



**KEEP THIS MANUAL WITH THE PERSON
RESPONSIBLE FOR THE OPERATION AND
MAINTENANCE OF THIS MACHINE AND FOR
THE ORDERING OF THE REPAIR PARTS.**

**OPERATION, MAINTENANCE
AND REPAIR PARTS
MANUAL**

AIR COOLED COOLER

**SEND ORDERS TO
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ACC 9000 Air Cooler

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PLEASE READ THESE INSTRUCTIONS BEFORE USING THIS EQUIPMENT

General

By using cool air to reduce temperature of an enclosed blast chamber environment, is most widely used and efficient method in the blasting industrial.

Cool air system has the following usages:

- Reduce temperature of the chamber as to satisfy technical requirements and improve working efficiency.
- As an effective ventilation method, its reduce the dust concentration in order to prevent accident occurrences.
- To improve working environment, and enhance working productive.

Operation Principle

Air cool compressor unit is used to lower the atmospheric temperature, in order to achieve cooling effect.

The system is incorporates with compressor, condenser⁶³, and evaporator, extension valves, air-blower, condenser fan and automatic control system unit, assembled in a container structure.

R22, refrigerated agent is compressed and fed to condenser coil. As the condenser coil is cooled by condenser fan, refrigerated agent in condenser coil is thus liquefied. Liquefied refrigerated agent fed through extension valves, throttle through evaporator coil, at this moment, the pressure of liquefied refrigerated agent decrease, and absorb heat from evaporator coil, to transform into vapors. Gas state refrigerated agent return into the compressor to be compressed, and repeat the whole process operation.



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Precautions

1. Operator **MUST** read through and understood the content of manual in order to operate the equipment.
2. The manufacturer will not hold any responsibilities for damages caused by not following the operating procedures or mishandling of the equipment.
3. The maintenance and troubleshooting of the equipment must handle by qualified personnel with knowledge on air-conditioning and electrical.
4. Due to the equipment in a highly dusty environment and long operating hours, the equipment requires regular maintenance and should not be left unattended while running.
5. The evaporator will get frozen up if the inlet air filter is choked and will cause liquid refrigerated agent to back-flow to compressor, thus causing severe damage to the equipment.
6. If equipment operates in a heavily dusty environment, cleaning of inlet filter has to be perform every 3 hours. Under normal usage, 2 cleaning session to be done per day.
7. If evaporator gets frozen, do not remove any ice with hammer or chisel. Shut down compressor, turn on air-blower or wash with fresh water.
8. Always ensure all motors supply voltage is sufficient. Motors operate under low voltage in long hours can easily damage.
9. * All motors rotation were factory set, protected by phase sequence relay. Server damage will cause to the motors if unauthorized wire connection is connected.

* Ensure motor is earthed.



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10. A technician with air cool and refrigerating qualification to operate on the equipment during leakage repair, vacuuming and charging of refrigerated agent.

WARNING: Must prevent evaporator from getting frozen at all time as it could caused serious damage to the compressor

Preparation for Operation

1. The equipment should be placed on a flat, solid ground and provide wooden blocks or plank for level and sound footing.
2. Connect up equipment air outlet to the air hose at site, and to install air blow regulator, when needed
3. Ensure no obstruction to air suction inlet and must be facing to an open space, away and free from blasting hopper etc, to avoid choking to the evaporator.
4. Check and ensure fan unit of condenser is free from rotation.
5. Ensure no loose items such as lifting cable, air trucking or small tools dying on top of the roof deck.
6. Ensure no obstruction to all access door
7. Ensure no obstruction on all air discharge manifold.
8. Connect power cable to a 3 phase, 415V, 50Hz power supply.
9. Check incoming supply to be stable and minimum at 415V
10. Turn on main circuit breaker and control switch.



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11. Check error indicator for “Wrong Phases” and “Low Voltage” indicator light on control panel for correct incoming phase sequence. If both indicators light are “on”, interchange any 2 phases of the 3 incoming phase.

Start Up Procedure

1. Turn on all electric circuit breaker, QF in control panel
2. Select ‘Manual’ on selector switch.
3. Check and ensure any RED indicator lit on the control panel, remedy actions must be done before equipment start.
4. If indicator light for ‘Wrong Phase’ and ‘Low Voltage’ lit on. Shut down main supply; swap any 2 phases of the 3 phases cable.
5. If only indicator light for ‘Low Voltage’ lit on, check on main supply for low voltage. If incoming supply were supply by power generator, check condition on power generator.
6. If indicator light for ‘Low Pressure’ lit on, check for possible leakage refrigerant. The lowest meter reading for compressor should shown between 3.5~ 10 bar when compressor is shut down.
7. If indicator light for ‘High pressure’ lit on, check for blockage in the system, open up related valves, and ensure 2 condenser fan are working.
8. If everything is normal, kindly follow the startup procedures on the equipment in sequence.
 - Condenser 1
 - Condenser 2 (Trigger by automatic high pressure control)
 - Air blower
 - Compressor



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9. When system needs to start in auto mode, select 'Auto' on the selector switch. The system will auto trigger to operate base on control.

Shut Down Procedure

Daily

1. Shutdown compressor
2. Shutdown air blower
3. Shutdown condenser fan
4. Auto shutdown by activate 'Stop' switch

Troubleshooting/Permanent

1. Shutdown compressor
2. Shutdown air blower
3. Shutdown condenser fan
4. Shut down all manual shut-off valves
5. Shutdown compressor exhaust suction valve



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Safety Features and Setting

Item	Safety Feature	Setting
1	Phases sequence protection; to prevent motor from wrong running rotation All motor direction of rotation set in factory	Rotation setting set by manufacturer
2	Earth leakage Protection To prevent motor operate during low voltage	$\pm 10\%$
3	Low Pressure Protection Prevent system from getting freezing and running under sub-zero pressure Low Pressure switch needs reset manually	halt @2.0bar Pressure differential set at 1.0bar
4	High Pressure Protection Prevent system operate at higher refrigerant pressure High Pressure switch needs reset manually	halt @21bar Pressure different set at 1.0bar
5	Motor overload protection Prevent all motors operate above system current limit	



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Operation Check List

1. When equipment operating in a dusty environment, air suction filter need to be clean every 2 hours.
2. When condenser coil found with thick dust or high pressure meter read above 21 bars, air-blown or wash-down with fresh water once dust accumulation is visible.
3. Check on the cleanliness of evaporator coil. If dust found on the evaporator pipe or low pressure meter lower than 3.5 bars, need to wash down with fresh water when dust accumulation is visible.
4. Under normal usage, both pressure meter reading should shown :
High pressure meter: 16 ~ 21 bars
Low pressure meter: 3.5 ~ 5.3 bars
5. Under normal usage, all meter reading should shown:
Condenser fan: 3.5 ~ 4.5A (for each blower)
Air-blower motor: 10 ~ 15A
Compressor motor: 30 ~ 38.5A
6. Check on motors for overheated symptoms
7. Check on condenser blower fan blades free from obstruction, and air flown direction towards upwards.
8. Loosen of power cable can causes overheated and cable melt. Observe sign of cable overheated or smoke forming, stop system and secure loose cable.
9. Check power voltage and frequency are normal and in stable condition.



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Troubleshooting

Condenser	Error indicate	Possible causes	Action
Condenser fan #1, fan #2 unable to power on	Wrong phase	Power cable wrong connection	Interchange any 2 power phases
	Condenser motors overheated	Overload relays incorrect setting OR motors faulty	Verify and reset overload relay
Air blower unable to power on	Low voltage supply	Unstable voltage supply or low power capacity	Replace higher rating power generator or power source
	Air blower motor overload	Overload relays incorrect setting OR air blower motors faulty	Verify and reset overload relay
Compressor unable to power on	High pressure exceed	Condenser choke OR too much gases in system	Clean condenser. Check for high pressure reading to be lower than 22 bars
	Low pressure exceed	Evaporator choke or get frozen. Low refrigerant or refrigerant leakage	Clean Evaporator. Check for leakage. Recharge to minimum 3.5 bars



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Maintenance and Inspection

- | | |
|---|---|
| 1. Cleaning of evaporator coil and air suction filter | <ul style="list-style-type: none">- Clean once a day under normal usage- Clean every 2 hours under severe dusty environments.- Perform chemical cleaning for every 3 months |
| 2. Cleaning of condenser coil | <ul style="list-style-type: none">- Clean once a day under normal usage- Clean every 4 hours under severe dusty environments.- Perform chemical cleaning for every 3 months |
| 3. Compressor | <ul style="list-style-type: none">- Perform daily oil level check- Replace oil after every 5,000 hours- Check on all alignment coupling after 10,000 hours of operation.- Overhaul after 30,000 hours of operation |
| 4. Air-blower fan | <ul style="list-style-type: none">- Check dynamic balancing after 30,000 hour of operation |
| 5. Condenser fan | <ul style="list-style-type: none">- Daily check on movement of rotor blade- Cleaning after every operation |
| 6. All motors | <ul style="list-style-type: none">- Grease after every operation- Overhaul after 30,000 hours of operation |
| 7. Solenoid valve | <ul style="list-style-type: none">- Clean after every 30,000 hours- Replace solenoid coil when necessary |
| 8. Power supply cable | <ul style="list-style-type: none">- Check and repair for breakage of Insulation and cable lugs |
| 9. Control panel | <ul style="list-style-type: none">- Check cable condition for overheating- Check for loose cable after every operation |



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Low Pressure Reading

3.2 ~ 5.5 bar

- Normal

- Good running condition

Low than 3.2 bar

- Too Low

- Possible due to evaporator chock, Cause by poor air circulation, and evaporator get frozen, defrost and clean air suction filter

- If high pressure meter shown low reading, it means there is insufficient refrigerant. Check for leakage repair, vacuum suction, replace filtrations dryer and refill refrigerant

- If high pressure meter exceeds 17 bar, it may be system choked. Check if any valves are not opened.

- If out door temperature is low, and compressor runs high capacity than required. Adjust compressor capacity controller to lower capacity

Above 5.5 bar

- Too High

- If high pressure meter shown high, its mean there is too much refrigerant and compressor is not fully loaded (maximum current for compressor should below 38.5A). Purge refrigerant if Necessary

- Condenser maybe dusty and get choke. or condenser fan not function and unable to dissipate heat. Clean condenser



10 bar

- Abnormal

- High possibility of compressor
faulty

Remark: Please check the above mention errors when occurred, and contact us if unable
to rectify



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High Pressure Reading

16 ~ 21 bar	- Normal	- Good running condition
Below 14 bar	- Too Low	- insufficient refrigerant. - System leakage
Above 22 bar	- Too High	- If high pressure meter shown high, its mean there is too much refrigerant and compressor is not fully loaded (maximum current for compressor should below 38.5A). Purge refrigerant if necessary - Condenser maybe dusty and get choke. or condenser fan not function and unable to dissipate heat. Clean condenser - When low pressure less than 0 bar or cut off, System maybe choke. Shut off valve not trigger or solenoid valve fails due to burnt solenoid coil
10 bar	- Abnormal	- High possibility of compressor faulty

Remark: Please check the above mention errors when occurred, and contact us if unable to rectify



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Product Specification

Technical Parameter

Power Supply	3 Phases / 415V $\pm$ 10% / 50hz
work method	Reduce temperature by air cool / refrigerating
Compressor	Copeland, USA, ZR310KC-TWD-552
Condenser dissipate heat method	Air Cool Method
Refrigerant media	R22
Temperature control	High Sensitive Temperature sensor
Evaporator	Copper pipe + Aluminum Sheet
Condenser	Copper pipe + Aluminum Sheet
Equipment Housing	Container Type
Duct Dimension	4 X Φ 250
Air Inlet filter	350g/m ² , efficiency 93% / waterproof filter / stainless steel mounting
Weight	2.5T
Overall Dimension	2000mm X 1700mm X 2600mm (LxWxH)
Power Consumption	
Compressor	25HP (18.75kw)
Condenser Fan	2.2kw x 2 = 4.4kw
Air Blower	7.5kw
Total power rating	30.65kw



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Spare Parts List

Major Component List		
Item	Description	Qty
1	Copeland full enclosed ZR310KC-TWD-552	1
2	Condenser coil	1
3	Evaporator coil	1
4	Air Blower 7.5kw	1
5	Condenser Fan 2.2kw	2

Warranty

Coverage

This system is subjected to a 12 months warranty which include service and repair with exclusion to replacement of wear and tear parts::

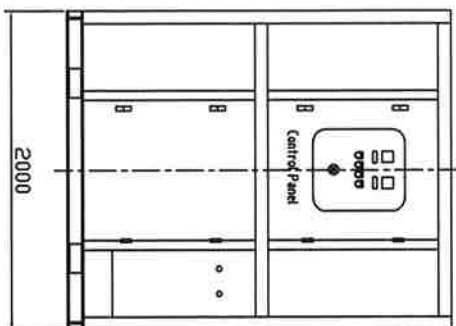
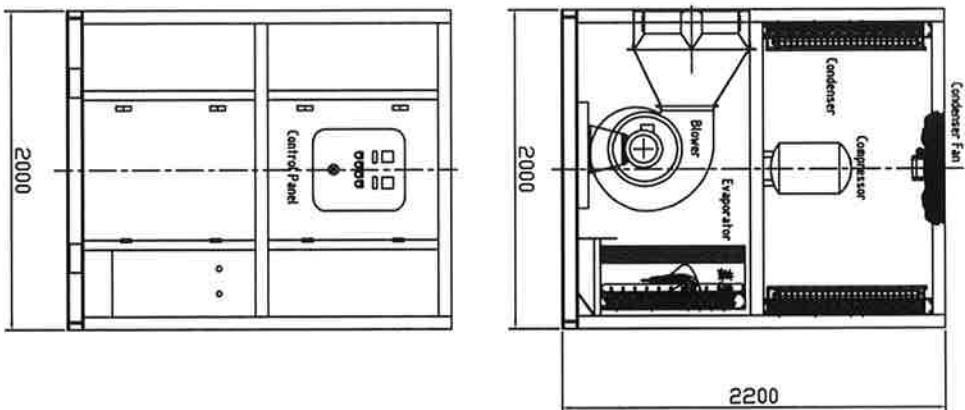
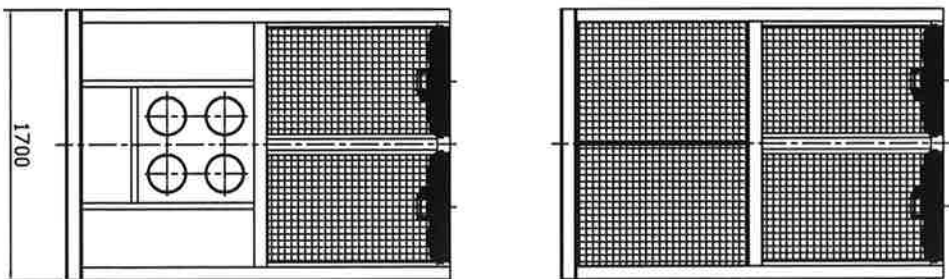
Exclusion

The manufacturer will not responsible for any damages caused by the following reasons.

1. Physical damage to the container housing or any component due to improper lifting, loading or unloading.
2. System damage due to vibration arises from poor positioning of the machine on a uneven ground.
3. Damages to any component, motors cause by present of any foreign object
4. Damages causes by wrong electrical power connection
5. Damages causes by missing of earth connection
6. Damages to motors due to wrong phase connection
7. Damages to motors due to improper positioning
8. Damages to system due to loose electrical cables to power source or broken cable insulation
9. System damages due to unauthorized adjustment made on all electrical components



ACC9000 System Dimension Drawing



Customer/Shipyard:		Drawing Title:	
Project Name:		AAC9000 LAYOUT DRAWING	
Reference No.:		Purchase Order No.:	
Project No.:		AAC 90B2-00	
Rev.:		Description:	
A1		ISSUE FOR APPROVAL	
C1		ISSUE FOR CONSTRUCTION	

GENERAL NOTES:

NOTE: 1. SPEEDO MAKES THE RIGHTS TO MAKE CHANGES OR MODIFICATIONS TO THE ABOVE DRAWING AND DESIGN WITHOUT NOTICE TO THE CUSTOMER. THE CUSTOMER AGREES TO ACCEPT ANY SUCH CHANGES OR MODIFICATIONS WITHOUT COMMENT OR THE COMPANY.

ALL DIMENSIONS IN MM UNLESS OTHERWISE STATED

Projection: Scale: 1:150



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