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YOUR LOCAL SERVICE CONTRACTOR IS:

COMPANY NAME:

_____

PHONE NUMBER: FAX NUMBER:

_____

Contents

I Technical Data

Model		Outdoor		
Dimensions		Depth	940	mm
		Width	3040	mm
		Height	1850	mm
Weight without refrigerant load		ca.	1066	kg
Weight with load		ca.	1090	kg
Shipping weight		ca.	1600	kg
Weight total refrigerant load			24.0	kg
Quantity of air		2x	18000	m³/h
Number of fans			4	
Refrigerant			R134a	
Required quantity of refrigerant			2x12kg	
High-pressure switch			19	bar
Water connection inlet		internal	2“ G" female thread	
Water connection outlet		internal	2“ G" femalethread	
Cold water temperature outlet		min.	14	°C ±1 K
Cold water temperature inlet		max.	30	°C
Primary water pump type 60Hz			IN-V 10-50(60Hz)	
Rated water capacity		min.	7.8	m³/h
Rated water pressure			6.5	bar
Ambient temperature		min.	10	°C
		max.	+48	°C
Cooling capacity			63.0	kW
Rated cold water outlet temperature			14	°C
Temperature of surroundings			48	°C
Main supply			480 V / 3Ph / 60 Hz 400 V / 3PH / 50Hz	
Control voltage			24	VDc
Fluctuations in main voltage		max.	-14+10	%
Fluctuations in frequency		max.	±1	Hz
Power input		max.	29	kW
Noise level	at 5 m		max.68	db(A)

I. Basics

Scope of Chiller supply:

- SC218-L-...
- Installing Instruction on switch cabinet
- Manual inside the switch cabinet
- Brass fittings for the connection Chiller inlet/outlet and piping (on the pump)

Carefully read the operating instructions located in the control cabinet before beginning installation.

Check the equipment for damage on arrival and report any defects immediately.

Claims submitted later cannot be honored.

Please observe the following notes and warnings.

1. Removing the operating instructions from the cooling block voids the warranty!
2. With the pump turned off, fill the system to a static water pressure of 1.5 bar (21.75 psi)
3. The cooling block operates completely independently of the MR system.
4. Voltage is still present in the SC control cabinet when the MR system is turned off. **Risk of death!**

5 Even with the cooling block turned off, high surface temperatures can cause burns. **Risk of death!**

Only trained and qualified personnel are permitted to install, start up, and repair the cooling block.

II. Installation site

a) Ambient temperatures

The chiller is designed to operate at ambient temperatures between +10°C minimum and +48°C maximum.
Malfunctions can occur outside these specifications.

If the chiller is used at high ambient temperatures (higher than 40°C = 104°F) the the chiller should be installed that the sun does not shine directly on the display.

b) Clearance

Maintain at least 100 cm (39.4 in.) around all four sides of the chiller for air intake and servicing/repair.

Under no circumstances install a roof above the chiller.

c) Servicing and repair access

See Clearance

d) Air flow

Never obstruct the air intake to the condensers on the upper third of the chiller.
The diameter of the tubes may not be smaller than the size specified.

e) Load capacity of the base

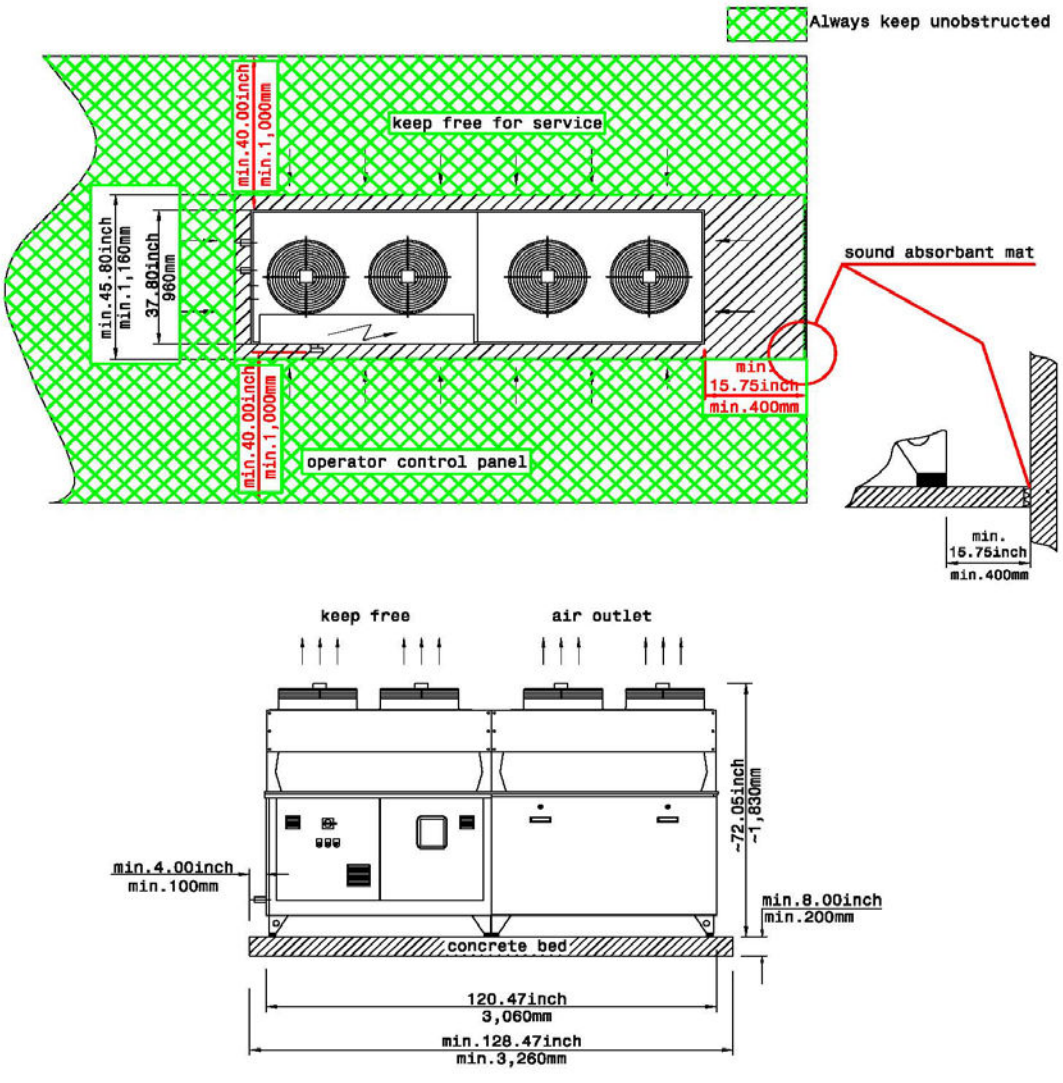
Verify that the installation surface has sufficient load capacity.
A concrete foundation or sectional steel construction is recommended.

A concrete foundation needs to be 200 mm (7.8 in.) wider and 200 mm (7.8 in.) longer than the cooling block. Final dimensions: approx. 3,200 mm (10.5 feet) long by 1,100 mm (3.6 ft) wide.

The operating weight of the chiller is approx. 1,100 kg (2,425 lbs.).

It is important that the cooling block be installed on a level surface.

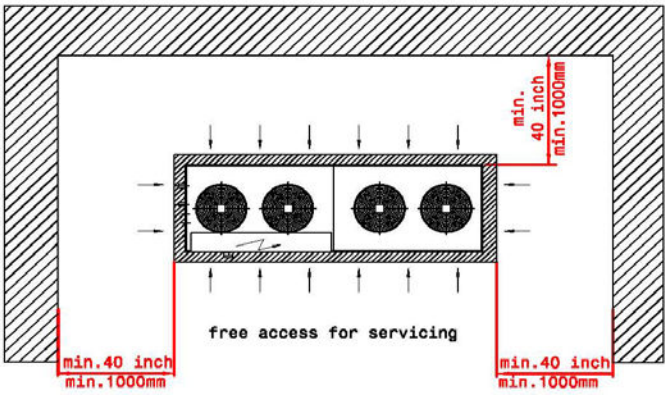
waterchiller installation I



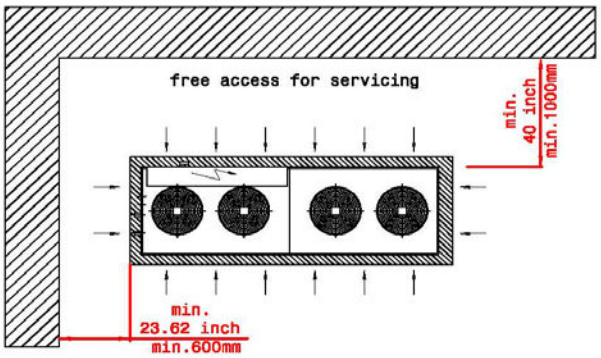
Dimensions for the concrete bed should be adjusted according to local circumstances.

waterchiller installation II

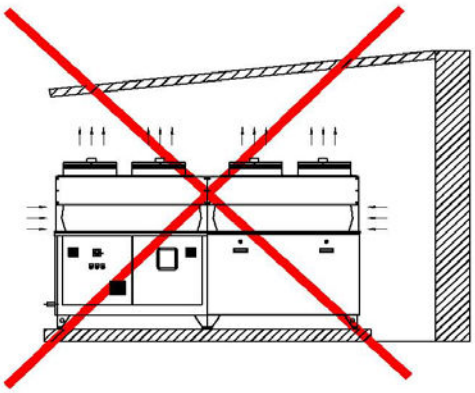
installation example A



installation example B



installation example C



Air outlet keep free!

III. Transport route/transport

a) Transport measurements

Length: approx. 3,200 mm (126 inches)
Width: approx. 1,100mm (43.3 inches)
Height: approx. 2,150mm (approx. 84.65 inches)

You also need to add the height of the transport equipment, such as pallets, lift truck, transport rollers, etc.

b) Transport weight

Weight: approx. 1,600 kg (approx. 3,528 lbs.)

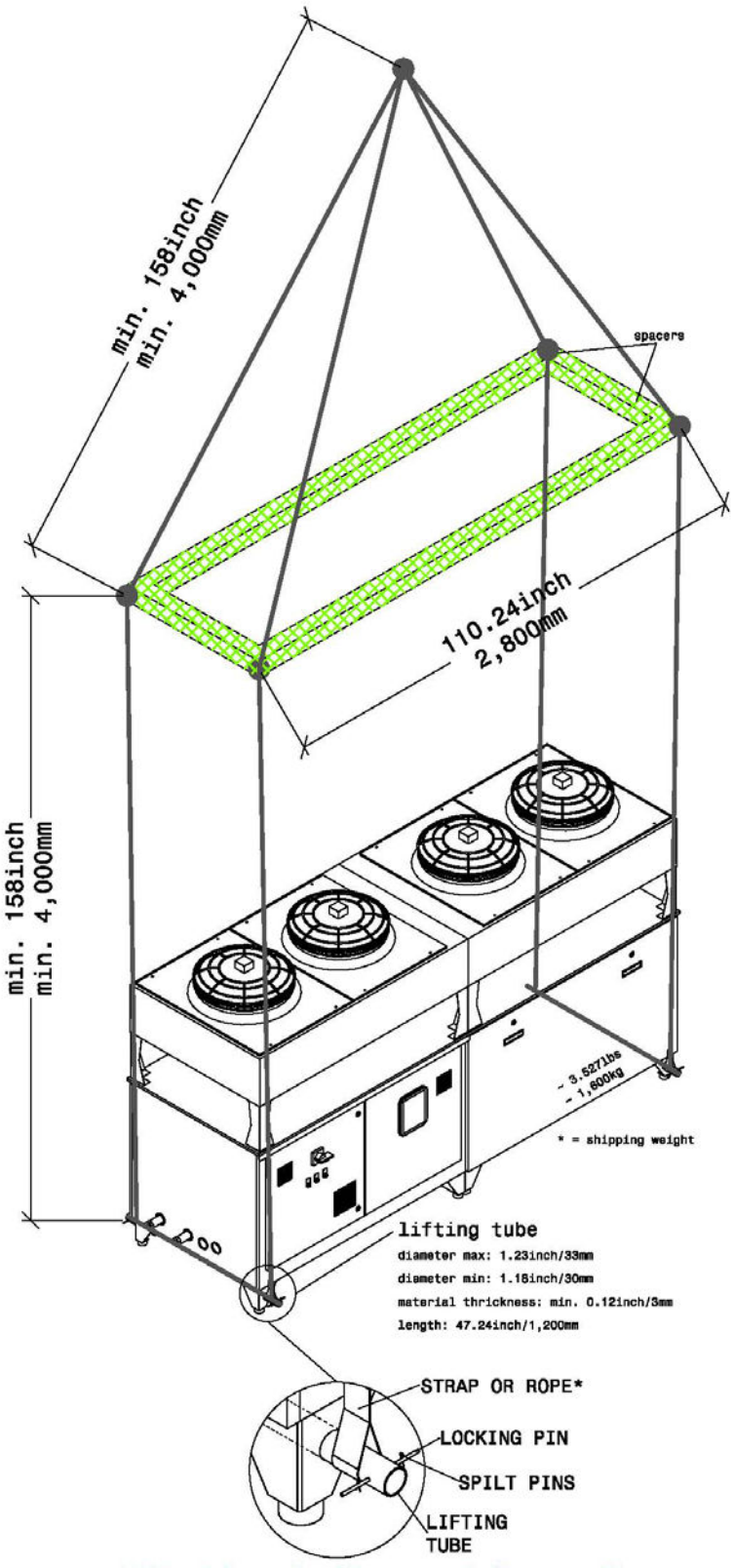
c) Transport safety locks

There are no transport safety locks to remove.

d) Crane transport

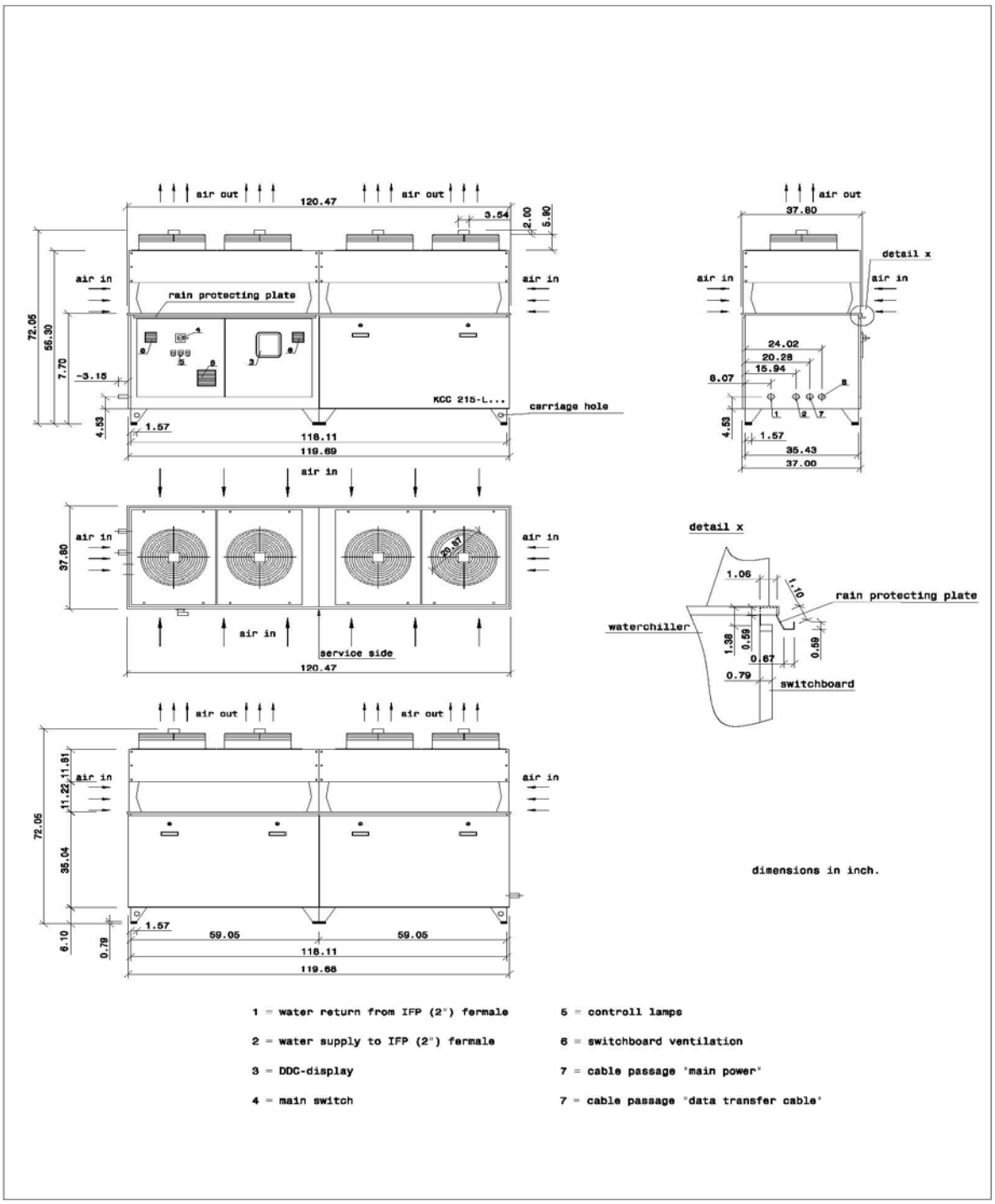
If a crane will be used to transport the chiller, note the following:

Lift the chiller only from its base. Insert two steel rods through the holes in the base. The rods must be specifically designed for this purpose and able to support the weight (1,100 kg./2,425 lbs.).
Secure the rods with locking pins to prevent shifting.
Use only straps or rope for lifting from the rods.
The straps or ropes must be held in place with a frame to keep them from pressing into the side walls, gutters, and condenser body. (Refer to the following graphic).

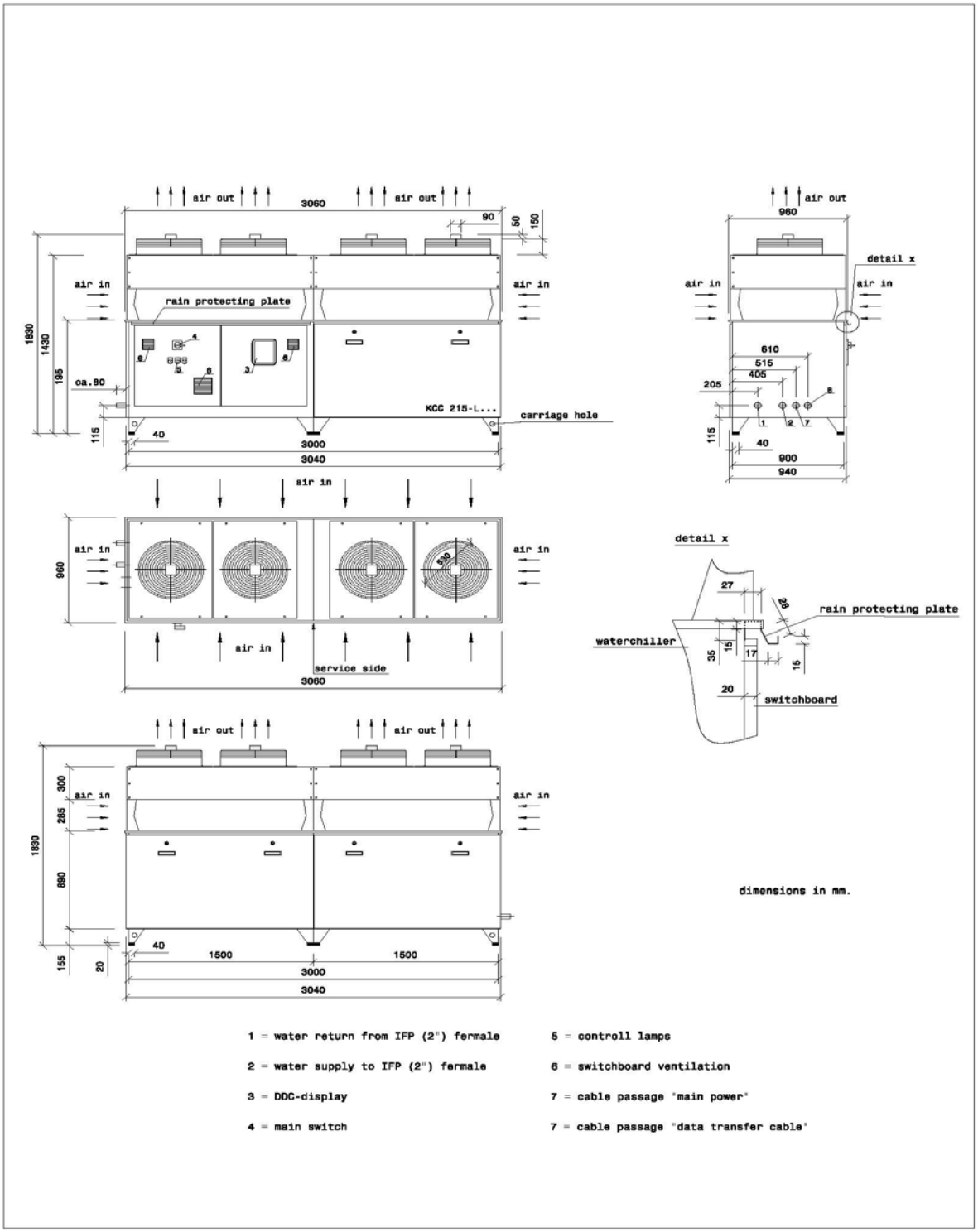


*Attention: don't use metal rope !!

e) Dimensions in inch



f) Dimensions in mm



g) Weights

Net weight:	1,060 kg. (2,337 lbs.)
Operating weight:	approx. 1,100 kg. (2,425 lbs.)
Transport weight:	approx. 1,600 kg (3,527.4 lbs.)
Refrigerant:	approx. 2 X 12 kg. (26.45 lbs.) R 134a
Coolant:	approx. 17 kg. (37,5 lbs.) 100% ethylene glycol

IV. Power supply/electrical connection

a) Follow local regulations

Strictly adhere to the regulations of the local power company and authorities. Only trained, authorized persons are permitted to connect the power.

b) Voltage, frequency, tolerances

Voltage range: 480 Volt –14%+10%
400V/3PH/50Hz

Frequency range: +/-1Hz

c) Type of cable

Make sure to use appropriately designed and approved cables when routing.

d) Length and cable width

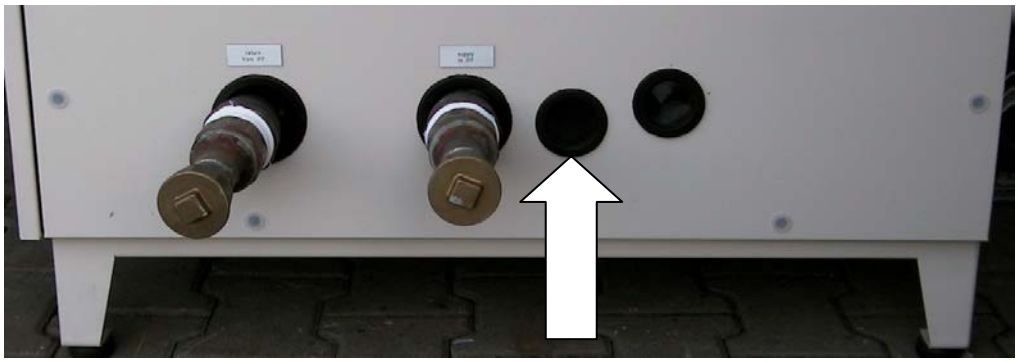
A cable width of at least 16mm² per phase is required for cables up to 50 meters (164 ft.) in length.
Therefore, a 5 x 16mm² cable is required.

e) Strain relief

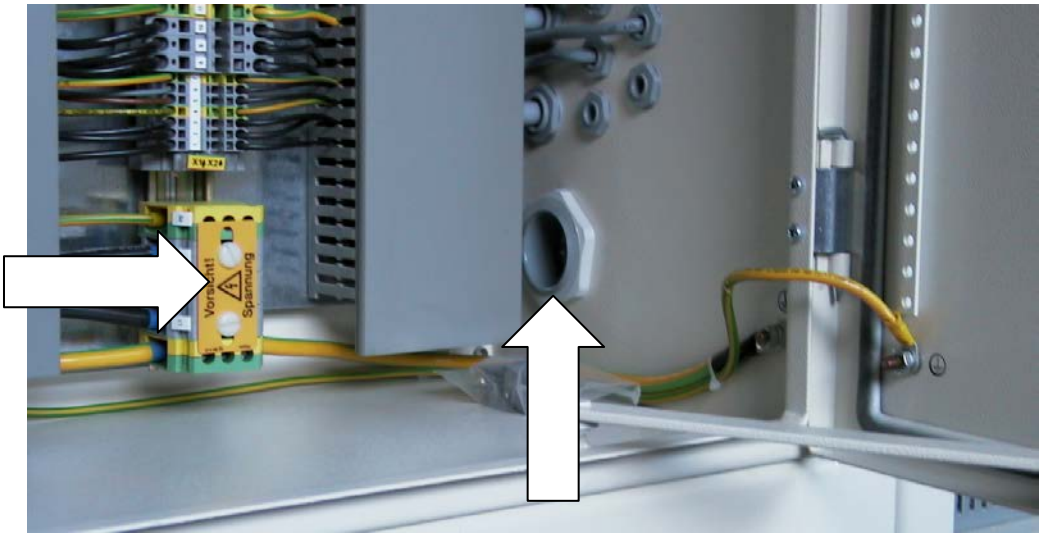
The input cable must be fitted on both sides with a strain relief.

f) Clamps

Insert the input cable through the cable feed-through (see photograph) next to the water connections. Route it into the control cabinet through the cable channel installed on the back of the control cabinet.



Use the clamps to secure the routed cable (see photograph).



Attention!!

Do not pass the power supply line across the switch cabinet!!

Use cable opening in the lower right hand side of cabinet!!

Drilling holes into and running cables into the cabinet can cause interferences with the regulation electronics!!

g) Fuse

Maximum 80 A slow-blowing fuse for pre-fusing.

Maximum overcurrent of 200 A for 50 msec.

h) Phase sequence

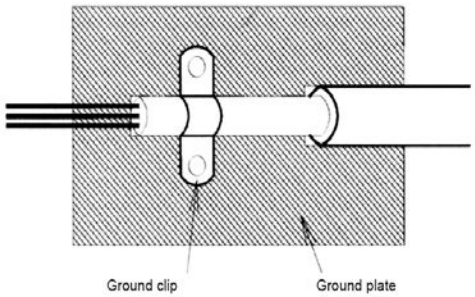
Observe the correct phase sequence when routing the wires, otherwise the cooling block will not start. A phase sequence relay (4A1) is installed for this purpose (see photograph).

The top LED is lit when operating voltage is present.
The LED underneath lights during overvoltage.
The next lower LED lights during undervoltage.
The fourth LED from the top lights during asymmetry, incorrect phase sequence, and power outage.
The bottom LED lights when the output relay is activated.

i) EMC Compatibility and Grounding

This comments are compiled to help the field electrician to install the grounding of the power supply and to get a EMC Compatibility.
All electrical equipment produces radio and line-borne interference at various frequencies. The cables pass this on to the environment like an aerial.
The basic countermeasures are isolation of the wiring of control and power components, proper grounding and shielding of cables.

A large contact area is necessary for low-impedance grounding of HF interference. The use of grounding straps instead of cables is therefore definitely advisable.



Moreover, cable shields must be connected with purpose-made ground clips.

The grounding surface must be highly conductive bare metal. Remove any coats of varnish and paint.

The width of the grounding wire must be min. 16mm² (AWG 6) or of the same width of the power supply.

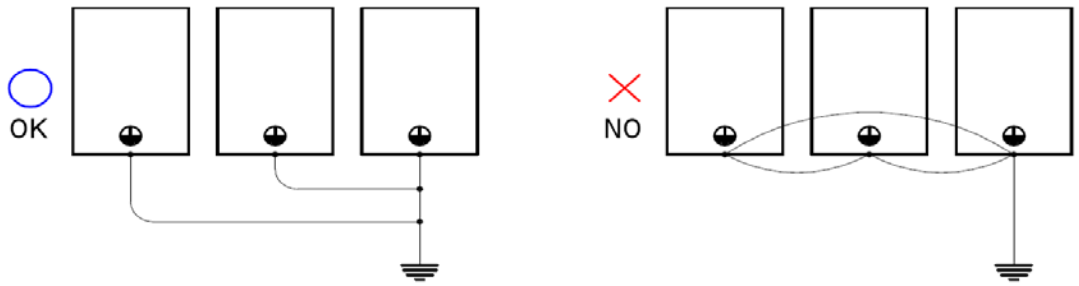
The grounding must be an isolated ground and must connected on the ground terminal (X1) in the switch cabinet. The ground resistance must be less than 10 Ohm.

Metal cable conduits are not allowed for grounding.

The piping of the chiller (supply and return) have to be grounded too.

Do not share the ground wire with other devices.
Always use a ground wire that complies with technical standards on electrical equipment and minimize the length of the ground wire.

When using more than one Inverter, be careful not to loop the ground wire.
(e.g. a CT-Chiller KPC108-L-U/S stands near an Avanto-Chiller KCC215-L-U/S)



VI. Water connection

a) Pipe material

Use only the following materials for the pipes:

1. Copper is recommended
2. Zinc-coated steel or stainless steel
3. PE or PVC – ensure that the appropriate steps are taken to protect the pipe along its length.

b) Relation of pipe diameter to distance between chiller and SEP

Use 2" (R2, DN 50 or 54-mm copper) for up to 25 meters (82 ft.) of straight pipe.

Use 2 ½" (R21/2, DN 65 or 64-mm copper) for up to 45 meters (147.6 ft.) of straight pipe.

For distances exceeding 45 meters (147.6 ft.) of straight pipe, e-mail the actual pipe length, the difference in height, and the required pipe elbows to KKT: info@kkt-chillers.com)

c) Dimensions of the connections

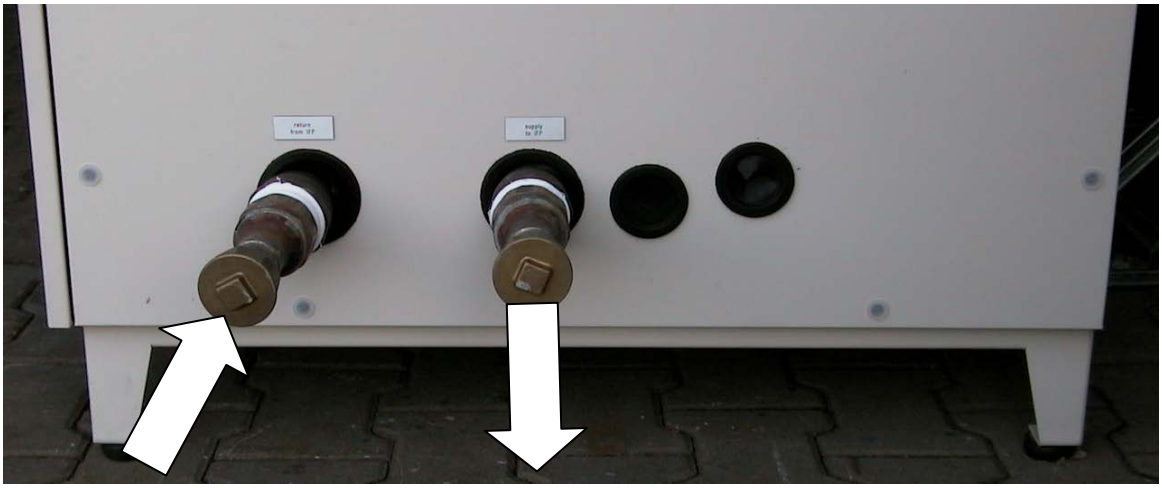
Both the coolant return (water/glycol mix) from the SEP and the coolant supply (water/glycol mix) to the SEP need to have a 2" internal thread.
To connect them, use a crossover with a 2" external screw thread or preferably a fitting with a 2" external screw thread (two crossovers are attached to the pump).

d) Inflow and outflow

Verify that the inflow and outflow pipes are attached correctly (do not confuse).
The inflow is FROM the SEP.
The outflow is TO the SEP.
The connections are labeled (see photograph).
On the Chiller inflow and outflow use the brass-fittings.
On the SEP use the stainless steel fittings.

e) Water quality

Use only potable water to fill the system



f) Glycol

Not needed

g) Filling

For filling, use the fill and drain valve near the pump.
It is best to fill the circulation system completely for the air to escape most easily (refer to the following item).

- open the valves on the SEP

h) Vents and air chambers

Be sure to avoid air pockets when routing the pipes.
Air chambers or automatic vents must be attached at the highest point to ensure the most simple and reliable venting procedure.
Perform and repeat the following steps until all the air has been bled from the system.

This steps have to be done during the first start up and after each replacement of components with water inside also Siemens components.

1. From the lowest point possible, fill the pipe with water/ethylene glycol mixture until no more air escapes from the vent (at the highest point).
   Fill the centrifugal pump and vent. Close the vent.
2. Continue filling until the pressure on the water circulation manometers display 1.5 bar (21.75 PSI) with the pump **OFF**.
3. Turn on the pump for 15 seconds and turn it off again.
4. Open the vents on the air chambers and the pump and vent off the remaining air. The pressure on the manometers drops.
5. Fill again until the pressure on the manometers with the pump **OFF** reaches 1.5 bar (21.75 PSI).
6. Repeat starting with step 3 until no more air escapes from the vents and the static pressure with the pump off does not drop below 1.5 bar (21.75 PSI).
7. Clean the filter during the next-to-the-last pass.
7. If the pressure remains constant for 60 – 90 minutes of operation, the coolant circulation system is full and no air remains.

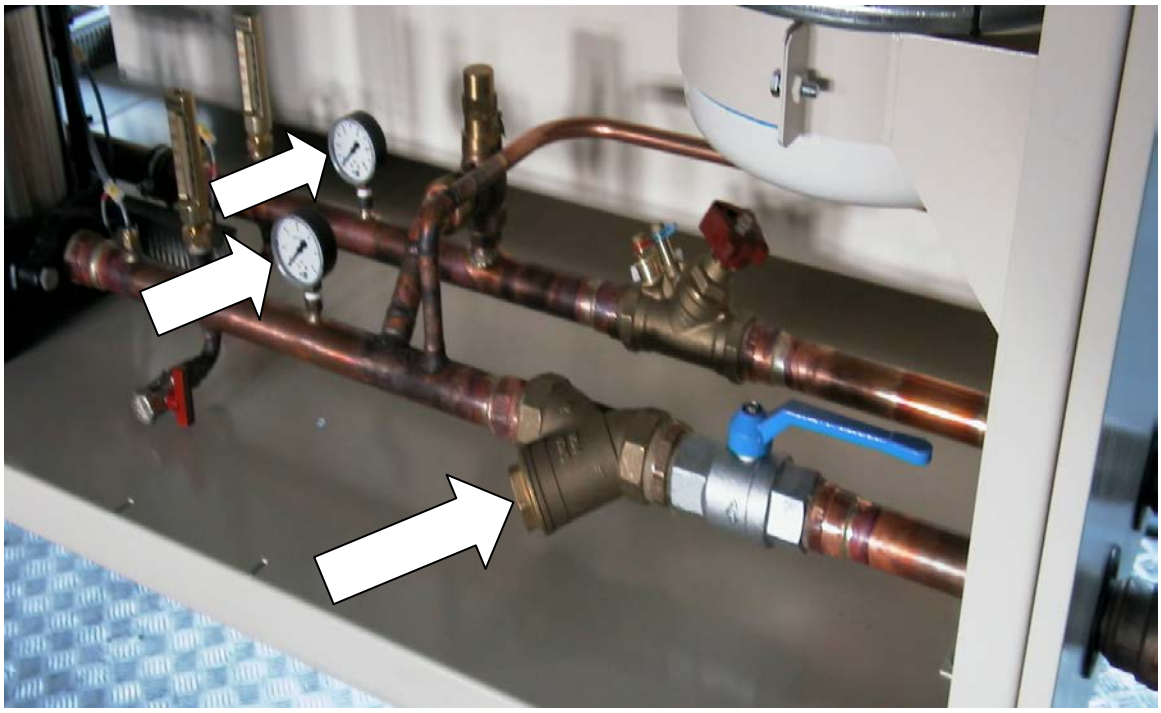


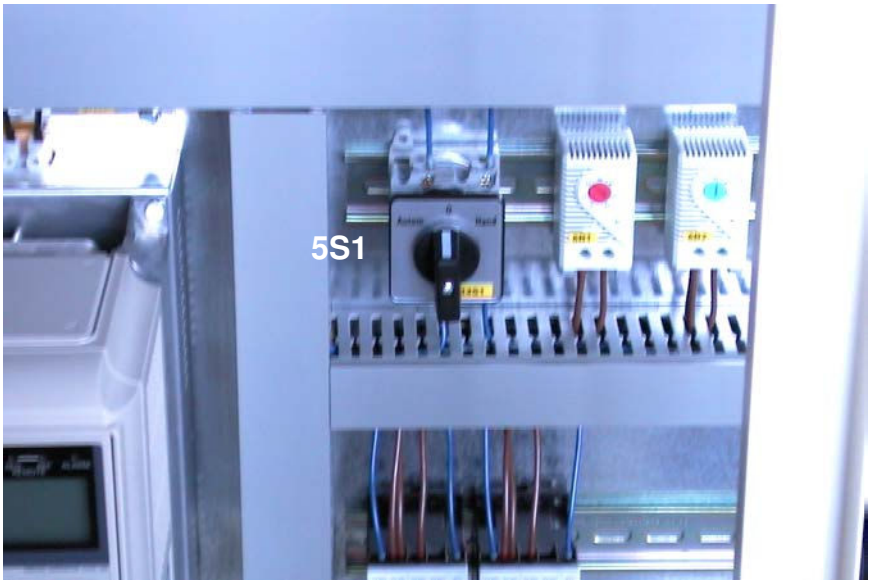
Figure 1

Table 1

VII. Initial start-up

1. Turn on main switch 4Q1.

2. Set control switch 5S1 to “Auto”.



3. The compressor begins running when the water temperature reaches 18. 5 °C after 30 seconds.

4. When the compressor is running the two condenser vents are released. They are reactivated once the pressure in the condenser reaches approx. 13 bar. The stop light on the frequency converter stays lit as long as the vents are off.

5. Vents regulate themselves gradually and independently of the SPS in accordance with the set condenser pressure.

IX. Control

a) Pump

Check the direction of rotation of the pump.
Check any noises the pump makes while running.
Check the power consumption.

b) Water pressures

Suction pressure must be between 1.0 bar (14.5 PSI) and 1.5 bar (21.75 PSI).
High pressure must be between 6.5 bar (94.3 PSI) and 7.0 bar (101.5 PSI).

c) Compressor

Check the power consumption.

d) Vents

Check the power consumption.

e) Refrigerant pressures

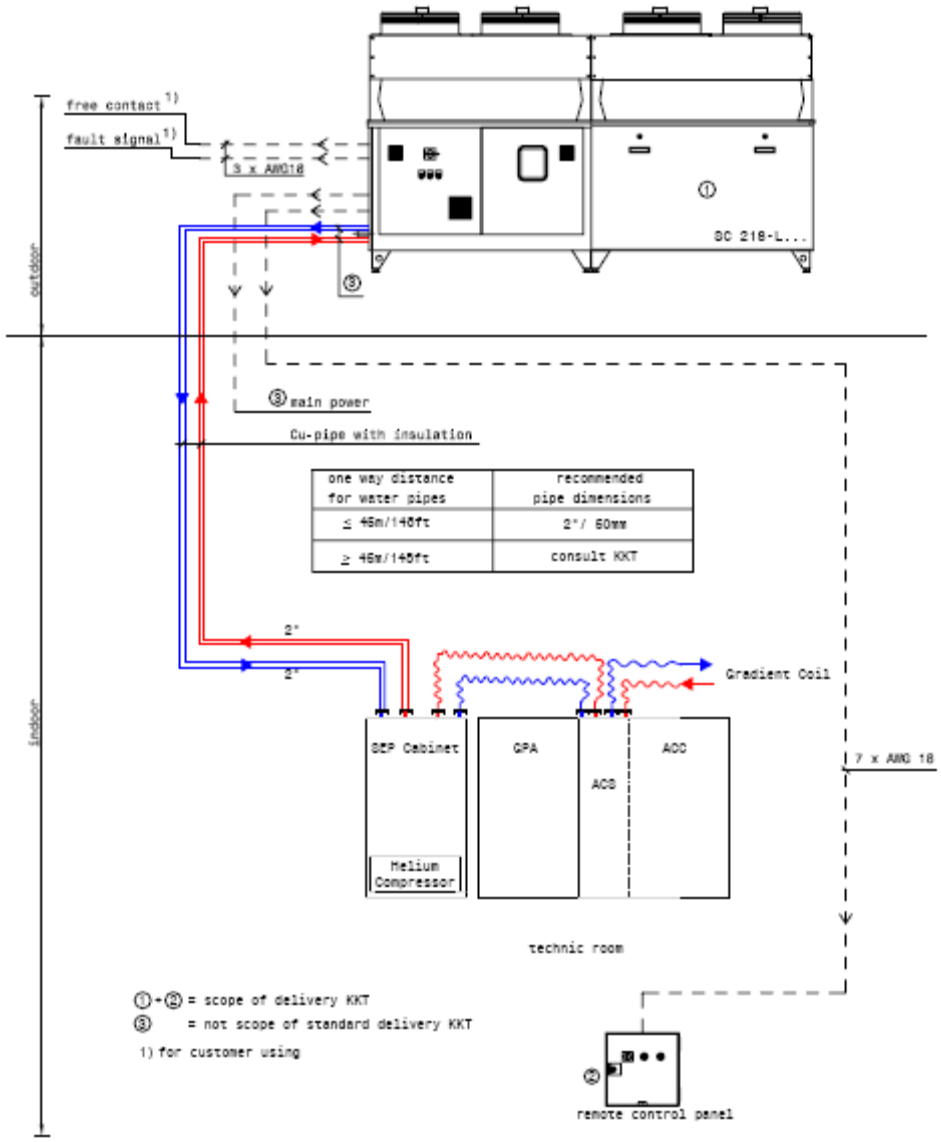
The low-pressure side must be between 3.0 bar (43.5 PSI) and 5.0 bar (72.5 PSI).
The high-pressure side must be between 8.0 bar (116 PSI) and 15.0 bar (217.5 PSI).

f) Temperatures

Outflow water temperatures should be between 13°C (50°F) and 15°C (53.6°F).
Inflow water temperatures should be between ~17°C (54°F) and ~27.7°C (67.1°F), depending on the operating state of the MR system.

X Overview water chiller and SEP

overview of waterchiller
transfer station / remote control panel



XI Trouble Shooting

KIND OF TROUBLE	CAUSE	ELIMINATION
• malfunction of plant/system	1. power failure asymmetry, over voltage or low voltage 2. temperature sensor defective 3. controller eliwell malfunction	- check mains connection and asymmetry relay 4A1 - check sensor 6B1 clamp feeler and measure the resistance - check power supply 24VDC 6U1and - fuses 4F1 and 4F2 -
• malfunction of pump 25M1	1. main switch 4Q1 not switched on 2. control switch 5S1 on 'OFF' 3. motor protection relay 5Q1 defective 4. fuse for control current defective 5. pump motor 5M1 defective 6. flow switch responded 5B1 7. shortage of water	- switch on main switch 4Q1 - switch control switch to 'AUTO' 5S1 - replace relay 5Q1 - replace fuse - replace pump - check water flow - check system pressure, clean strainer
• still malfunction of pump	1. overload trip 5Q1 of pump protection interrupted control circuit	- main switch to '0', push in overload trip
• pump makes gurgling noise	1. circuit is not completely vented	- vent and fill up with water/Ethylene glycol

KIND OF TROUBLE	CAUSE	ELIMINATION
• compressor 7M1 and 10M1 stops	1. Klixon/INT69 tripped 7A1 and 10A1	- Check motor protection 7Q1 and 10Q1 - wait until compressor cooled down; perhaps clean condenser or provide fresh air supply
	2. Klixon/INT69 7A1and 10A1defective	- replace Klixon/INT69
• malfunction of refrigerating machine	1. controller stopped machine, return temperature too cold	- to check function, level down adjustments, wait until return temperature rised
• still malfunction of refrigerating machine	1. low pressure in refrigerant circuit - plant looses refrigerant - dryer in liquid pipe dirty - pressure relief valve defective - solenoid valve 8Y1 and 11Y1 in liquid pipe defective	 - find leak, seal, refill circuit - replace dryer - replace pressure relief valve - replace solenoid valve
	2. high pressure in refrigerant circuit - condenser dirty - fan defective - outside temperature too high - pressure sensor 9B1 and 12B1 for condenser control defective - Frequency inverter defective	 - clean condenser - put right electric cause; check fuses 9Q1 and 12Q1 - spray condenser with water - replace pressostate - replace frequency inverter 9U1 and 12U1
• refrigerating machine starts and stops short-termed	1. not enough fresh air supply for condenser; high pressure pressostate tries to protect refrigerating machine against overload	- provide enough fresh air supply and fresh air removal; get rid of short-circuit across fresh air and exhaust air
	2. not enough pressure of refrigerant circuit; refrigerant partly escaped; diminished pressure switch shut down compressor	- find leak, seal, refill circuit

KIND OF TROUBLE	CAUSE	ELIMINATION
• not enough refrigeration power	1. air in water circuit	- vent system
	2. fallen below minimum water agitation quantity	- design cross-section of water pipe right; perhaps open check valve in water circuit completely, increase pipe cross-section
	3. not enough fresh air supply for condenser	- provide enough fresh air supply and fresh air removal; get rid of short-circuit across fresh air and exhaust air
	4. not enough refrigerant in circuit	- find leak, seal, refill circuit

Problem	Possible cause	Remedy
The pump does not run	1. No power at motor.	Check for voltage at motor teminal box. If no voltage at motor, check feeder panel for tripped circuits and reset circuit.
	2. Fuses are blown or circuit breakers are tripped.	Turn off power and remove fuses. Check for continuity with ohmmeter. Replace blown fuses or reset circuit breaker. If new fuses blow or circuit breaker trips, the electrical installation, motor and wires must be checked.
	3. Motor starter overloads are burned or have tripped out.	Check for voltage on line and load side of starter. Replace burned heaters or reset. Inspect starter for other damage. If heater trips again, check the supply voltage and starter holding coil.
	4. Starter does not energize.	Energize control circuit and check for voltage at the holding coil. If no voltage, check control circuit fuses. If voltage, check holding coil for shorts. Replace bad coil.
	5. Defective controls.	Check all safety and pressure switches for operation. Inspect contacts in control devices. Replace worn or defective parts or controls.
	6. Motor is defective.	Turn off power and disconnect wiring. Measure the lead to lead resistances with ohmmeter (RX-1). Measure lead to ground values with ohmmeter (RX-100K). Record measured values. If an open or grounded winding is found, remove motor and repair or replace.
	7. Defective capacitor. (Single-phase motors)	Turn off power and discharge capacitor. Check with ohmmeter (RX-100K). When the meter is connected to the capacitor, the needle should jump towards 0 ohms and slowly drift back to infinity (∞). Replace if defective.
	8. Pump is bound.	Turn off power and manually rotate pump shaft. If shaft does not rotate easily, check coupling setting and adjust as necessary. If shaft rotation is still tight, remove pump and inspect. Disassemble and repair.
The pump runs but at reduced capacity or does not deliver water	1. Wrong rotation	Check wiring for proper connections. Correct wiring.
	2. Pump is not primed or is airbound.	Turn pump off, close isolation valve(s), remove priming plug. Check fluid level. Refill the pump, replace plug and start the pump. Long suction lines must be filled before starting the pump.
	3. Strainers, check or foot valves are clogged.	Remove strainer, screen or valve and inspect. Clean and replace. Reprime pump.
	4. Suction lift too large.	Install compound pressure gauge at the suction side of the pump. Start pump and compare reading to performance data. Reduce suction lift by lowering pump, increase suction line size or removing high friction loss devices.
	5. Suction and/or discharge piping leaks.	Pump runs backwards when turned off. Air in suction pipe. Suction pipe, valves and fittings must be airtight. Repair any leaks and retighten all loose fittings.
	6. Pump worn.	Install pressure gauge, start pump, gradually close the discharge valve and read pressure at shutoff. Convert measured pressure (in PSI) to head (in feet): (Measured PSI x 2.31 ft./PSI = _____ ft.). Refer to the specific pump curve for shutoff head for that pump model. If head is close to curve, pump is probably OK. If not, remove pump and inspect.
	7. Pump impeller or guide vane is clogged.	Disassemble and inspect pump passageways. Remove any foreign materials found.

Problem		Possible cause	Remedy
The pump runs but at reduced capacity or does not deliver water (continued)	8.	Incorrect drain plug installed.	If the proper drain plug is replaced with a standard plug, water will recirculate internally. Replace with proper plug.
	9.	Improper coupling setting.	Check/reset the coupling, see page 10.
Pump cycles too much	1.	Pressure switch is not properly adjusted or is defective.	Check pressure setting on switch and operation. Check voltage across closed contacts. Readjust switch or replace if defective.
	2.	Level control is not properly set or is defective.	Check setting and operation. Readjust setting (refer to level control manufacturer's data). Replace if defective.
	3.	Insufficient air charging or leaking tank or piping.	Pump air into tank or diaphragm chamber. Check diaphragm for leak. Check tank and piping for leaks with soap and water solution. Check air to water volume. Repair as necessary.
	4.	Tank is too small.	Check tank size and air volume in tank. Tank volume should be approximately 10 gallons for each gpm of pump capacity. The normal air volume is 2/3 of the total tank volume at the pump cut-in pressure. Replace tank with one of correct size.
	5.	Pump is oversized.	Install pressure gauges on or near pump suction and discharge ports. Start and run pump under normal conditions, record gauge readings. Convert PSI to feet (Measured PSI x 2.31 ft./PSI = _____ ft.) Refer to the specific pump curve for that model, ensure that total head is sufficient to limit pump delivery within its design flow range. Throttle pump discharge flow if necessary.
Fuses blow or circuit breakers or overload relays trip	1.	Low voltage.	Check voltage at starter panel and motor. If voltage varies more than ±10%, contact power company. Check wire sizing.
	2.	Motor overloads are set too low.	Cycle pump and measure amperage. Increase heater size or adjust trip setting to a maximum of motor nameplate (full load) current.
	3.	Three-phase current is imbalanced.	Check current draw on each lead to the motor. Must be within ±5%. If not, check motor and wiring. Rotating all leads may eliminate this problem.
	4.	Motor is shorted or grounded.	Turn off power and disconnect wiring. Measure the lead-to-lead resistance with an ohmmeter (RX-1). Measure lead-to-ground values with an ohmmeter (RX-100K) or a megaohm meter. Record values. If an open or grounded winding is found, remove the motor, repair and/or replace.
	5.	Wiring or connections are faulty.	Check proper wiring and loose terminals. Tighten loose terminals. Replace damaged wire.
	6.	Pump is bound.	Turn off power and manually rotate pump shaft. If shaft does not rotate easily, check coupling setting and adjust as necessary. If shaft rotation is still tight, remove pump and inspect. Disassemble and repair.
	7.	Defective capacitor (single-phase motors).	Turn off power and discharge capacitor. Check with ohmmeter (RX-100K). When the meter is connected to the capacitor, the needle should jump towards 0 ohms and slowly drift back to infinity (∞). Replace if defective.
	8.	Motor overloads at higher ambient temperature than motor.	Use a thermometer to check the ambient temperature near the overloads and motor. Record these values. If ambient temperature at motor is lower than at overloads, especially where temperature at overloads is above +104°F (+40°C), ambient-compensated heaters should replace standard heaters.

XII. Maintenance

The cooling block must be serviced at least twice a year by a Chiller company. (e.g., KKT chillers or SBT)

XIII. Warranty

The unit is supplied finished, tested and ready to work. The unit warranty will be void if any modification to the unit is carried out without written agreement of KKT chillers.
For warranty purposes, the following conditions must be satisfied:

- The initial start of the unit must be carried out by trained personnel from an Authorized KKT chillers Service Partner.
- Maintenance must be carried out by properly trained personnel.
- Only genuine KKT chillers spare parts must be used.
- The manual (this document) must not remove from the chiller.
- All the scheduled maintenance operations detailed in this manual must be performed at the specified times. Please use a higher amount of services if the local conditions require it.

Failure to satisfy any of these conditions will automatically void the warranty.

XIV. Safety Warnings

-Cooling water circuit is pressurized.
Switch off the chiller and depressurize before servicing the cooling water circuit.
-Drain water from pipes and spare parts before shipment.
-Nominal static filling pressure when Chiller has been switched off: 1,5bar. The pressure of the expansion tank is without counter pressure from the "water / glycol – side" = 1,0 bar.
-Don`t handle valves while the Chiller is running

-Voltage continuous to be present at the terminals, even after the medical device has been switched off.
-Parts in the refrigerant circuit are hot, even the Chiller has been switched off.

Warranty void if manual removed from chiller.

OBSERVE THE SAFETY RULES

Before commencing work on the unit, switch the plant to voltage-free

IN CASES OF EMERGENCY TURN OFF THE AGGREGATE BY THE MASTER SWITCH !	
Caution!	Work on electric and refrigerant circuits should only be performed by qualified operatives Observe the safety rules!