Install Instructions

Models: ECO122L with IFP
ECO133L with IFP

0036

Customer
Siemens Helthcare
Allee am Röthelheimpark 2
91052 Erlangen

Manufacturer
ait-deutschland GmbH
Industriestraße 3
95359 Kasendorf
Germany
T +49 9228 9977 0
F +49 9228 9977 149
E info@kkt-chillers.com
W www.kkt-chillers.com

Service Center
KKT chillers, Inc. Servicehotline USA:
765 Dillon Drive
Wood Dale, IL 60191
TF +1 866 517 6867 24/7 Hotline
F +1 847 734 1601
E support@kkt-chillersusa.com

Safety first:
The owner of this unit is responsible that everyone who is working on the unit observ the safety rules and read the whole Manual/Install instructions and understand it.
A wrong or sloppy maintained unit could cause high body risk or even risk of death.

Contents

1 Technical Data

Model	Outdoor			
Dimensions	Depth	1100	mm	
	Width	2100	mm	
	Height	2050	mm	
Weight		see page 13		
Quantity of air	max.	20000	m³/h	ECO122L
Quantity of air	max.	25000	m³/h	ECO133L
Refrigerant		R407C		
GWP		1774		
Required quantity of refrigerant		13kg		
CO_2 equivalent		23,1 t CO_2		
High-pressure switch		31	bar	
Water connection inlet	internal	2“ G" female thread		
Water connection outlet	internal	2“ G" female thread		
Cold water temperature outlet	Set /min/max	20 / 19 / 22 °C	±0.5 K	
Cold water temperature inlet	max.	30 °C		
Operating liquid (water circuit)	distilled water and 35-38% Ethylene Glycol			
Rated water capacity	min.	7.8	m³/h	
Rated water pressure at IFP	max.	6.0	bar	
Safety valve water circuit/Chiller	3.0	bar		
Ambient temperature		min.-20	°C	
		max.+48	°C	
Cooling capacity		45.0	kW	ECO122L
Cooling capacity		60.0	kW	ECO133L
Rated cold water outlet temperature	20	°C		
Temperature of surroundings		48	°C	
Main supply ROW		380-480V / 3Ph / 50-60Hz		
Main supply USA		460V/3Ph/60Hz		
Control voltage		24	VDc	
Fluctuations in main voltage	max.	-14/+10	%	
Fluctuations in frequency	max.	±1	Hz	
Power input	max.	21	kW	ECO122L
Power input	max.	28,5	kW	ECO133L
Noise level at 5 m at max cooling capacity and max. ambient temperature	max.	61	db(A)	

2 Basics

Most important notice:
Attention: A too high static pressure at the IFP cause damage in the Siemens equippment!
KKT or Siemens will not pay the expenses of such operations!

LEAK-TEST
DO NOT PRESSURIZE THE IFP WITH MORE THAN 2,9BAR/42PSI
WHEN THE SIEMENS SYSTEM IS CONNECTED!

Scope of Chiller supply:

-ECO122L or ECO133L inclusive IFP
-Install Instruction on switch cabinet
-Manual inside switch cabinet (CD)
-Data transfer cable 50m (164feet) POF
-Spare parts in a box near the pump:

- 3 piece Fuse 10A
- 3 piece Fuse 50A
- Coil for Solenoid Valve
- Temperature Sensor PT1000
- Pressure Sensor 30bar
- Pressure Sensor 10bar
- filter pad large for fan switch cabinet
- filter pad small for air switch cabinet outlet
- water strainer inlet
- Brass fittings for the connection Chiller inlet/outlet and piping (on the pump)
- IFP
- Brass fittings for the connection piping and IFP inlet/outlet (on IFP)

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. The volume of the water circulation system of the cooling block is approx. 12 liters (~3.2 gal) Please consider this by filling the water system with clean water (distilled water quality) with Ethylene-glycol.

3. Always operate the water circulation system at a volume of 35-38% ethylene glycol.

   This is regardless of the ambient temperature.
   Non-compliance voids the warranty.

   Use of automobile anti-freeze and propylene glycol is prohibited.

   Fill with clean water (distilled water quality) with Ethylene-glycol at the rate of min. 35% to max. 38%.
   Use ethylene-glycol of only one manufacturer.
   (e.g.: DOWTHERM SR1-Dow Chemical, Safeflow EG - Clariant)
   Do not mix two ore more different manufacturer for one water-ethylene-glycol circuit.
   Open front panel and fill to a pressure of min.1,0 bar (14.5PSI) to 1,3bar (21.7PSI) via the feed cock when the pump is off.
   After filling, check all connections for leakage.

4. The static pressure at the IFP-pressure gauge (pump is OFF) shall have the following value:

Chiller same level or above the MRI	1.7 – 1.8bar
Chiller lower than the MRI	1.2 – 1.3bar

5. The cooling block operates dependently of the MR system via Heartbeat.

6. Voltage is still present in the control cabinet when the MR system is turned off. **Risk of death!**

7. 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.

3 Installation site

3.1 Ambient temperatures

The chiller is designed to operate at ambient temperatures between –20°C (-4°F) minimum and +48°C (+118.4°F) maximum.
Malfunctions can occur outside these specifications.
If the chiller is used at high ambient temperatures (higher than 40°C = 104°F) the chiller should be installed that the switch cabinet is not fully exposed to the sun radiation when the maximum ambient temperature is prevent. If this is not possible please install a sun protection!
Support from KKT chillers could be requested.

3.2 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.

3.3 Servicing and repair access

See Clearance

3.4 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.

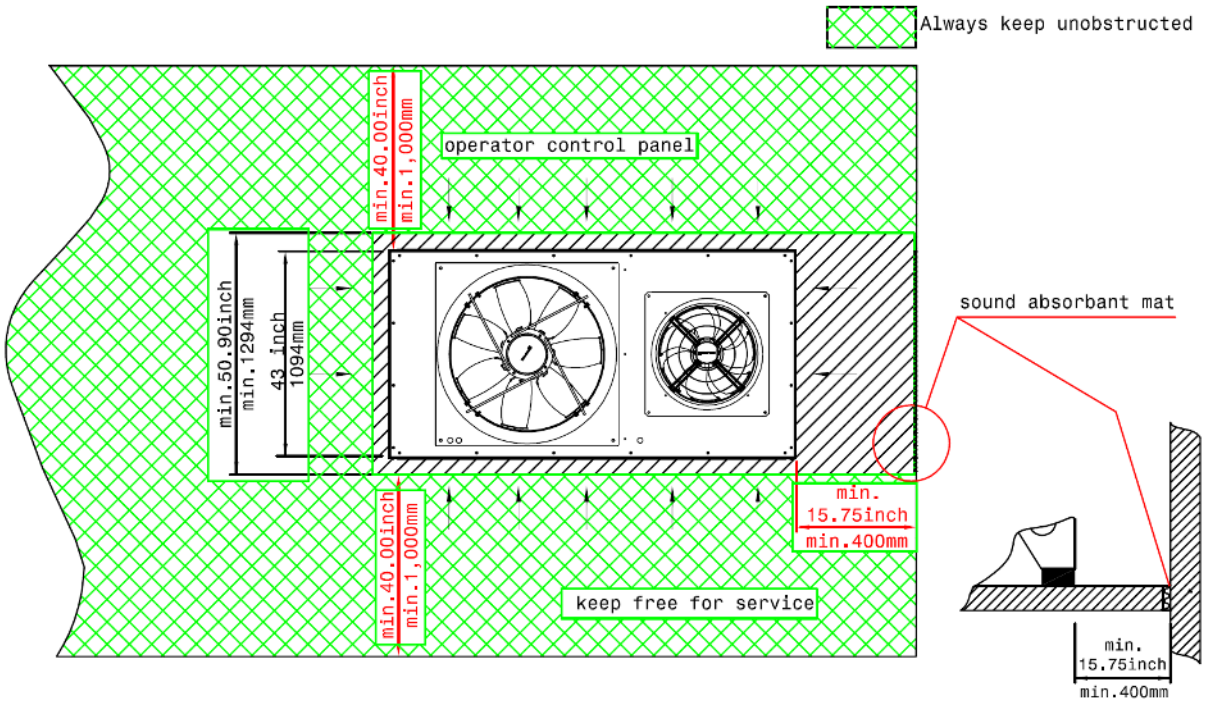
3.5 Load capacity of the base

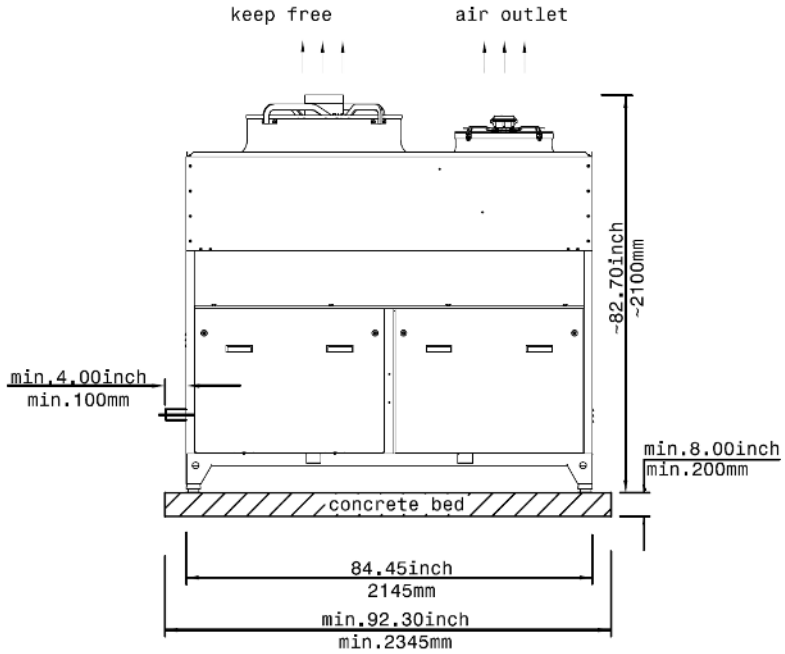
Verify that the installation surface has sufficient load capacity.
A concrete foundation or sectional steel construction is recommended.
A concrete foundation needs to be 200 mm (7.8 in.) wider and 200 mm (7.8 in.) longer than the cooling block. Final dimensions: approx. 2,300 mm (7.55 feet) long by 1,300 mm (4.26 ft) wide.

The operating weight of the ECO133L is approx. 780 kg (1,720 lbs.). **The operating weight of the ECO122L is approx. 727 kg (1,603 lbs.).**

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

waterchiller installation I

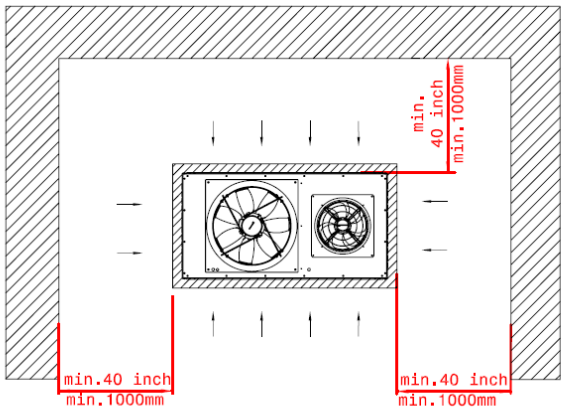




Dimensions for the concrete bed should be adjusted according to local circumstances.

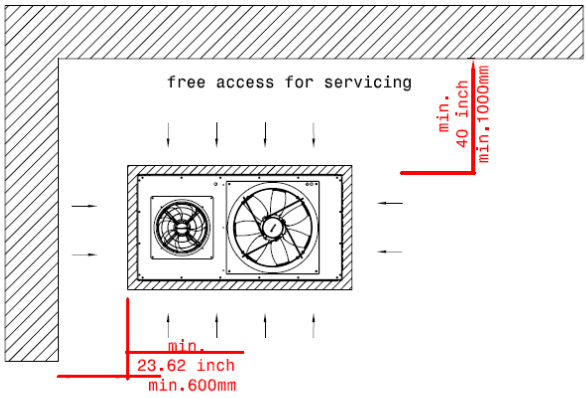
waterchiller installation II

installation example A

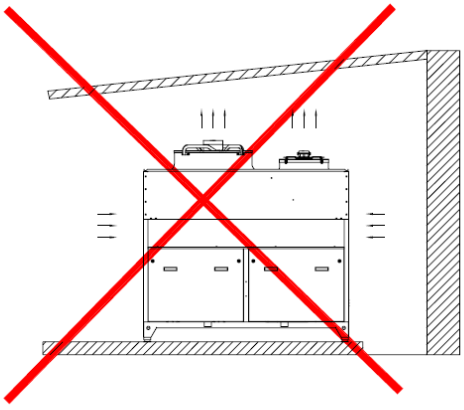


free access for servicing

installation example B



installation example C



Air outlet keep free!

4 Transport route/transport

4.1 Transport measurements

Length: approx. 2,100 mm (approx. 83 inches)
Width: approx. 1,100mm (approx. 43.3 inches)
Height: approx. 2,050mm (approx. 80.7 inches)

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

4.2 Transport weight

Weight: ECO133L approx. 1,230 kg (approx. 2,712 lbs.)
Weight: ECO122L approx. 1,177 kg (approx. 2,595 lbs.)

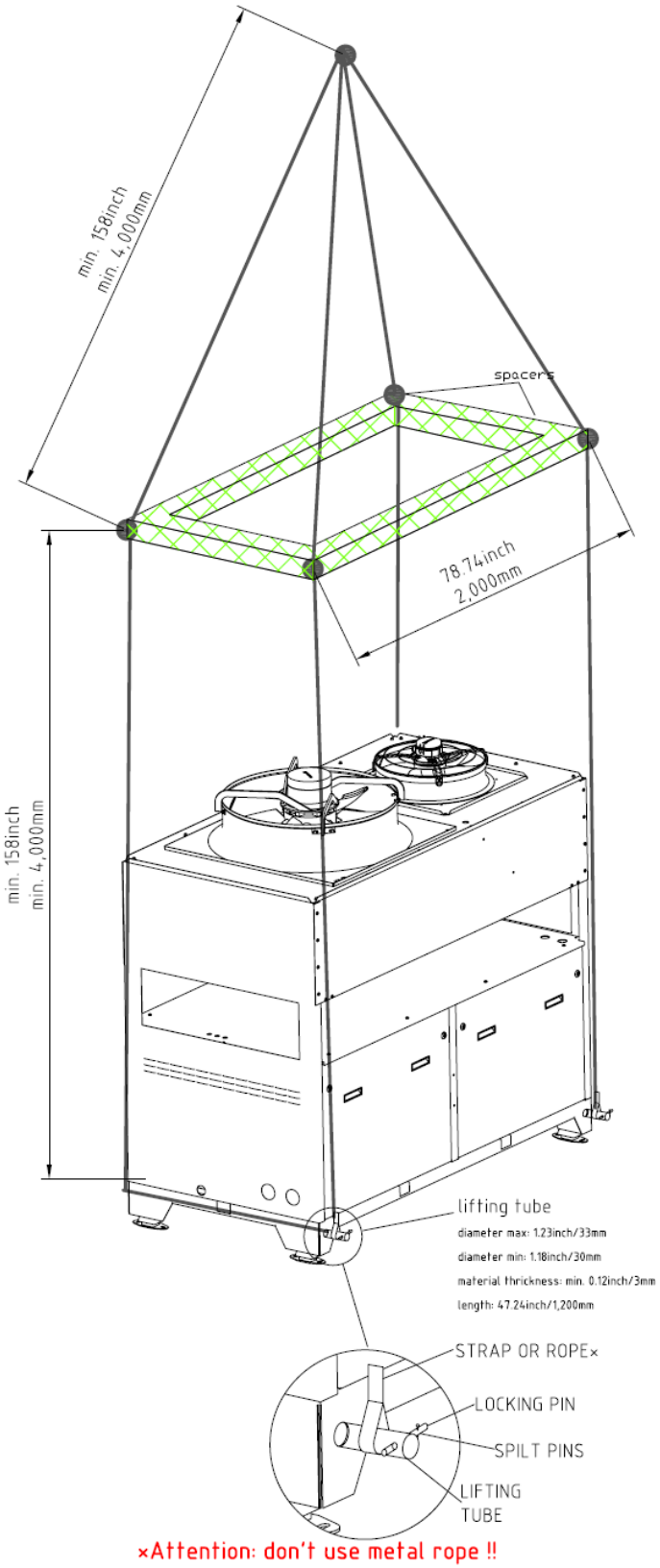
4.3 Transport safety locks

There are no transport safety locks to remove.

4.4 Crane transport

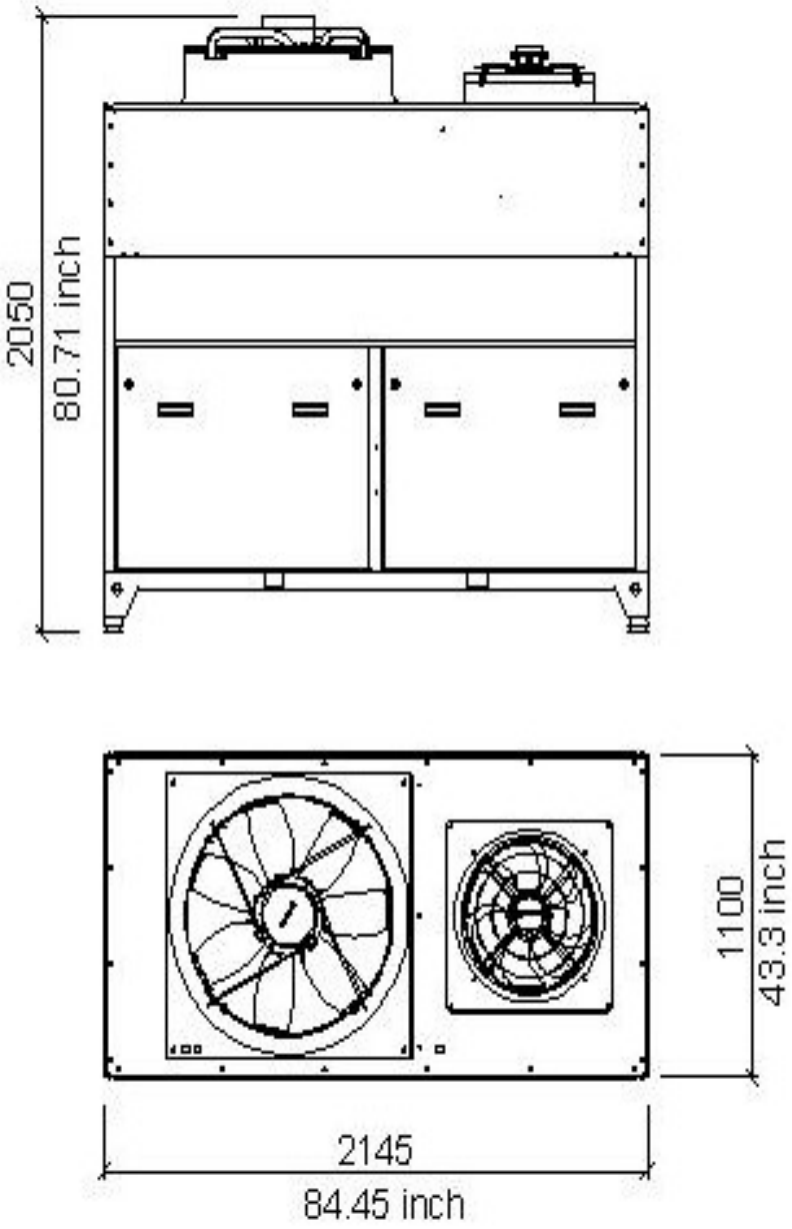
If a crane will be used to transport the chiller, note the following:

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 (800 kg./1,764 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 !!

4.5 Dimensions in mm/inch



4.6 Weights Chiller

	ECO122L	ECO133L
Net weight	707kg (1,559lbs)	760kg (1,675lbs)
Operating weigt	727kg (1603lbs)	780kg (1,720lbs)
Transport weight	1177kg (2,595lbs)	1230kg (2,712lbs)
Refrigerant	13kg (28.7lbs)	13kg (28.7lbs)

4.7 Weights IFP

Net weight: 67 kg. (147.7 lbs.)
Operating weight: approx. 72 kg. (158.7 lbs.)
Transport weight: is packed with the chiller

5 Power supply/electrical connection

5.1 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.

5.2 Voltage, frequency, tolerances

Voltage range: 380 - 480 Volt –14%+10%

Frequency range: 50 – 60Hz +/-1Hz

5.3 Type of cable

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

5.4 Length and cable width

A cable width of at least 16mm^2 per phase is required for cables up to 50 meters (164 ft.) in length.
Therefore, a 5 x 16mm^2 cable is required.

5.5 Strain relief

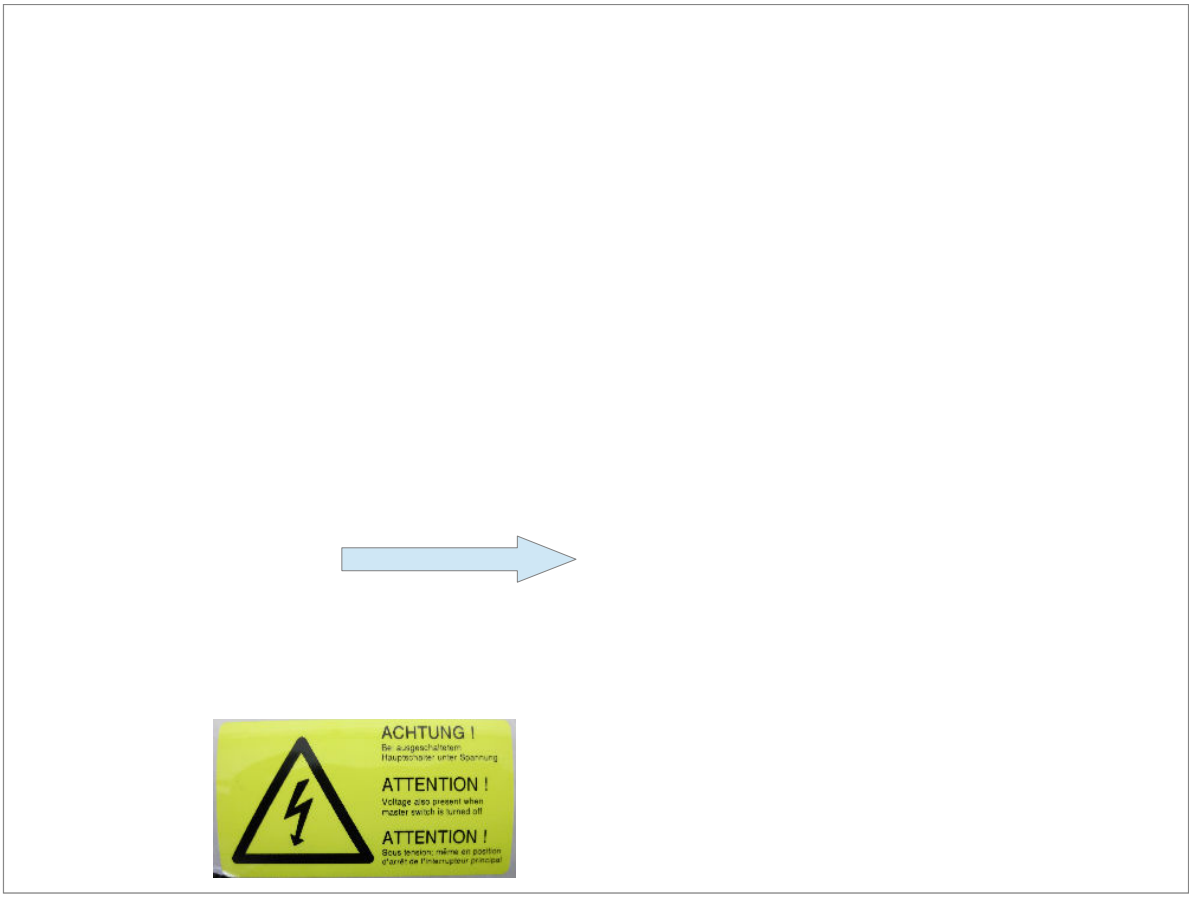
The input cable must be fitted on both sides with a strain relief.

5.6 Clamps

Insert the input cable through the cable feed-through (see photograph) next to the water connections.

Do not drill any hole into the unit!

Use the clamps on the main switch(see photograph).



Attention!!

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

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

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

5.7 Fuse

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

5.8 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.

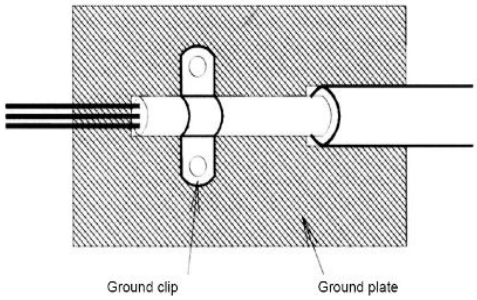
The monitoring relay has ist own power supply, measured voltage = supply voltage.
The relay monitors the phase sequence an the phase failure of one of the three phases in a 3-phase network. No settings are necessary.
When the line voltage is switched on, the green LED lights up. IF the correct phase sequence is applied to the terminals L1-L2-L3, the output relay picks up.
If the wrong phase sequence is applied, the red LED blinks an the output relay does not pick up. If a phase failure occurs, the red LED lights up an the output relay drops out.

Attention: The red LED is an error diagnosis indicator an does not show the current state of the relay.

5.9 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.

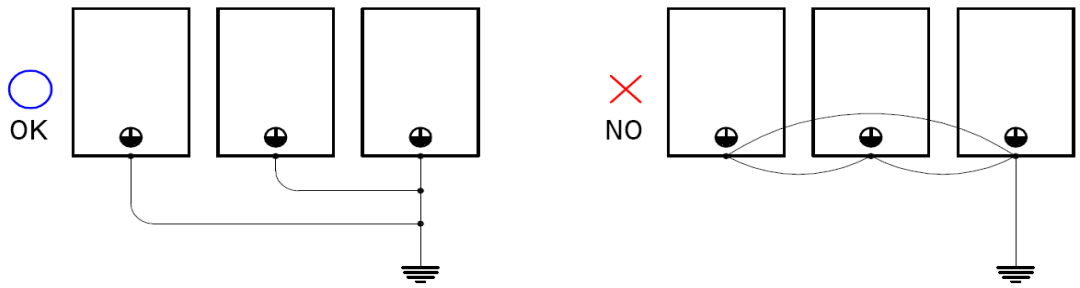
The width of the grounding wire must be min. 16mm² (AWG 6) or of the same width of the power supply.
The grounding must be an isolated ground and must connected on the ground terminal (X1) in the switch cabinet. The ground resistance must be less than 5 Ohm.

Metal cable conduits are not allowed for grounding.

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

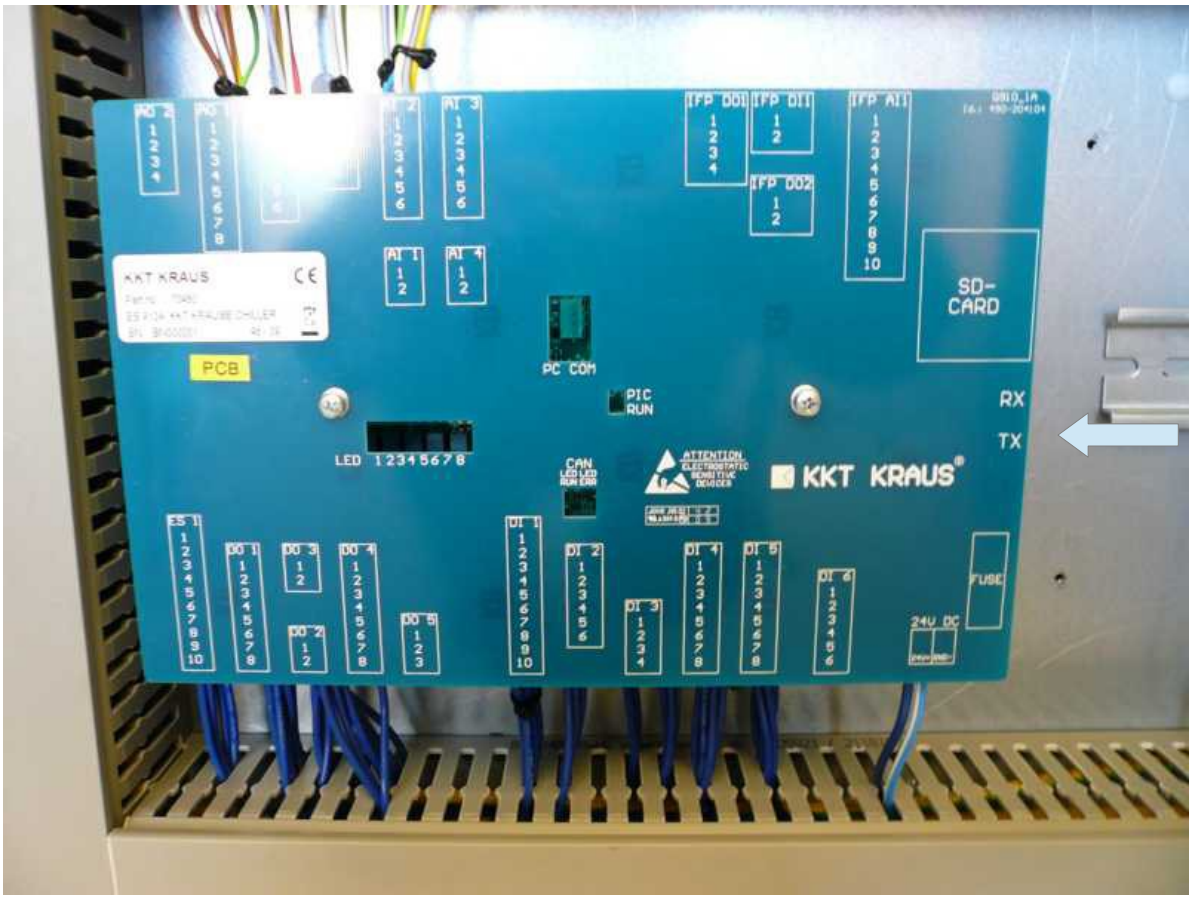
Do not share the ground wire with other devices.
Always use a ground wire that complies with technical standards on electrical equipment and minimize the length of the ground wire.

When using more than one Inverter, be careful not to loop the ground wire.



5.10 Data cable

Attach the POF-cable end to the RX an TX connector (see photograph) at the PCB in the control cabinet of the chiller and at the PCB in the control cabinet of the IFP.
Also use the RX TX connector on the IFP PCB.



Feed-through

- Run the POF cable from the chiller to the IFP panel.

Plastic optical fiber (POF) (or Polymer optical fibre)

Following Pictures are for example and not part of delivery from your ECO-System.

1. Step

The connectors are usually protected with a rubber end cap and shall not be removed during installation.

2. Step

Unroll the cable before installation.

3. Step

The tensile strength of the CABLE is max. 100N

The tensile strength of the WIRE is max. 5N

4. Step

Never slide/draggle the cable on the ground or around edges.

5. Step

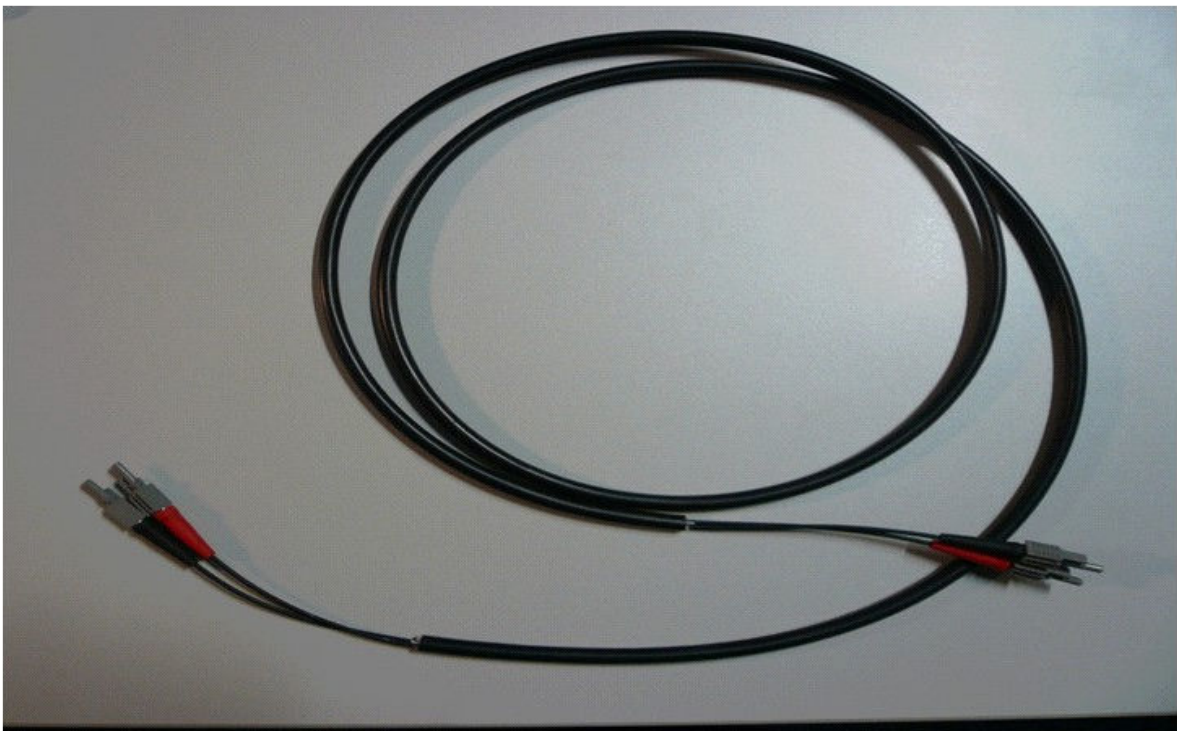
The bend radius is minimum 12 X outer diameter.

Outer diameter of the cable is 8mm

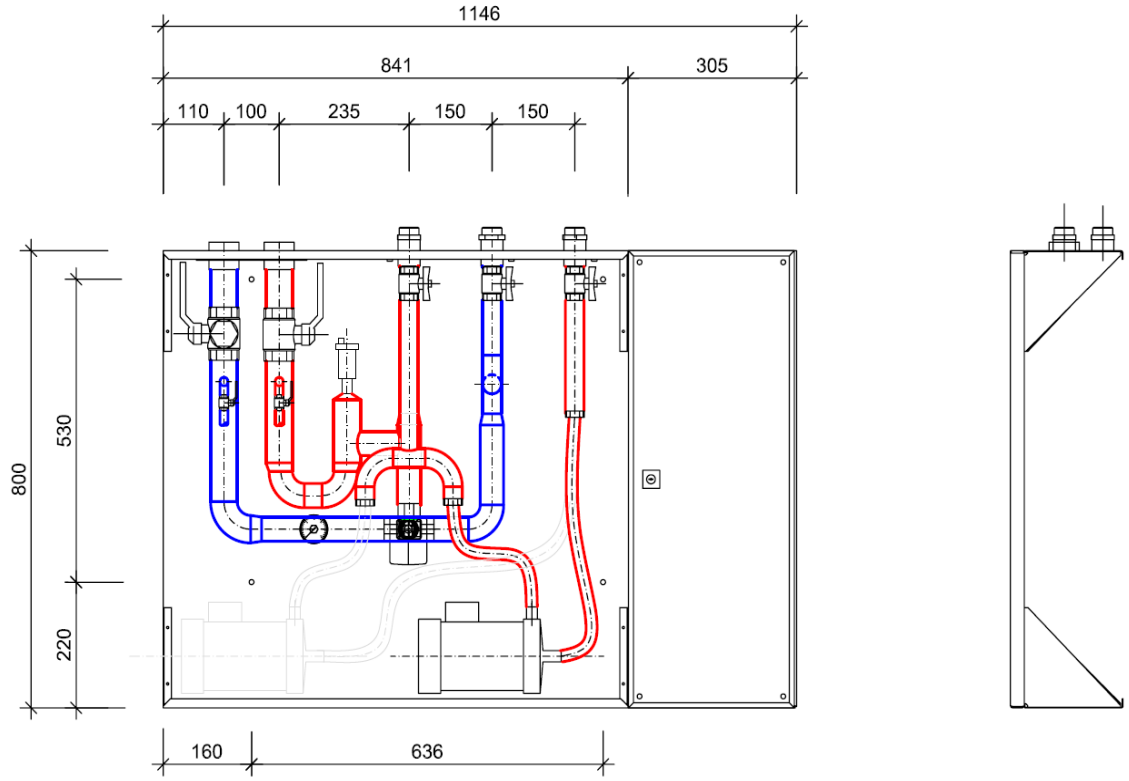
Bend radius = 8mm x 12

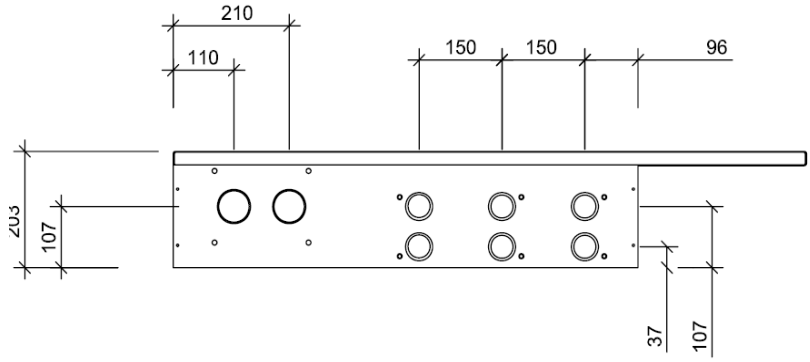
Bend radius = 96mm à compared to 3.77“

6 Interface filter panel (IFP)



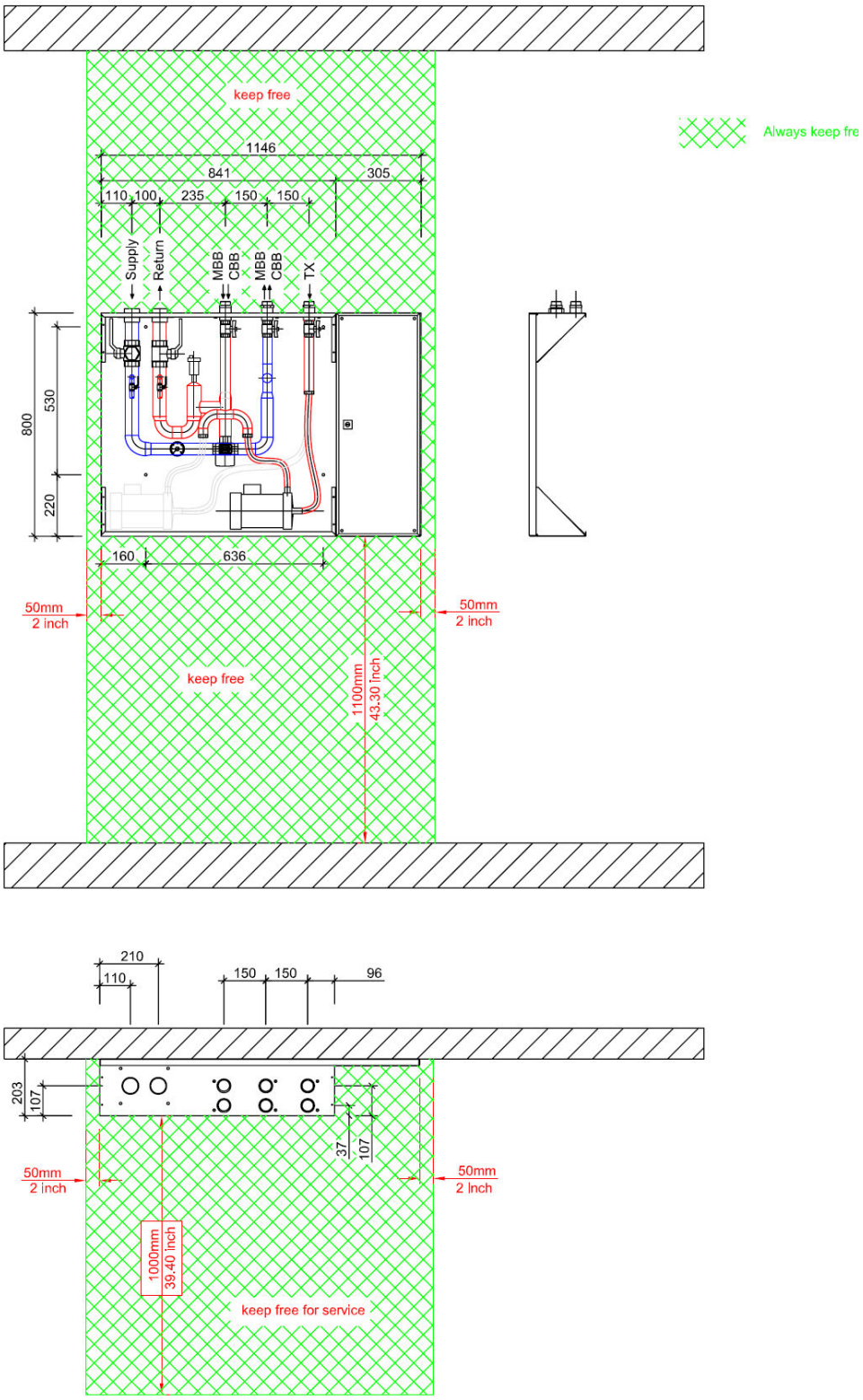
Drawing and foot print


1146
841
305
110
100
235
150
150
800
530
220
160
636


210
110
150
150
96
203
107
37
107

6.1 Installation of IFP 098 (sample)

IPF 090 should be installed simmilarly reguarding free spaces arround the IFP Outer demensions of IFP 098 and IFP090 are the same.



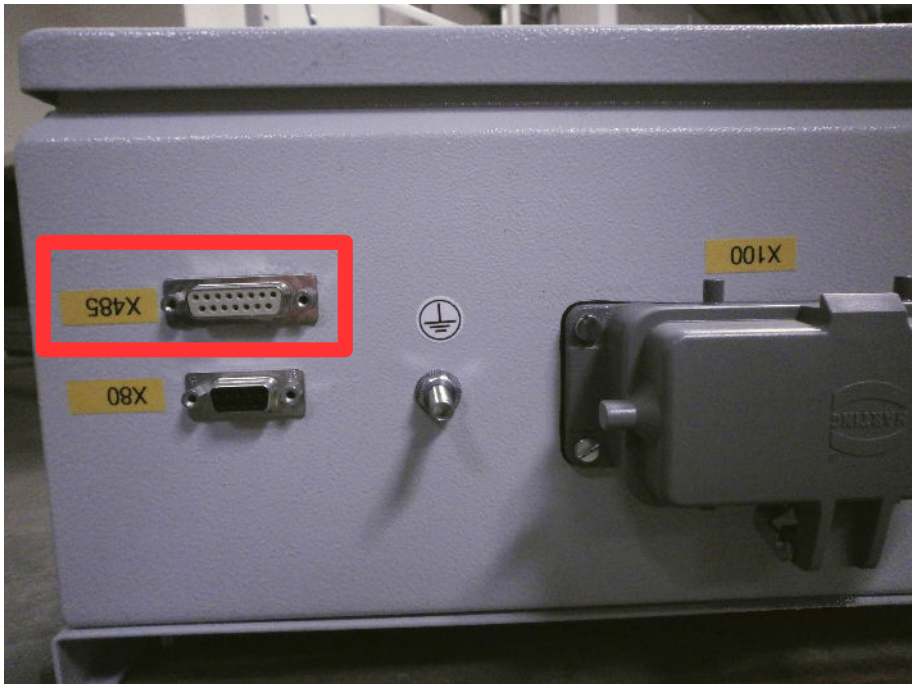
Attach the IFP to the wall. Contact the project manager for the correct location.

The outflow port of IFP to the MR electronic cabinet and the inflow port from the MR electronic cabinet can be closed by handling the ball valves.
The valves allows filling the chiller and the IFP with water/ethylene glycol mixture without MR electronic cabinets connected to IFP.
Water hoses from IFP to the MR electronic cabinets are delivered with the MR-System and will installed by Siemens.

The power supply from the MRI have to be connected to X100 on top of the switch cabinet (Harting Connector).

The CAN-Cable from the MRI have to be connected to SUB D 9pole Connector.

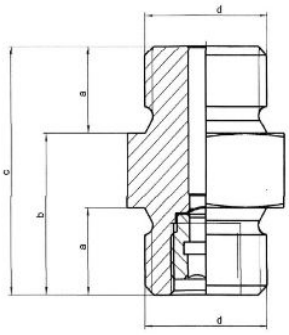
The RS485-Bus has to be connected at X485 (only existent at IFP 090)



A removed or non working RS485-Bus will result in a communication error at IFP. If communication is lost for over 10 minutes the chiller will proceed with daymode.

The Data cable (POF cable) from the Chiller have to be connected to the RX an TX connector (see photograph) at the PCB in the switch cabinet of the IFP.

rupture disc (IFP)



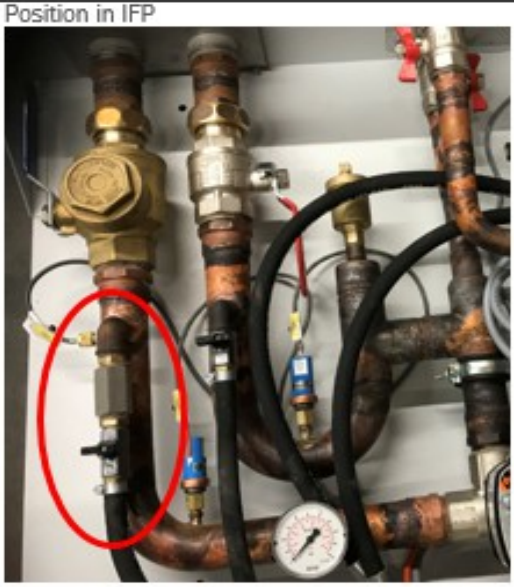
d	a	b	c	SW	DN	burst pressure
1/2"	14mm	26 mm	40 mm	27	5,5 mm	8 - 10 bar

If the rupture disc is bursting and you have to take care for adequate draining of the water / glycol mixture please follow the national regulations, laws and standards accordingly

For the case that the water/glycol mixture definitely can NOT be treated as waste water we recommend to provide at site a pail for collecting approx. 90 liters (approx. 25 gallons)

Disassembly of the flow limiter

ATTENTION: The flow limiter in the IFP must be removed when using a **Helium Compressor ST-7H.**
This compressor is used on **Magnetom Vida and Magnetom Sola**
Please proceed according to the following steps.

1	Position in IFP 	2	Pull the hose from the hose nozzle  
3	Open fitting on the pipe bend ATTENTION: hold against the pipe bend  	4	Unscrew flow restrictor ATTENTION: hold against screw connection 
5	Seal the nipple and screw it back into the pipe bend ATTENTION: hold against the pipe bend  	6	Pull the hose back onto the hose nozzle and fasten 

6.2 High differences – Fill pressure

This drawing is only a sketch and is not a exact model down to the last detail!

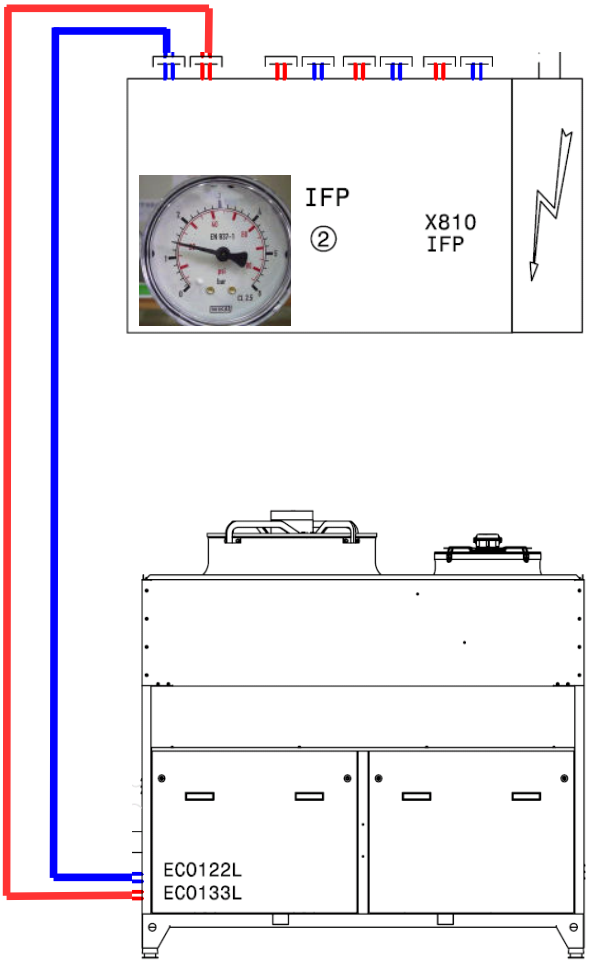
Chiller is installed below the IFP panel!

Before filling the system:

- Whole system is installed with all options
- All valves are in open position
- System is OFF

Read the static pressure of your system
at the pressure gauge on the IFP panel.

Chiller lower than the IFP panel → 1,2 – 1,3 bar
Limitation: 17m below IFP



The maximum permitted length of the piping between ECO Chiller and IFP is 45m one way.

A installed and working automatic Airvent in supply & return piping with a correct static pressure will determin most of the failures and is recommended for this system.

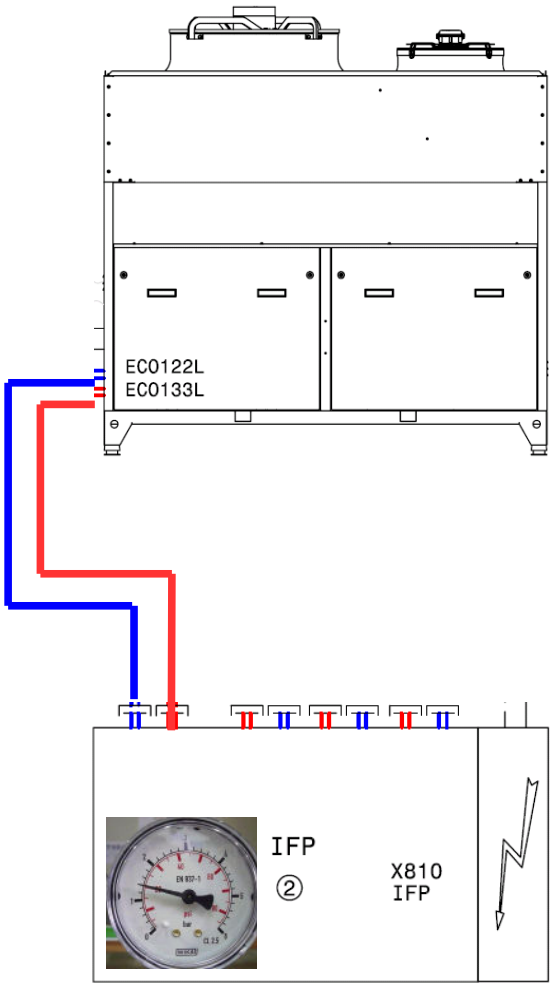
chiller location	adjusted value at expansion vessel 40 l	filling pressure at chiller gauge
	[bar]	[bar]
2,5 m below IFP	0,9	1,5
5 m below IFP	1,1	1,7
7,5 m below IFP	1,4	2
10 m below IFP	1,6	2,2
12,5 m below IFP	1,8	2,4
15 m below IFP	2	2,6
17 m below IFP	2,2	2,8

The heights refer to the base plate of the chiller and the upper edge of the IFP !

Chiller is installed above the IFP panel!
This drawing is only a sketch and is not a exact model down to the last detail!

Before filling the system:

- Whole system is installed with all options
- All valves are in open position
- System is OFF



Read the static pressure of your system
at the pressure gauge on the IFP panel.

Chiller higher than the IFP panel → 1.7–1.8bar
Limitation: 8m above IFP

Chiller on the same level panel → 1.7–1.8bar

The maximum permitted length of the piping between ECO Chiller and IFP is 45m one way.

A installed and working automatic Airvent in supply&return piping with a correct static pressure will determin most of the failures and is recommended for this system.

chiller location	adjusted value at expansion vessel 40 l	filling pressure at chiller gauge
	[bar]	[bar]
same level as IFP	1	1,6
8 m above IFP	0,4	1
6 m above IFP	0,4	1
4 m above IFP	0,6	1,2
2 m above IFP	0,9	1,5

The heights refer to the base plate of the chiller and the upper edge of the IFP !

7 Water connection

7.1 Pipe material

Use only the following materials for the pipes:

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

The proper way to seal the European fittings can be done with any of following steps.

1. Pipe sealing cord. There are a number of brands available, however we use Loctite 55
2. Teflon Tape and a Anaerobic sealant.
3. Teflon Tape an Nylog sealant.

As with any sealant, the application instruction must be followed for proper use.

7.2 Relation of pipe diameter to distance between chiller and IFP

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.

Distances exceeding 45 meters (147.6 ft.) are not permitted at using ECO and IFP.

7.3 Dimensions of the connections

Both the coolant return (water/ethylene glycol mix) from the IFP and the coolant supply (water/ethylene glycol) to the IFP 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/chiller and two at the IFP panel).

7.4 Inflow and outflow

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

On the IFP use also the attached brass-fittings.

7.5 Water quality

Fill with clean water (distilled water quality)

7.6 Glycol

For transport the chiller is empty. The volume which is to consider for the water ethylene glycol mixture is approx. 12 liters (~3.2 gal.).
35-38% of the whole volume of water circuit must be filled with ethylene glycol..
Never use automobile anti-freeze or propylene glycol.

The contractor who fills the water circuit has to supply minimum 30 liters (7.9 gal.) of distilled water-ethylene glycol mixture (35-38% ethylene glycol) for service.

Fill with clean water (distilled water quality) with Ethylene-glycol at the rate of min. 35% to max. 38%
Use ethylene-glycol of only one manufacturer.
(e.g.: DOWTHERM SR1-Dow Chemical, Safeflow EG-Clariant)
Do not mix two ore more different manufacturer for one water-ethylene-glycol circuit.
Open front panel and fill to a pressure of min.1,5 bar via the feed cock when the pump is off.
After filling, check all connections for leakage.

7.7 Filling

7.7.1 Filling of coolant loop

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 IFP

7.7.2 Fill the expansion vessel (40 L)

To maintain a constant pressure in the water circuit.
SERIAL: (January 2020)
EC0133 → 2372

The system can be filled as described.
Remark: The expansion vessel is pre ressurized with 0.6bar nitrogen.
Be aware to check any replacement part by yourself.

Overall Picture:
expansion vessel 40l

7.8 Fans and air chambers

Be sure to avoid air pockets when routing the pipes.
Automatic fans must be attached at the highest point in both pipes to ensure the most simple and reliable venting procedure.
Perform and repeat the following steps until all the air has been bleed 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.

The following procedure should be followed to properly air vent a Chiller and Piping before start-up or after any major hydraulics repair.

1. Open all individual (not the fill or drain valves) unit valves to assure circulation.
   Also open all valves on the IFP Panel.

2. Fill system with premixed water/ethylene glycol (35-38%glycol), from the lowest point. In case of repair on the water circuit (also change of water cooled component in the electronic cabinets of Siemens) refill system with premixed water/ethylene glycol (35-38%glycol) from the lowest point.

3. The static pressure at the IFP-pressure gauge (pump is OFF) shall have the following value:
   Chiller same level oder above the IFP panel 1,7 – 1,8bar
   Chiller lower than the IFP panel 1,2– 1,3bar

4. Vent all air by the automatic air vent (black or brass coloured small tank on the top of the suction side of pump, at the IFP panel and in the piping)

5. If static pressure decreases during air vent the water circuit must be refilled with premixed water/ethylene glycol (35-38%glycol) up to: see point 3

6. Now bleed all air out of the system and chiller again (expansion vessel, pump, automatic and manual air bleeder). If the static pressure decreases again → refill according to point 3

7. If all air is bled out of the system start pump for a few minutes. Then switch off the pump and vent air again. If the static pressure decreases again → refill according to point 3

8. Now start pump again. Monitor pump and bleed points to insure all trapped air is removed.

9. Check pressure on suction side of the pump after a few minutes and again after a few hours and refill the system if necessary up to: → refill according to point 3

10. For a proper adjustment of the suction pressure it is necessary to have the right pressure of nitrogen filling in the expansion vessel. The correct pressure of the nitrogen filling is 0,6-0,8bar

11. The suction pressure should be re-checked within 24hours by someone on-site who can advise of any changes.

12. Generally is it necessary to check the suction pressure four times a year even if nothing is changed.

8 Initial start-up

1. Turn on main switch 4Q1.

2. After a few seconds the pump starts. IF not:

Press reset, if necessary. **(Black button on the control cabinet door)**

All automatic fuses and Motor protection relay are off when the unit is shipped.

3. The compressor begins running when the water temperature reaches 22°C. If the Chiller is in Daymode. Otherwise it will turn on at 26°C.

4. When the compressor is running the condenser fans are released. They are reactivated once the pressure in the condenser reaches approx. 20bars.

5. Fans regulate themselves in accordance with the set condenser pressure.

6. There won´t be any flow if the MR is not installed and the chiller will switch off!

9 Settings

There are no further settings necessary.

10 Control

10.1 Pump

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

10.2 Water pressures

Suction pressure must be between 1.0 bar (14.5 PSI) and 1.5 bar (21.75 PSI).
High pressure on the IFP shall be between 4.0 bar (58 PSI) and 6.0 bar (87 PSI) in Day Mode.
High pressure on the IFP shall be between 2.0 bar (29 PSI) and 4.0 bar (58 PSI) in Night Mode.

10.3 Compressor

Check the power consumption.

10.4 Fans

Check the power consumption.

10.5 Refrigerant pressures

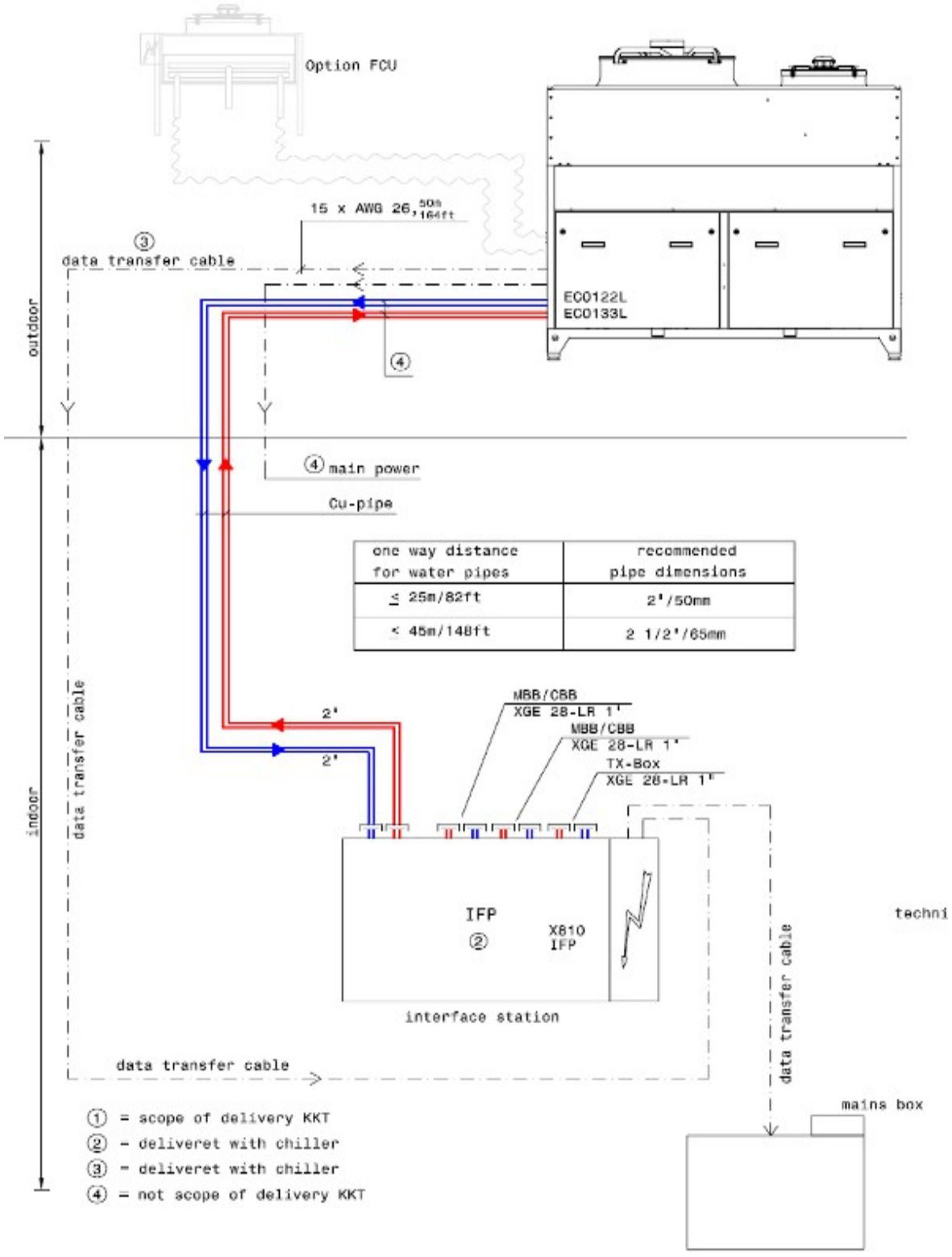
The low-pressure side should be between 6.0 bar (87 PSI) and 8.0 bar (116 PSI).
The high-pressure side should be between 18 bar (261 PSI) and 26 bar (377 PSI).

10.6 Temperatures

Outflow water temperatures should be between 19°C (66.2°F) and 22°C (71.6°F).
Inflow water temperatures should be between ~21°C (69.8°F) and ~27.7°C (81.9°F) for the EC0133L and 21°C (69.8°F) and 25,5°C (77.9°F) for the EC0122L, depending on the operating state of the MR system.

Be aware that the outlet watertemp. during Nightmode reach 26°C

11 Overview water chiller and IFP



12 Maintenance

The Chiller/IFP/FreeCooler have to be serviced at least twice a year by a Chiller company. (e.g., KKT chillers or authorized service partner)

13 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.
- For ECO122L and ECO133L: Ethylene glycol must be added to the rate of 35-38Vol%.
- Do not remove the Manual or any other Document 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.
- The warranty registration have to be filled out and send back within 30days after startup!

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

14 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 is about: 1-2 bar (14.5-29PSI)
- The pressure of the expansion vessel is without counter pressure from the “water /glycol – side” = 0,6-0,8bar.
- Don`t handle valves while the Chiller is running
- **Ethylene glycol must** be added at the rate of 35-38% of the volume of water anytime otherwise warranty void.
- The rate depends not on the local ambient temperature.
- Don’t use automotive antifreeze.
- Voltage is continuous 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 MAIN SWITCH !

Caution!	Work on electric and refrigerant circuits should only be performed by qualified operatives Observe the safety rules!