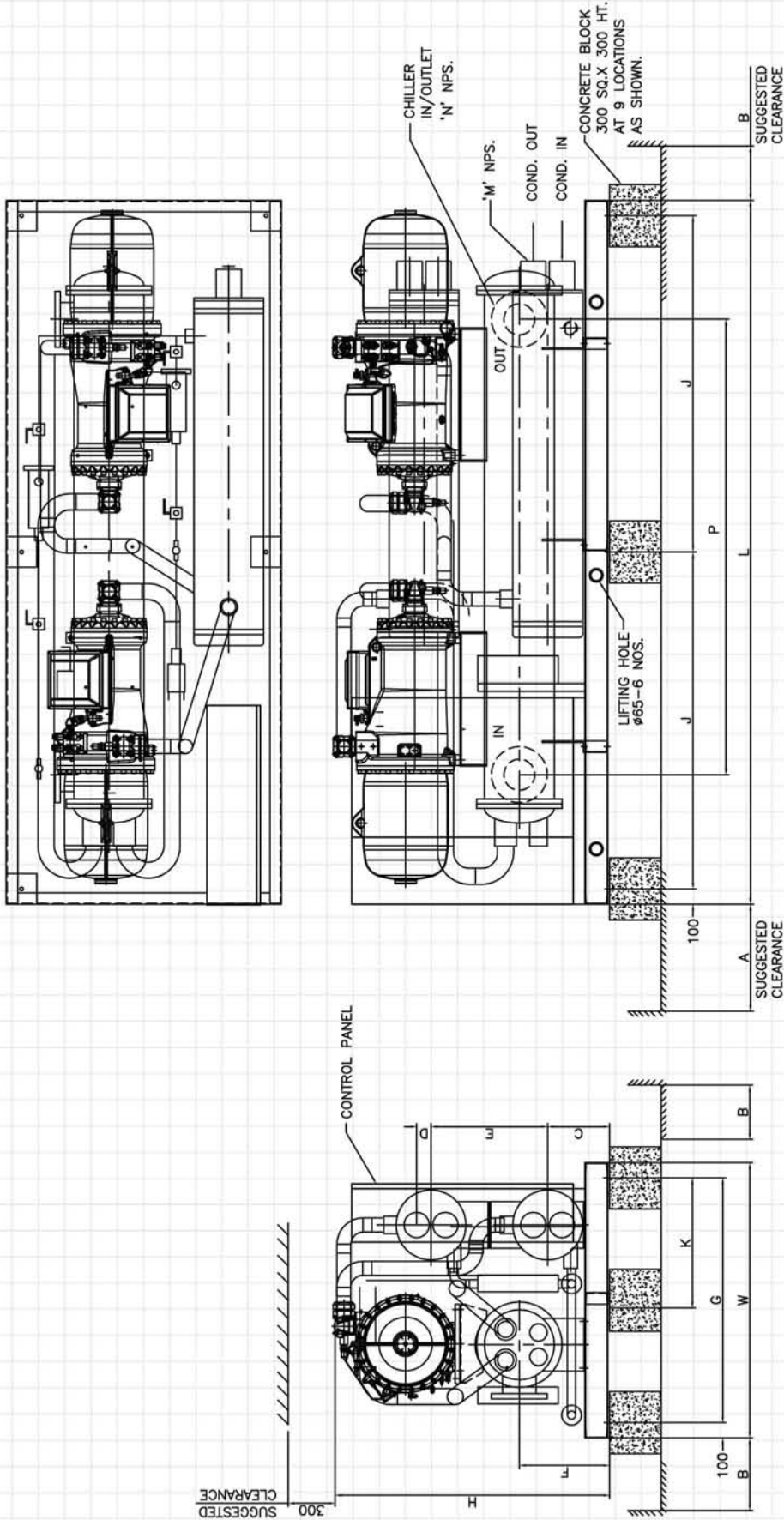
G. A. DRAWING 200 TR



MODEL	COMPRESSOR	EVAPORATOR	CONDENSER	L	W	H	A	B	C	D	E	F	G	J	K	P	N"NPS.	M"NPS.
GSWCDXR200-2	2xCSH8591-140Y	1xERDX2102P-2	2x09126-1	4300	1700	1700	2200	750	405	60	760	590	1500	2050	690	2974	200	150



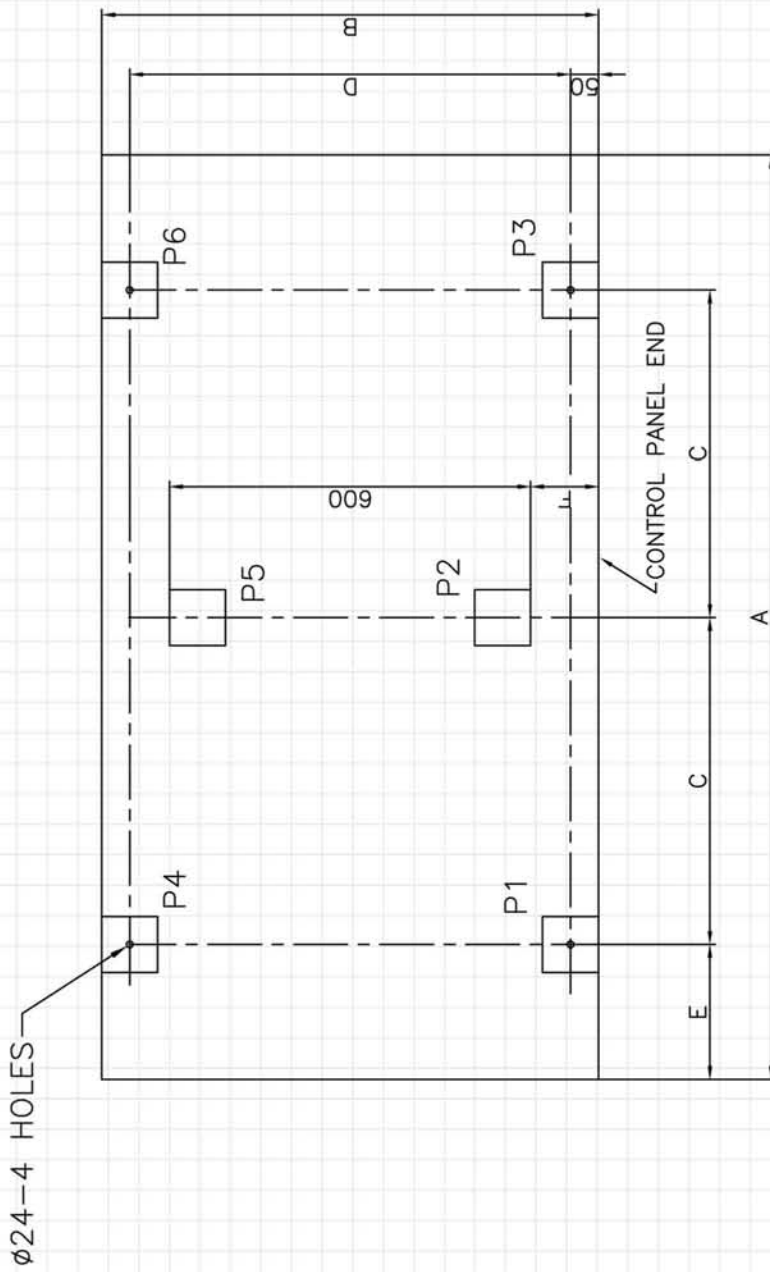
G. A. DRAWING 240 TR - 330 TR



MODEL	COMPRESSOR	EVAPORATOR	CONDENSER	L	W	H	A	B	C	D	E	F	G	J	K	P	N"NPS.	M"NPS.
GSWCXR240-2	2xCSH9561-160Y	1xERDX2402P-2	2x09166-1	4500	1800	1700	2200	750	450	94	760	660	1600	2150	790	2930	200	150
GSWCXR300-2	2xCSH9581-210Y	1xERDX3002P-2	2x09176-1	4600	1800	1800	2200	750	475	94	760	660	1600	2200	790	3182	250	150
GSWCXR330-2	2xCSH9591-240Y	1xERDX3402P-2	2x09176-1	4600	1900	1900	2800	750	475	94	760	710	1700	2200	890	2514	250	150



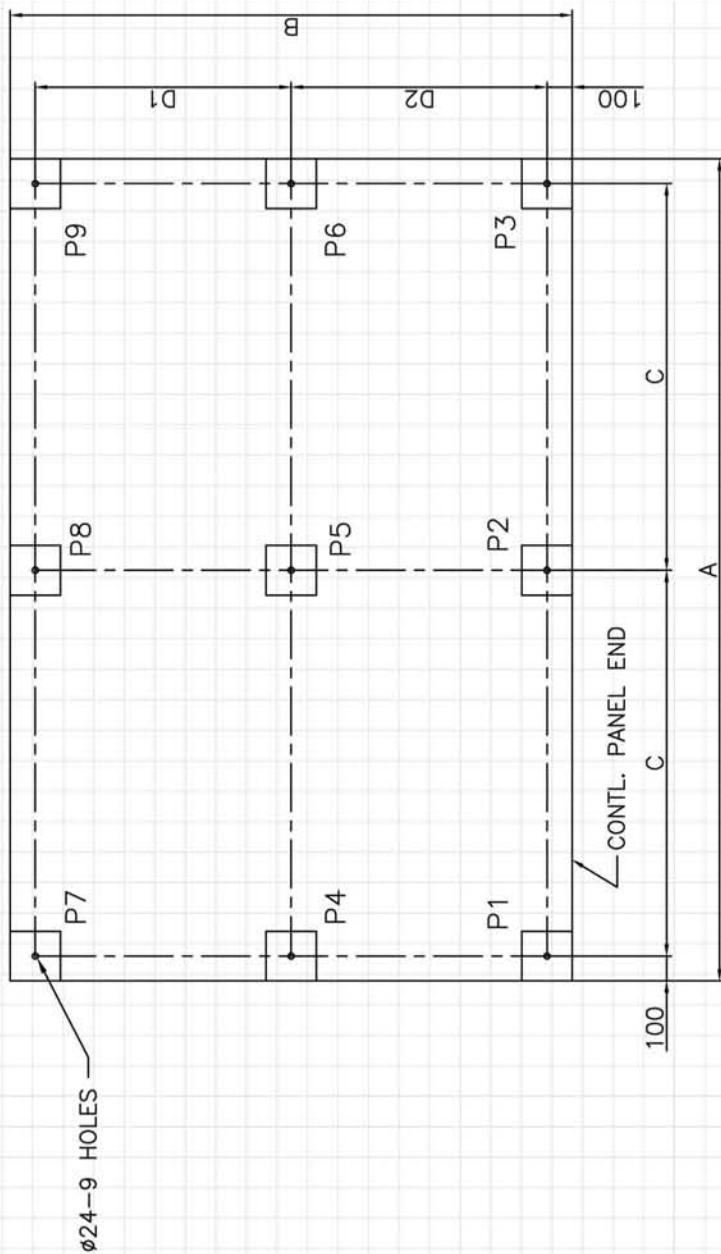
POINT LOAD DIAGRAM 100 TR - 170 TR



MODEL	OVERALL UNIT SIZE		LOAD PER POINT - KG.									
	A	B	C	D	E	F	P1	P2	P3	P4	P5	P6
GSWCXR100-1	3500	1100	1055	1000	900	200	328	658	330	391	784	393
GSWCXR120-1	3560	1200	1055	1100	925	250	406	815	409	483	970	487
GSWCXR150-1	3560	1200	1100	1100	875	250	444	890	447	528	1060	532
GSWCXR170-1	3860	1200	1100	1100	1025	250	481	965	484	573	1150	577



POINT LOAD DIAGRAM 200 TR - 330 TR



MODEL	OVERALL UNIT SIZE		C	D1	D2	LOAD PER POINT – KG.								
	A	B				P1	P2	P3	P4	P5	P6	P7	P8	P9
GSWCDXR200-2	4300	1700	2050	810	690	251	703	452	405	1200	795	154	497	343
GSWCDXR240-2	4500	1800	2150	810	790	361	1009	648	581	1721	1140	220	713	492
GSWCDXR300-2	4600	1800	2200	810	790	382	1068	686	615	1822	1207	233	755	521
GSWCDXR330-2	4600	1900	2200	810	890	408	1140	733	657	1946	1289	249	806	557

ALL INDIA CONTACT NUMBERS

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