Installation and maintenance manual

SYSAQUA

140 / 150 / 170 / 190 / 210

Air Cooled Water Chillers and Heat Pumps

R410A

143.7 ➔ 217.6kW

125.4 ➔ 208.8kW

CE

INSTALLATION INSTRUCTION

NOTICE D'INSTALLATION

INSTALLATIONSHANDBUCH

ISTRUZIONI INSTALLAZIONE

INSTRUCCIONES DE INSTALACIÓN

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POWER SUPPLY MUST BE SWITCHED OFF BEFORE STARTING WORK IN THE ELECTRIC CONTROL BOX

1. GENERAL RECOMMENDATIONS

The purpose of this Manual is to provide users with instructions for installing, commissioning, using and maintaining the units. It also contains instructions on starting up the machine as well as recommendations to avoid bodily injury and risks of damage to the device during its operation.

It does not contain the complete description of all the maintenance operations guaranteeing the unit's long life and reliability. Only the services of a qualified technician can guarantee the unit's safe operation over a long service life.

Please read the following safety precautions very carefully before installing the unit.

1.1. SAFETY DIRECTIONS

Follow the safety rules in forces when you are working on your appliance.

The installation, commissioning, use and maintenance of these units should be performed by qualified personnel having a good knowledge of standards and local regulations, as well as experience of this type of equipment.

This appliance has not been designed for use by persons (including children) with reduced physical, sensorial or mental faculties or by persons without any experience or knowledge of heating systems, unless they act under the safety and supervision of a responsible person or have received prior training concerning the use of the appliance.

The unit should be handled using lifting and handling equipment appropriate to the unit's size and weight.

Any wiring produced on site must comply with the corresponding national electrical regulations.

Make sure that the power supply and its frequency are adapted to the required electric current of operation, taking into account specific conditions of the location and the current required for any other appliance connected to the same circuit.

The unit must be EARTHED to avoid any risks caused by insulation defects.

It is forbidden to start any work on the electrical components if water or high humidity is present on the installation site.

1.2. WARNING

Cutoff power supply before starting to work on the appliance.

When making the hydraulic connections, ensure that no impurities are introduced into the pipe work.

The manufacturer declines any responsibility and the warranty becomes void if these instructions are not respected.

If you meet a problem, please call the Technical Department of your area.

If possible, assemble the compulsory or optional accessories before placing the appliance on its final location (see instructions provided with each accessory).

In order to become fully familiar with the appliance, we suggest to read also our Technical Instructions.

The information contained in these Instructions are subject to modification without advance notice.

1.3. EQUIPMENT SAFETY DATA

Safety Data	R410A
Toxicity	Low
In contact with skin	Skin contact with the rapidly evaporating liquid may cause tissue chilblains. In case of skin contact with the liquid, warm the frozen tissue with water and call a doctor. Remove contaminated clothing and footwear. Wash the clothing prior to re-use.
In contact with eyes	Vapours have no effect. Liquid splashes or sprays may cause freeze burns. In these cases rinse your eyes with running water or with a solution for eye lavages for at least 10 minutes. Immediately contact a doctor.
Ingestion	In this case, burns may result. Do not attempt to make the patient vomit. If the patient is conscious, rinse the mouth with water. Call a doctor immediately.
Inhalation	In case of inhalation, move the patient to an area with fresh air and provide oxygen if necessary. Perform artificial respiration if the patient has stopped breathing or lacks air. In case of cardiac arrest, perform external cardiac massage. Call a doctor immediately.
Further Medical Advice	Exposure to high concentrations can be dangerous for individuals with cardiac problems, as the presence of catecholamines such as adrenalin in the bloodstream may lead to increased arrhythmia and possible cardiac arrest.
Occupational exposure limits	R410A: Recommended limits: 1,000 ppm v/v 8 hours TWA.
Stability	Stable product
Conditions to avoid	Increased pressure due to high temperatures may cause the container to explode. Keep out of the sun and do not expose to a temperature >50°C.
Hazardous reactions	Possibility of dangerous reactions in case of fire due to the presence of F and/or CI radicals
General precautions	Avoid the inhalation of high concentrations of vapours. The concentration in the atmosphere shall be kept at the minimum value and anyway below the occupational limits. Since vapours are heavier than air and they tend to stagnate and to build up in closed areas, any opening for ventilation shall be made at the lowest level.
Breathing protection	In case of doubt about the actual concentration, wear breathing apparatus. It should be self-contained and approved by the bodies for safety protection.
Storage Preservation	Refrigerant containers shall be stored in a cool place, away from fire risk, direct sunlight and all heat sources, such as radiators. The maximum temperature shall never exceed 50°C in the storage place.
Protection clothes	Wear boots, safety gloves and glasses or masks for facial protection.
Behaviour in case of leaks or escapes	Never forget to wear protection clothes and brething apparatus. Isolate the source of the leakage, provided that this operation may be performed in safety conditions. Any small quantity of refrigerant which may have escaped in its liquid state may evaporate provided that the room is well ventilated.In case of a large leakage, ventilate the room immediately. Stop the leakage with sand, earth or any suitable absorbing material. Prevent the liquid refrigerant from flowing into drains, sewers, foundations or absorbing wells since its vapours may create an asphyxiating atmosphere.
Disposal	The best procedure involves recovery and recycle. If this is not possible, the refrigerant shall be given to a plant which is well equipped to destroy and neutralise any acid and toxic by-product which may derive from its disposal.
Combustibility features	R410A: Non-inflammable at ambient temperatures and atmospheric pressures.
Containers	If they are exposed to the fire, they shall be constantly cooled down by water sprays. Containers may explode if they are overheated.
Behaviour in case of fire	In case of fire wear protection clothes and self-contained breathing apparatus.

2. INSPECTION AND STORAGE

At the time of receiving the equipment carefully cross check all the elements against the shipping documents in order to ensure that all the crates and boxes have been received. Inspect all the units for any visible or hidden damage.

In the event of shipping damage, write precise details of the damage on the shipper's delivery note and send immediately a registered letter to the shipper within 48 hours, clearly stating the damage caused. Forward a copy of this letter to the manufacturer or his representative.

Never store or transport the unit upside down. It must be stored indoors, completely protected from rain, snow etc. The unit must not be damaged by changes in the weather (high and low temperatures). Excessively high temperatures (above 60 °C) can harm certain plastic materials and cause permanent damage. Moreover, the performance of certain electrical or electronic components can be impaired.

3. WARRANTY

The appliances are delivered fully assembled, factory tested and ready to operate.

Any modification to the units without the manufacturer's prior approval, shall automatically render the warranty null and void.

The following conditions must be respected in order to maintain the validity of the warranty:

- Commissioning shall be performed by specialised technicians from technical services approved by the manufacturer.
- Maintenance shall be performed by technicians trained for this purpose.
- Only Original Equipment spare parts shall be used.
- All the operations listed in the present manual shall be performed within the required time limits.

THE WARRANTY SHALL BE NULL AND VOID IN THE EVENT OF NON-COMPLIANCE WITH ANY OF THE ABOVE CONDITIONS.

4. PRESENTATION

All the models in the **SYSAQUA** liquid coolers range are produced to state-of-the-art design and manufacturing standards. In this way, they offer guarantees of high performance and reliability as well as the capability of adapting to all types of air conditioning installations operating with both chilled water and glycol solutions (and with hot water for the Heat pump units). The unit, designed for an outdoor mounted application, is not suitable for any use other than those specified in the present manual.

Improper usage of the unit or a use for purposes other than those originally intended, without the prior approval by the manufacturer or its agents, could result in the unit functioning outside its safe operating limits and could present risks to both personnel and property.

SYSAQUA are packaged units, optimized for air conditioning applications.

After the units are assembled, the refrigerating and electrical circuits are tested at the factory in order to guarantee correct operation.

The are filled with an operational refrigerant fluid charge and are subjected to pressure tightness tests.

The Cooling only models can produce chilled water at temperatures varying between +18°C to +5°C or chilled water/glycol solution at temperatures varying between +5°C to -10°C.

The Heat pump models can produce hot water at temperatures varying between +20°C and +50°C.

5. CONTENTS OF PACKAGE

1 **SYSAQUA**

1 Water filter

1 Bag with the documentation

5.1. OPTIONALS ACCESSORIES

Anti-vibration rubber pads

Spring pads

Isolating valve

On opening the carton, check that all the accessories required for installation are present.

6. DIMENSIONS

SEE APPENDIX

7. HANDLING

7.1. NET WEIGHT

			SYSAQUA140	SYSAQUA150	SYSAQUA170	SYSAQUA190	SYSAQUA210
Cooling only - Without pump		kg	1 422	1 425	1 515	1 584	1 847
Heat pump - Without pump		kg	1 577	1 597	1 687	1 777	2 087
Standard pump	1 pump	kg	90	90	90	93	93
	2 pumpS	kg	122	122	122	131	131
High pressure pump	1 pump	kg	106	106	106	106	106
	2 pumpS	kg	150	150	150	150	150
Buffer tank		Kg	132	132	132	132	132

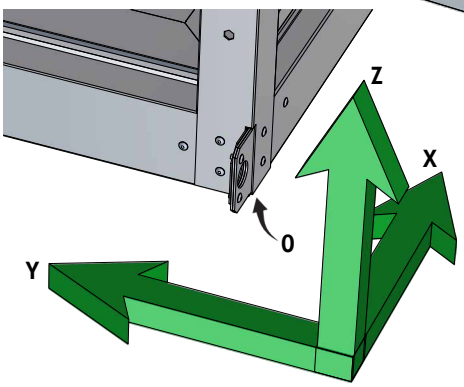
7.2. GRAVITY CENTER POSITION

7.2.1. SYSAQUA.L WITHOUT PUMP AND WITHOUT BUFFER TANK

	X_G	Y_G	Z_G
	mm	mm	mm
SYSAQUA140	1 241	1 063	784
SYSAQUA150	1 241	1 063	759
SYSAQUA170	1 255	1 021	758
SYSAQUA190	1 253	1 067	760
SYSAQUA210	1 265	1 071	800

7.2.2. SYSAQUA.H WITH DUAL HIGH PRESSURE PUMP AND BUFFER TANK

	X_G	Y_G	Z_G
	mm	mm	mm
SYSAQUA140	1 465	1 083	745
SYSAQUA150	1 463	1 082	721
SYSAQUA170	1 463	1 050	728
SYSAQUA190	1 455	1 084	734
SYSAQUA210	1 440	1 086	696



7.3. MANUTENTION GENERALITES

The method of handling depends on the model of **SYSAQUA** and its final destination.

- Take care to avoid any rough handling or impacts when unloading and moving the appliance.
- Before hoisting into position, test lift to insure stability and balance. Avoid twisting or uneven lifting of the units.
- The units shall be carefully inspected before unit installation to make sure this has not happened.
- ll these sections have been inspected before leaving the factory. It is therefore important to insure that no bolts, screws or other fixing system are loosened or missing before the commissioning.

Caution

Never submit the metal work (panels, posts) of the **SYSAQUA** to handling constraints, as only its base is designed for that purpose.

Caution

Do not tilt the **SYSAQUA** during handling, as it would be damaged irreversibly.

Caution

Never move the **SYSAQUA** on rollers.

Caution

When handling the **SYSAQUA**, beware not to damage the finned coil block. Protect it with cardboard or particle panels.

7.3.1. HANDLING WITH A FORKLIFT

When a forklift is used to handle the **SYSAQUA 140/150/170/190/210** units, lift them only along their width.

Place a safety wedge between the unit base and the fork lift truck to avoid damaging the unit's structure and casing.

7.3.2. HANDLING BY SLINGING

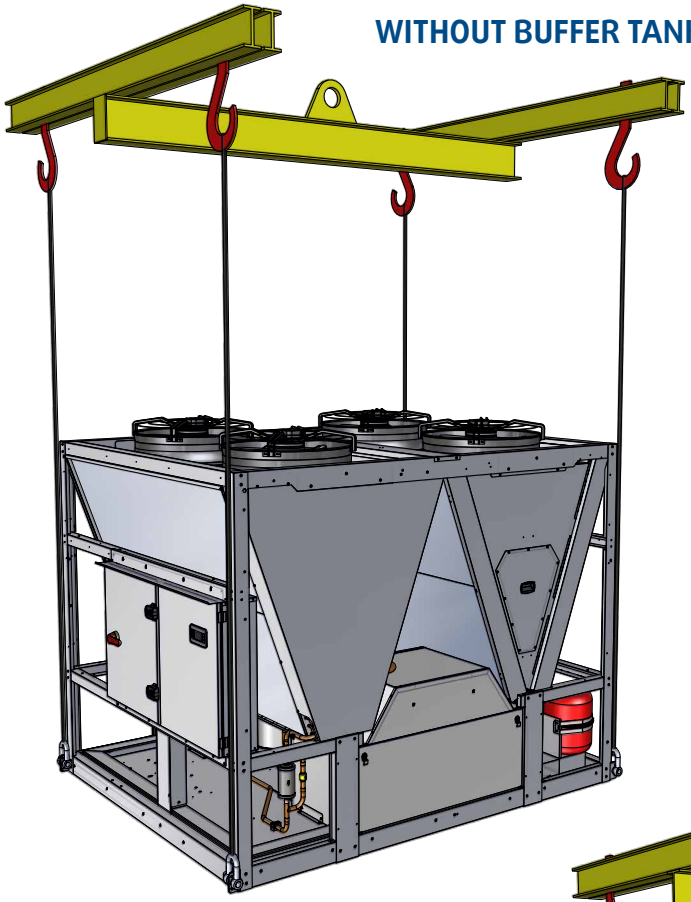
Lifting is also possible by slinging.

A spreader must be used to prevent damage to the machine edges.

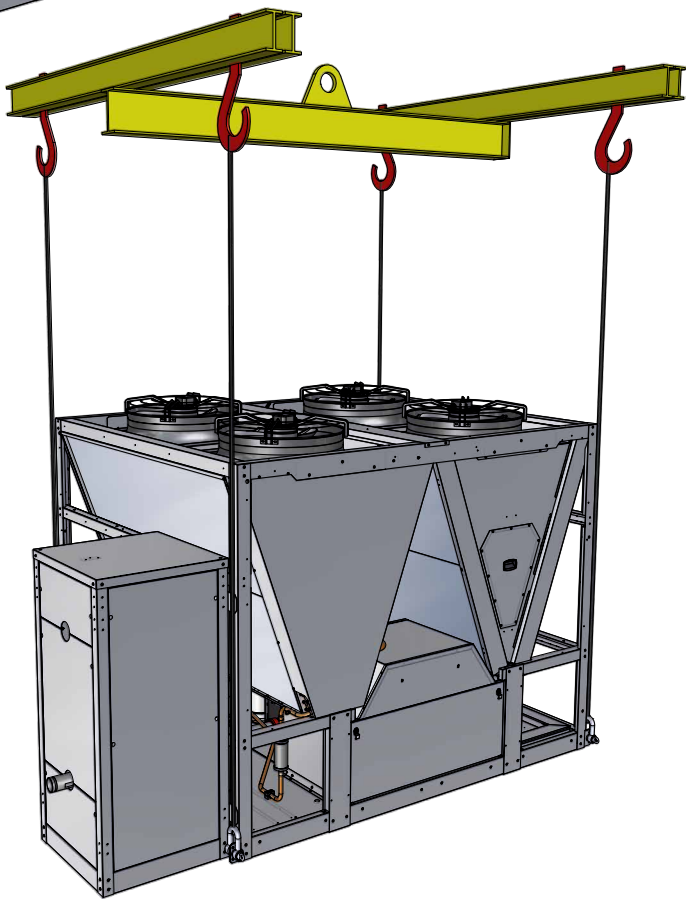
Caution

Slings must never touch the unit casing of **SYSAQUA**.

WITHOUT BUFFER TANK



WITH BUFFER TANK



8. TECHNICAL SPECIFICATIONS

8.1. PHYSICAL CHARACTERISTICS

					SYSAQUA140	SYSAQUA150	SYSAQUA170	SYSAQUA190	SYSAQUA210
Supply voltage					400V / 3~ N / 50Hz				
Number of refrigerang circuit					2				
REFRIGERANT									
Type					R410A				
Factory charge					SEE NAME PLATE				
COMPRESSORS									
Type					Scroll				
Number					4	4	4	4	4
Startup type					DIRECT				
Part load steps				%	0/24/26/48/50 52/74/76/100	0/23/27/46/50 54/73/77/100	0/20/24/44/45 55/69/80/100	0/22/28/44/50 56/72/78/100	0/19/31/38/50 62/69/81/100
Crankcase heater				W	66 + 66 + 66 + 66	66 + 66 + 66 + 66	66 + 66 + 82 + 66	82 + 66 + 82 + 66	95 + 66 + 95 + 66
EVAPORATOR									
Type					plates				
Number					1				
Water volume				L	8.49	8.49	12.21	12.21	12.21
Cooling Only		water flow	nominal	m^3/h	23.1	25.3	27.8	32.3	36.0
			minimum		14.4	15.8	17.4	20.2	22.5
			maximum		38.5	42.1	46.3	53.8	60.0
		Water pressure losses		kPa	37	45	27	37	45
Heat Pump	Cooling mode	water flow	nominal	m^3/h	21.6	23.7	25.9	30.2	33.7
			minimum		13.5	14.8	16.2	18.9	21.1
			maximum		35.9	39.4	43.2	50.4	56.2
		Water pressure losses		kPa	33	39	24	32	40
	Heating mode	water flow	nominal	m^3/h	24.8	26.5	29.6	33.9	37.9
			minimum		15.5	16.5	18.5	21.2	23.7
			maximum		41.3	44.1	49.3	56.5	63.2
		Water pressure losses		kPa	44	50	31	41	50
Antifreeze electric heater				W	60	60	120	120	120
FANS									
Type					AXIAL				
Number					4	4	4	4	4
Speed				tr/mn	900	900	900	900	900
Air flow rate				m^3/h	56 000	56 000	71 000	86 000	83 000
Input power				W	940	940	940 - 1 650	1 650	1 650
COILS									
Number					4	4	4	4	4
Frontal surface				m^2	11.88	11.88	11.88	11.88	11.88
Number of rows			Cooling only		2 + 2	2 + 2	2 + 3	3 + 3	3 + 3
			Heat pump		4 + 4	4 + 4	4 + 6	6 + 6	6 + 6
HYDRAULIC LINKS									
Type					Victaulic connection				
Inlet diameter				pouce	2"1/2	2"1/2	2"1/2	2"1/2	2"1/2
Outlet diameter				pouce	2"1/2	2"1/2	2"1/2	2"1/2	2"1/2
BUFFER TANK (OPTION)									
Volume				L	300	300	300	300	300
ACOUSTICAL DATA									
Sound power level (1)				dB(A)	85.4	85.4	87.0	88.1	88.1

(1) according to Eurovent.

8.2. REFRIGERATION SPECIFICATIONS

8.2.1. REFRIGERANT CIRCUIT DIAGRAM

SEE APPENDIX

8.2.2. REFRIGERANT CHARGE

Caution

This equipment contains fluorinated gas with greenhouse gas effects covered by the Kyoto agreement.

The type and quantity of refrigerating fluid per circuit are indicated on the product plate.

The installer and end user will get informed on local environmental regulations for the installation, operation and disposal of the equipment ; more particularly, for the collection of substances hazardous for the environment (refrigerating fluid, oil, antifreeze, etc.). A refrigerating fluid, whatever it is, must not be vented. Refrigerating fluids must be handled by skilled personnel.

Caution

SYSAQUA units use the R410A fluoro-carbonated fluid, belonging to group 2 as defined in directive 2014/68/UE. Considering the maximum operating pressure of these units (42 bar g), they integrate category 2 (or lower) components as defined in directive 2014/68/UE.

8.2.3. FLUOROCARBON GAS REGULATIONS

The EC No. 517/2014 regulation covering fluorinated greenhouse gases requires of refrigeration equipment operators to comply with the following five obligations:

1. Installation, servicing, maintenance as well as checking the sealing must be carried out by qualified personnel.
2. The fluorinated gas must be recovered during servicing and maintenance as well as the end of the installation.
3. All the necessary measures must be taken to prevent the leakage of fluorinated gases and any leaks must be repaired as rapidly as possible.
4. Regular checks on any leaks must be performed according to the following conditions:
   - ✔ for equipment containing fluorinated greenhouse gases in quantities greater than or equal to the equivalent of 5 tonnes of CO_2 but less than the equivalent of 50 tonnes of CO_2: at least every twelve months or, if a leak detection system is installed, at least every twenty-four months
   - ✔ for equipment containing fluorinated greenhouse gases in quantities greater than or equal to the equivalent of 50 tonnes of CO_2 but less than the equivalent of 500 tonnes of CO_2: at least every six months or, if a leak detection system is installed, at least every twelve months
   - ✔ for equipment containing fluorinated greenhouse gases in quantities greater than or equal to the equivalent of 500 tonnes of CO_2: at least every three months or, if a leak detection system is installed, at least every six months.
5. A document grouping a description of all the operations carried out on the cooling circuit must be drafted and conserved.

Caution

Non-compliance with one of these obligations constitutes an offense and can result in financial penalties.
Furthermore, compliance of the equipment with the fluorinated gases regulation must be proven to the insurance company.

8.2.3.1. CALCULATING GREENHOUSE GAS QUANTITIES

Greenhouse gas quantity (kg of CO_2) = Quantity of gas (kg) x gas' GWP

Quantity of greenhouse gas expressed in weight (kg) and CO_2 equivalent

Quantity of gas: amount of gas contained in the machine in kg (see ID plate)

GWP (Global Warming Potential) of the gas contained in the machine (see ID plate)

- ➢ **GWP for the R410A = 2088**
- ➢ **GWP for the R407C = 1774**

8.3. ELECTRIC SPECIFICATIONS

			SYSAQUA140	SYSAQUA150	SYSAQUA170	SYSAQUA190	SYSAQUA210
Power supply			400 V / 3~ N / 50 Hz				
Without pump	Maximum current	A	108	119	136	153	170
	Fuse rating aM	A	125	125	160	160	200
	Total starting current (without Soft starter)	A	251	262	324	341	397
	Total starting current (with Soft starter)	A	130	141	160	175	199
With Standard pump	Maximum current	A	115	125	142	159	176
	Fuse rating aM	A	125	160	160	200	200
	Total starting current (without Soft starter)	A	257	268	330	347	403
	Total starting current (with Soft starter)	A	136	147	167	184	208
With High pressure pump	Maximum current	A	119	130	146	163	180
	Fuse rating aM	A	125	160	160	200	200
	Total starting current (without Soft starter)	A	262	272	335	351	407
	Total starting current (with Soft starter)	A	141	151	172	188	212

IMPORTANT

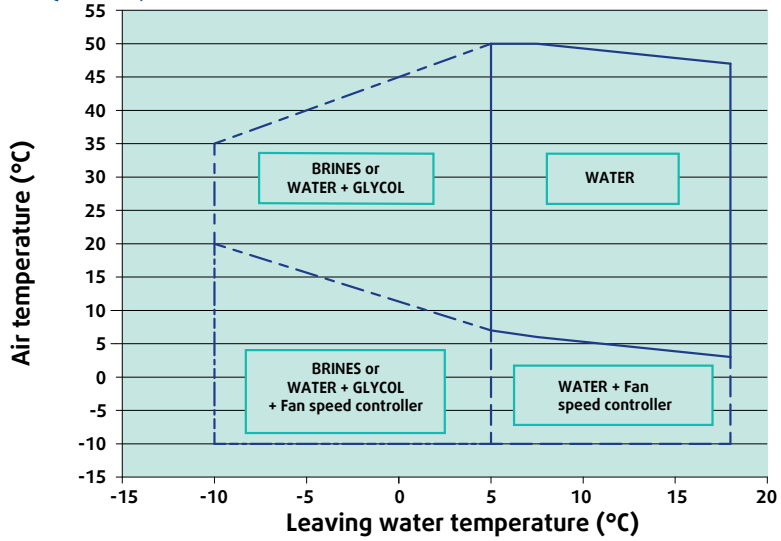
* These datas are given for guidance only. They must be checked aat commissioning according to prevailing standards. They depend on the installation and the cables used.

A main fuse must mandatorily be provided on the power supply.

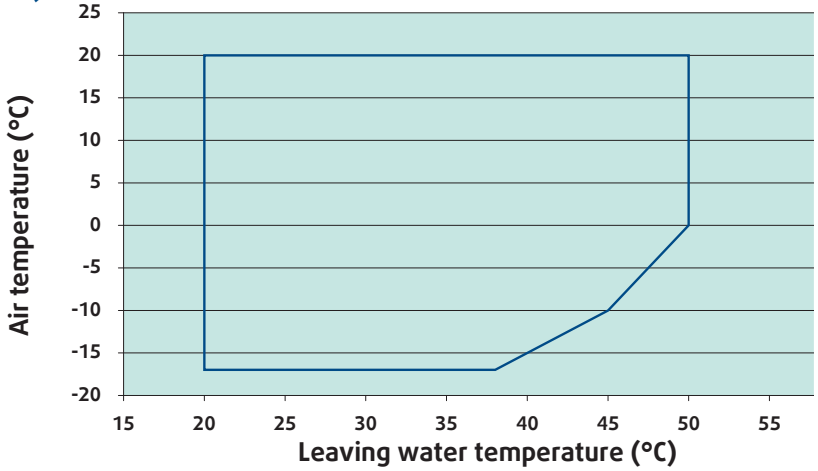
- Fuses not supplied
- Cables not supplied

8.4. OPERATING LIMITS

8.4.1. SYSAQUA.L/SYSAQUA.H COOLING MODE



8.4.2. SYSAQUA.H HEATING MODE



9. INSTALLATION

Caution

The unit is not designed to withstand weights or stresses from adjacent equipment, pipe work or constructions. Any foreign weight or stress on the unit structure could lead to a malfunction or a degradation with dangerous consequences for personnel and property. In such an event, the warranty shall be null and void.

Caution

The unit base shall be arranged as indicated in the manual. There could be a risk of personal injury or damage to property in the event of the unit being incorrectly supported.

9.1. SITING THE INSTALLATION

The **SYSAQUA** must be installed outdoors with sufficient surrounding clearance to enable unobstructed air circulation through the appliance and access for maintenance work.

Caution

Do not expose the **SYSAQUA** to rejections from chimneys or vents. Fumes charged with soot or grease as well as acid rejections are likely to clog or damage the condenser irreversibly. This would cancel the warranty.

9.1.1. PREVAILING WIND

In the case of the unit being sited in areas exposed to high winds, you must avoid the wind hitting the fan blowing surface areas directly to avoid any risk of recycling cooled air. Exchanger fan operation can be disrupted by strong winds, which can cause de-icing problems and fan malfunctions.

Caution

Unit operation depends on air temperature. Any recycling of air extracted by the fan lowers the air intake temperature across the exchanger fins and alters the standard operating conditions.

9.1.2. CONDENSATE WATER MANAGEMENT IN HEATING MODE

Depending on temperature and outdoor air humidity conditions, water vapour contained in the air can condense on the finned heat exchanger and even form ice under low outdoor temperature conditions (around < 5°C). This condensate water and defrosted water runs off via outlets provided under the exchanger. To aid water run-off and avoid frozen water remaining in the appliance in winter, we recommend that it is mounted at a height of around 10cm off the ground. In this way, these water can run off freely and be absorbed into the ground or channelled to a basin built under the appliance in order to protect the environment.

In areas where outdoor temperatures fall below 1°C, the system can be equipped with a condensate anti-freeze protection system (e.g. a heated pipe sheath, Not supplied).

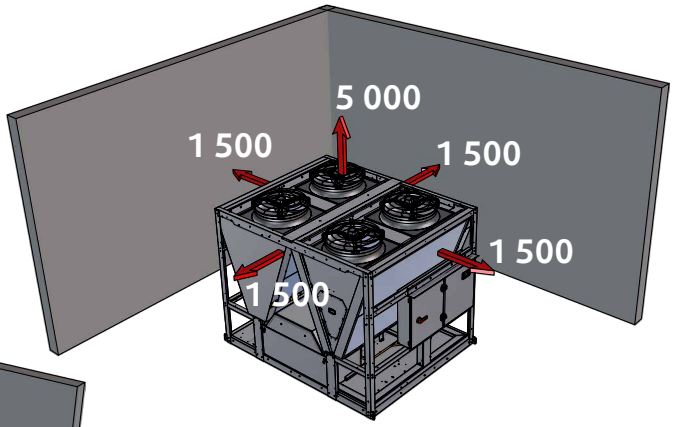
9.1.3. HOW TO REDUCE NOISE POLLUTION

In order to contain noise levels, we equip our appliances with quiet fans and encase the technical compartment in sound-proofed panels. However, noise levels can be reduced even further by following a few installation precautions:

- Do not install the appliance near a window.
- Do not install the unit in enclosed or confined yards, narrow locations where noise may be reflected on walls.
- Install the rubber pads supplied or anti-vibration pads (available as an option) under the appliance.
- Do not join the concrete slab supporting the appliance to the structure of the dwelling (structure-borne noise transmission).
- Electrical and hydraulic connections to the unit must be flexible to avoid transmitting vibrations.

9.2. CLEARANCE

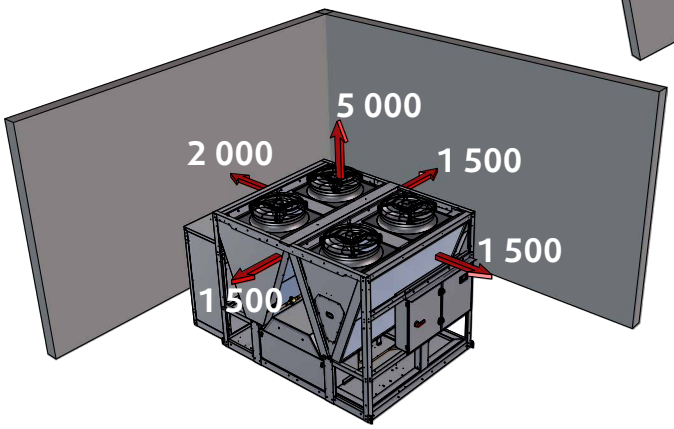
When choosing the location for the **SYSAQUA**, take care to leave sufficient free clearance on all sides to ensure easy access for maintenance work.



WITHOUT BUFFER TANK

The minimum free clearance dimensions indicated must be observed to ensure both proper system operation and allow access for maintenance and cleaning.

WITH BUFFER TANK

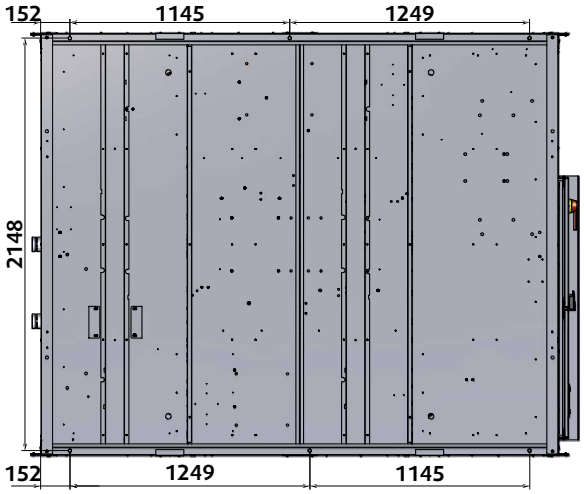


Caution

When several **SYSAQUA** units are installed, ensure proper clearance is implemented around the condensers specific to each machine.

9.3. ATTACHMENT TO THE GROUND

The surface of the floor or structure located under the **SYSAQUA** must be flat, and with sufficient strength to withstand the unit's weight with its full liquid load, and occasional presence of maintenance equipment.

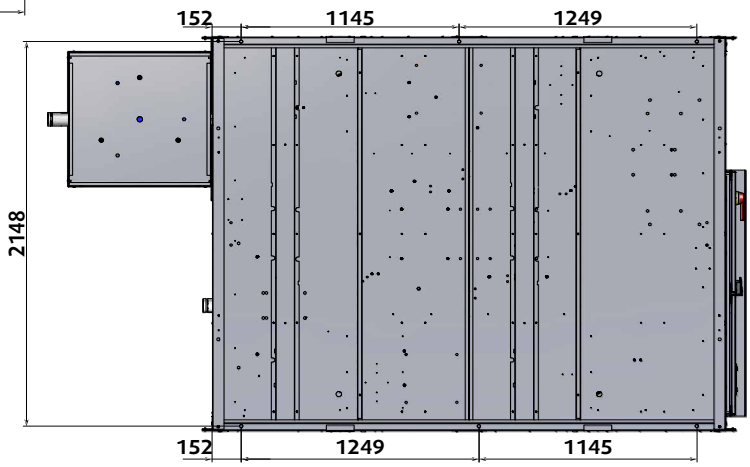


WITHOUT BUFFER TANK

The **SYSAQUA** does not require anchoring on the foundations, except in regions exposed to a high earthquake risk or if the device is installed on a high level on a steel frame.

For normal applications, rigidity of the **SYSAQUA** and the positions of supports allow for an installation minimizing vibrations. However, the installers can use anti-vibration rubber pads (supplied in option).

WITH BUFFER TANK



When fitting anti-vibration pads, refer to the manual supplied with the kit.

10. HYDRAULIC LINKS

Caution

When choosing and installing water pipes, you must consult and observe all current local standards, regulations and instructions.

10.1. MAIN HYDRAULIC CIRCUIT

Caution

The mains hydraulic circuit will provide a constant water flow on the refrigerating fluid/water plate exchanger and in case of load variation.

You must design the pipe network with the minimum number of bends and keep the number of changes in height to the strict minimum. This will reduce installation costs and ensure optimum system performance. The pipe network must include:

- A vibration elimination system (e.g.: link hoses available as an accessory) on all pipes connected to the appliance in order to reduce vibrations and noise transmitted to the building fabric.
- A balancing valve on the water outlet pipe in order to adjust the water flow.
- Stop cocks to isolate the hydraulic circuit during maintenance.
- Manual or automatic bleed valves at the highest point on the water circuit.
- Draining connectors at all low points to allow complete circuit draining
- A circulation pump guaranteeing flow necessary for the operation of the SYSAQUA unit.
- A diaphragm expansion tank fitted with a safety and draining valve must be visible.
- A low water pressure sensor to secure the water pump against cavitation if the water pressure in the circuit decreases.
- The installation of thermometers and pressure gauges on the heat exchanger inlet and outlet to facilitate day-to-day controls and system maintenance.
- An element ensuring ground continuity of all piping. An unbalance of grounding connection points can cause corrosion electrolytic.

Caution

The expansion tank must be dimensioned to be able to absorb an expansion corresponding to 2% total volume of water contained in the installation (exchanger, piping, installations and buffer tank, if present).

Caution

THE WARRANTY DOES NOT COVER DAMAGE DUE TO CORROSION RESULTING FROM ELECTROLYTIC PHENOMENA.

10.2. ANTI-CLOGGING PROTECTION

Caution

To avoid any risk of foreign bodies entering the appliance and to guarantee operating performance, IT IS IMPERATIVE TO INSTALL WATER FILTER on the SYSAQUA inlet pipe.

Failing that, **SYSAQUA's** heat plate exchanger would clog up soon after being commissioned. Proper operation of the **SYSAQUA** would be disturbed by a reduced water flow or the partial blockage of certain heat plates. The heat plate exchanger could be **IRREVERSIBLY** damaged if the water flow were not sufficiently high. A link smaller than or equal to 800µm is recommended

Caution

THE MANUFACTURER'S WARRANTY IS VOID IF THE FILTER SUPPLIED WITH THE SYSAQUA IS NOT INSTALLED TO PROTECT THE APPLIANCE

10.3. MINIMUM WATER VOLUME REQUIREMENTS

To ensure that the system operates correctly you must use suitably sized and properly routed pipes for the hydraulic links between the **SYSAQUA** and the mains network. Proper operation of the regulation and safety devices is ensured only when the water volume is sufficient.

For refrigeration only units, the total volume on the level of the primary water circuit must never below:

- application air conditioning
  - ✔ 3.5 L/kW refrigeration power
- application process
  - ✔ 10 L/kW refrigeration power

For reversible units, a water volume equal to 6.5 L/kW is recommended, so that energy reserves are full enough to ensure the defrosting cycle without any discomfort for the end user.

If the total volume of the primary hydraulic circuit does not allow to reach these recommendations, a buffer tank must be added to the installation to increase the water volume up to the value required.

If the unit runs with a low volume of water (with air treatment plant...) or if it is used for industrial processes, a buffer tank is compulsory to guarantee sufficient thermal inertia and satisfactory temperature stability.

A water tank can be required to increase the water volume of the whole hydraulic circuit in the system, so as to reach the minimum water volume requested.

Internal water tank :

- **SYSAQUA 140-150-170-190-210** ⇨ 300L

10.3.1. SYSAQUA COOLING ONLY VERSION

		SYSAQUA140	SYSAQUA150	SYSAQUA170	SYSAQUA190	SYSAQUA210
Minimum water volume in the system application air conditioning	L	469	515	565	658	731
Minimum water volume in the system application process		1 340	1 470	1 612	1 878	2 088

10.3.2. SYSAQUA HEAT PUMP VERSION

		SYSAQUA140	SYSAQUA150	SYSAQUA170	SYSAQUA190	SYSAQUA210
Minimum water volume in the system	L	935	1 000	1 106	1 268	1 415

10.4. MAXIMUM WATER VOLUME REQUIREMENTS

The maximum water volume is limited by the sizing of the unit's expansion tank and/or the expansion tank present in the facility's hydraulic circuit. Expansion tanks must be sized according to the glycol percentage in the hydraulic circuit.

The expansion tank should be installed at the pump suction, and the pressure inside will be adjusted by taking into account the whole hydraulic circuit.

The volume of the expansion tanks selected with Single pump and double pump options are :

		SYSAQUA140	SYSAQUA150	SYSAQUA170	SYSAQUA190	SYSAQUA210
volume of the expansion tank supplied with hydraulic options	L	25	25	25	25	25

10.5. RINSING THE CIRCUIT

Caution

Before filling the installation, check it and remove any contamination such as sand, stone, welding chips and other materials likely to damage the **SYSAQUA**.

Fully rinse all water pipes before final connection to the **SYSAQUA**.

When using an off-the-shelf acid rinsing solution, implement a temporary branching around the **SYSAQUA** to prevent damaging internal components (particularly the plate exchanger, flow switch, pump...).

10.6. FROST PROTECTION

10.6.1. WATER LOOP GLYCOLING

Caution

THE USE OF A GLYCOL-BASED SOLUTION IS THE ONLY EFFECTIVE FROST-PROTECTION MEANS

The glycol-based water solution must be sufficiently concentrated to ensure appropriate protection and prevent ice from forming. Take precautions when using non inert MEG antifreeze solutions (Mono Ethylene Glycol) or MPG (Mono Propylene Glycol). With this type of antifreeze solution, corrosion may occur in the presence of oxygen.

Contact glycol resellers to ensure that its characteristics are compatible with environmental directive applicable on site (this is not under manufacturer responsibility).

Caution

Glycol concentration in the installation's hydraulic circuit must be entered in the regulation upon start-up. This parameter setting changes the safety and alarm triggering threshold limits. An incorrect value may cause malfunctions and a destruction of the unit's heat exchanger.

Avertissement

It is strongly recommended to post, on the electric box of the unit, glycol type and concentration in the hydraulic circuit.

Glycoling the water loop worsens slightly the performances, in particular the pressure drops. The hereunder table gives corrective factors with respect of type and concentration of the glycol. For instance, the 20% MEG glycoling will :

- Increase the pressure drop : with glycol = 1.160 x without glycol
- Increase the flowrate : with glycol = 1.050 x without glycol
- Decrease the capacity : with glycol = 0.985 x without glycol

Mono Ethylene Glycol concentration		%	10	20	30	45
Correction factor	load loss		1.070	1.160	1.235	1.368
	water flow		1.015	1.050	1.085	1.169
	thermodynamic power		0.995	0.985	0.970	0.949

Mono Propylene Glycol concentration		%	10	20	30	45
Correction factor	load loss		1.112	1.175	1.290	1.520
	water flow		1.005	1.030	1.067	1.162
	thermodynamic power		0.991	0.977	0.945	0.894

Draining the water circuit is not recommended for frost protection, for the following reasons:

- The water circuit will rust, which will shorten its lifetime.
- Water will remain at the bottom of the plate exchangers and freezing may cause damage.

Caution

Never fill the hydraulic circuit with pure glycol. Maximum glycol concentration is 45%. The water and glycol mixture must be precisely prepared before filling the hydraulic circuit. If the mixture is too much concentrated, the hydraulic could be damaged and the unit **SYSAQUA** should not perform normally. **In this case, unit guarantee will be cancelled.**

Caution

For Heatpump models, if the outdoor temperature is likely to fall below +1°C, provide a system to prevent the condensates from freezing (e.g. heating cord).

10.6.2. OUTER AIR PROTECTION

In case of negative temperatures, the water loop must be protected against icing when the unit is off. Concentration must comply with the temperature level:

Minimum outer air temperature	°C	5 > T > 0	0 > T > -5	-5 > T > -10	-10 > T > -27
MEG concentration	%	10	20	30	45
MPG concentration	%	10	20	30	45

10.6.3. LEAVING WATER PROTECTION

In case of low temperature setpoint or reduced water flow, the water loop must be protected against icing during the operation of the unit. Concentration must comply with the minimum water temperature of the installation. The choice of the type of glycol shall take in consideration the increase of pressure drops.

For instance, we recommend to protect a -10°C setpoint down to -18°C. Using MPG, that protection is achieved with a 35% concentration.

10.7. WATER QUALITY

The water must be analyzed; the hydraulic network system installed must include all elements necessary for water treatment: filters, additives, intermediate exchangers, drain valves, vents, check valves, etc., according to the results of the analysis.

Caution

The SYSAQUA must not run on a network with open loops, likely to cause incidents related to oxygenation, or with non treated table water.

Using improperly treated or non treated water in the **SYSAQUA** may cause scaling, erosion, corrosion or algae or sludge deposits in the exchangers. Refer to a specialist skilled in water treatment to determine any treatment to apply. The manufacturer will not be held liable for damages caused when non treated or improperly treated water, demineralized water, salty water or sea water are used.

Apply the following guidelines :

- No NH_4^+ ammonium ions in the water, highly detrimental to copper. <10mg/l
- Cl- chloride ions are detrimental to copper with a risk of puncture by picking corrosion. <10mg/l.
- SO_4^{2-} sulphate ions may cause perforating corrosion. < 30mg/l.
- No fluoride ions (<0.1 mg/l)
- No Fe^{2+} and Fe^{3+} ions, particularly in case of dissolved oxygen. Fe< 5mg/l with dissolved oxygen < 5mg/l. The presence of these ions with dissolved oxygen indicates corrosion of steel parts, likely to generate corrosion of copper parts under Fe deposits, particularly in the case of multitubular exchangers.
- Dissolved silica: silica is an acid element of water and may also cause corrosion. Content < 1mg/l.
- Water hardness: Values between 10°fH and 30°fH may be recommended. This facilitates scaling deposits likely to limit copper corrosion. Excess TH values may lead to clogging the pipes.
- TAC<100
- Dissolved oxygen: Prevent any sudden change in the water's oxygenation conditions. Also, avoid deoxygenating water by sparging inert gas as well as overoxygenating it by pure oxygen sparging. Disturbing oxygenation conditions destabilizes copper hydroxides and particle salting-out.
- Electrical Resistivity - Conductivity: The higher the resistivity, the slower the corrosion. Values above 3000 ohm/cm are preferred. A neutral environment favours maximum resistivity. For electrical conductivity, values around 200-600 S/cm can be recommended.
- pH: neutral pH at 20°C (7 < pH < 9)

Caution

If the water circuit is to be drained for a time exceeding one month, the circuit must be fully charged with nitrogen to prevent any risk of corrosion by differential venting.

Caution

The manufacturer is not liable for recommendations in terms of water treatment (call a specialized company).

However, this matter has a critical nature, and particular care must be given to ensure that the type of treatment applied is effective.

The liability of the manufacturer or its representative will not be sought when non treated water or non compliant quality water is used.

10.8. HEAT INSULATION

To guarantee proper energy efficiency and compliance with current standards, water pipes passing through uninhabited zones should be properly lagged to retain heat.

To achieve correct insulation with conductivity of 0.04 W/mK, lag the pipes with insulating material with a radial thickness between 25mm and 30 mm.

10.9. FILLING THE SYSTEM WITH WATER

Caution

FILLING OR DRAINING THE WATER CIRCUIT MUST BE PERFORMED BY SKILLED PERSONS USING THE APPROPRIATE DEVICES ON THE EXTERNAL HYDRAULIC CIRCUIT BY THE INSTALLER.

It is important to ensure that the mains water supply pressure is sufficient to fill the installation.

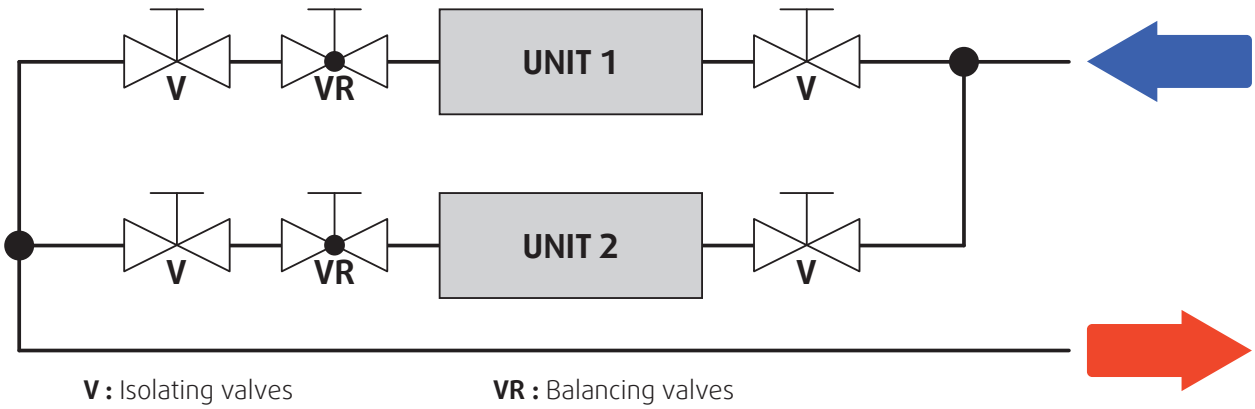
Once the installation is complete and after having clean and rinsed out the circuit network, you must fill the water circuit in accordance with current professional standards until you obtain the service pressure which will be:

0.5 bar < Service Pressure < 2.5 bar

A 3.5 bar safety valve is mounted in the unit when hydraulic options are selected (single or double pump).

Always check that the manual or automatic air drains are installed at all the high points of the hydraulic network.

When two or three units are connected in parallel, it is recommended that the return circuit connections are reversed (Tickelman loop system) in order to reduce the pressure loss in each unit's circuit.



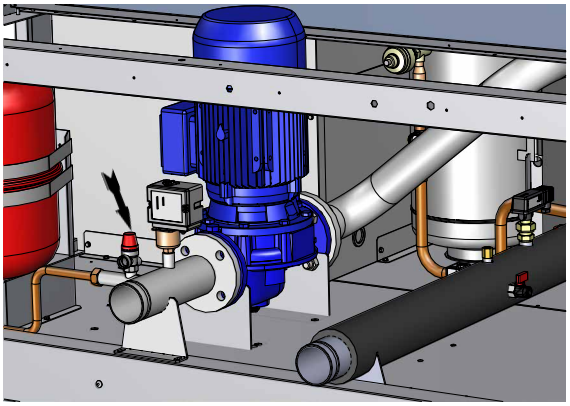
V : Isolating valves **VR :** Balancing valves

Install a balancing valve on the output pipe to adjust the water flow.

Caution

The water inlets and outlets must be connected as described on the labels affixed near the connections.

When the hydraulic pump option is selected, a safety valve is mounted (factory assembled) at the Aqualogic water inlet to prevent from over pressure in the circuit. The installer has to put a pipe at the safety valve outlet for water evacuation.



11. WIRING DIAGRAM AND LEGEND

11.1. WIRING DIAGRAM

SEE APPENDIX

11.2. LEGEND

N 821			
SE4595	models SYSAQUA140 to SYSAQUA210 circuit 1	Power	400 V / 3~ N / 50 Hz +/- 10%
SE4596	models SYSAQUA140 to SYSAQUA210 circuit 2	Power	400 V / 3~ N / 50 Hz +/- 10%
SE4597	models SYSAQUA140 to SYSAQUA210 circuit 1	Control	230V 50Hz +/- 10%
SE4598	models SYSAQUA140 to SYSAQUA210 circuit 2	Control	230V 50Hz +/- 10%
SE4605	models SYSAQUA140 to SYSAQUA210 TTS circuit 1	Power	400 V / 3~ N / 50 Hz +/- 10%
SE4606	models SYSAQUA140 to SYSAQUA210 TTS circuit 2	Power	400 V / 3~ N / 50 Hz +/- 10%
SE4607	models SYSAQUA140 to SYSAQUA210 TTS circuit 1	Control	230V 50Hz +/- 10%
SE4608	models SYSAQUA140 to SYSAQUA210 TTS circuit 2	Control	230V 50Hz +/- 10%
SE4647	models SYSAQUA140 to SYSAQUA210 circuit 1	Power	400 V / 3~ / 50 Hz +/- 10%
SE4648	models SYSAQUA140 to SYSAQUA210 circuit 2	Power	400 V / 3~ / 50 Hz +/- 10%
SE4649	models SYSAQUA140 to SYSAQUA210 circuit 1	Control	230V 50Hz +/- 10%
SE4650	models SYSAQUA140 to SYSAQUA210 circuit 2	Control	230V 50Hz +/- 10%
SE4651	models SYSAQUA140 to SYSAQUA210 TTS circuit 1	Power	400 V / 3~ / 50 Hz +/- 10%
SE4652	models SYSAQUA140 to SYSAQUA210 TTS circuit 2	Power	400 V / 3~ / 50 Hz +/- 10%
SE4653	models SYSAQUA140 to SYSAQUA210 TTS circuit 1	Control	230V 50Hz +/- 10%
SE4654	models SYSAQUA140 to SYSAQUA210 TTS circuit 2	Control	230V 50Hz +/- 10%

11.2.1. POWER SUPPLY

Power cable must be connected to the main power supply switch QG (Copper cable is recommended).

The supply is protected at the head by an FFG main fuse holder supplied by the installer. It must be fitted next to the unit. Refer to the § **ELECTRIC SPECIFICATIONS**, page 11

The electrical installation and wiring of this unit must comply with local electrical installation standards.

➢ Three phase 400 V~ 50Hz + Neutral + Ground :

On the L1, L2, L3, N terminals of the QG section switch
On the ground screw of the earth cable.

➢ Three phase 400 V~ 50Hz + Ground :

On the L1, L2, L3 terminals of the QG section switch
On the ground screw of the earth cable.

11.2.2. WIRING DIAGRAM KEY DESCRIPTIONS

SEE APPENDIX

11.2.3. RANGE AND SETTINGS OF THEMAL PROTECTION / NOMINAL INTENSITY OF THE CONTACTORS (CLASSE AC3)

MODELS		SYSAQUA140	SYSAQUA150	SYSAQUA170	SYSAQUA190	SYSAQUA210
FTI	Range	24-32A	23-32A	30-40A	30-40A	37-50A
	Adjustment	32A	32A	38A	38A	46A
FT2	Range	20-25A	23-32A	23-32A	30-40A	30-40A
	Adjustment	22A	27A	32A	32A	32A
FT3	Range	24-32A	23-32A	23-32A	30-40A	37-50A
	Adjustment	32A	32A	32A	38A	46A
FT4	Range	20-25A	23-32A	23-32A	30-40A	30-40A
	Adjustment	22A	27A	27A	32A	32A
FTOF1-L	Range	2.5-4A	2.5-4A	6-10A	6-10A	6-10A
	Adjustment	3.5A	3.5A	7A	7A	7A
FTOF1-H	Range	2.5-4A	2.5-4A	6-10A	6-10A	6-10A
	Adjustment	3.5A	3.5A	7A	7A	7A
FTOF2-L	Range	2.5-4A	2.5-4A	2.5-4A	6-10A	6-10A
	Adjustment	3.5A	3.5A	3.5A	7A	7A
FTOF2-H	Range	2.5-4A	2.5-4A	2.5-4A	6-10A	6-10A
	Adjustment	3.5A	3.5A	3.5A	7A	7A
FTWP Standard pump	Range	6-10A	6-10A	6-10A	6-10A	6-10A
	Adjustment	6.4A	6.4A	6.4A	6.4A	6.4A
FTWP High pressure pump	Range	9-14A	9-14A	9-14A	9-14A	9-14A
	Adjustment	10.5A	10.5A	10.5A	10.5A	10.5A
Contactors						
KOF1 / KOF1-L / KOF1-H		6A	6A	9A	9A	9A
KOF2 / KOF2-L / KOF2-H		6A	6A	6A	9A	9A
KWP1/2 Standard pump		9A	9A	9A	9A	9A
KWP1/2 High pressure pump		12A	12A	12A	12A	12A

12. ELECTRICAL CONNECTIONS

WARNING

Before carrying out any work on the equipment, make sure that the electrical power supply is disconnected and that there is no possibility of the unit being started inadvertently.

Non-compliance with the above instructions can lead to injury or death by electrocution.

The electrical installation must be performed by a fully qualified electrician, and in accordance with local electrical standards and the wiring diagram corresponding to the unit model.

Any modification performed without our prior authorisation may result in the unit's warranty being declared null and void.

The power supply cable section must be sufficient to provide the appropriate voltage to the unit's power supply terminals, both at start-up and under full load operating conditions.

The power supply cable shall be selected in accordance with the following criteria:

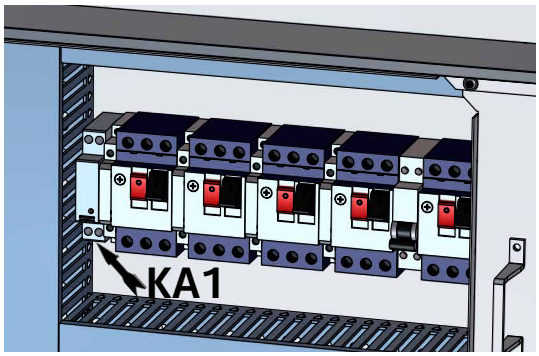
1. Power supply cable length.
2. Maximum unit operating current
3. Maximum unit starting current draw
4. Power supply cables' installation mode.

The use of fuse to protect the unis against short circuits is recommended. The fuse sizes are displayed in the table in § **ELECTRIC SPECIFICATIONS**, page 11

VERY IMPORTANT:

3N~400V-50HZ

The outdoor unit is equipped as standard with a phase sequence and cut-out controller located in the electrical box.



THE LED's INDICATE THE FOLLOWING CONDITIONS:

Green LED = 1

Yellow LED =1

Power ON

The compressor rotation direction is correct.

Green LED = 1

Yellow LED =0

Phase inversion or phase absent (L1)

The compressor and the fans do not start.

Green LED = 0

Yellow LED =0

Phase absent (L2 or L3)

The compressor and the fans do not start.

Caution

Before connecting the supply lines, check that the voltage available is within the limits specified (Refer to the § ELECTRIC SPECIFICATIONS, page 11).

Voltage differences between each phase do not have to exceed 2 %.

If the unbalance is inacceptable, call the distribution company to have this anomaly corrected.

Caution

Supplying the unit with a line with an unbalance exceeding the acceptable value results in cancelling the warranty.

Caution

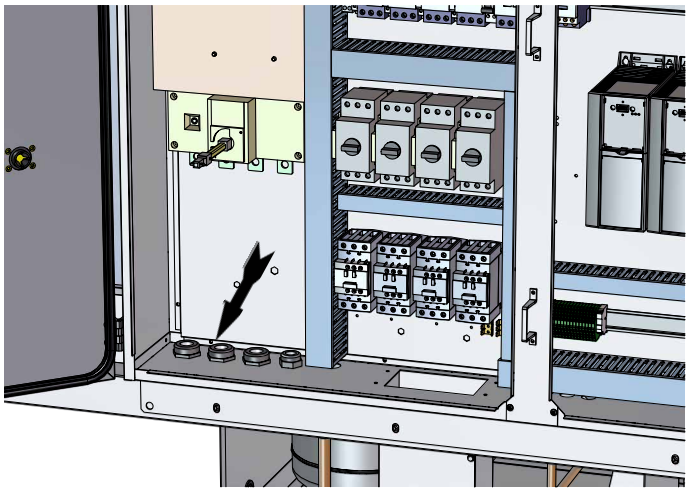
Correction of the excessive centralized power factor (>0.95) may generate transient phenomena dangerous for the motors and contactors of the unit during the start and stop phases. Check instant voltages during these phases.

These units are equipped with a local switch used as general terminal board.

The supply cables of the units must be routed up to the section switch through the grommets present on the front panel of the units.

To ensure proper contact, fit the end pieces adapted to the cross-section of the connecting cable.

copper cable only



13. REGULATION

SYSAQUA units are fitted with an electronic control system. It provides the command, control and alarm functions.

13.1. ORDER OF PRIORITY FOR CONTROL SYSTEMS

The integrated regulator in the **SYSAQUA** can be controlled by various interfaces and systems. The order of priority for each drive system is as follows:

1. Timing programming: this scheduling is integrated in the regulator
2. The BMS : the remote supervision transmits it commands according to the communication protocols
3. The HMI: the commands are given by the user directly on the unit (integrated display) or remotely (remote display)
4. Digital inputs: the client can transmit commands electro-mechanically over 2 dry contacts:
   - ✔ Input D1: ON/OFF
   - ✔ Input D2: configurable

13.2. USER INTERFACE

This terminal has a liquid crystal display and has 6 buttons.

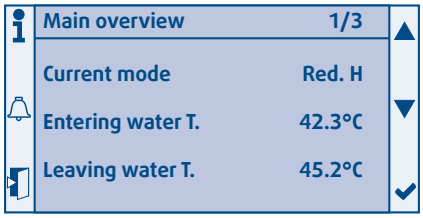
13.2.1. KEYPAD

INFO	From any screen, this button returns the user to the main menu or home screen and, like the ESCAPE button, invalidates a current modification.
ALARM	When pressing the alarm button (the red LED flashes if an alarm is active), the alarm management menu is displayed. (see § alarms)
ESCAPE	Returns to the previous level in the menu tree. Pressing this button during modification invalidates the change being made and returns the user to the previous menu. This function is very important if a setting is inadvertently modified.
UP/DOWN	These buttons have two functions. 1. In a menu, they are used to move up and down the list of possible options. 2. They can change the value of a setting when it has been selected.
ENTER	This button has three functions 1. It is used to access a submenu 2. Activate the modification of a setting 3. Validate the modification of a setting

13.2.2. HOME PAGE

The home page is used to quickly display the state of the machine by displaying the following information:

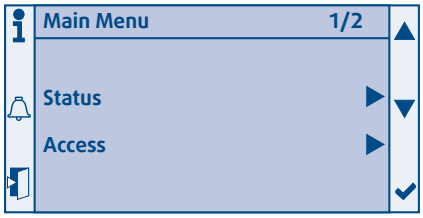
- Operating mode
- Water return temperature
- Water flow temperature



13.2.3. MAIN MENU

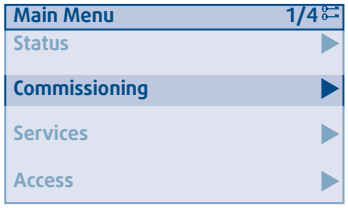
Pressing the "Info" button displays this screen directly.

The authorized menus are displayed according to the access level selected:



Access level	Final user	Installer	Maintenance
Menu “Access”	✔	✔	✔
Menu “Status”	✔	✔	✔
Menu “Commissioning”	✘	✔	✔
Menu “Service”	✘	✘	✔
Menu “Alarms”	✔	✔	✔

13.2.4. MENUS



The display has several menus. The "Status" menu is freely accessible. The other "Installation" and "Maintenance" menus can be displayed and accessed according to the access level.

To change the access level, go to the "Access" menu and enter the password corresponding to the level.

The first line of all the screens integrates the following information:

- Screen title
- Number of the active line/number of lines of the menu
- Access level
  - ✔ Final user
  - ✔ Installer
  - ✔ Maintenance

13.3. INITIAL SETTINGS

Open the electrical box and check that all circuit breakers are open except for **FTC**.

Before starting up the **SYSAQUA** for the first time, the "Installation" menu must be configured.

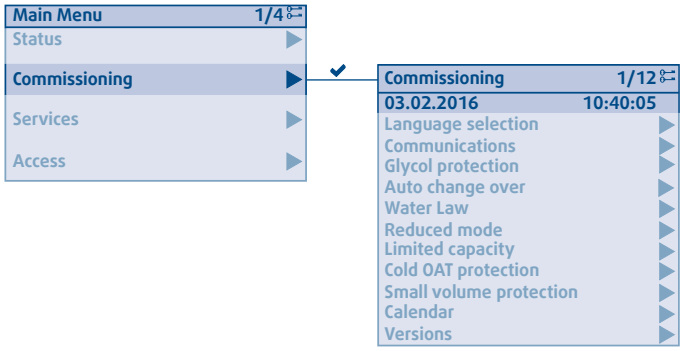
13.3.1. TIME SETTINGS

Caution

If the date and time are not set, the unit will function in degraded mode or may not even be able to start.

Start by configuring the date and time.

To do so, switch to the "Installer" or "Maintenance" profile in the "Installation" section. The first line of the menu is used to set the date and time.



The date and time line will appear as highlighted.

Press the "Enter" button ✔ to activate the change in date.

The ▲ and ▼ buttons are used to change the highlighted setting.

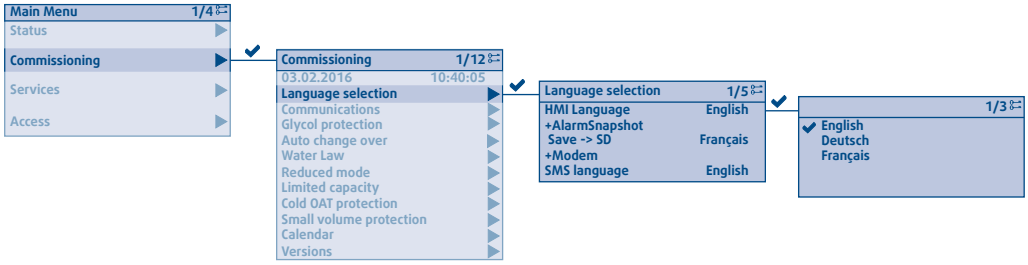
Press once on the ✔ button to approve the defined value and move on to the next setting.

Information

Power outage lasting longer than 8h will lead to a loss of the time setting. It is important to set the unit back to the right time after such an event.

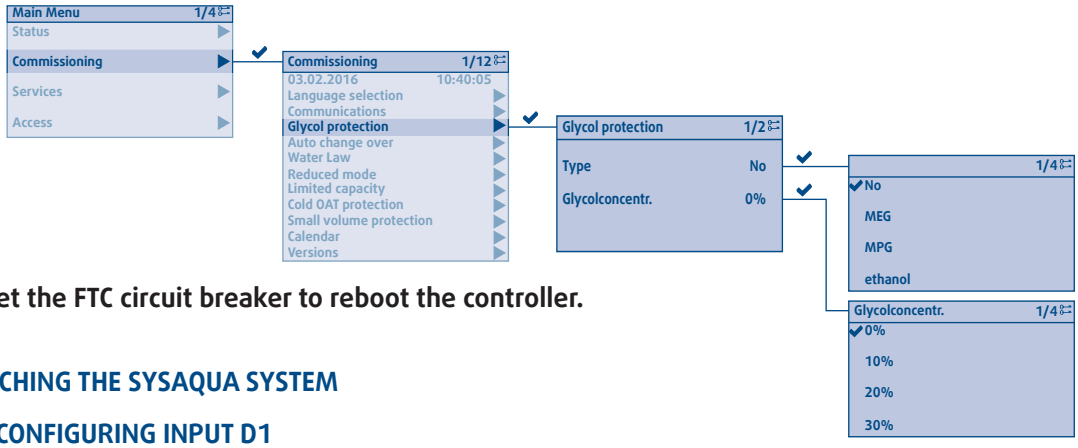
13.3.2. LANGUAGE SETTINGS

Select the languages required according to the application.



13.3.3. DEFINING THE GLYCOL RATE

Define the type and glycol content present in the installation water circuit.



Open then reset the FTC circuit breaker to reboot the controller.

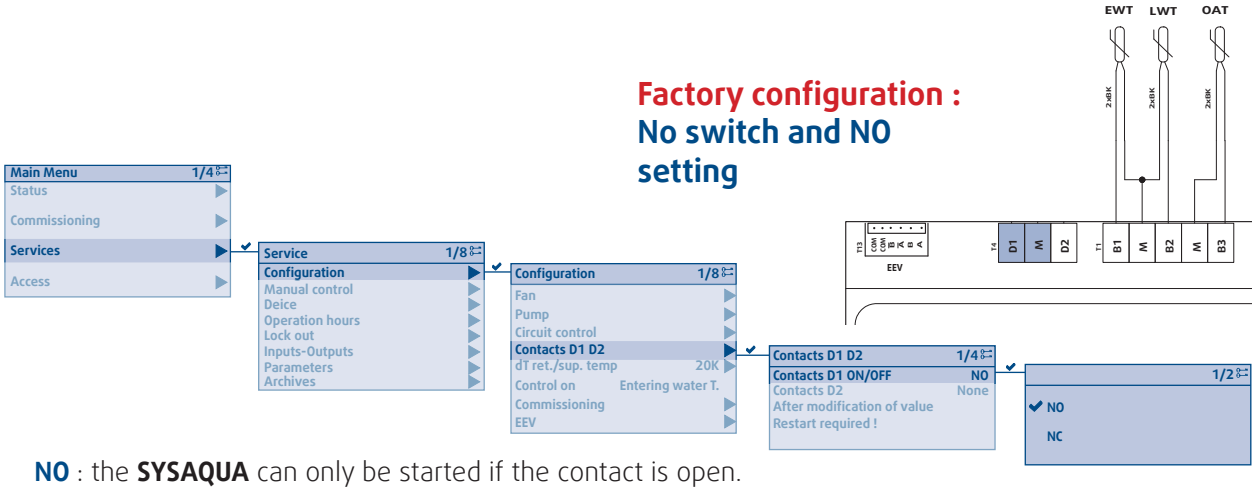
13.4. LAUNCHING THE SYSAQUA SYSTEM

13.4.1. CONFIGURING INPUT D1

During installation, an on/off switch can be connected remotely onto the D1 input.

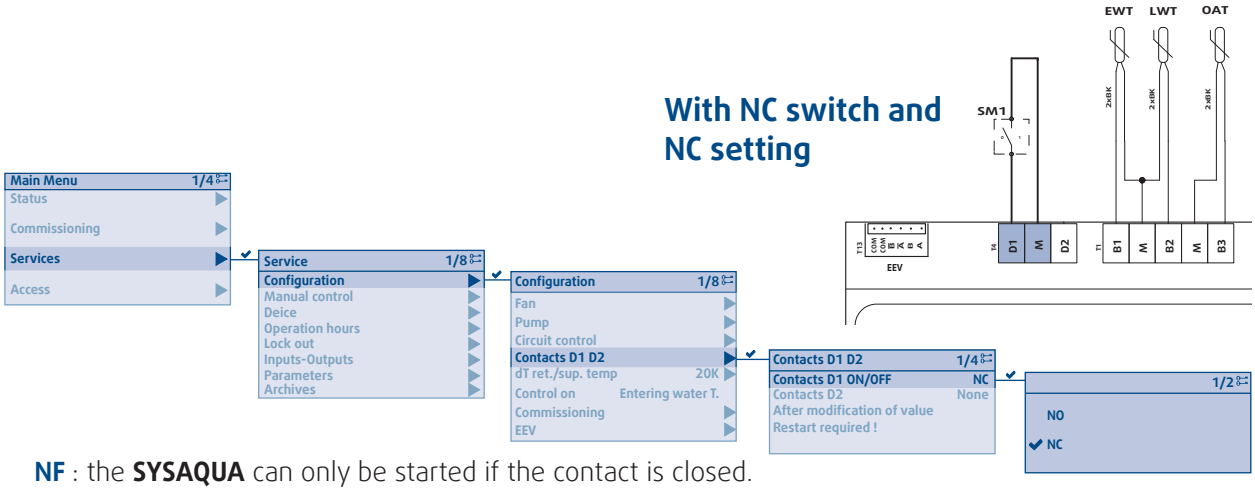
This input's behavior must be defined. **This input takes priority over all other control systems.**

Factory configuration : No switch and NO setting



NO : the **SYSAQUA** can only be started if the contact is open.

With NC switch and NC setting



NF : the **SYSAQUA** can only be started if the contact is closed.

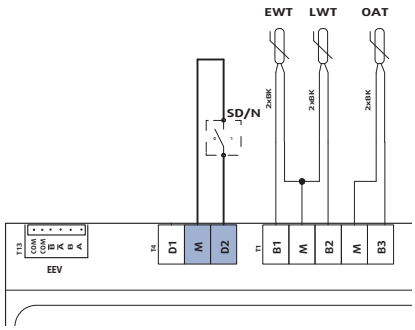
Caution

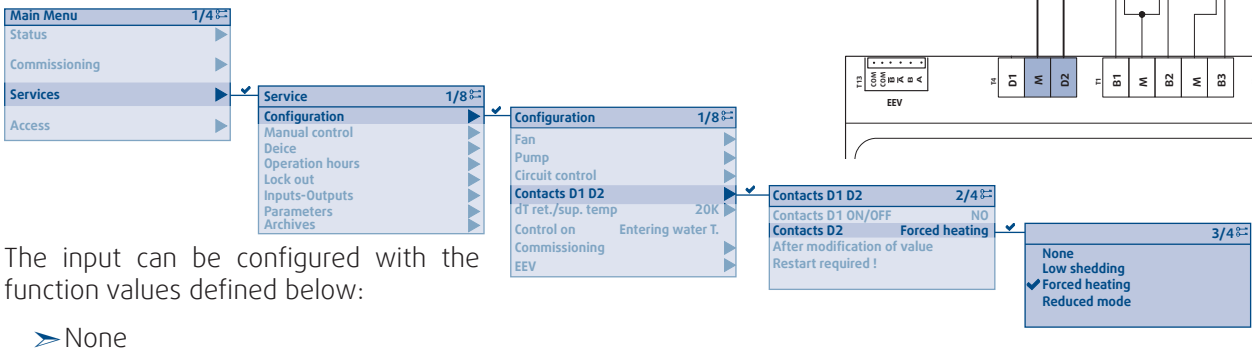
If the settings are changed, open then reset the FTC circuit breaker to reboot the controller.

13.4.2. CONFIGURING INPUT D2

During installation, a switch can be connected onto the D2 digital input.

The operating mode defined for this input takes priority over all control systems such as the HML, BMS or calendar.





The input can be configured with the function values defined below:

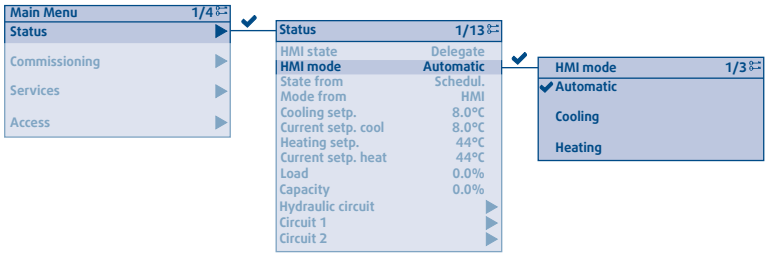
- None
- Low shedding
- Forced Heating
- Reduced mode

Further information regarding this contact's configuration can be found in thein § **CASCADE OF PRIORITIES**, page 30 user manual.

13.4.3. HEAT/COOL SELECTION

Information

Selection of the heat/cool mode is only possible in reversible units. This menu does not exist in the "cool only" versions.

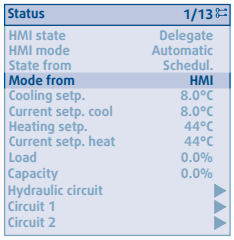


The operating mode can be chosen in the "HMI mode" :

- **Automatic** : delegated to the BMS/Auto-change-over (refer to the UM)
- **Cooling** : request for cool mode
- **Heating** : request for heat mode

The "Mode from" line states which element requested the current mode:

- **Contact: D2** configurable digital input
- **HMI:** user interface
- **BMS**
- **Schedul.**

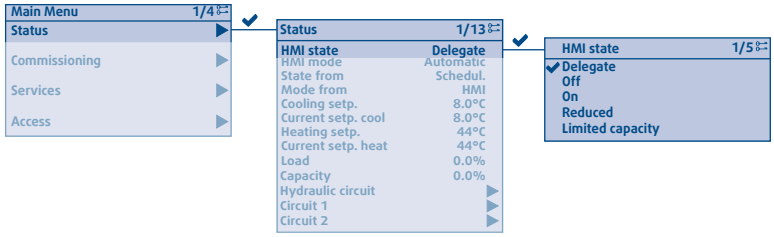


Caution

The automatic change-over mode is activated if the local mode and the BMS mode are set to "Auto".

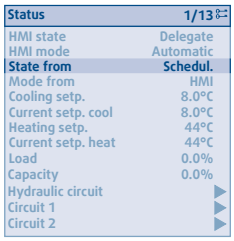
13.4.4. SELECTING THE OPERATING MODE

To launch the unit, the user must select the desired mode in the menu:



- **Delegate** : the current mode is determined by the BMS or by default by the calendar (refer to the user manual)
- **Off** : Unit is stopped
- **On** : System is launched
- **Reduced** : Refer to the § **REDUCED MODE**, page 33
- **Limited capacity** : Refer to the § **LIMITED CAPACITY**, page 33

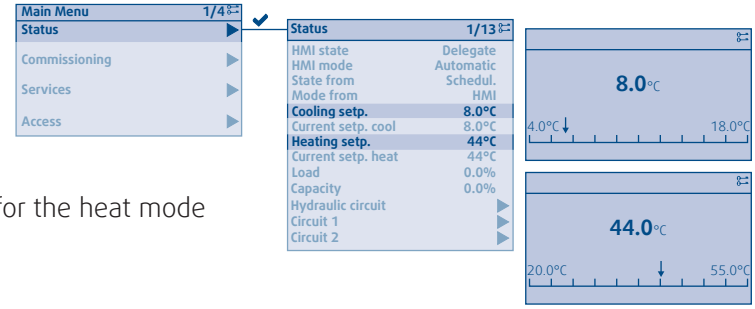
The "State from" line states which element requested the current status :



- **Cont.off** : on/off digital input
- **Cont.ext** : **D2** configurable digital input (in "Reduced mode" or "Limited capacity"
- **HMI:** User interface
- **BMS**
- **Schedul**

13.4.5. USER TEMPERATURE SETPOINTS AND ACTUAL SETPOINTS

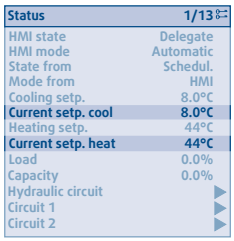
In the Status menu, the user can set start or return temperature setpoints, according to the control mode selected:



- **Cooling setp** : temperature setpoint for the cool mode
- **Heating setp** : temperature setpoint for the heat mode

These setpoints are fixed and restricted to the unit's operating limits.

They can however be adjusted with the "Water law" and "Reduced mode" options, which are deactivated by default.



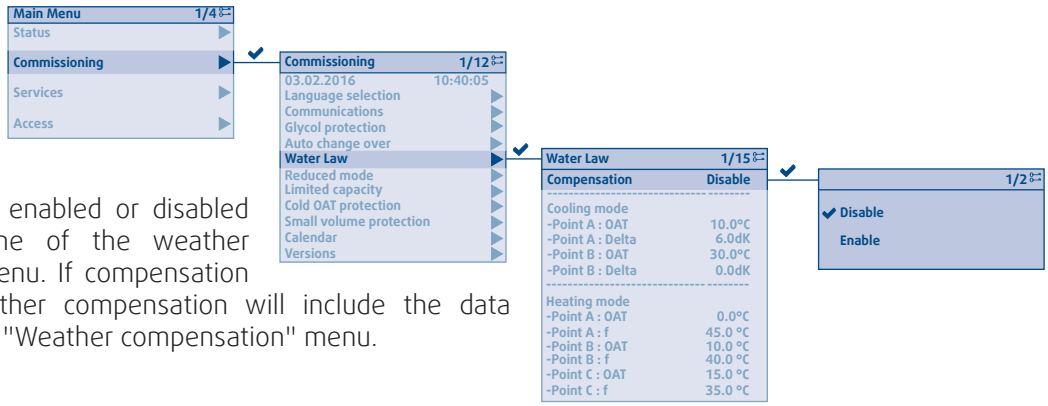
Regardless of the adjustment, the resulting setpoint is restricted to the operating limits to protect the unit.

Actual heat and cooling setpoints correspond to values used in real time, account taken of any adjustments and protections.

13.4.6. WATER LAW

The configuration of the different water law settings dynamically matches the setpoint according to the outside temperature.

The different parameters below for the water law can be set in the installation menu and by a GTC.



Compensation is enabled or disabled via the first line of the weather compensation menu. If compensation is enabled, weather compensation will include the data configured in the "Weather compensation" menu.

Caution

If the automatic heat/cool changeover mode is selected, weather compensation is enabled by default. The default weather compensation values are applied without using the weather compensation menu settings.

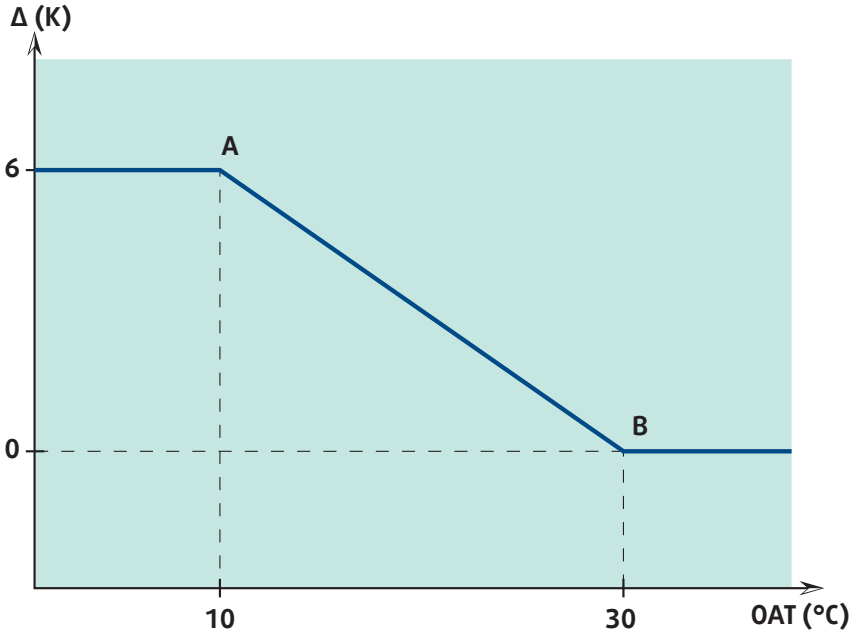
13.4.6.1. COOL MODE

The water law introduces correction Δ which depends on the OAT outside temperature:

➢ water law setpoint = cool mode temperature setpoint + Δ(OAT)

Correction Δ is restricted between 0 and 8K. It is defined by points A and B in the graph below. The values indicated are factory values.

Water Law	1/15
Compensation	Disable
Cooling mode	
-Point A : OAT	10.0°C
-Point A : Delta	6.0dK
-Point B : OAT	30.0°C
-Point B : Delta	0.0dK
Heating mode	
-Point A : OAT	0.0°C
-Point A : f	45.0 °C
-Point B : OAT	10.0 °C
-Point B : f	40.0 °C
-Point C : OAT	15.0 °C
-Point C : f	35.0 °C



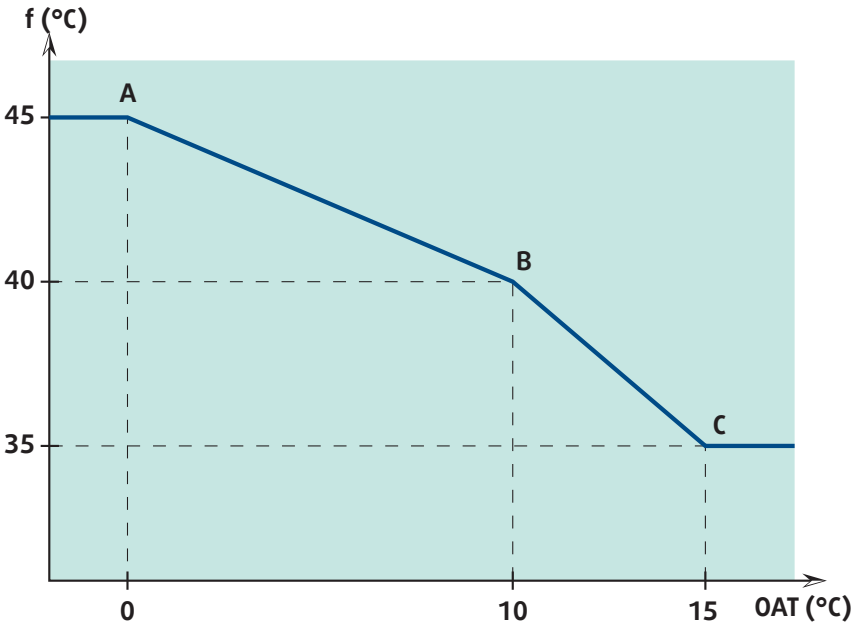
Points	Coordinates	unit	Values		
			Min	Max	Default
A	OAT	°C	10	30	10
	Δ	K	ΔB	8	6
B	OAT	°C	20	36	30
	Δ	K	0	ΔA	0

13.4.6.2. HEAT MODE

The water law replaces the heat mode setpoint with the f function of the OAT outside temperature:

➢ water law setpoint = f(OAT)

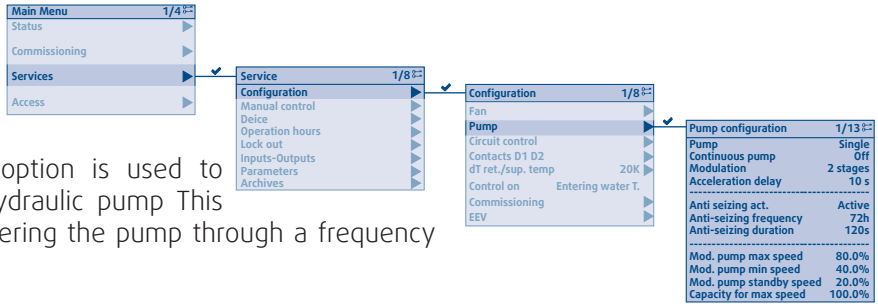
Function f is restricted between 20 and 50°C. It is defined by points A, B and C in the graph below. The values indicated are factory values.



Water Law	1/15
Compensation	Disable
Cooling mode	
-Point A : OAT	10.0°C
-Point A : Delta	6.0dK
-Point B : OAT	30.0°C
-Point B : Delta	0.0dK
Heating mode	
-Point A : OAT	0.0°C
-Point A : f	45.0 °C
-Point B : OAT	10.0 °C
-Point B : f	40.0 °C
-Point C : OAT	15.0 °C
-Point C : f	35.0 °C

Points	Coordinates	unit	Values		
			Min	Max	Default
A	OAT	°C	-20	OAT_B	0
	f	°C	f_B	50	45
B	OAT	°C	OAT_A	OAT_C	10
	f	°C	f_C	f_A	40
CC	OAT	°C	OAT_B	50	15
	f	°C	20	f_B	35

13.4.7. "VARIABLE PRIMARY FLOW" OPTION



The "Variable Primary Flow" option is used to modulate the power of the hydraulic pump This modulation is obtained by powering the pump through a frequency inverter.

Caution

The minimum frequency of the pump must not be less than the manufacturer's recommendations (e.g. 30Hz) and must ensure a sufficient rate for teh unit (Refer to the § PHYSICAL CHARACTERISTICS, page 9).

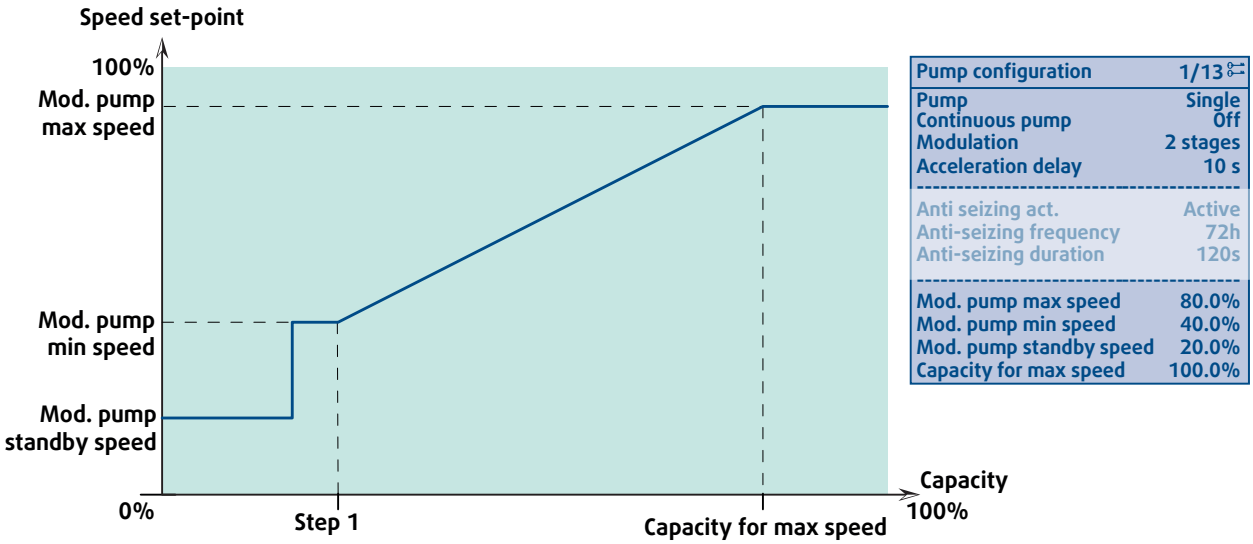
13.4.7.1. CONSTANT SPEED MODE

The pump operates at a fixed speed whatever the unit capacity. This speed is determined during commissioning to adjust the power of the pump to the load drops of the installation.

Setting	default	min	max
Mod. pump max speed	100%	0%	100%
Mod. pump standby speed	60%	0%	100%

13.4.7.2. CONSTANT SPEED MODE VS CAPACITY

The speed of the pump depends on the capacity of the unit. This speed range is determined during commissioning to adjust the power of the pump to the load drops of the installation.



Pump configuration	1/13
Pump	Single
Continuous pump	Off
Modulation	2 stages
Acceleration delay	10 s
Anti seizing act.	Active
Anti-seizing frequency	72h
Anti-seizing duration	120s
Mod. pump max speed	80.0%
Mod. pump min speed	40.0%
Mod. pump standby speed	20.0%
Capacity for max speed	100.0%

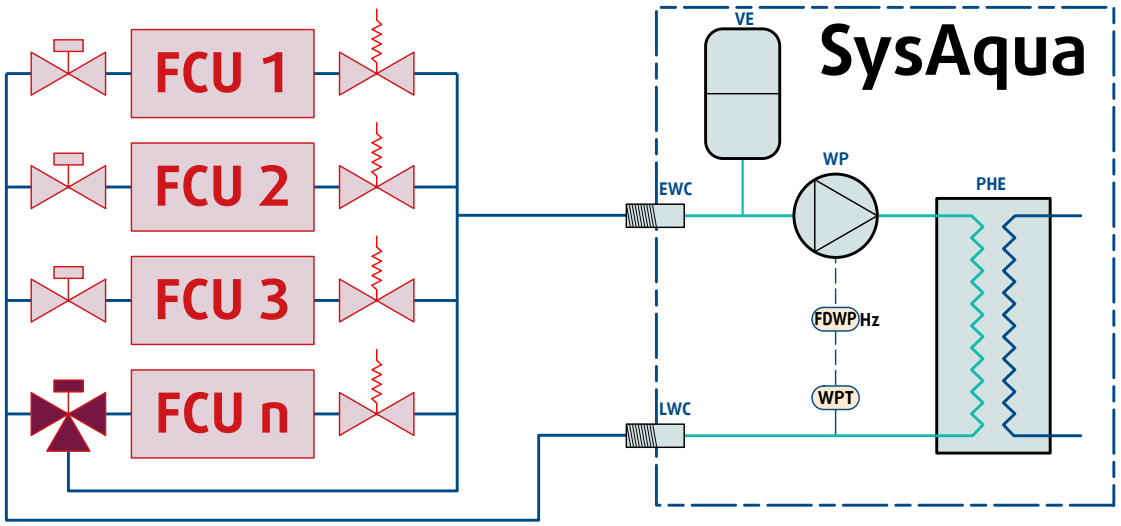
Setting	default	min	max
Mod. pump max speed	100%	0%	100%
Mod. pump min speed	70%	0%	100%
Mod. pump standby speed	60%	0%	100%
Capacity for max speed	100%	0%	100%

13.4.7.3. CONSTANT OUTPUT PRESSURE MODE

The regulation controls the pump's speed to maintain an even water pressure at the output of the unit, regardless of the number of operating terminals.

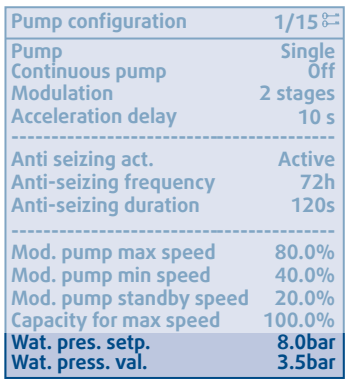
Caution

The hydraulic facility must include a system that retains the required minimum water pressure when the terminals' two-way valves are shut.



Installation of one or more three-way valves on the facility to maintain the minimum required pressure.

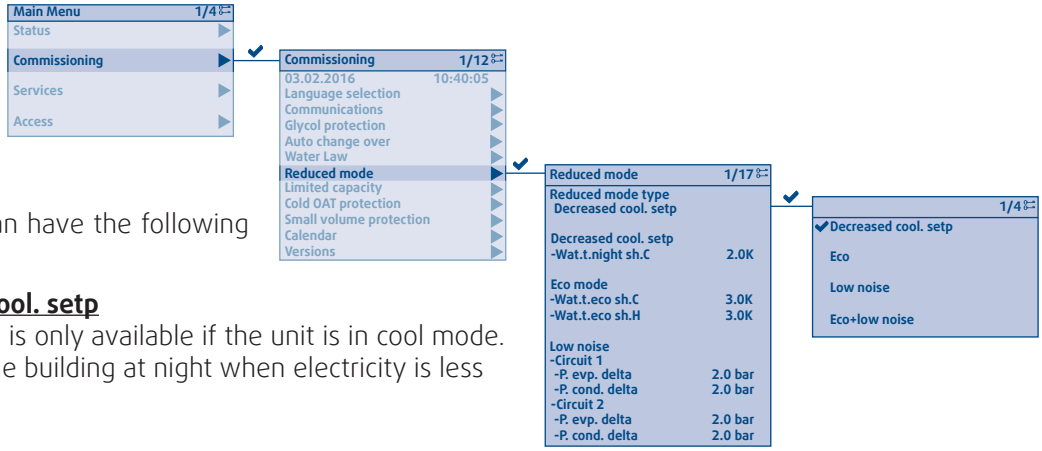
1. Set all units in demand to open all the valves (load = 100%).
2. Set the water pressure setting to a high value (example: 8.0 bar)
3. Check that the output is in line with **SYSAQUA** requirements.
4. Read the pressure value in the system (example: 3.5 bar).
5. Set the water pressure setting to the read value.



When the pressure setting is set, check that the system is operational in the following conditions:

- when in partial load, the pressure is constant.
- when at zero load (all units off), check that the pump switches to stand-by and that no water pressure alarm is triggered

13.4.8. REDUCED MODE



Reduced mode can have the following configurations:

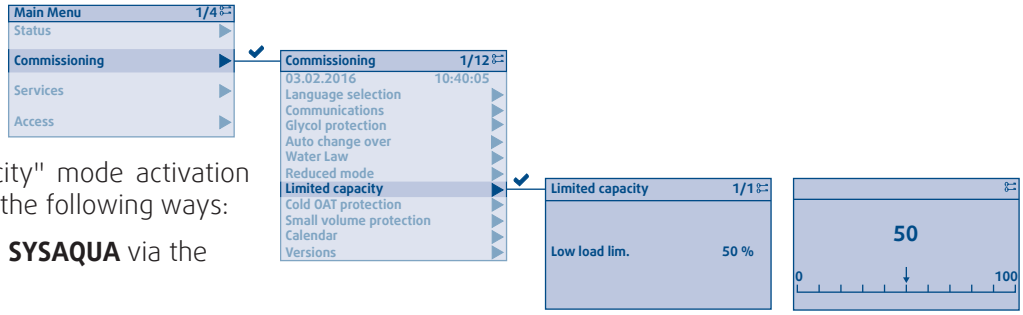
- **<u>Decreased cool. setp</u>**
  This function is only available if the unit is in cool mode. It can cool the building at night when electricity is less expensive.
- **<u>Eco</u>**
  Heat and cool setpoints are respectively lowered and raised to reduce the unit's electrical consumption.
- **<u>Low noise</u>**
  In cool mode, the condensation pressure setpoint is increased to reduce the noise generated by the ventilators.
- **<u>Eco + Low noise</u>**

The "reduced mode" mode activation can be triggered in the following ways:

- directly on the **SYSAQUA** via the user interface
- communication network (Modbus/Bacnet/Cloud)
- external dry contact D2 if entry configured.

13.4.9. LIMITED CAPACITY

Limited capacity is occasionally used to limit the electricity consumption of the **SYSAQUA** to prevent exceeding the electric power capacity of the installation site.

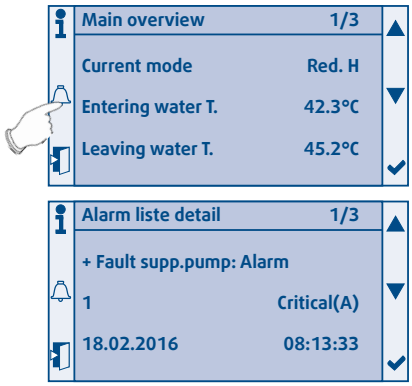


The "Limited capacity" mode activation can be triggered in the following ways:

- directly on the **SYSAQUA** via the user interface
- communication network (Modbus/Bacnet/Cloud)
- external dry contact **D2** if entry configured.

13.5. ALARMS

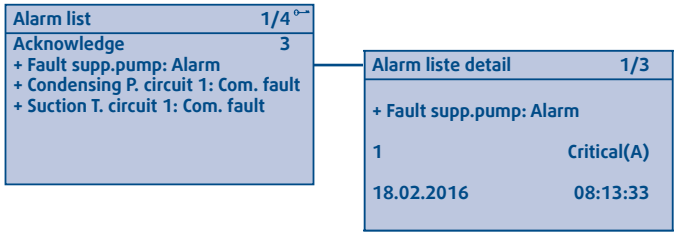
Trigger all circuit breakers. Silence the alarm.



If at least one alarm or warning is in progress, the alarm button flashes.

Press the 'Alarm' button to access the latest current alarm. The screen displays the latest alarm activated with a description, the date and time at which it occurred.

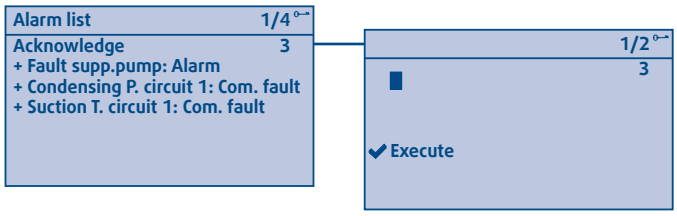
Pressing the button a second time gives access to the list of alarms and warnings that are currently active. You can scroll the alarm list and obtain details by clicking on the "Enter" button ✔. To exit the alarm detail and return to the alarm list menu, press the "Escape" button.



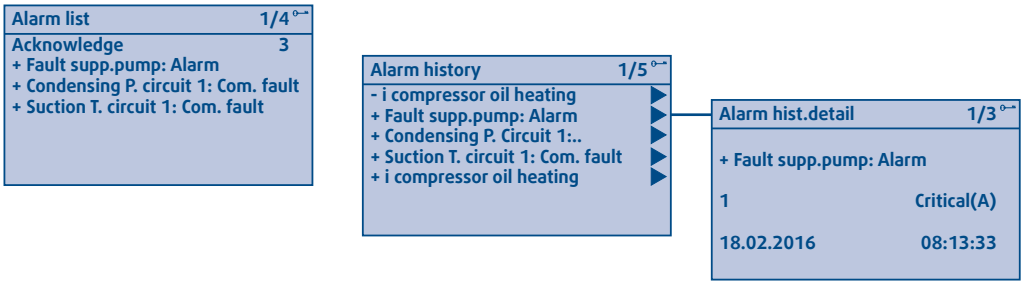
The first "Remove" line is used to remove alarms that are not active but require acknowledgment. To do this:

- ensure that you have an "Installation" or "Maintenance"' access level
- select this line, validate and select "Execute".

The number on the first line shows the number of alarms or warnings that are currently active.



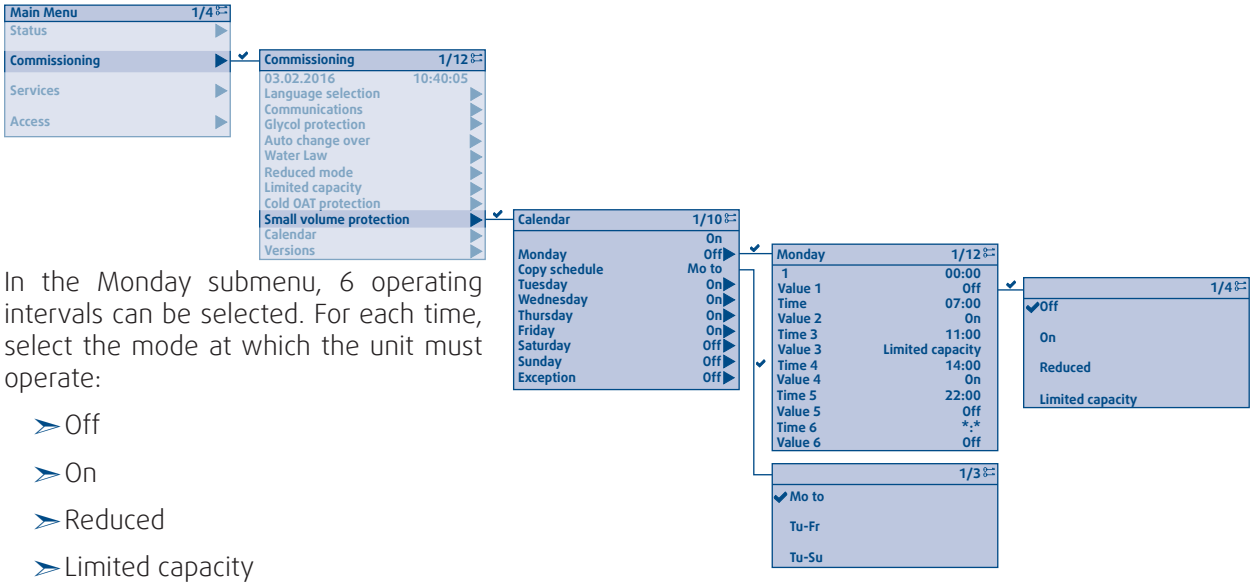
If the list of alarms is displayed, pressing the "Alarm" button takes you to the alarm history. Here again, the detail of the alarms can be displayed (max. 50).



In the alarm history, a line beginning with a **+** identifies when an alarm is activated. A line beginning with a **-** shows that the alarm was reset or acknowledged.

13.6. SCHEDULE

The first line displayed shows the current mode at the level of time programming.



In the Monday submenu, 6 operating intervals can be selected. For each time, select the mode at which the unit must operate:

- Off
- On
- Reduced
- Limited capacity

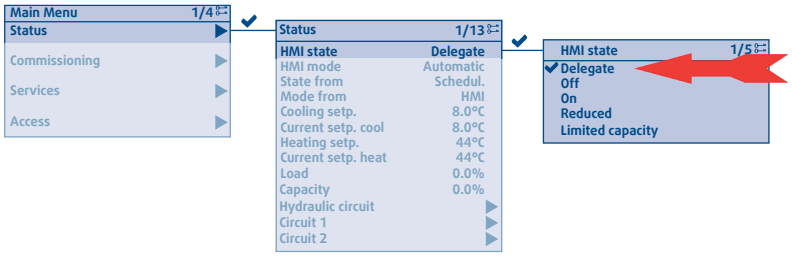
To deactivate an operating interval, configure the corresponding time as follows: *:*.

The "Copy calendar" line copies the configuration made on Monday from Tuesday to Friday or from Tuesday to Sunday.

The configuration of the weekdays can also be changed separately.

Caution

So that the mode indicated in the calendar is activated, the unit must operate in "Delegate" mode.



14. COMMISSIONING

Caution

When performing startup and service, thorough safety precautions shall always be taken.

Only qualified individuals should perform these functions.

14.1. PRE-START CHECK LIST

Before commissioning the system, you must carry out a certain number of installation checks to ensure that the appliance will operate in the best possible conditions. The following list of checks is not exhaustive and only serves as a minimum reference guide.

1. Check that the equipment installed matches the order
2. Check that the oil heating resistances have been energised for at least 12 hours.

14.1.1. VISUAL CHECK

1. Check the lack of debris or cardboard in the unit.
2. Check free clearances around the unit :
   - ✔ exchanger air intake
   - ✔ exchanger air outlet
   - ✔ access or maintenance work.
3. Unit mounted as specified.
4. Check that the unit is level and that condensates drain freely away from the unit (pouHeat pump units).
5. Check that there is no possibility of blown air being recycled through the fans due to wind exposure.
6. In arduous climates (sub-zero temperature, snow, high humidity), check that the appliance is raised 10 cm off ground.
7. For loose or missing bolts or screws.
8. For refrigerant leaks in connections and components.

14.1.2. ELECTRICAL CHECK

1. Electrical installation has been carried out according to unit wiring diagram and the Supply Authority Regulations in effect.
2. Size fuses or circuit breaker has been installed at the main switchboard.
3. Supply voltages as specified on unit wiring diagram.
4. **Check that all of the appliance's electrical connections have been tightened.**
5. Check that the electric motors are planned for the network supply voltage.
6. the cables and wires are clear of or protected from pipework and sharp edges.
7. Check the electrical grounding of the appliance.

14.1.3. HYDRAULIC CHECK

1. Check that the external water circuit components (pumps, user equipment, filters, expansion tank and reservoir if supplied) have been correctly installed in accordance with the manufacturer's recommendations and that the water inlet and outlet connections are correct.
2. Check that the water quality complies with the indicated standards (Refer to the § **WATER QUALITY**, page 17).
3. Check that venting and draining caps are properly closed.
4. **Check the presence, direction and position of the water filter upstream of the appliance (mailles ≤ 800µm).**
5. Check the presence and position of the stop valves to isolate the unit during maintenance periods.
6. Check that the hydraulic circuit is filled correctly and that the fluid flows freely without any signs of leaks or air bubbles. When ethylene glycol anti-freeze is used, check that the concentration level is correct.
7. Check that the pump liners are not stuck. The shaft of the motor must turn freely "by hand". If necessary, free up the shaft using a tool.
8. Check the direction of rotation of the pump and leave the fluid to circulate for at least 12 hours for each pump. Then clean the pump inlet water filter.
9. Adjust the water flow in order to comply with the specifications.

14.2. OPERATING CHECK LIST

14.2.1. GENERAL

Cheek for any unusual noises or vibration in the running components.

14.2.2. PHASE ROTATION PROTECTION

If the phase of the power supply are not correct, the phase rotation protection device will prevent the machine from starting.

14.2.3. ELECTRICAL

14.2.3.1. SET POINTS

1. Compressors circuit breaker settings.
2. Pump Circuit Breaker and Fan Circuit breaker settings.

NOTE : The outdoor fan motor is equiped with an internal safety device with automatic reset.

14.2.3.2. OPERATING VOLTAGE:

Recheck voltage at unit supply terminals.

14.2.3.3. CONTROL

1. Verify that on/off switch and pump 1/2 switch works perfectly.
2. Check unit is wired for correct control of unit fan, cooling and heating modes.
3. Verify all sensor values available with the controller display.

14.2.4. COMPRESSOR AND REFRIGERATION SYSTEM

1. Running check: Start the compressor. Check for any unusual noise or vibration.
2. Operating Pressures: Operate the unit for at last 20 minutes and ensure that the refrigerant pressures are stabilised, and cheek that they are within the normal operating ranges.
3. Operating Temperature: Check discharge, suction and liquid temperatures.
4. Discharge temperature on cooling cycle should normally not exceed 115°C.
5. Suction superheat should be 6K ±2K.

14.2.5. HYDRAULIC CIRCUIT

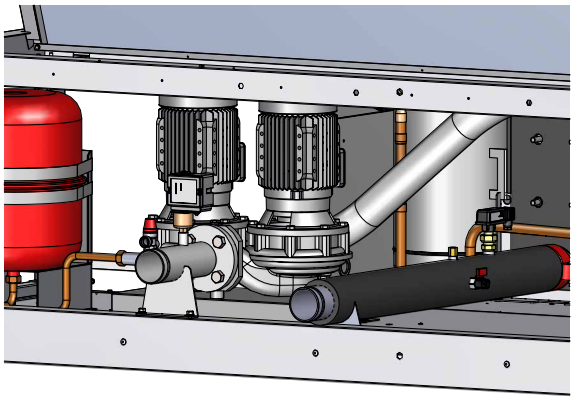
1. Check the filter's cleanliness
2. Check the presence and position of the stop valves to isolate the unit during maintenance periods
3. Adjust the water flow to specifications. (see graphs appended).
   - ✔ Check pressure at the inlet and outlet of the plate exchanger
   - ✔ Determine the water flow using a flowmeter or the load loss of the plate exchanger
4. Check the installation is protected against frost (heat insulation, glycol ethylene percentage of the unit if its presence is necessary...)
5. Check that the bleeder present in the unit has actually been opened.

The unit must work with a water flow rate in agreement with recommended values displayed in the tablein § **PHYSICAL CHARACTERISTICS**, page 9. Running the unit with a low water flow is dangerous, as it could result in irreversible damage to the components as well as to the plate exchanger. If the unit is run with insufficient flow, its performance will not be optimum.

14.2.5.1. PUMP MANAGEMENT

The pump operates as long as the **SYSAQUA** is not in Off mode.

For the double pump option, the pumps never operate simultaneously. The operating priority is given to the first pump motor. The second pump motor backs up the first in the event that it becomes faulty.



The first pump motor will be stopped and replaced automatically by the second motor in the following situations:

- First motor issued order but no flow is detected
- Thermal security of the first motor is activated.

The pump motors are identified by numbers 1 and 2.

If the pump fails, the unit is shut down. These failures can be:

- External pump: no flow detected
- Single pump:
  - ✔ Pump activated and no flow
  - ✔ Thermal protection of the pump activated
- Double pump:
  - ✔ Second pump motor activated and no flow
  - ✔ Thermal protection of the two motors activated

14.2.6. FINAL CHECK

1. All panels and fan guards are in place and secured.
2. Unit clean and free of remainder installation material.

15. IN CASE OF WARRANTY - MATERIAL RETURN PROCEDURE

Material must not be returned without permission of our After Sales Department.

To return the material, contact your nearest sales office and ask for a "return form". The return form shall be sent with the returned material and shall contain all necessary information concerning the problem encountered.

The return of the part is not an order for replacement. Therefore, a purchase order must be entered through your nearest distributor or regional sales office. The order should include part name, part number, model number and serial number of the unit involved.

Following our personal inspection of the returned part, and if it is determined that the failure is due to faulty material or workmanship, and in warranty, credit will be issued on customer's purchase order. All parts shall be returned to our factory, **transportation charges prepaid**.

16. ORDERING SERVICE AND SPARE PARTS ORDER

The part number, the order confirmation and the unit serial number indicated on the name plate must be provided whenever service works or spare parts are ordered.

For any spare part order, indicate the date of unit installation and date of failure. Use the part number provided by our service spare parts, if it not available, provide full description of the part required.

17. MAINTENANCE

Caution

The user is responsible for ensuring that the unit is in perfect working order and that the technical installation and **minimum maintenance** operations have been performed by a qualified technician in accordance with the procedures described in the present manual.

Depending on actual operational constraints and regulatory changes, the installer might recommend increased maintenance operations and more frequent inspections.

Simple preventive maintenance ensures longevity of your **SYSAQUA** :

- Better refrigeration performance
- Reduced power consumption
- Accidental component breakage prevention
- Prevention of heavy, late, and expensive interventions
- Environment protection

Caution

All refrigerating fluid charging, sampling and draining operations must be performed by a skilled technician using equipment adapted to the unit, in agreement with authority regulation in effect on site.

Any inappropriate handling may cause uncontrolled fluid venting into the atmosphere.

Warning

Isolate unit from power supply before working on unit.

Warning

Opening the refrigeration circuit then involves vacuum drawing, checking the circuit sealing and recharging refrigerating fluid. For any intervention on the refrigerating fluid circuit, first drain the unit's charge using a refrigerating fluid collection station.

17.1. WEEKLY CHECK

Inspect the entire running installation, while paying particular attention to :

- any damage on the **SYSAQUA** housing
- any traces of oil (sign of refrigerating fluid leak)
- any water leak
- the presence of removed protections, doors or lids improperly closed
- the coil's cleanliness.

Check:

- the oil level of the compressors (use sight glass on the oil equalization pipe of compressor tandems)
- the humidity rate of the refrigerating fluid using the fluid indicator
- the operating pressure of the installation
- the water temperature at the plate exchanger inlet and outlet.

When the **SYSAQUA** is running, perform a sound check of the compressors, pump and fans. Also check that no vibration can cause breakage or wear by vibrating contact.

17.2. PERIODIC TABLE OF SERVICE AND MAINTENANCE

TASKS PER COMPONENTS		ACTIONS	1 month	3 months	6 months	12 months	24 months
			Recommended inspection and maintenance interval				
1 - Casing							
1.1	Control possible contaminations, damage and/or corrosion.	Clean and repair if required.				✘	
1.2	Check the possible presence of water (condensates, leakages,...).	Clean and look for the cause, then repair.			✘		
1.3	Verify thermal insulation aspect	Replace if required.				✘	
1.4	Check the state of the anti-vibration pads	Replace if required.				✘	
1.5	Check the condition of door gasket.	Replace if required.	At each inspection				
2 - REFRIGERANT CIRCUIT							
2.1	Verify oil compressor level when compressors are off			✘			
2.2	Check the lack of gas bubbles in the fluid line			✘			
2.3	Check the lack of humidity in the refrigerating fluid			✘			
2.4	Check the pipes or capillaries do not rub and vibrate.				✘		
2.5	Check the compressors do not emit abnormal noise or vibration.			✘			
2.6	Check the backflow temperature.		✘				
2.7	Record the operating pressure	Check it is above or below those recorded when the unit was started up.	✘				
2.8	Check the compressor fastening screws are tight.				✘		
2.9	Check the crankcase heater are powered on during the stop cycle.		✘				
2.10	Check the cleanliness of the coil.	Clean if required.		✘			
2.11	Test the oil for contamination.	Change the oil if required.				✘	
2.12	Check the filter drier clogging.	Replace if required		✘			
2.13	Check the operation of the high pressure switch.	Replace if required	✘				
2.14	Check the lack of refrigerating fluid leak (visuel + détecteur si nécessaire)	Repair				✘	
2.15	Check the cycle reversal valve				✘		
2.16	Check the condition of the anti-vibration studs	Replace if required			✘		
3 - HYDRAULIC CIRCUIT							
3.1	Check the state of the function, check there is no damage nor corrosion.	Clean and repair.		✘			
3.2	Check the condition of the exchanger, in terms of corrosion and functionality.	Clean and repair.			✘		
3.3	Check the tightening of the pipe connections and fastening	Readjust and repair if necessary.				✘	
3.4	Verify the pressure value of the hydraulic circuit					✘	
3.5	Bleed the air.					✘	
3.6	Run the isolation valves						
3.7	Check there is no ice set.					✘	
3.8	Check the state of the piping thermal insulation.	Repair and replace if required.					
3.9	Check the frost protection devices (glycol-based water, thermostat, ...).	Repair and replace if required. When air temperatures are wintery, and after general stoppage of the installation, the water contained in the plate exchanger may freeze. To prevent such problems, fully drain the unused plate exchanger or protect it by pouring an antifreeze solution into the hydraulic circuit or other devices. ⚠ The manufacturer waives any liability for damage to the plate exchanger caused by water freezing inside the unit.	Whenever there is a risk of freezing				

TASKS PER COMPONENTS		ACTIONS	1 month	3 months	6 months	12 months	24 months
			Recommended inspection and maintenance interval				
3.10	Check filter cleanliness.	Clean	✘				
3.11	Check that the hydraulic circuit is filled properly		✘				
3.12	Check the condition of the expansion tank (presence of excess corrosion, or gas pressure loss)	Replace if required.	✘				
3.13	Check the water pump	If the unit has not been used for a long time, manually rotate the pump shaft and check that it turns freely. For a unit equipped with a double pump, it is recommended to switch from one pump to the other every month or to check that the pump shaft turns freely to prevent the liners sticking.	✘				
		Change the pump liner after 15,000 hours running with anti-freeze or 25,000 hours running with water.		✘			
3.14	Verify that low water pressure sensor works perfectly		✘				
3.15	Record the water temperatures at the plate exchanger inlet and outlet.		✘				
4 - ELECTRIC CIRCUIT							
4.1	Check the electrical voltage applied to the unit, which must remain stable within the tolerances specified in the information plates.			✘			
4.2	Check that the main supply cable is void of alterations likely to impact the insulation.	Replace if required.		✘			
4.3	Check the grounding of the metallic structure	Repair if required.	✘				
4.4	Inspect the contacts.	Replace if required.	✘				
4.5	Check that all electrical connections of the device are tight	Tighten if required.	✘			✘	
4.6	Check the thermal protection relays of the motors	Replace if required.	✘				
4.7	Check the nominal intensity and condition of the fuses.		✘				
4.8	Check the condition of the condensers.		✘				
4.9	Clean the compressed air electrical unit to remove any dust or other contaminants building up.			✘		✘	
4.10	Check the motor windings are insulated.			✘			
5 - FAN(S)							
5.1	Check the lack of contamination, corrosion or damage.	Clean if required			✘		
5.2	Check proper fastening of the fan.	Tighten if required.			✘		
5.3	Check the vanes to guarantee balancing.	Clean if required.				✘	
5.4	Check the bearings for noise.	Repair if required.	✘				
5.5	Check the condition of the grease and greasers (unless if permanently lubricated).	Re-grease if required (Lithium soap grease DIN 51825-K3N for fans type K, K1, K2).		T>70 °C	✘		
5.6	Check the condition of the fan motor.			✘			
6 - REGULATION							
6.1	Check the condition of the alarms	Acknowledge them after taking them into consideration	✘				
6.2	Check the setting points		✘				
6.3	Check the operation of all probes		✘				

17.3. MAINTENANCE PROCEDURES

17.3.1. REFRIGERANT CIRCUIT

This equipment must be submitted to sealing checks **minimum once per year, by a professional authorized to perform such an operation**. Refer to national requirements for the frequency of these checks.

Caution

Never use the compressor as a vacuum pump to drain the installation.

17.3.1.1. REFRIGERATING FLUID CHARGE

Run the unit in refrigerating mode to determine whether the group's charge is correct by checking actual sub-refrigeration.

17.3.1.2. COMPRESSOR OIL

Oil for refrigeration equipment is light and transparent. It maintains its colour for a long operating period.

As a refrigeration system designed and installed properly will run without problem, the compressor oil does not require replacement, even after a long operating period.

Blackened oil has been exposed to impurities in the refrigeration piping system, or excess temperatures on the compressor backflow side, which inevitably degrades oil quality. Blackening oil or degradation of its qualities may also be caused by humidity in the system. Change the oil when its colour changes or when it is degraded.

In this case, before restarting the unit, the refrigeration circuit must be emptied.

Caution

Compressors use polyester oil. During maintenance interventions on the compressor, or if the refrigeration circuit has to be opened in any point, do not forget that this type of oil is highly hygroscopic, and avoid exposing it to the atmosphere during long periods, which would require to change the oil.

Warning

Protect the **SYSAQUA** frame so as to get back oil that could flow out accidentally.

17.3.1.3. FILTER DRIER

Refrigeration circuits are fitted with filters drier.

The fluid indicator is used to check the refrigeration flow and humidity rate of the refrigerating fluid. The presence of bubbles indicates that the filter drier is clogged or the charge insufficient.

In this event, even after cleaning the cartridge, the air bubbles remain, which means that the system has lost part of its refrigerating fluid in one or several points, which must be detected and repaired.

The glass window contains a colour indicator. Comparing the indicator colour with the scale present on the glass window allows to calculate the humidity rate of the refrigerating fluid. If excessive, change the filter cartridge, run the system for one day, then check the humidity rate again.

A humidity rate within the preset limits requires no further intervention. If the humidity rate remains too high, change the filter drier again, start the unit, and run it for another day.

17.3.1.4. AIR COOLED CONDENSER

Caution

Fin edges are sharp and can cause injury hazard. Avoid contact with them.

Condenser coils are composed of copper tubes and aluminium fins. In case of leaks due to damage or shock, the coils must be repaired by one of the authorized Support Centres. To guarantee the best possible operation of the condenser bank, the condenser surface must be maintained as clean as possible, and it must be void of foreign materials (leaves, wires, insects, slag, etc.). A dirty coil will see its absorbed electrical power increase. In addition, condensation pressure could increase and trigger a high pressure alarm.

Clean the air exchanger using a special product for aluminium-copper coils and rinse with water. Do not use hot water nor steam, as these may increase the refrigerating fluid's pressure.

Caution

Avoid damaging the aluminium fins during cleaning. Never use pressurized water without a wide diffuser. Concentrated and/or rotating water jets are strictly forbidden.

17.3.2. HYDRAULIC CIRCUIT

17.3.2.1. PLATE HEAT EXCHANGEUR

Verify the pressure difference between the inlet and the outlet of the heat plate exchanger. If the water pressure and flow rate values do not correspond to the pressure loss curves available in § **PRESSURE LOSSES**, page XIII , the heat plate exchanger may be foul up. To clean it, use a non corrosive solvent to remove calcareous deposits. The equipment used for the external water flow, the quantity of solvent and safety measures applied must be approved by the company supplying the cleaning products, or the one performing these operations.

17.3.2.2. WINTER PROTECTION

A frost protection system is built into the **SYSAQUA** control system. By default when the **SYSAQUA** is in stand-by, the control can trigger the pump to operate from the anti-freeze resistance of the plate heat exchanger.

Caution

During winter, the SYSAQUA must remain on to ensure protection against frost.

In winter, if a general shutdown of the installation is programmed, there may be a risk that the water in the hydraulic circuit could freeze.

To prevent any problem, it is recommended to fully drain any circuits not used and to pressurize them with nitrogen or protect them by adding an anti-freeze solution or other measures.

The anti-freeze concentration must be checked regularly and carefully before each winter season.

Caution

The manufacturer waives any liability for damage of a plate exchanger caused by water freezing of water contained inside does not engage the responsibility of the manufacturer with respect to this incident (Low winter temperature or water start temperature below 5°C in summer mode).

CAUTION

BEFORE CARRYING OUT ANY OPERATION ON THE EQUIPMENT, CHECK THAT THE ELECTRICAL POWER SUPPLY IS SWITCHED OFF AND THAT IT CANNOT BE SWITCHED ON INADVERTENTLY.

IT IS RECOMMENDED THAT THE DISCONNECT SWITCH BE PADLOCKED

18. TROUBLE SHOOTING

Problem	Probable cause	Solution
Unit operates continuously but without generating cooling	Insufficient refrigerant fluid charge.	Top up the refrigerant fluid charge.
	Clogged dehumidification filter.	Replace the dehumidification filter.
	Reduced output from one or both circuits	Check the compressor valves and change them if necessary.
Frozen intake line	The overheating setting on the thermostatic pressure relief valve is too low.	Increase the setting.
		Check the refrigerant fluid charge
Excessive noise	Vibrating pipe work	Attach the pipe work correctly. Check the pipe work attachments.
	Whistling noise from the thermostatic pressure relief valve	Top up the refrigerant fluid charge.
		Check and replace the dehumidification filter if necessary.
	Noisy compressor	Check the condition of the valves. Seized bearings. Replace the compressor Check the tightness of the compressor attachment nuts.
Low oil level in the compressor	Presence of one or several oil or gas leaks in the circuit	Locate and repair the leaks
	Mechanical compressor damage.	Contact an approved Service Centre.
	Sump oil heater resistance fault.	Check the electrical circuit and the condition of the resistance. Replace defective parts if necessary.
One or both compressors do not operate.	Electrical circuit cut.	Check the electrical circuit and seek out any grounding and/or short- -circuits. Check the fuses.
	High pressure pressostat activated.	Reset the pressostat from the control panel and restart the unit. Identify and eliminate the causes of this activation.
	Control circuit fuse blown.	Check the control circuit and seek out any grounding and/or short-circuits. Replace the fuses.
	Connection problem	Check the tightness of all the electrical connection terminals.
	Electrical circuits thermal protection cuts in.	Check the operation of the control and safety devices. Identify and eliminate the cause of the activation.
	Incorrect wiring.	Check the wiring of the control and safety devices.
	Mains voltage too low.	Check the power line. Eliminate any possible problems associated with the system. If the problem is due to the network, inform the Electricity Company.
	Compressor motor short-circuited.	Check the continuity of the motor winding.
	Compressor seized	Replace the compressor.

Problem	Probable cause	Solution
Circuit stoppage further to the low pressure thermostat being activated.	Presence of a leak.	Identify and repair the leak.
	Insufficient refrigerant fluid charge.	Top up the refrigerant fluid charge.
	Pressostat operating fault.	Replace the pressostat.
Circuit stoppage further to the high pressure thermostat being activated.	Incorrect operation of the high pressure pressostat.	Check the operation of the pressostat. Replace it if required.
	Outlet valve partially closed.	Open the valve. Replace it if required.
	Non-condensable particles in the circuit.	Bleed the circuit
	Condenser fan(s) not operating.	Check the wiring and the motors. Repair and replace if required.
Liquid line too hot	Insufficient refrigerant fluid charge.	Locate and eliminate the causes of charge losses and top up the refrigerant fluid charge.
Liquid line frozen	Liquid line valve partially closed.	Checking the opening of all the valves.
	Clogged dehumidification filter.	Replace the filter cartridge.
Fans do not operate.	Electrical circuit problems.	Check the connections.
	Internal circuit thermal cut-out activated.	Contact an approved Service Centre.
Reduced output in both Heating and Cooling mode	Compressor operating fault	Contact an approved Service Centre.
	Dirt in the evaporator water circuit.	Chemical cleaning of the evaporator water circuit.
	Condenser battery blocked.	Clean the condenser battery.
	Insufficient refrigerant fluid charge.	Top up the refrigerant fluid charge.
Evaporator heater is not operating.	No power supply.	Check the main fuse and the auxiliary fuses.
	Heater circuit open	Check the heater and replace if required.
No/ little control over water temperature.	Incorrect thermostat setting.	Check the temperature setting on the control panel.
	Incorrect temperature differential between evaporator inlet and outlet.	Check the water flow and the quantity of liquid in the water circuit.
	Electronic control system malfunction.	Contact an approved Service Centre.
Insufficient water circulation.	Air in the circuit	Bleed the air via the safety valve.
	Deposits or impurities in the evaporator.	Wash out the evaporator by back-flushing.
Unit not operating, no alarm activation	Water circulation fault	Check the pump.
	Flow controller inoperable.	Check the flow controller.
	Differential pressostat inoperable.	Check the differential pressostat.

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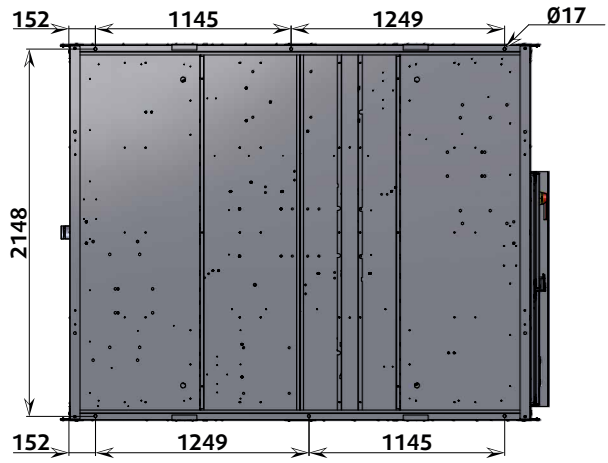
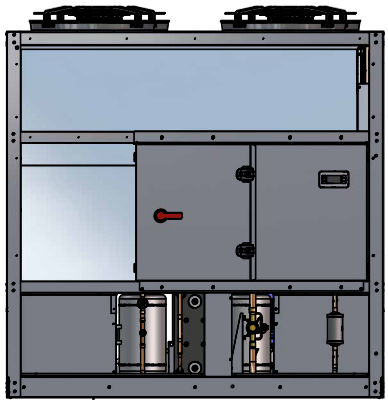
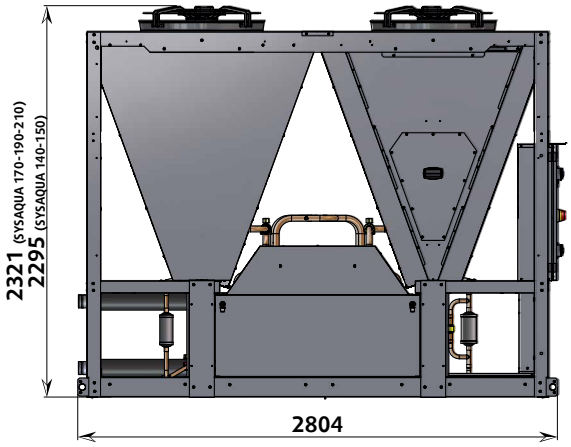
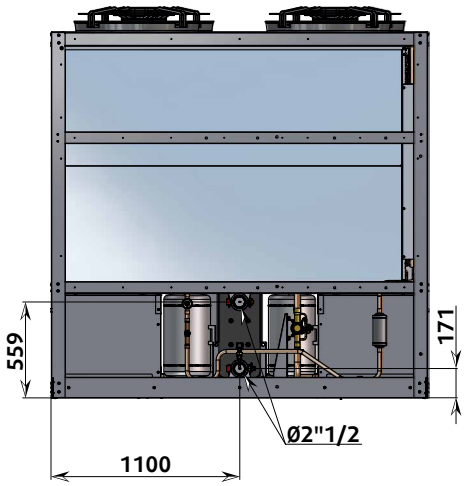
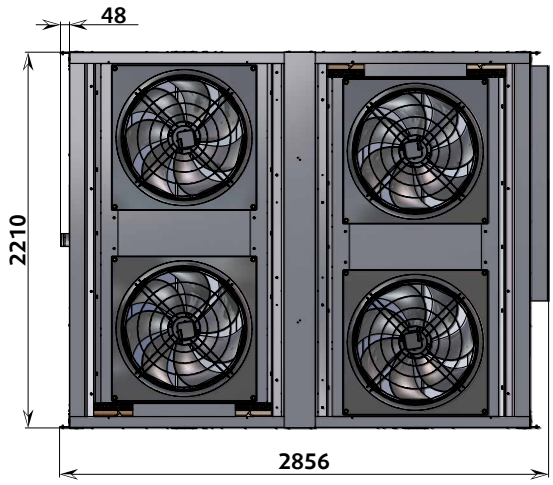
SYSAQUA WITHOUT PUMP

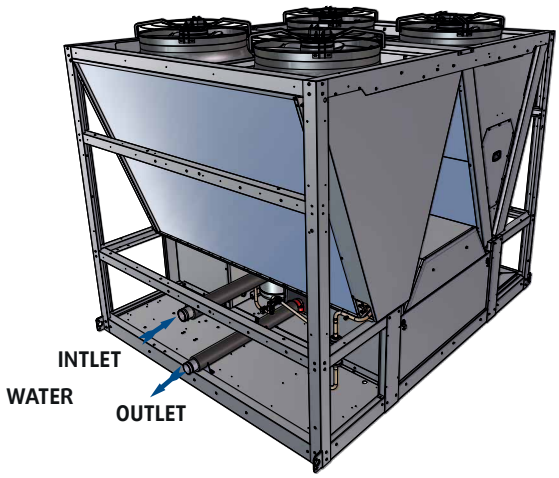




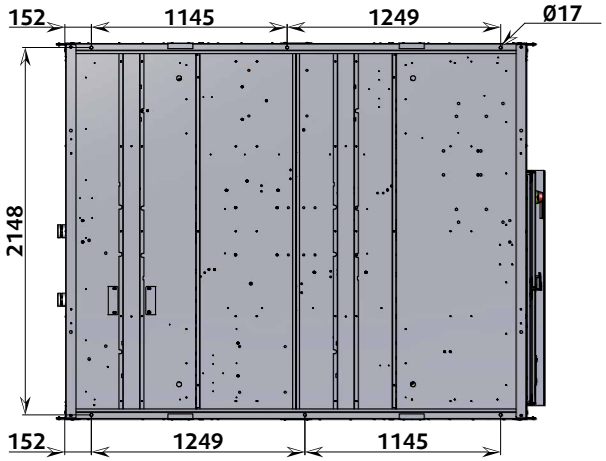


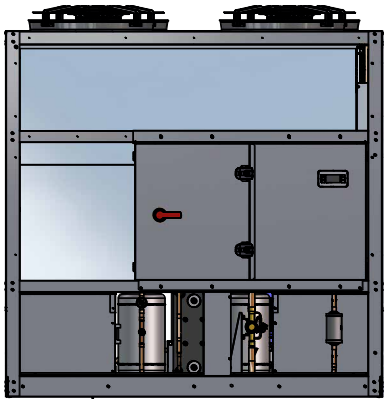


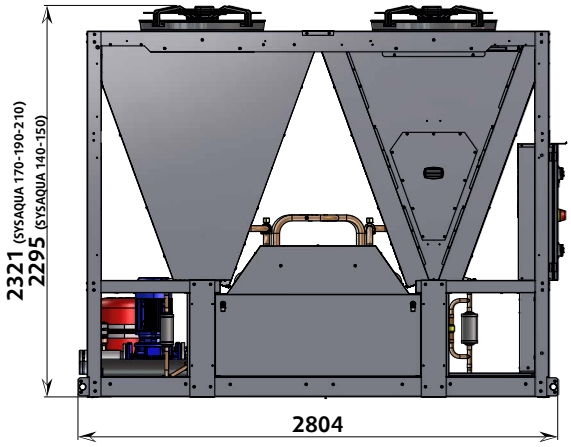


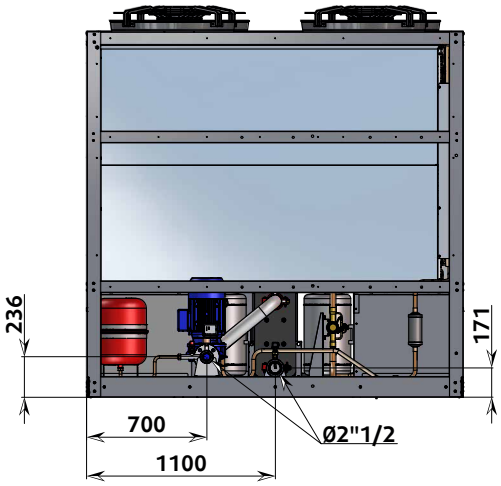


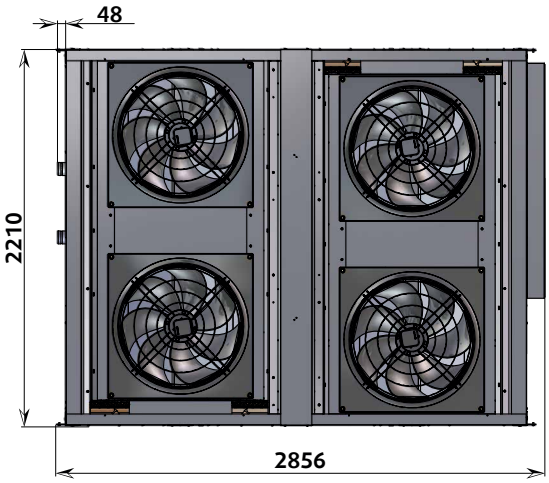
SYSAQUA WITH 1 PUMP

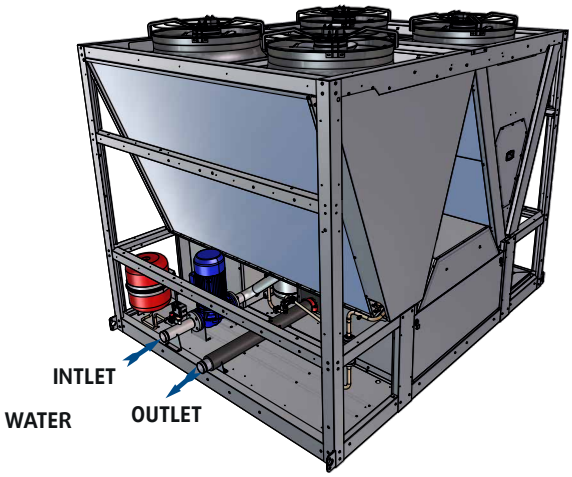




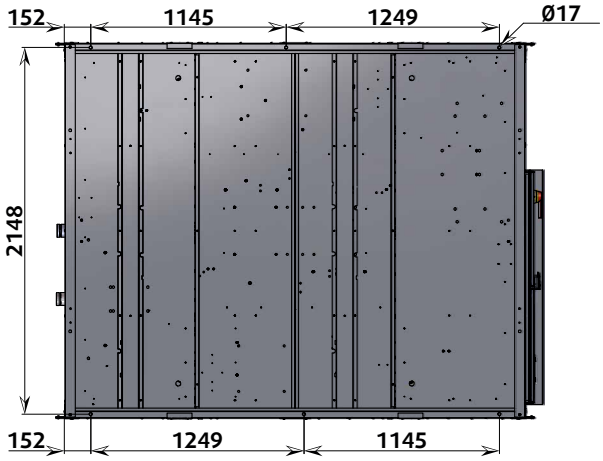


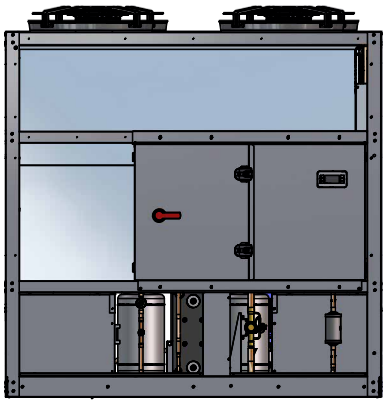


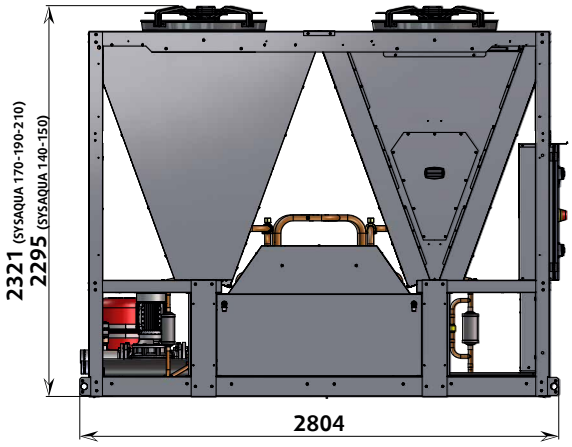


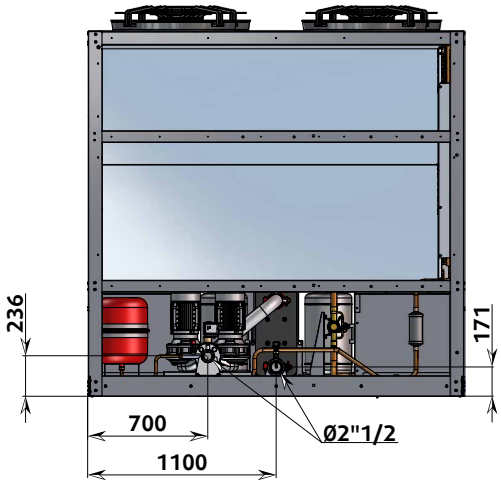


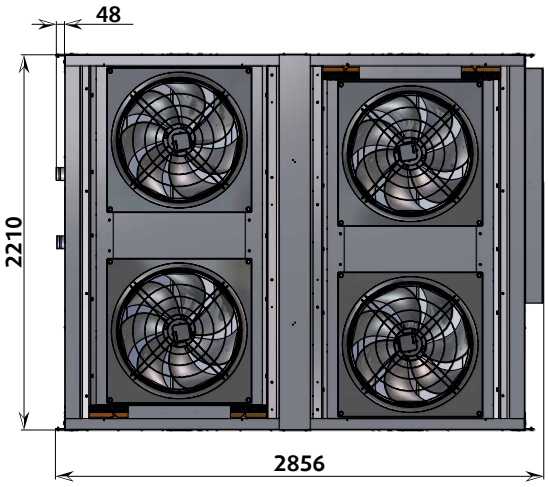
SYSAQUA WITH 2 PUMPS

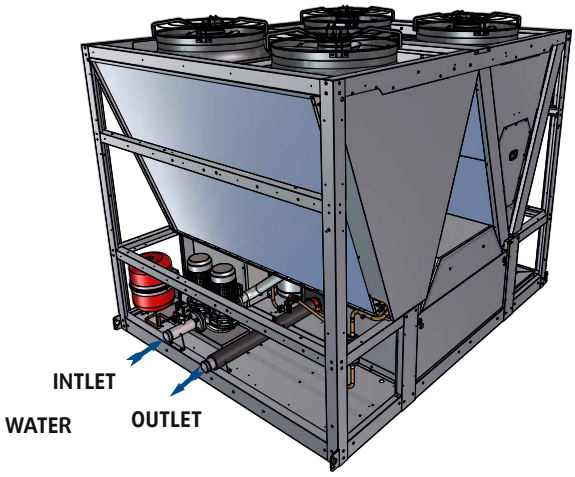




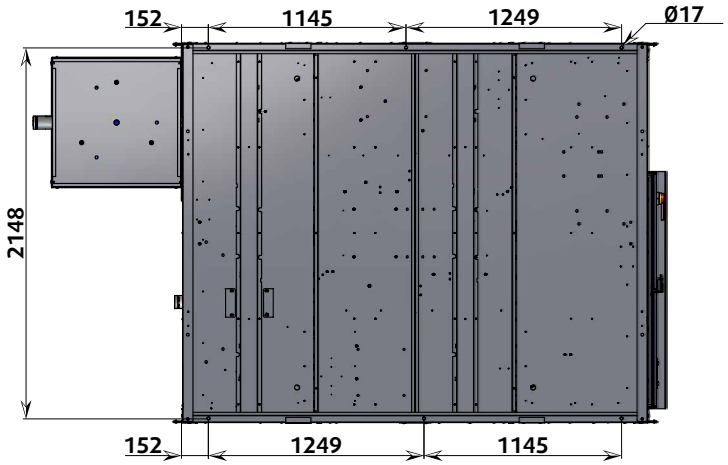


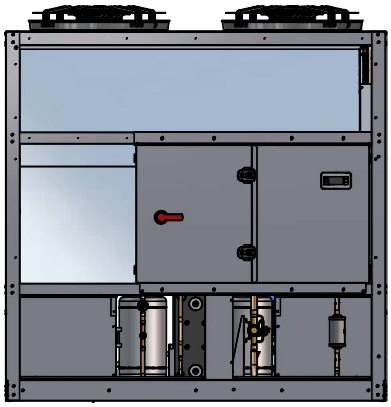


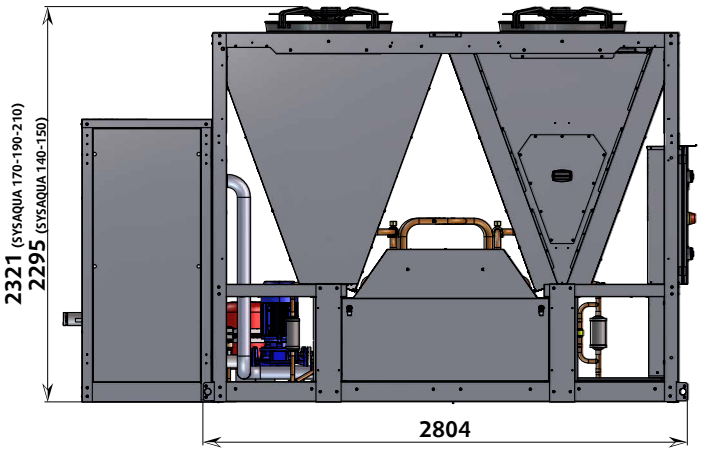


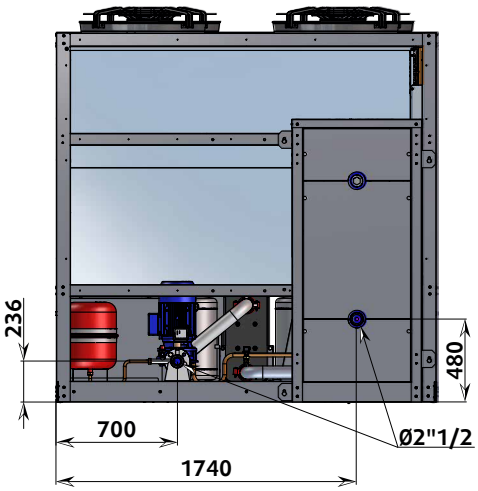


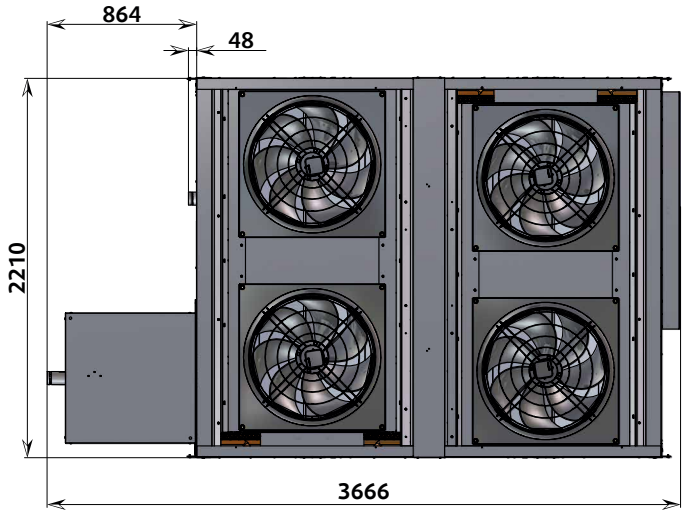
SYSAQUA WITH 1 PUMP AND BUFFER TANK

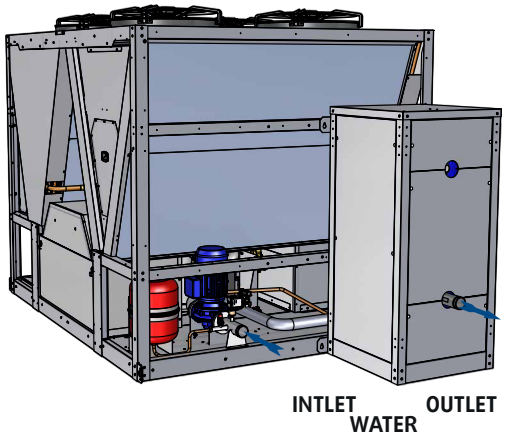




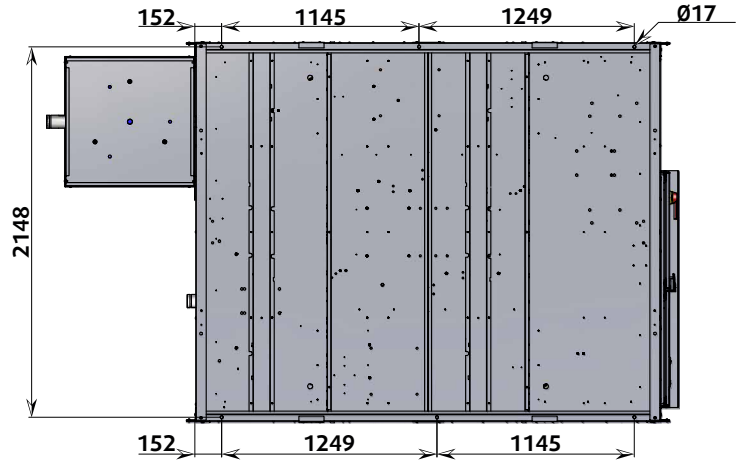


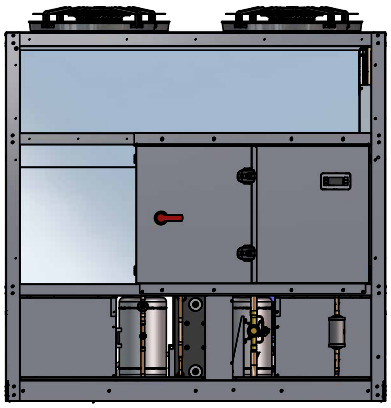


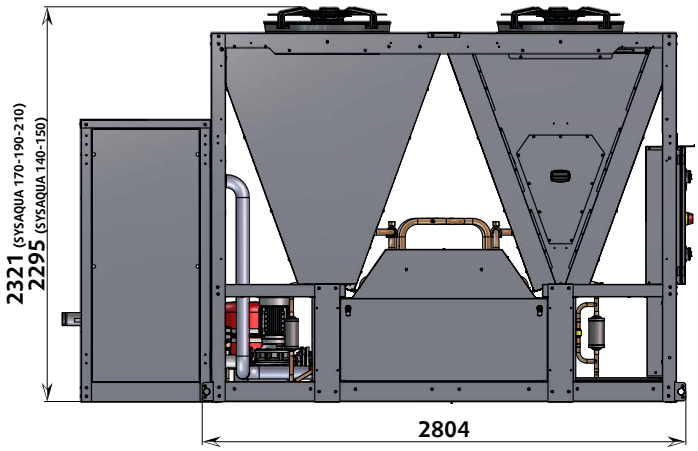


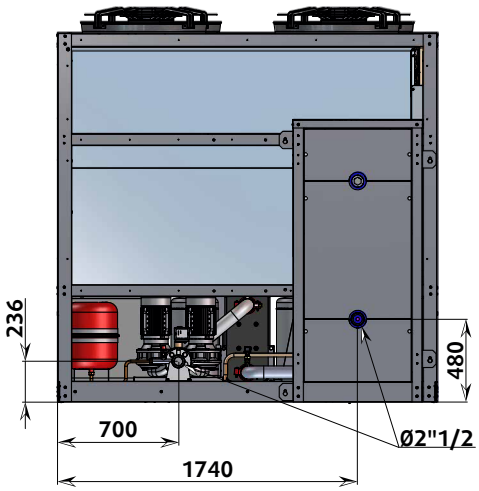


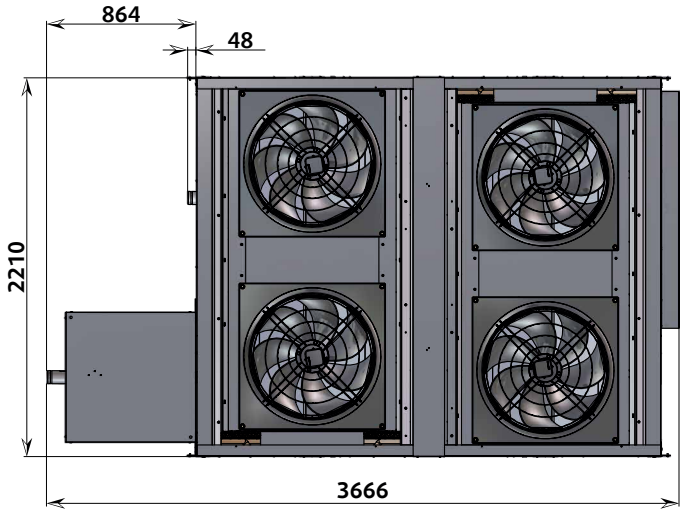
SYSAQUA WITH 2 PUMPS AND BUFFER TANK

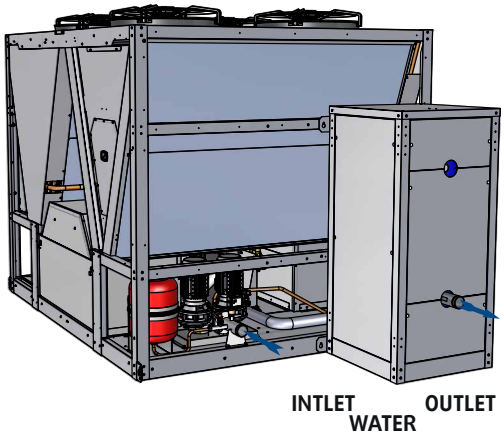












REFRIGERANT CIRCUIT DIAGRAM
SCHEMA DU CIRCUIT FRIGORIFIQUE
KÄLTEKREISLAUFDIAGRAMM
SCHEMA DEL CIRCUITO REFRIGERANTE
ESQUEMA DEL CIRCUITO FRIGORIFÍCO

English

M1-1	circuit 1	Compressors 1
M1-2	circuit 1	Compressors 2
M2-1	circuit 2	Compressors 1
M2-2	circuit 2	Compressors 2
RV1 RV2	circuit 1 circuit 2	Cycle reversal valve
OFA/B OFC/D	circuit 1 circuit 2	Outdoor fans motor
3-1 3-2	circuit 1 circuit 2	Air condenser
4-1 4-2	circuit 1 circuit 2	Filter drier
5-1 5-2	circuit 1 circuit 2	Sight glass
6-1 6-2	circuit 1 circuit 2	Electronic expansion valve
7-1 7-2	circuit 1 circuit 2	liquid receiver
8		Plate heat exchanger
		Pressure tapping point 5/16"
FPC1 FPC2	circuit 1 circuit 2	High pressure transducer
HP1 HP2	circuit 1 circuit 2	High pressure switch
CDT1 CDT2	circuit 1 circuit 2	Discharge temperature sensor
FPE1 FPE2	circuit 1 circuit 2	Low pressure transducer
CST1 CST2	circuit 1 circuit 2	Suction temperature sensor
OCT1 OCT2	circuit 1 circuit 2	Condenser outdoor temperature sensor
OAT		Outdoor air temperature sensor

Français

M1-1	circuit 1	Compresseurs 1
M1-2	circuit 1	Compresseurs 2
M2-1	circuit 2	Compresseurs 1
M2-2	circuit 2	Compresseurs 2
RV1 RV2	circuit 1 circuit 2	Vanne inversion de cycle
OFA/B OFC/D	circuit 1 circuit 2	Moteur de la ventilation extérieure
3-1 3-2	circuit 1 circuit 2	Condenseur à air
4-1 4-2	circuit 1 circuit 2	Filtre déshydrateur
5-1 5-2	circuit 1 circuit 2	Voyant liquide
6-1 6-2	circuit 1 circuit 2	Détendeur électronique
7-1 7-2	circuit 1 circuit 2	Bouteille accumulation liquide
8		Evaporateur à plaques
		Prise de pression 5/16"
FPC1 FPC2	circuit 1 circuit 2	Transducteur haute pression
HP1 HP2	circuit 1 circuit 2	Pressostat haute pression
CDT1 CDT2	circuit 1 circuit 2	Sonde température refoulement
FPE1 FPE2	circuit 1 circuit 2	Transducteur basse pression
CST1 CST2	circuit 1 circuit 2	Sonde température d'aspiration
OCT1 OCT2	circuit 1 circuit 2	Sonde température de condensation
OAT		Sonde température air extérieur

Deutsch

M1-1	Kreislauf 1	Kompressor 1
M1-2	Kreislauf 1	Kompressor 2
M2-1	Kreislauf 2	Kompressor 1
M2-2	Kreislauf 2	Kompressor 2
RV1 RV2	Kreislauf 1 Kreislauf 2	Umkehrzyklusventil
OFA/B OFC/D	circuit 1 circuit 2	Motor der externen Lüftung
3-1 3-2	Kreislauf 1 Kreislauf 2	Verflüssigerbündel
4-1 4-2	Kreislauf 1 Kreislauf 2	Filtertrockner
5-1 5-2	Kreislauf 1 Kreislauf 2	Schauglas
6-1 6-2	Kreislauf 1 Kreislauf 2	Elektronisches Expansionsventil
7-1 7-2	Kreislauf 1 Kreislauf 2	Fluessigkeitssammler
8		Plattenverdampfer
		5/16" Druckanschluss
FPC1 FPC2	Kreislauf 1 Kreislauf 2	Hochdruckgeber
HP1 HP2	Kreislauf 1 Kreislauf 2	Überdruckschalter
CDT1 CDT2	Kreislauf 1 Kreislauf 2	Auslass-Temperaturfühler
FPE1 FPE2	Kreislauf 1 Kreislauf 2	Niederdruckgeber
CST1 CST2	Kreislauf 1 Kreislauf 2	Saug-Temperaturfühler
OCT1 OCT2	Kreislauf 1 Kreislauf 2	Verflüssigeraustritt-Temperaturfühler
OAT		Außenlufttemperaturfühler

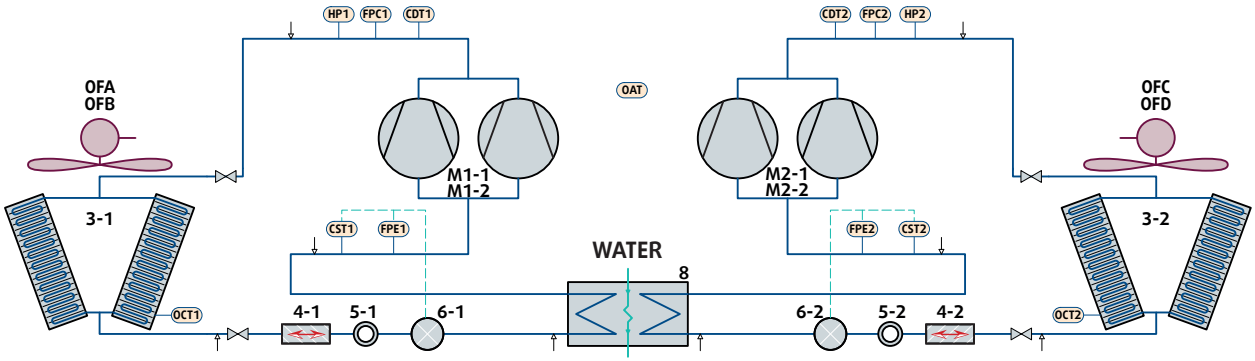
Italiano

M1-1	circuito 1	Compressore 1
M1-2	circuito 1	Compressore 2
M2-1	circuito 2	Compressore 1
M2-2	circuito 2	Compressore 2
RV1 RV2	circuito 1 circuito 2	Valvola di inversione ciclo
OFA/B OFC/D	circuit 1 circuit 2	motore della ventilazione esterna
3-1 3-2	circuito 1 circuito 2	Condensatore ad aria
4-1 4-2	circuito 1 circuito 2	Filtro-essiccatore
5-1 5-2	circuito 1 circuito 2	Spia di vetro
6-1 6-2	circuito 1 circuito 2	valvola di espansione elettronica
7-1 7-2	circuito 1 circuito 2	Accumulatore di liquido
8		Evaporatore a piastre
		Presa di pressione 5/16"
FPC1 FPC2	circuito 1 circuito 2	Trasduttore di alta pressione
HP1 HP2	circuito 1 circuito 2	Pressostato di alta pressione
CDT1 CDT2	circuito 1 circuito 2	Sonda temperatura di scarico
FPE1 FPE2	circuito 1 circuito 2	Trasduttore di bassa pressione
CST1 CST2	circuito 1 circuito 2	Sonda di temperatura di aspirazione
OCT1 OCT2	circuito 1 circuito 2	Sonda di temperatura di Condensazione
OAT		Sonda di temperatura d'arie esterna

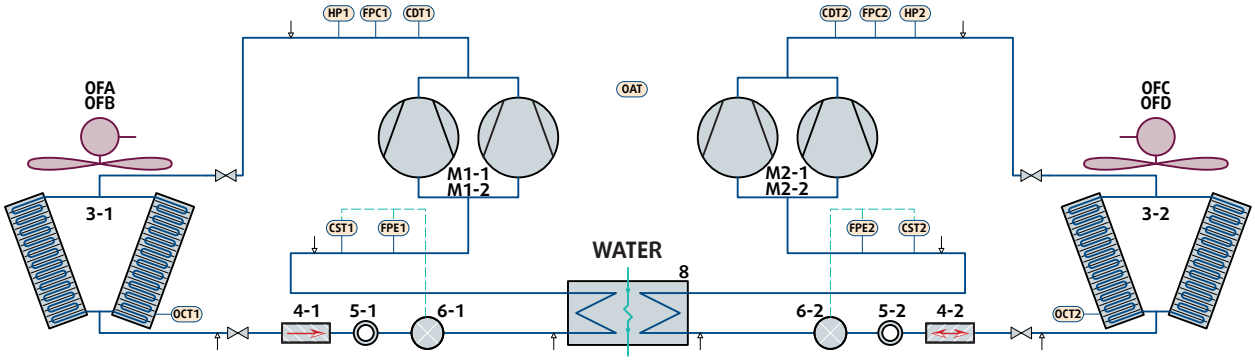
Español

M1-1	circuito 1	Compresor 1
M1-2	circuito 1	Compresor 2
M2-1	circuito 2	Compresor 1
M2-2	circuito 2	Compresor 2
RV1 RV2	circuito 1 circuito 2	Válvula de inversión de ciclo
OFA/B OFC/D	circuit 1 circuit 2	Motor de la ventilación exterior
3-1 3-2	circuito 1 circuito 2	Condensador de aire
4-1 4-2	circuito 1 circuito 2	Filtro deshidratador
5-1 5-2	circuito 1 circuito 2	Indicador luminoso de líquido
6-1 6-2	circuito 1 circuito 2	válvula de expansión electrónica
7-1 7-2	circuito 1 circuito 2	Botella de acumulación de líquido
8		Evaporador de placas
		Toma de presión 5/16"
FPC1 FPC2	circuito 1 circuito 2	Transductor de alta presión
HP1 HP2	circuito 1 circuito 2	Presóstato de alta presión
CDT1 CDT2	circuito 1 circuito 2	Sonda de temperatura descarga
FPE1 FPE2	circuito 1 circuito 2	Transductor de baja presión
CST1 CST2	circuito 1 circuito 2	Sonda de temperatura de succión
OCT1 OCT2	circuito 1 circuito 2	Sonda temperatura salida condensador
OAT		Sonda de temperatura de aire exterior

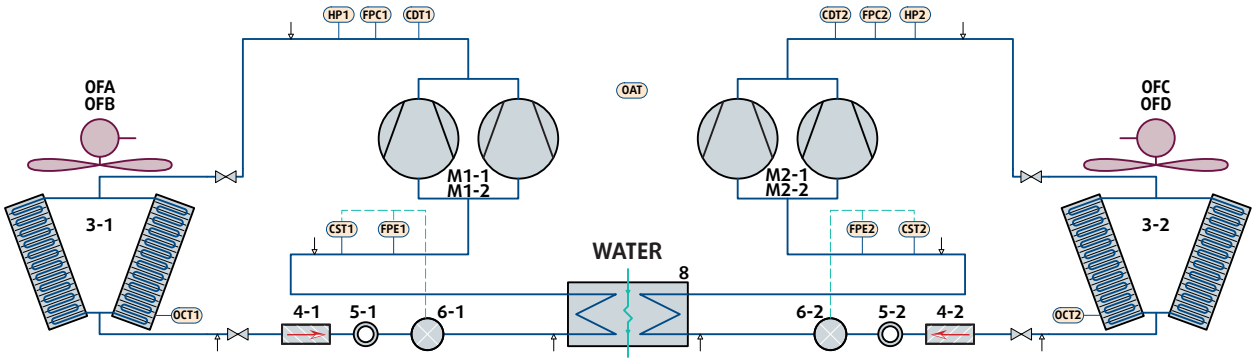
COOLING ONLY VERSION - SYSAQUA.L 140 TO SYSAQUA.L 150



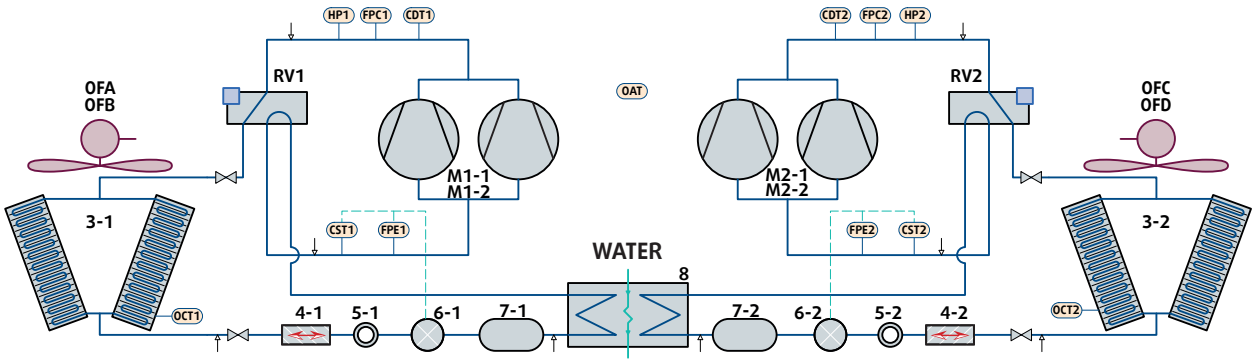
COOLING ONLY VERSION - SYSAQUA.L 170



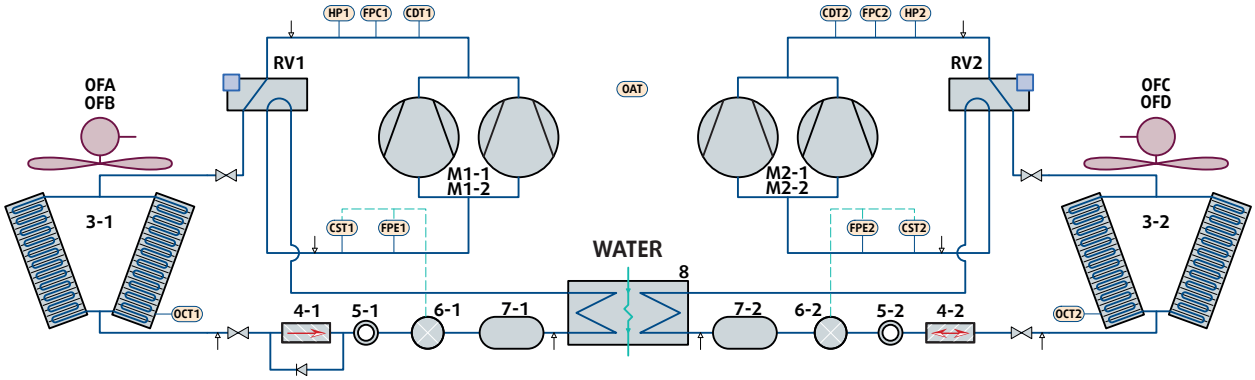
COOLING ONLY VERSION - SYSAQUA.L 190 TO SYSAQUA.L 210



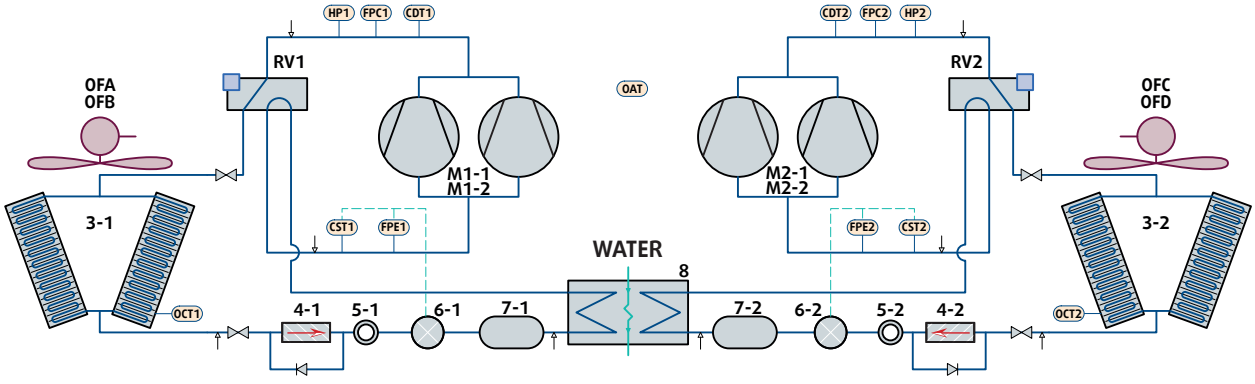
HEAT PUMP VERSION - SYSAQUA.H 140 TO SYSAQUA.H 150



HEAT PUMP VERSION - SYSAQUA.H 170



HEAT PUMP VERSION - SYSAQUA.H 190 TO SYSAQUA.H 210



HYDRAULIC CIRCUIT DIAGRAM
SCHEMA DU CIRCUIT HYDRAULIQUE
HYDRAULISCHER SCHALTPLAN
SCHEMA CIRCUITALE IDRAULICO
ESQUEMA CIRCULAR HIDRÁULICO

English

RECOMMENDED INSTALLATION

CF Connexion flexible
VV Drain valve
VA Globe valve
VR Water charging valve
MN Manometer

HYDRAULIC CIRCUIT SYSAQUA

FT Filter (supplied loose)
EWC/LWC Intlet/outlet Victaulic- 2''1/2
VE Pressure expansion tank
WPS Lack of water pressure switch (Optional)
SS Safety valve
WP Pump
PA Automatic air vent
CL Pressure tap 3/8''
EWT Intlet water temperature sensor
LWT Outlet water temperature sensor
PHE Plate heat exchanger
RAG Antifreeze heater
FS Flow switch
WT Water tank
VD Drain valve
WPT Pressure transducer (option)

Français

INSTALLATION RECOMMANDEE

CF Connexion flexible
VV Vanne de vidange
VA Vanne d'arrêt
VR Vanne de remplissage
MN Manomètre

CIRCUIT HYDRAULIQUE SYSAQUA

FT Filtre à tamis (Livré non monté)
EWC/LWC Connexion entrée /sortie d'eau Victaulic- 2''1/2
VE Vase d'expansion
WPS Pressostat manque d'eau (Option)
SS Soupape
WP Pompe
PA Purgeur automatique
CL Prise de pression 3/8''
EWT Sonde température d'entrée d'eau
LWT Sonde température sortie d'eau
PHE Echangeur à plaques
RAG Résistances antigel
FS Détecteur de débit
WT Ballon tampon
VD Vanne de vidange
WPT Transducteur de pression hydraulique (option)

Deutsch

EMPFOHLENE INSTALLATION

CF Schlauchverbindung
VV Ablassventil
VA Absperrhahn
VR Füllventil
MN Manometer

WASSERKREISLAUF SYSAQUA

FT Siebfilter (nicht montiert geliefert)
EWC/LWC Verbindung Wassereintritt / -austritt Victaulic- 2''1/2
VE Expansionsgefäß
WPS Wassermangel-Druckwächter (Option)
SS Ventil
WP Pumpe
PA Automatische Entlüftung
CL 3/8'' Druckanschluss
EWT Wassereintritt-Temperaturfühler
LWT Wasseraustritt-Temperaturfühler
PHE Plattenwärmetauscher
RAG Frostschutz-Widerstände
FS Strömungswächter
WT Vorratsbehälter
VD Ablassventil
WPT Druckwandler (Option)

Italiano

INSTALLAZIONE CONSIGLIATA

CF Collegamento flessibile
VV Valvola di scarico
VA Valvola di arresto
VR Valvola di riempimento
MN Manometro

CIRCUITO IDRAULICO SYSAQUA

FT Filtro fine a rete (Fornito non montato)
EWC/LWC Collegamento ingresso/uscita dell'acqua Victaulic- 2''1/2
VE Vaso di espansione
WPS Pressostato mancanza di acqua (Opzione)
SS Valvola
WP Pompa
PA Sfiato automatico
CL Presa di pressione 3/8''
EWT Sonda temperatura di ingresso dell'acqua
LWT Sonda temperatura di uscita dell'acqua
PHE Scambiatore a piastre
RAG Resistenze antigelo
FS Sensore di portata
WT Serbatoio inerziale
VD Valvola di scarico
WPT Trasduttore di pressione idraulica (opzionale)

Español

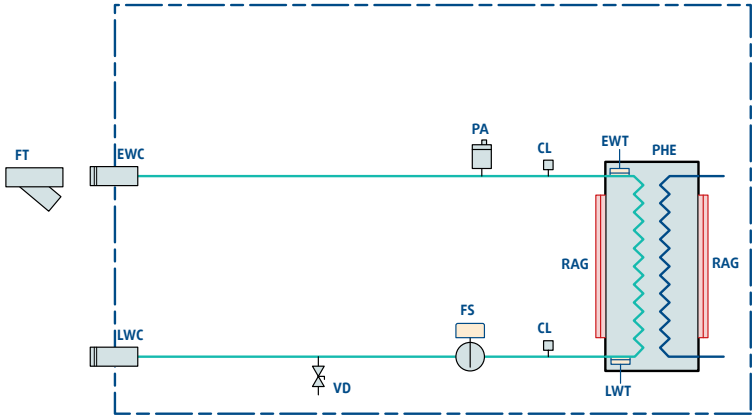
INSTALACIÓN RECOMENDADA

CF Conexión flexible
VV Válvula de vaciado
VA Válvula de parada
VR Válvula de llenado
MN Manómetro

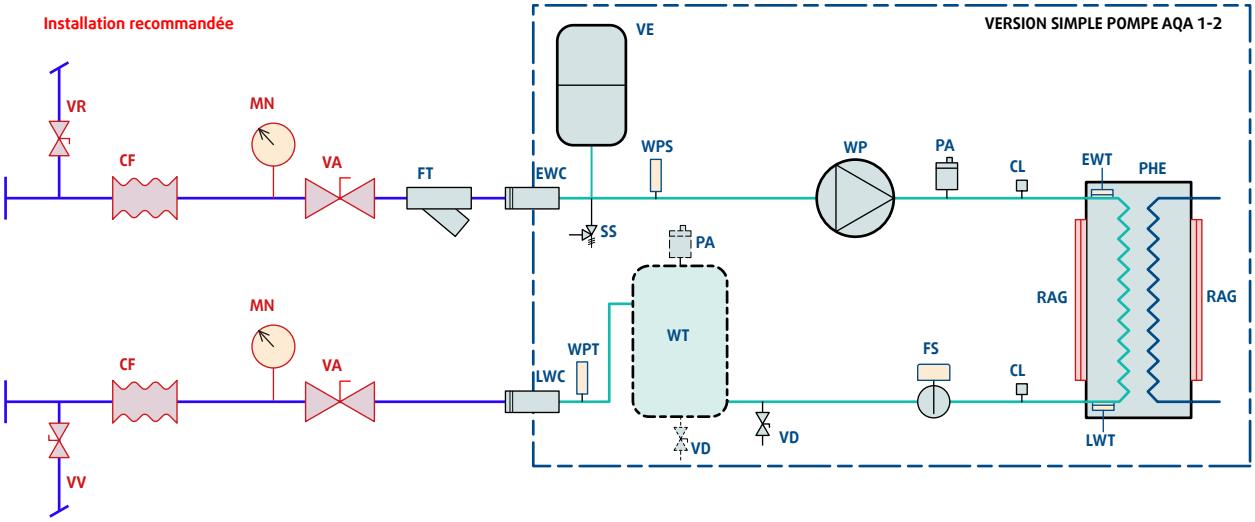
CIRCUITO HIDRÁULICO SYSAQUA

FT Filtro de tamiz (suministrado no montado)
EWC/LWC Conexión entrada/salida de agua Victaulic- 2''1/2
VE Vaso de expansión
WPS Presóstato falta de agua (opcional)
SS Válvula
WP Bomba
PA Purgador automático
CL Toma de presión 3/8''
EWT Sonda de temperatura de entrada de agua
LWT Sonda de temperatura de salida de agua
PHE Intercambiador de placas
RAG Resistencia anticongelación
FS Detector de caudal
WT Balón intermedio
VD Válvula de vaciado
WPT Transductor de presión hidráulica (opcional)

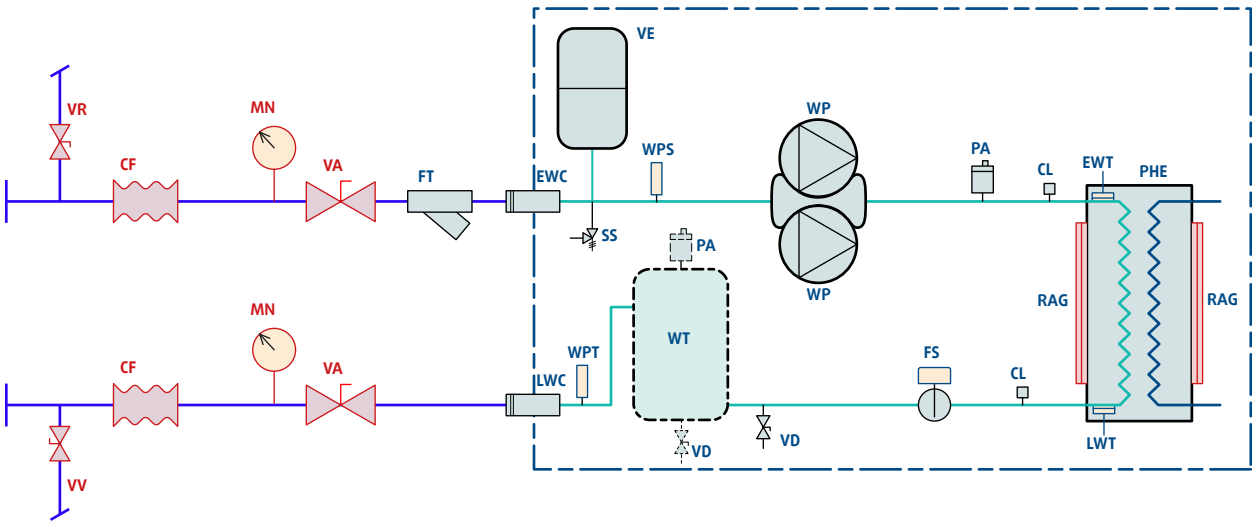
WITHOUT PUMP



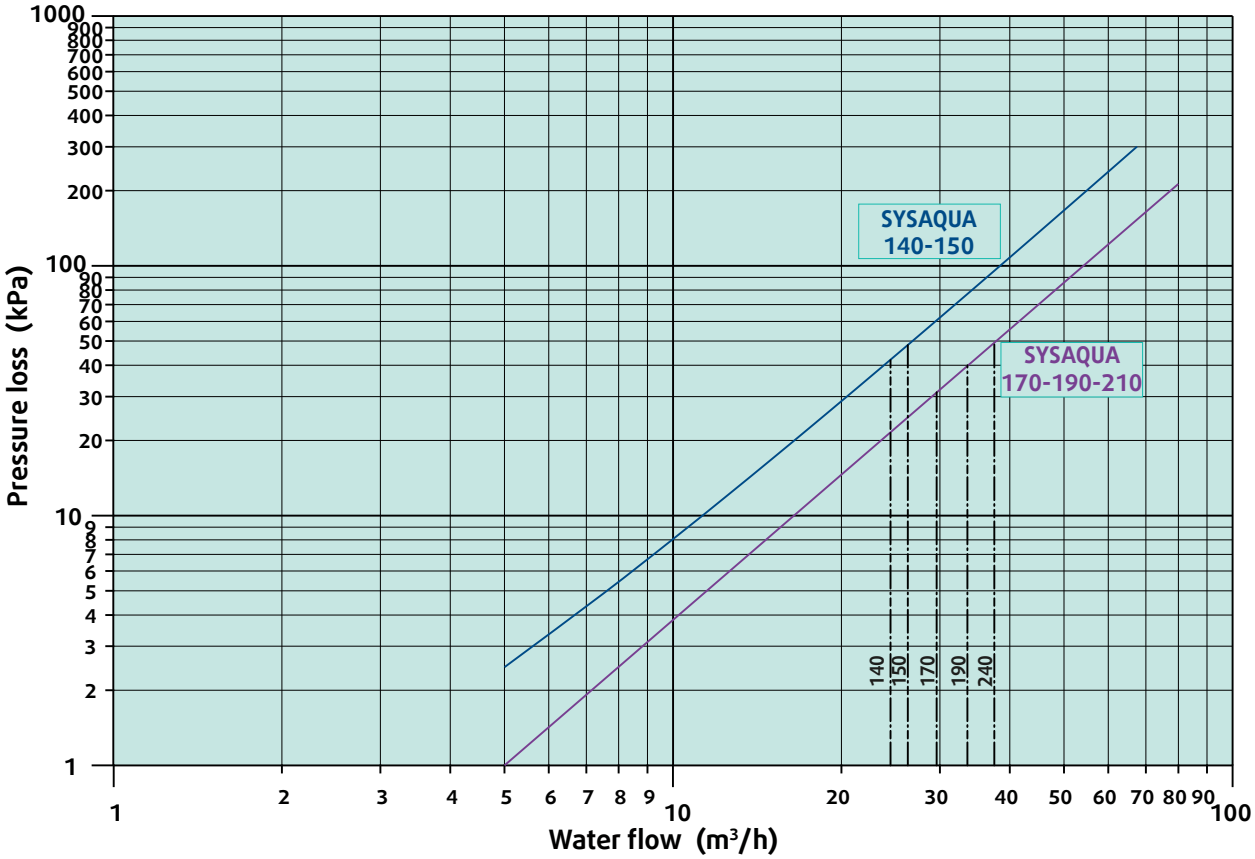
WITH 1 PUMP



WITH 2 PUMPS



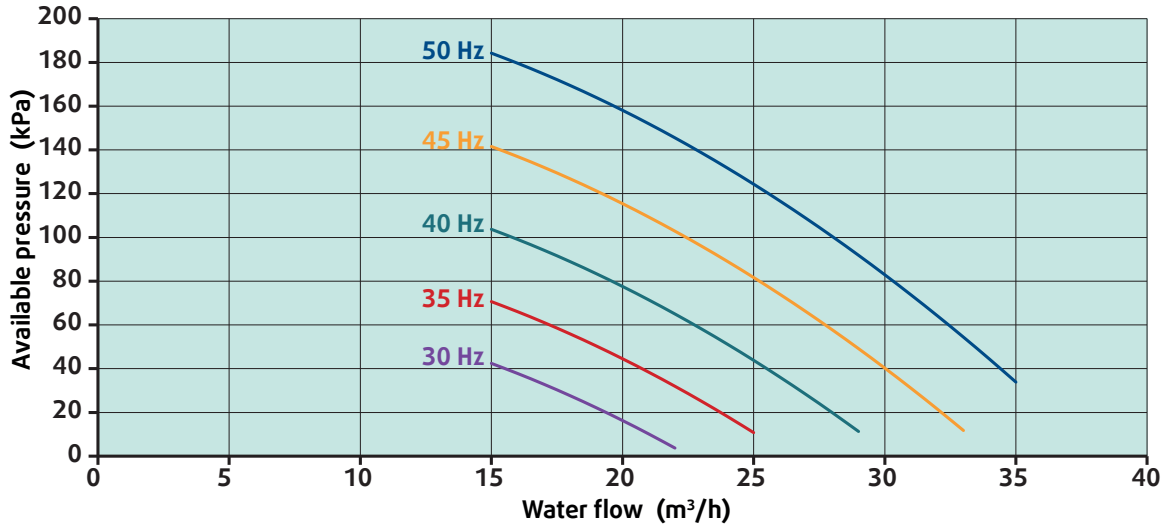
PRESSURE LOSSES
PERTE DE CHARGE DE L'ECHANGEUR A PLAQUES
DRUCKVERLUST
PERDITA DI CARICO
PÉRDIDA DE CARGA

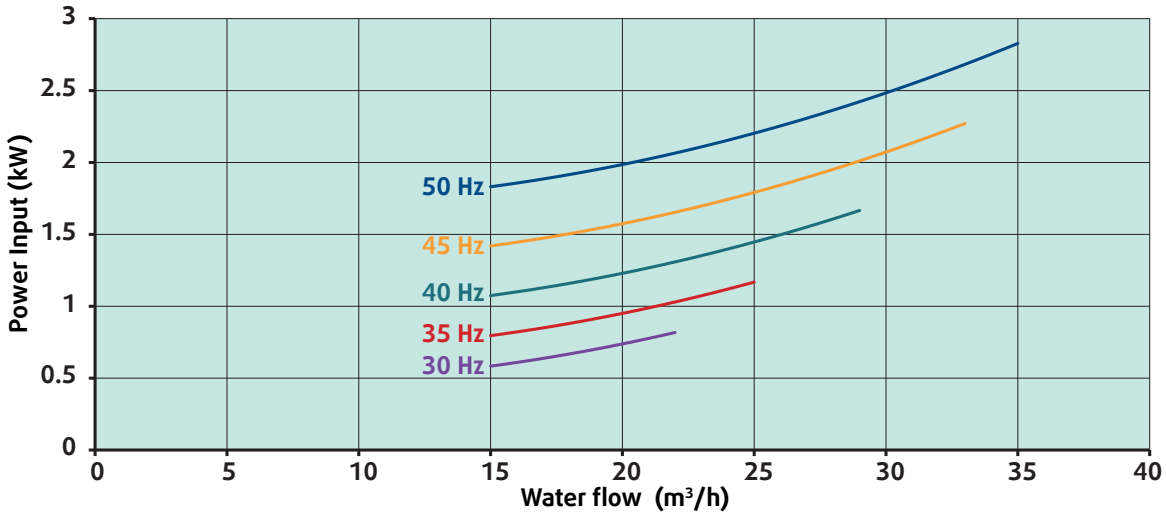


HYDRAULIC PUMPS CURVES
COURBES DES POMPES HYDRAULIQUES
KURVEN VON HYDRAULIKPUMPEN
CURVE DELLE POMPE IDRAULICHE
CURVAS BOMBAS HIDRÁULICAS

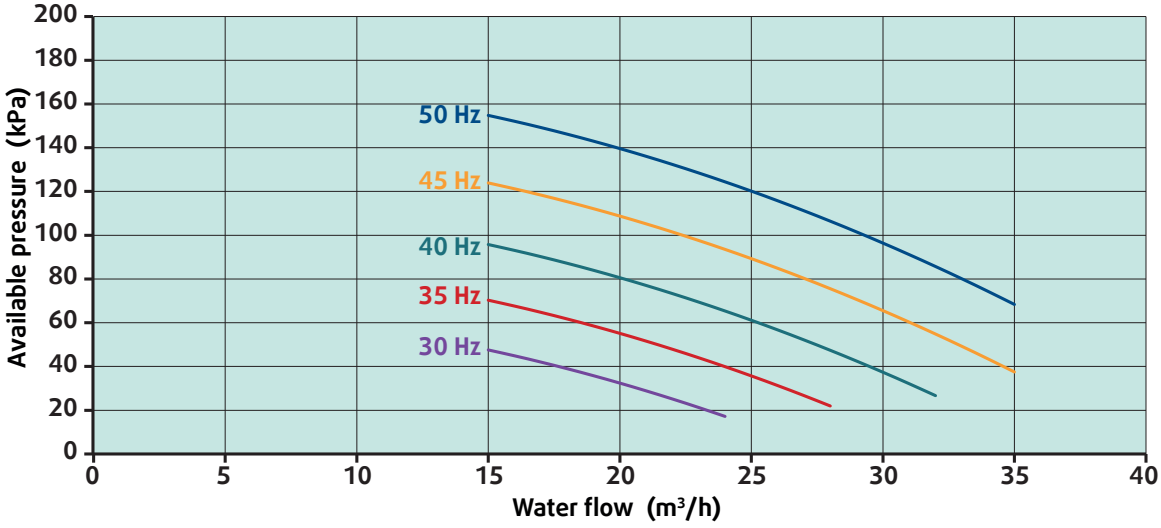
STANDARD PUMP

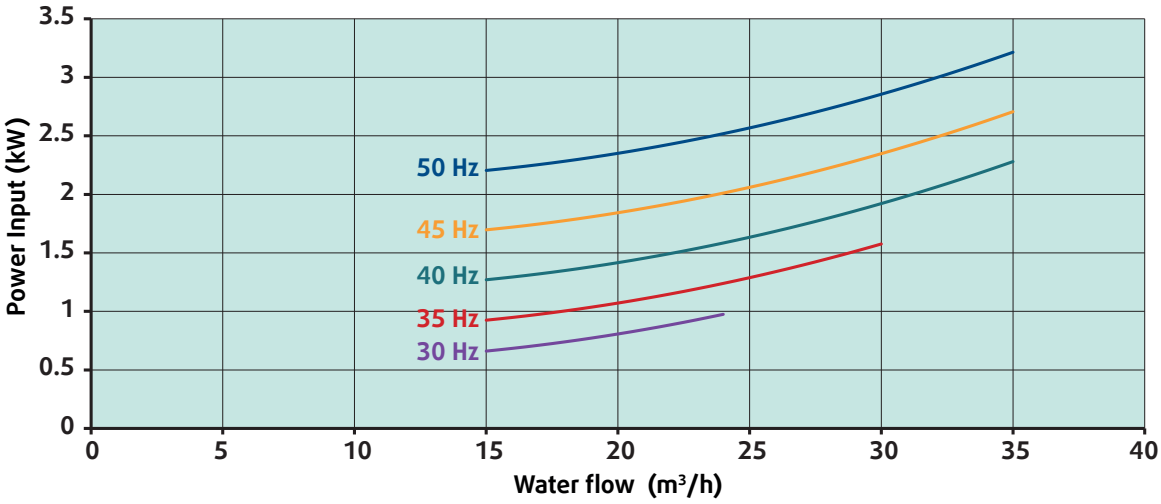
SYSAQUA 140 - 150 - 170





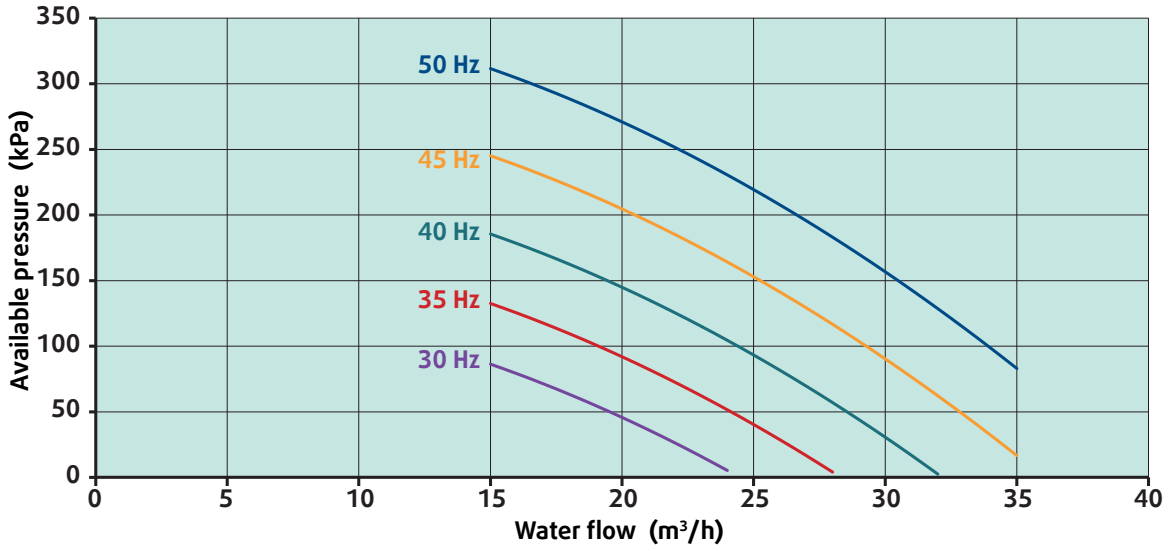
SYSAQUA 190 - 210

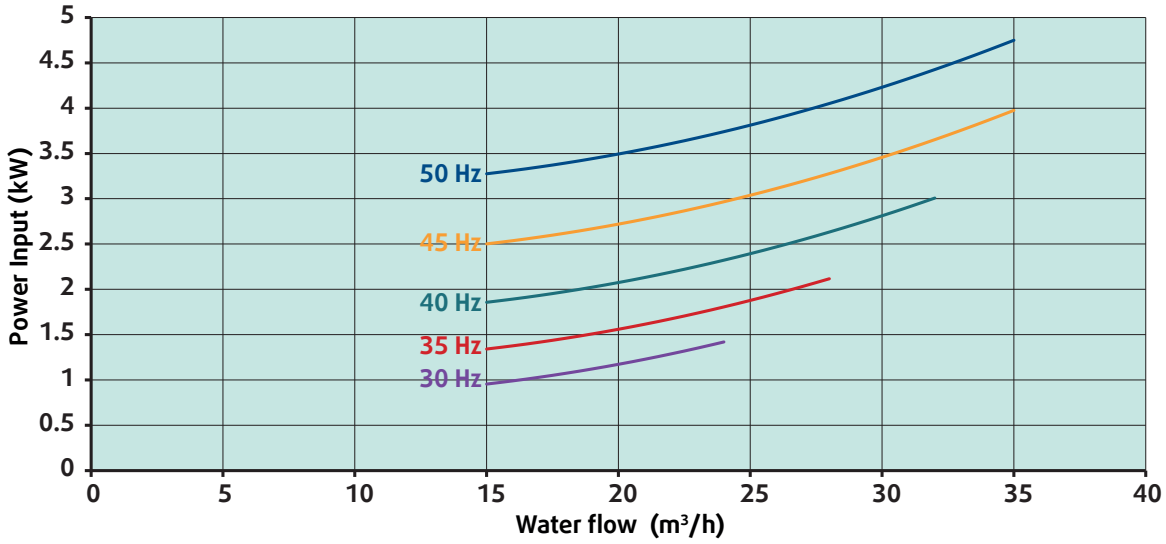




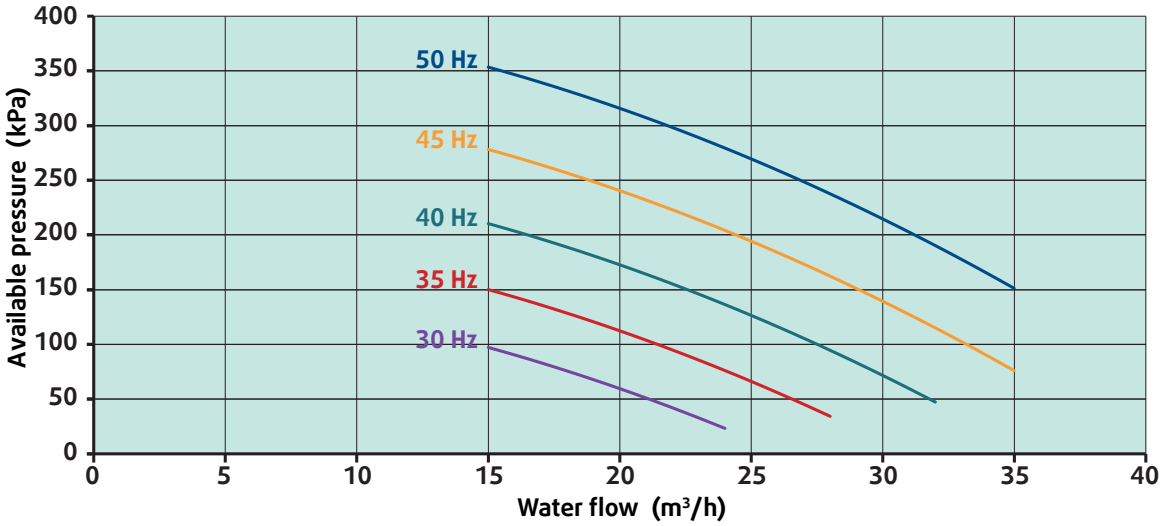
HIGHT PRESSURE PUMP

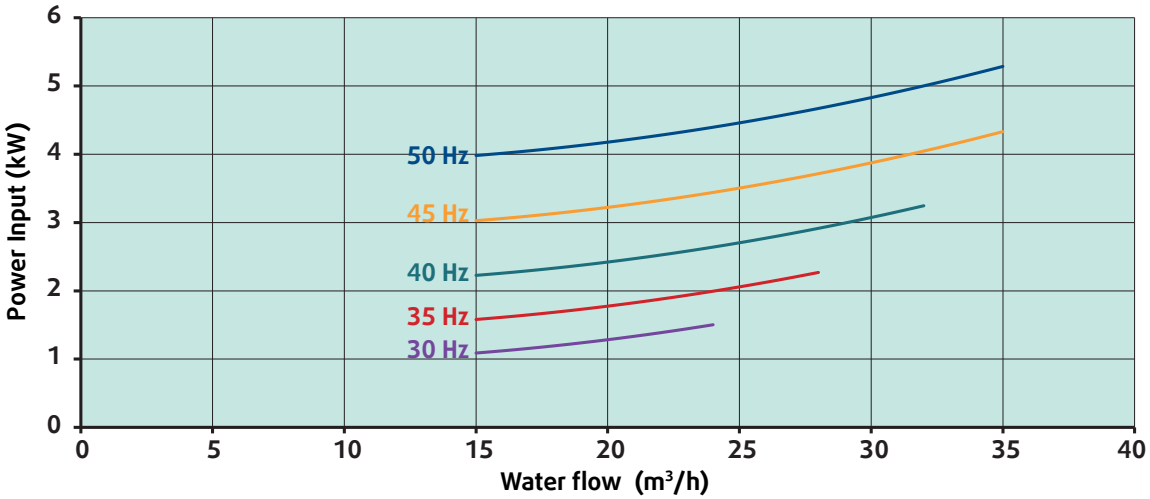
SYSAQUA 140 - 150 - 170 - 190





SYSAQUA 210


Available pressure (kPa)
400
350
300
250
200
150
100
50
0
50 Hz
45 Hz
40 Hz
35 Hz
30 Hz
0
5
10
15
20
25
30
35
40
Water flow (m³/h)


Power Input (kW)
6
5
4
3
2
1
0
50 Hz
45 Hz
40 Hz
35 Hz
30 Hz
0
5
10
15
20
25
30
35
40
Water flow (m³/h)

WIRING DIAGRAM
SCHEMAS ELECTRIQUES
STROMLAUFPLANS
SCHEMA ELETRICO
ESQUEMA ELECTRICO

TAKE CARE!

These wiring diagrams are correct at the time of publication. Manufacturing changes can lead to modifications. Always refer to the diagram supplied with the product.

ATTENTION

Ces schémas sont corrects au moment de la publication. Les variantes en fabrication peuvent entraîner des modifications. Reportez-vous toujours au schéma livré avec le produit.

ACHTUNG!

Diese Stromlaufplans sind zum Zeitpunkt der Veröffentlichung gültig. In Herstellung befindliche Varianten können Änderungen mit sich bringen. In jedem Fall den mit dem Produkt gelieferten Stromlaufplan hinzuziehen.

ATTENZIONE !

Questi schemi sono corretti al momento della pubblicazione. Le varianti apportate nel corso della fabbricazione possono comportare modifiche. Far sempre riferimento allo schema fornito con il prodotto.

ATENCIÓN !

Esto esquemas son correctos en el momento de la publicación. Pero las variantes en la fabricación pueden ser motivo de modificaciones. Remítase siempre al esquema entregado con el producto.

POWER SUPPLY MUST BE SWITCHED OFF BEFORE STARTING TO WORK IN THE ELECTRIC CONTROL BOXES!

MISE HORS TENSION OBLIGATOIRE AVANT TOUTE INTERVENTION DANS LES BOITIERS ELECTRIQUES.

VOR JEDEM EINGRIFF AN DEN ANSCHLUßKÄSTEN UNBEDINGT DAS GERÄT ABSCHALTEN!

PRIMA DI OGNI INTERVENTO SULLE CASSETTE ELETTRICHE ESCLUDERE TASSATIVAMENTE L'ALIMENTAZIONE !

PUESTA FUERA DE TNESIÓN OBLIGATORIA ANTES DE CUALQUIER INTERVENCIÓN EN LAS CAJAS ELÉCTRICAS!

LEGEND

	English	Français	Deutsch	Italiano	Español
	POWER SUPPLY	SCHEMAS DE PUISSANCE	LEISTUNGSPLÄNE	SCHEMI DI POTENZA	ESQUEMAS DE POTENCIA
	DESCRIPTION	DESIGNATION	BEZEICHNUNG	DENOMINAZIONE	DESCRIPCIÓN
QG	main section switch	Interrupteur principal	Hauptschalter	interruttore principale	interruptor seccionador principal
KA1	three-phase network control relay (phase sequence and cut-out)	module de contrôle d'ordre et de coupure de phases	Phasenabschaltungs- und reihenfolge Kontrollmodul	modulo di controllo d'ordine e di interruzione di fasi	módulo de control de orden y de corte de fases
FT1/2	magneto-thermal circuit breaker of compressors of circuit 1	disjoncteurs magnétothermiques des compresseurs du circuit 1	Magnetothermische Schutzschalter der Verdichter von Kreislauf 1	disgiuntori magnetotermici dei compressori del circuito 1	disyuntores magnetotérmicos de los compresores de circuito 1
FT3/4	magneto-thermal circuit breaker of compressors of circuit 2	disjoncteurs magnétothermiques des compresseurs du circuit 2	Magnetothermische Schutzschalter der Verdichter von Kreislauf 2	disgiuntori magnetotermici dei compressori del circuito 2	disyuntores magnetotérmicos de los compresores de circuito 2
K1/2	power circuit contactor of compressors of circuit 1	contacteurs de puissance des compresseurs du circuit 1	Leistungsschütze der Verdichter von Kreislauf 1	contattori di potenza dei compressori del circuito 1	contactores de potencia de los compresores de circuito 1
K3/4	power circuit contactor of compressors of circuit 2	contacteurs de puissance des compresseurs du circuit 2	Leistungsschütze der Verdichter von Kreislauf 2	contattori di potenza dei compressori del circuito 2	contactores de potencia de los compresores de circuito 2
C1-1/1-2	compressors 1 and 2 of circuit 1	compresseurs 1 et 2 du circuit 1	Verdichter 1 und 2 von Kreislauf 1	compressori 1 e 2 del circuito 1	compresores 1 y 2 de circuito 1
C2-1/2-2	compressors 1 and 2 of circuit 2	compresseurs 1 et 2 du circuit 2	Verdichter 1 und 2 von Kreislauf 2	compressori 1 e 2 del circuito 2	compresores 1 y 2 de circuito 2
R1/2	crankcase heater of compressors of circuit 1	Résistances de carter des compresseurs du circuit 1	Ölsumpfheizungen der Verdichter von Kreislauf 1	resistenze del carter dei compressori del circuito 1	resistencias de cárter de los compresores de circuito 1
R3/4	crankcase heater of compressors of circuit 2	Résistances de carter des compresseurs du circuit 2	Ölsumpfheizungen der Verdichter von Kreislauf 2	resistenze del carter dei compressori del circuito 2	resistencias de cárter de los compresores de circuito 2
FTC	control circuit magneto-thermal circuit breaker	disjoncteur magnétothermique du circuit de commande	Magnetothermischer Schutzschalter des Steuerkreises	disgiuntore magnetotermico del circuito di comando	disyuntor magnetotérmico del circuito de comando
FTOF1-L	magneto-thermal circuit breaker of outdoor fans of circuit 1	disjoncteur magnétothermique de la ventilation extérieure du circuit 1	Magnetothermischer Schutzschalter der externen Lüftung von Kreislauf 1	disgiuntore magnetotermico della ventilazione esterna del circuito 1	disyuntor magnetotérmico de la ventilación exterior de circuito 1
FTOF1-H	magneto-thermal circuit breaker of outdoor fans of circuit 1	disjoncteur magnétothermique de la ventilation extérieure du circuit 1	Magnetothermischer Schutzschalter der externen Lüftung von Kreislauf 1	disgiuntore magnetotermico della ventilazione esterna del circuito 1	disyuntor magnetotérmico de la ventilación exterior de circuito 1
FTOF2-L	magneto-thermal circuit breaker of outdoor fans of circuit 2	disjoncteur magnétothermique de la ventilation extérieure du circuit 2	Magnetothermischer Schutzschalter der externen Lüftung von Kreislauf 2	disgiuntore magnetotermico della ventilazione esterna del circuito 2	disyuntor magnetotérmico de la ventilación exterior de circuito 2
FTOF2-H	magneto-thermal circuit breaker of outdoor fans of circuit 2	disjoncteur magnétothermique de la ventilation extérieure du circuit 2	Magnetothermischer Schutzschalter der externen Lüftung von Kreislauf 2	disgiuntore magnetotermico della ventilazione esterna del circuito 2	disyuntor magnetotérmico de la ventilación exterior de circuito 2
KOF1	power contactors of outdoor fans of circuit 1	contacteur de puissance de la ventilation extérieure du circuit 1	Leistungsschütz der externen Lüftung von Kreislauf 1	contattore di potenza della ventilazione esterna del circuito 1	contactor de potencia de la ventilación exterior de circuito 1
KOF1-L	power contactors of outdoor fans of circuit 1	contacteur de puissance de la ventilation extérieure du circuit 1	Leistungsschütz der externen Lüftung von Kreislauf 1	contattore di potenza della ventilazione esterna del circuito 1	contactor de potencia de la ventilación exterior de circuito 1
KOF1-H	power contactors of outdoor fans of circuit 1	contacteur de puissance de la ventilation extérieure du circuit 1	Leistungsschütz der externen Lüftung von Schaltung 1	contattore di potenza della ventilazione esterna del circuito 1	contactor de potencia de la ventilación exterior de circuito 1
KOF2	power contactors of outdoor fans of circuit 2	contacteur de puissance de la ventilation extérieure du circuit 2	Leistungsschütz der externen Lüftung von Kreislauf 2	contattore di potenza della ventilazione esterna del circuito 2	contactor de potencia de la ventilación exterior de circuito 2
KOF2-L	power contactors of outdoor fans of circuit 2	contacteur de puissance de la ventilation extérieure du circuit 2	Leistungsschütz der externen Lüftung von Kreislauf 2	contattore di potenza della ventilazione esterna del circuito 2	contactor de potencia de la ventilación exterior de circuito 2
KOF2-H	power contactors of outdoor fans of circuit 2	contacteur de puissance de la ventilation extérieure du circuit 2	Leistungsschütz der externen Lüftung von Kreislauf 2	contattore di potenza della ventilazione esterna del circuito 2	contactor de potencia de la ventilación exterior de circuito 2

	English	Français	Deutsch	Italiano	Español
	POWER SUPPLY	SCHEMAS DE PUISSANCE	LEISTUNGSPLÄNE	SCHEMI DI POTENZA	ESQUEMAS DE POTENCIA
	DESCRIPTION	DESIGNATION	BEZEICHNUNG	DENOMINAZIONE	DESCRIPCIÓN
OFA/B	outdoor fans motor of circuit 1	moteur de la ventilation extérieure du circuit 1	Motor der externen Lüftung von Kreislauf 1	motore della ventilazione esterna del circuito 1	motor de la ventilación exterior de circuito 1
OFC/D	outdoor fans motor of circuit 2	moteur de la ventilation extérieure du circuit 2	Motor der externen Lüftung von Kreislauf 2	motore della ventilazione esterna del circuito 2	motor de la ventilación exterior de circuito 2
S1/S3	compressor internal safety device	sécurité interne compresseur 1	Eingebauter Wärmeschutzschalter Verdichter 1	sicurezza interna compressore 1	seguridad interna compresor 1
FF11	fuse carrier (triphasic version without neutral)	porte-fusibles (version TRI sans Neutre)	Sicherungseinsatzträger (Version dreiphasisch ohne Neutralen)	portafusibili (versione TRIFASE senza Neutro)	portafusible (versione trifásica senza neutro)
T2	400V/230V transformer (triphasic version without neutral)	transformateur 400V/230V (version TRI sans Neutre)	Transformator 400V/230V (Version dreiphasisch ohne Neutralen)	trasformatore 400V/230V (versione TRIFASE senza Neutro)	transformador 400V/230V (versione trifásica senza neutro)

	English	Français	Deutsch	Italiano	Español
	CONTROL AND REGULATION	SCHEMAS DE COMMANDE	STEUERPLÄNE	SCHEMI DI COMANDO	ESQUEMAS DE COMANDO
	DESCRIPTION	DESIGNATION	BEZEICHNUNG	DENOMINAZIONE	DESIGNACIÓN
POL687/096	CHILLER regulation	régulation CHILLER	CHILLER-Regelung	regolazione CHILLER	regulación CHILLER
T1	CHILLER regulation transformer	transformateur de la régulation chiller	Transformator der Chiller-Regelung	trasformatore della regolazione chiller	transformador de la regulación chiller
FFT	fuse carrier secondary circuit of T1	porte-fusible circuit secondaire de T1	Sicherungseinsatzträger sekundärer Umkreis von T1	portafusibile circuito secondario di T1	portafusible circuito secondario de T1
FT1/2	additional magneto-thermal circuit breaker of compressors of circuit 1	contacts additionnels disjoncteur magnétothermique des compresseurs du circuit 1	Zusätzliche Kontakte des magnetothermischen Schutzschalters der Verdichter von Kreislauf 1	contatti aggiuntivi disgiuntore magnetotermico dei compressori del circuito 1	contactos adicionales disyuntor magnetotérmico de los compresores de circuito 1
FT3/4	additional magneto-thermal circuit breaker of compressors of circuit 2	contacts additionnels disjoncteur magnétothermique des compresseurs du circuit 2	Zusätzliche Kontakte des magnetothermischen Schutzschalters der Verdichter von Kreislauf 2	contatti aggiuntivi disgiuntore magnetotermico dei compressori del circuito 2	contactos adicionales disyuntor magnetotérmico de los compresores de circuito 2
FTOF1-L	additional magneto-thermal circuit breaker of outdoor fans of circuit 1	contact additionnel disjoncteur magnétothermique de la ventilation extérieure du circuit 1	Zusätzlicher Kontakt des magnetothermischen Schutzschalters der externen Lüftung von Kreislauf 1	contatto aggiuntivo disgiuntore magnetotermico della ventilazione esterna del circuito 1	contacto adicional disyuntor magnetotérmico de la ventilación exterior de circuito 1
FTOF1-H	additional magneto-thermal circuit breaker of outdoor fans of circuit 1	contact additionnel disjoncteur magnétothermique de la ventilation extérieure du circuit 1	Zusätzlicher Kontakt des magnetothermischen Schutzschalters der externen Lüftung von Kreislauf 1	contatto aggiuntivo disgiuntore magnetotermico della ventilazione esterna del circuito 1	contacto adicional disyuntor magnetotérmico de la ventilación exterior de circuito 1
FTOF2-L	additional magneto-thermal circuit breaker of outdoor fans of circuit 2	contact additionnel disjoncteur magnétothermique de la ventilation extérieure du circuit 2	Zusätzlicher Kontakt des magnetothermischen Schutzschalters der externen Lüftung von Kreislauf 2	contatto aggiuntivo disgiuntore magnetotermico della ventilazione esterna del circuito 2	contacto adicional disyuntor magnetotérmico de la ventilación exterior de circuito 2
FTOF2-H	additional magneto-thermal circuit breaker of outdoor fans of circuit 2	contact additionnel disjoncteur magnétothermique de la ventilation extérieure du circuit 2	Zusätzlicher Kontakt des magnetothermischen Schutzschalters der externen Lüftung von Kreislauf 2	contatto aggiuntivo disgiuntore magnetotermico della ventilazione esterna del circuito 2	contacto adicional disyuntor magnetotérmico de la ventilación exterior de circuito 2
FOFA/B	outdoor fans motors internal protection of circuit 1	sécurité interne du moteur de la ventilation extérieure du circuit 1	Eingebauter Wärmeschutzschalter des Motors der externen Lüftung von Kreislauf 1	sicurezza interna del motore della ventilazione esterna del circuito 1	seguridad interna del motor de la ventilación exterior de circuito 1
FOFC/D	outdoor fans motors internal protection of circuit 2	sécurité interne du moteur de la ventilation extérieure du circuit 2	Eingebauter Wärmeschutzschalter des Motors der externen Lüftung von Kreislauf 2	sicurezza interna del motore della ventilazione esterna del circuito 2	seguridad interna del motor de la ventilación exterior de circuito 2

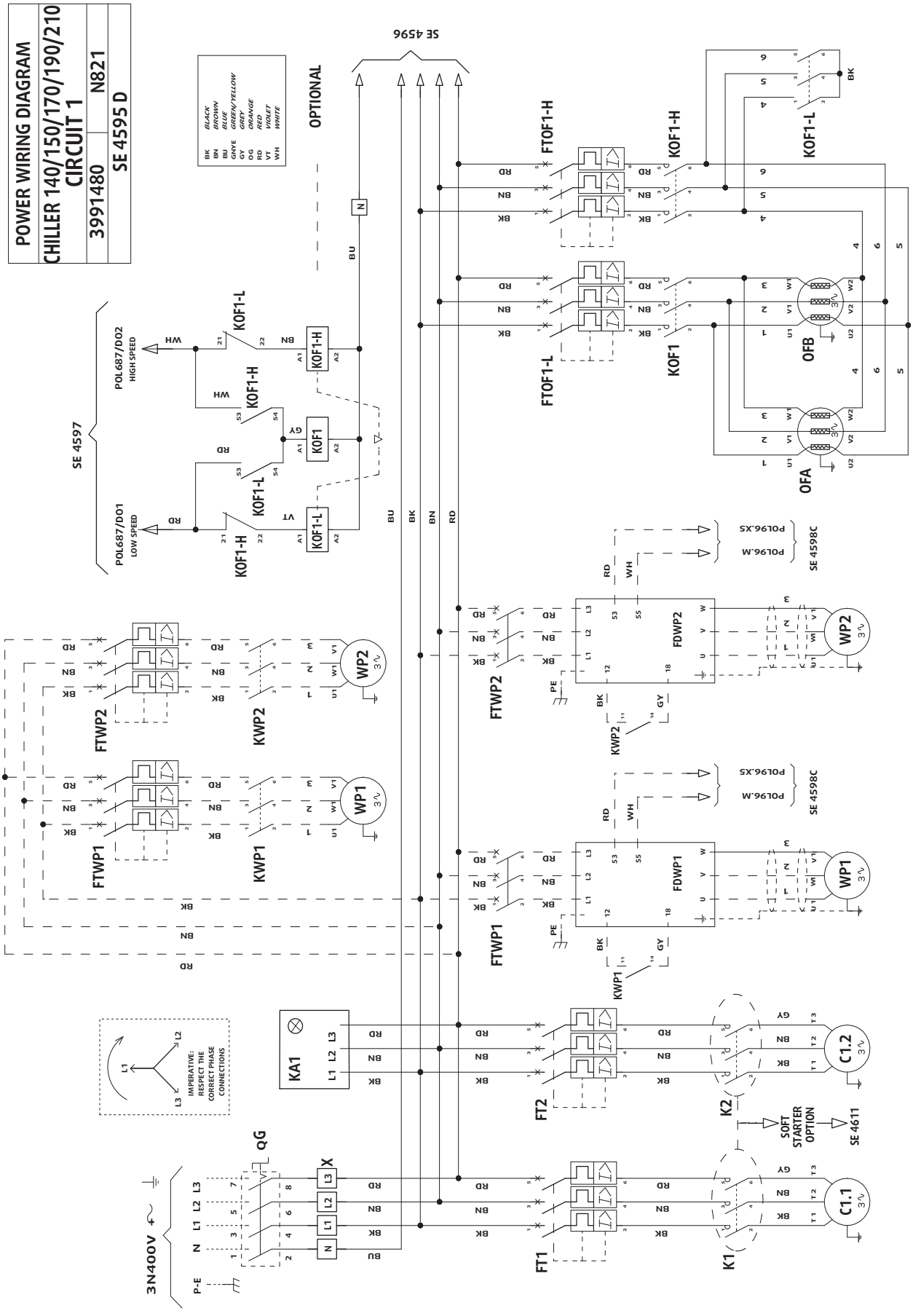
	English	Français	Deutsch	Italiano	Español
	CONTROL AND REGULATION	SCHEMAS DE COMMANDE	STEUERPLÄNE	SCHEMI DI COMANDO	ESQUEMAS DE COMANDO
	DESCRIPTION	DESIGNATION	BEZEICHNUNG	DENOMINAZIONE	DESIGNACIÓN
FS	flow switch	détecteur de débit d'eau (flow switch)	Strömungswächter (flow switch)	sensore di portata di acqua (flussostato)	detector de caudal de agua (flow switch)
WPS	lack of water pressure switch (option)	pressostat manque d'eau (option)	Wassermangel-Druckwächter (Option)	pressostato mancanza di acqua (opzionale)	presóstato falta de agua (opcional)
HP1	automatic reset high-pressure pressostats of circuit 1	pressostat haute pression à réarmement automatique du circuit 1	Überdruckschalter mit automatischer Wiedereinschaltung von Kreislauf 1	pressostato alta pressione a riarmo automatico del circuito 1	presóstato de alta presión con rearme automático de circuito 1
HP2	automatic reset high-pressure pressostats of circuit 2	pressostat haute pression à réarmement automatique du circuit 2	Überdruckschalter mit automatischer Wiedereinschaltung von Kreislauf 2	pressostato alta pressione a riarmo automatico del circuito 2	presóstato de alta presión con rearme automático de circuito 2
EEV1	electronic expansion valve of circuit 1	détendeur électronique du circuit 1	Elektronisches Expansionsventil von Kreislauf 1	valvola di espansione elettronica del circuito 1	válvula de expansión electrónica de circuito 1
EEV2	electronic expansion valve of circuit 2	détendeur électronique du circuit 2	Elektronisches Expansionsventil von Kreislauf 2	valvola di espansione elettronica del circuito 2	válvula de expansión electrónica de circuito 2
K1/2	power circuit contactor of compressors of circuit 1	contacteurs de puissance des compresseurs du circuit 1	Leistungsschütze der Verdichter von Kreislauf 1	contattori di potenza dei compressori del circuito1	contactores de potencia de los compresores de circuito 1
K3/4	power circuit contactor of compressors of circuit 2	contacteurs de puissance des compresseurs du circuit 2	Leistungsschütze der Verdichter von Kreislauf 2	contattori di potenza dei compressori del circuito 2	contactores de potencia de los compresores de circuito 2
RAG	antifreeze electric heater	résistance anti-gel	Frostschutz-Widerstand	resistenza antigelo	resistencia anticongelación
RV1	4-way cycle reversal valve of circuit 1(option)	vannes d'inversion de cycle du circuit 1(option)	Umkehrzyklusventil von Kreislauf 1(Option)	valvole di inversione di ciclo del circuito 1 (opzionale)	válvula de inversión de ciclo de circuito 1(opcional)
RV2	4-way cycle changeover valves of circuit 2(option)	vannes d'inversion de cycle du circuit 2(option)	Umkehrzyklusventil von Kreislauf 2(Option)	valvole di inversione di ciclo del circuito 2 (opzionale)	válvula de inversión de ciclo de circuito 2(opcional)
KA1	three-phase network control contactor	contact du module de contrôle d'ordre et de coupure de phases	Kontakt des Phasenabschaltungs- und reihenfolge Kontrollmoduls	contatto del modulo di controllo d'ordine e di interruzione di fasi	contacto del módulo de control de orden y de corte de fases
FPE1	low pressure transducer of circuit 1	transducteur basse pression du circuit 1	Niederdruckgeber von Kreislauf 1	trasduttore bassa pressione del circuito 1	transductor de baja presión de circuito 1
FPE2	low pressure transducer of circuit 2	transducteur basse pression du circuit 2	Niederdruckgeber von Kreislauf 2	trasduttore bassa pressione del circuito 2	transductor de baja presión de circuito 2
FPC1	high pressure transducer of circuit 1	transducteur haute pression du circuit 1	Hochdruckgeber von Kreislauf 1	trasduttore alta pressione del circuito 1	transductor de alta presión de circuito 1
FPC2	high pressure transducer of circuit 2	transducteur haute pression du circuit 2	Hochdruckgeber von Kreislauf 2	trasduttore alta pressione del circuito 2	transductor de alta presión de circuito 2
OCT1	condenser outdoor temperature sensor of circuit 1	sonde de température de condensation du circuit 1	Verflüssigeraustritt-Temperaturfühler von Kreislauf 1	sonda di temperatura di condensazione del circuito 1	sonda temperatura salida condensador de circuito 1
OCT2	condenser outdoor temperature sensor of circuit 2	sonde de température de condensation du circuit 2	Verflüssigeraustritt-Temperaturfühler von Kreislauf 2	sonda di temperatura di condensazione del circuito 2	sonda temperatura salida condensador de circuito 2
CDT1	discharge temperature sensor of circuit 1	sonde de température de refoulement du circuit 1F	Auslass-Temperaturfühler von Kreislauf 1	sonda di temperatura di mandata del circuito 1	sonda de temperatura descarga de circuito 1
CDT2	discharge temperature sensor of circuit 2	sonde de température de refoulement du circuit 2	Auslass-Temperaturfühler von Kreislauf 2	sonda di temperatura di mandata del circuito 2	sonda de temperatura descarga de circuito 2

	English	Français	Deutsch	Italiano	Español
	CONTROL AND REGULATION	SCHEMAS DE COMMANDE	STEUERPLÄNE	SCHEMI DI COMANDO	ESQUEMAS DE COMANDO
	DESCRIPTION	DESIGNATION	BEZEICHNUNG	DENOMINAZIONE	DESIGNACIÓN
CST1	suction temperature sensor of circuit 1	sonde de température d'aspiration du circuit 1	Saug-Temperaturfühler von Kreislauf 1	sonda di temperatura di aspirazione del circuito 1	sonda de temperatura de succión de circuito 1
CST2	suction temperature sensor of circuit 2	sonde de température d'aspiration du circuit 2	Saug-Temperaturfühler von Kreislauf 2	sonda di temperatura di aspirazione del circuito 2	sonda de temperatura de succión de circuito 2
OAT	Outdoor air temperature sensor (air)	sonde de température extérieure (air)	Außenlufttemperaturfühler	sonda di temperatura esterna (aria)	sonda de temperatura de aire exterior
EWT	inlet water temperature sensor	sonde de température d'entrée d'eau	Wassereintritt-Temperaturfühler	sonda di temperatura di ingresso dell'acqua	sonda de temperatura de entrada de agua
LWT	outlet water temperature sensor	sonde de température de sortie d'eau	Wasseraustritt-Temperaturfühler	sonda di temperatura di uscita dell'acqua	sonda de temperatura de salida de agua
S1	compressor 1 internal safety device of circuit 1 1	sécurité interne compresseur 1 du circuit 1	Eingebauter Wärmeschutzschalter Verdichter 1 von Kreislauf 1	sicurezza interna compressore 1 del circuito 1	seguridad interna compresor 1 de circuito 1
S3	compressor 1 internal safety device of circuit 1 2	sécurité interne compresseur 1 du circuit 2	Eingebauter Wärmeschutzschalter Verdichter 1 von Kreislauf 2	sicurezza interna compressore 1 del circuito 2	seguridad interna compresor 1 de circuito 2
SM1	ON/OFF switch	interrupteur marche/arrêt	Ein-/Aus-Schalter	interruttore on/off	interruptor funcionamiento/parada
SD/N	switch day / night (not supplied)	interrupteur jour/nuit (non fourni)	Tag-/Nacht-Schalter (nicht mitgeliefert)	interruttore giorno/notte (non fornito)	interruptor día/noche (no suministrado)
SS/W	switch summer / winter (closed in winter) (not supplied)	interrupteur été/hiver (fermé en hiver) (non fourni)	Sommer-/Winter-Schalter (im Winter geschlossen) (nicht mitgeliefert)	interruttore estate/invero (chiuso in inverno) (non fornito)	interruptor verano/invierno (cerrado en invierno) (no suministrado)

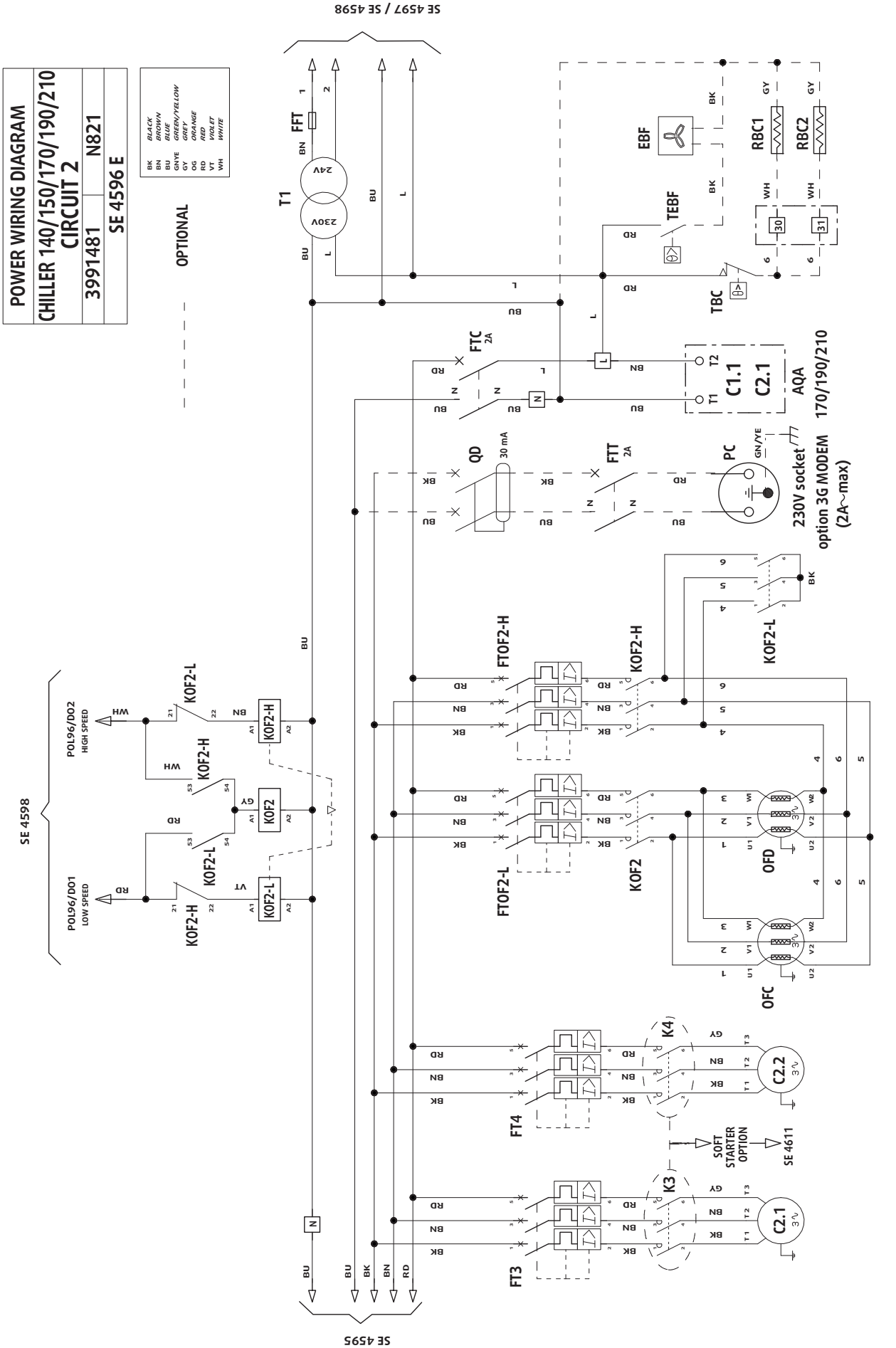
	English	Français	Deutsch	Italiano	Español
	OPTIONS	OPTIONS	OPTIONEN	OPZIONI	OPCIONES
	DESCRIPTION	DESIGNATION	BEZEICHNUNG	DENOMINAZIONE	DESIGNACIÓN
	OPTION PUMP	OPTION POMPE	OPTION PUMPE	OPZIONE POMPA	OPCIÓN BOMBA
FTWP1/2	water pump motor magnetothermal circuit breaker	disjoncteur magnétothermique du circulateur d'eau	Magnetothermischer Schutzschalter des Wasserpumpenmotors	disgiuntore magnetotermico del circuito dell'acqua (opzionale)	disyuntor magnetotérmico del motor de la bomba hidráulica
KWP1/2	water pump motor power contact	contacteur de puissance du circulateur d'eau	Leistungsschütz des Wasserpumpenmotors	contattore di potenza del circolatore dell'acqua (opzionale)	contactor de potencia del motor de la bomba hidráulica
WP1/2	water pump	circulateur d'eau	Wasserpumpe	circolatore dell'acqua	bomba hidráulica
FDWP1/2	three phase frequency variator of water pump motor	variateur de fréquence triphasé des moteurs des circulateur d'eau	Drehstrom-Frequenzumrichter des Wasserpumpenmotors	variatore di frequenza trifase dei motori del circolatore dell'acqua	variador de frecuencia trifásico de los motores de la bomba hidráulica
WPT	hydraulic pressure sensor	capteur de pression hydraulique	Hydraulikdrucksensor	sensore di pressione idraulica	captor de presión hidráulica

	English	Français	Deutsch	Italiano	Español
	OPTIONS	OPTIONS	OPTIONEN	OPZIONI	OPCIONES
	DESCRIPTION	DESIGNATION	BEZEICHNUNG	DENOMINAZIONE	DESIGNACIÓN
	OPTION ALL SEASONS	OPTION TOUTES SAISONS	OPTION GANZJAHRESBETRIEB	OPZIONE TUTTE LE STAGIONI	OPCIÓN TODAS LAS ESTACIONES DEL AÑO
FTOFA/B	magnetic circuit breaker of outdoor fans of circuit 1	disjoncteur magnétique des ventilateurs extérieurs du circuit 1	Magnetischer Schutzschalter der externen Lüftung von Kreislauf 1	disgiuntore magnetico dei ventilatori esterni del circuito 1	disyuntor magnético de la ventilación exterior de circuito 1
FTOFC/D	magnetic circuit breaker of outdoor fans of circuit 2	disjoncteur magnétique des ventilateurs extérieurs du circuit 2	Magnetischer Schutzschalter der externen Lüftung von Kreislauf 2	disgiuntore magnetico dei ventilatori esterni del circuito 2	disyuntor magnético de la ventilación exterior de circuito 2
FDA/B	three phase frequency variator of outdoor fans of circuit 1	variateur de fréquence triphasé des moteurs ventilateurs extérieurs du circuit 1	Drehstrom-Frequenzumrichter der Motoren der externen Lüftung von Kreislauf 1	variatore di frequenza trifase dei motori ventilatori esterni del circuito 1	variador de frecuencia trifásico de los motores de la ventilación exterior de circuito 1
FDC/D	three phase frequency variator of outdoor fans of circuit 2	variateur de fréquence triphasé des moteurs ventilateurs extérieurs du circuit 2	Drehstrom-Frequenzumrichter der Motoren der externen Lüftung von Kreislauf 2	variatore di frequenza trifase dei motori ventilatori esterni del circuito 2	variador de frecuencia trifásico de los motores de la ventilación exterior de circuito 2
KOFA/B	three phase frequency variator command relay of outdoor fans of circuit 1	relais de commande des variateurs de fréquence triphasés des moteurs ventilateurs extérieurs du circuit 1	Steuerrelais der Drehstrom-Frequenzumrichter der Motoren der externen Lüftung von Kreislauf 1	relè di comando dei variatori di frequenza trifase dei motori ventilatori esterni del circuito 1	relé de comando de los variadores de frecuencia trifásicos de los motores de la ventilación exterior de circuito 1
KOFC/D	three phase frequency variator command relay of outdoor fans of circuit 2	relais de commande des variateurs de fréquence triphasés des moteurs ventilateurs extérieurs du circuit 2	Steuerrelais der Drehstrom-Frequenzumrichter der Motoren der externen Lüftung von Kreislauf 2	relè di comando dei variatori di frequenza trifase dei motori ventilatori esterni del circuito 2	relé de comando de los variadores de frecuencia trifásicos de los motores de la ventilación exterior de circuito 2
	OPTION SOFT STARTER	OPTION SOFT STARTER	OPTION SOFT STARTER	OPZIONE SOFT STARTER	OPCIÓN SOFT STARTER
S.ST1/2/3/4	Soft Starter	démarreurs «Soft Starter»	Anlasser «Soft Starter»	motorini di avviamento «Soft Starter»	Motor de arranque «Soft Starter»
	NORDIC OPTION	OPTION PACK NORDIQUE	NORDISCHE OPTION	OPZIONE NORDICA	OPCIÓN NÓRDICO
TBC	thermostat electric heater of drain pan	thermostat résistances bacs condensats	Temperaturregler des Frostschutz-Widerstand des Kondensatwanne	termostato resistenze vasche della condensa	termostato resistencia anticongelación de la bandeja de drenaje
RBC1	antifreeze electric heater of drain pan of circuit 1	résistance bac condensats circuit 1	Frostschutz-Widerstand des Kondensatwanne von Kreislauf 1	resistenza vasca della condensa circuito 1	resistencia anticongelación de la bandeja de drenaje de circuito 1
RBC2	antifreeze electric heater of drain pan of circuit 2	résistance bac condensats circuit 2	Frostschutz-Widerstand des Kondensatwanne von Kreislauf 2	resistenza vasca della condensa circuito 2	resistencia anticongelación de la bandeja de drenaje de circuito 2
	OPTION FAN OF ELECTRIC PANEL	OPTION VENTILATION DU COFFRET ELECTRIQUE	OPTION LÜFTUNG DER ELEKTRISCHEN TAFEL	OPZIONE VENTILAZIONE DEL QUADRO ELETTRICO	OPTION VENTILACIÓN DE CUADRO ELÉCTRICO
TEBF	fan thermostat of electric panel	thermostat ventilateur boîtier électrique	Temperaturregler des Lüftung der elektrischen Tafel	termostato ventilatore quadro elettrico	termostato ventilación de cuadro eléctrico
EBF	fan of electric panel	ventilateur boîtier électrique	Lüftung der elektrischen Tafel	ventilatore quadro elettrico	ventilación de cuadro eléctrico

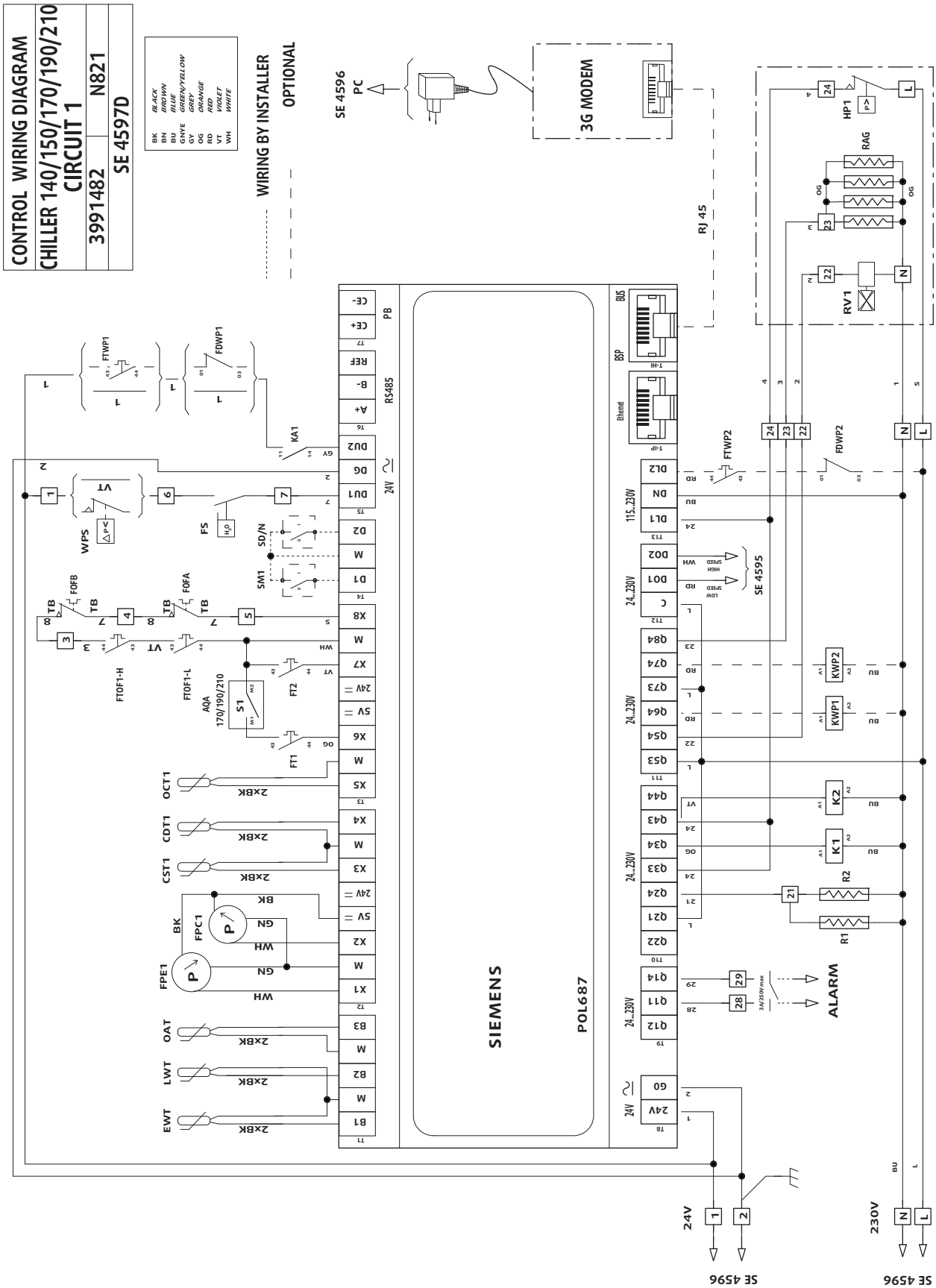
POWER - CIRCUIT 1



POWER - CIRCUIT 2



CONTROL - CIRCUIT 1

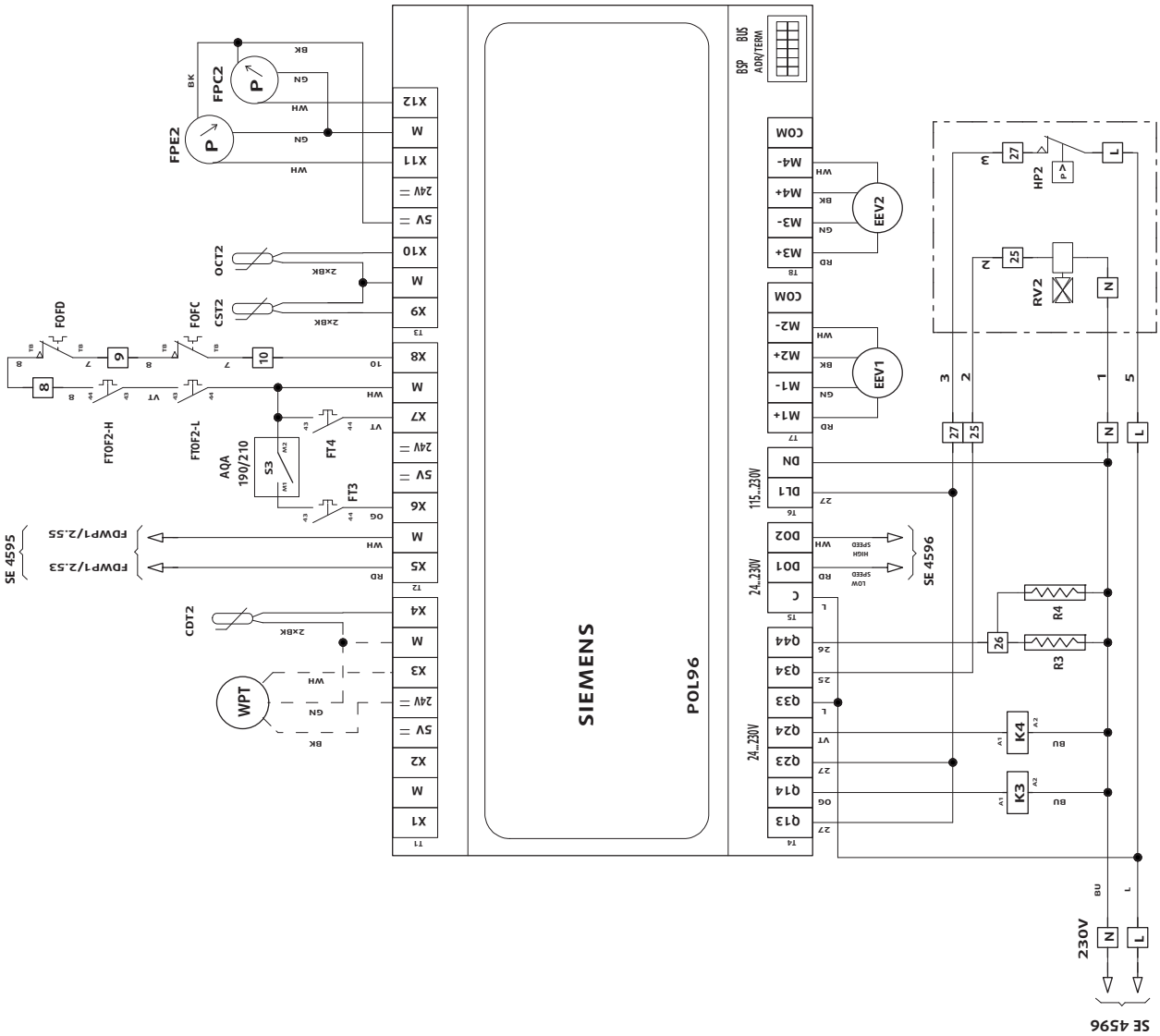


CONTROL - CIRCUIT 2

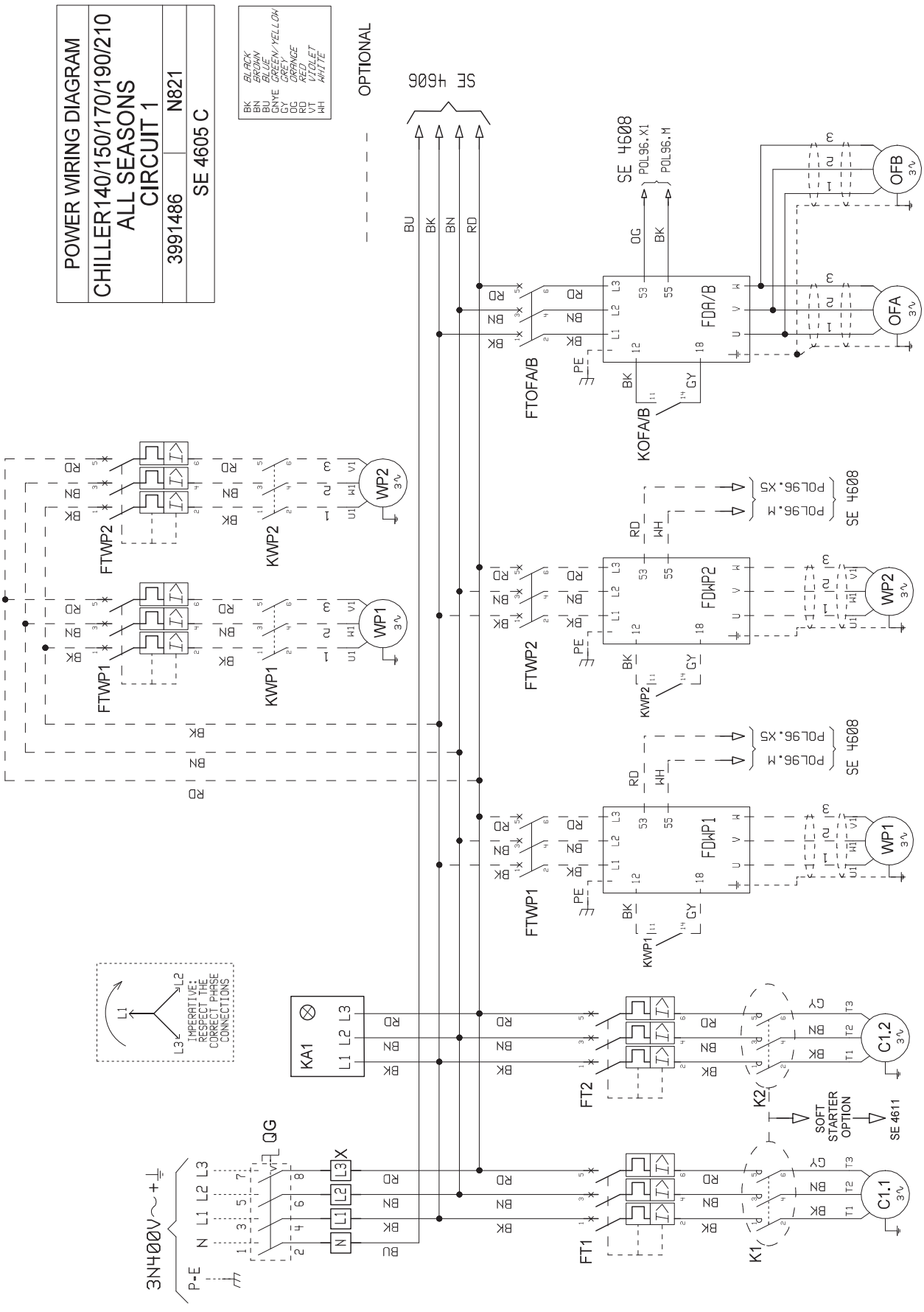
CONTROL WIRING DIAGRAM
CHILLER 140/150/170/190/210
CIRCUIT 2
3991483 | N821
SE 4598D

BK BLACK
BN BROWN
BU BLUE
GNYE GREEN/YELLOW
GY GREY
OG ORANGE
RD RED
VT VIOLET
WH WHITE

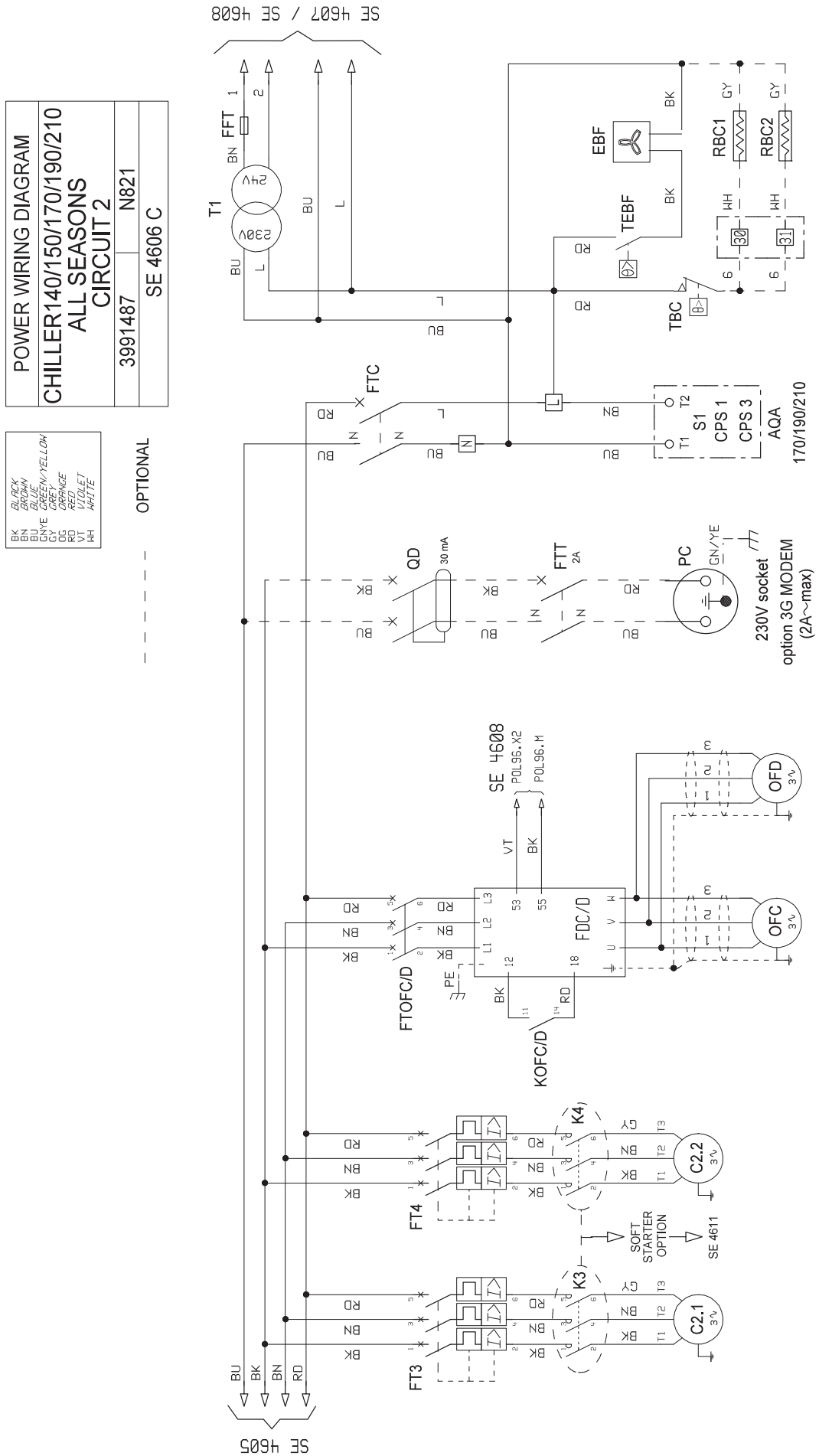
OPTIONAL



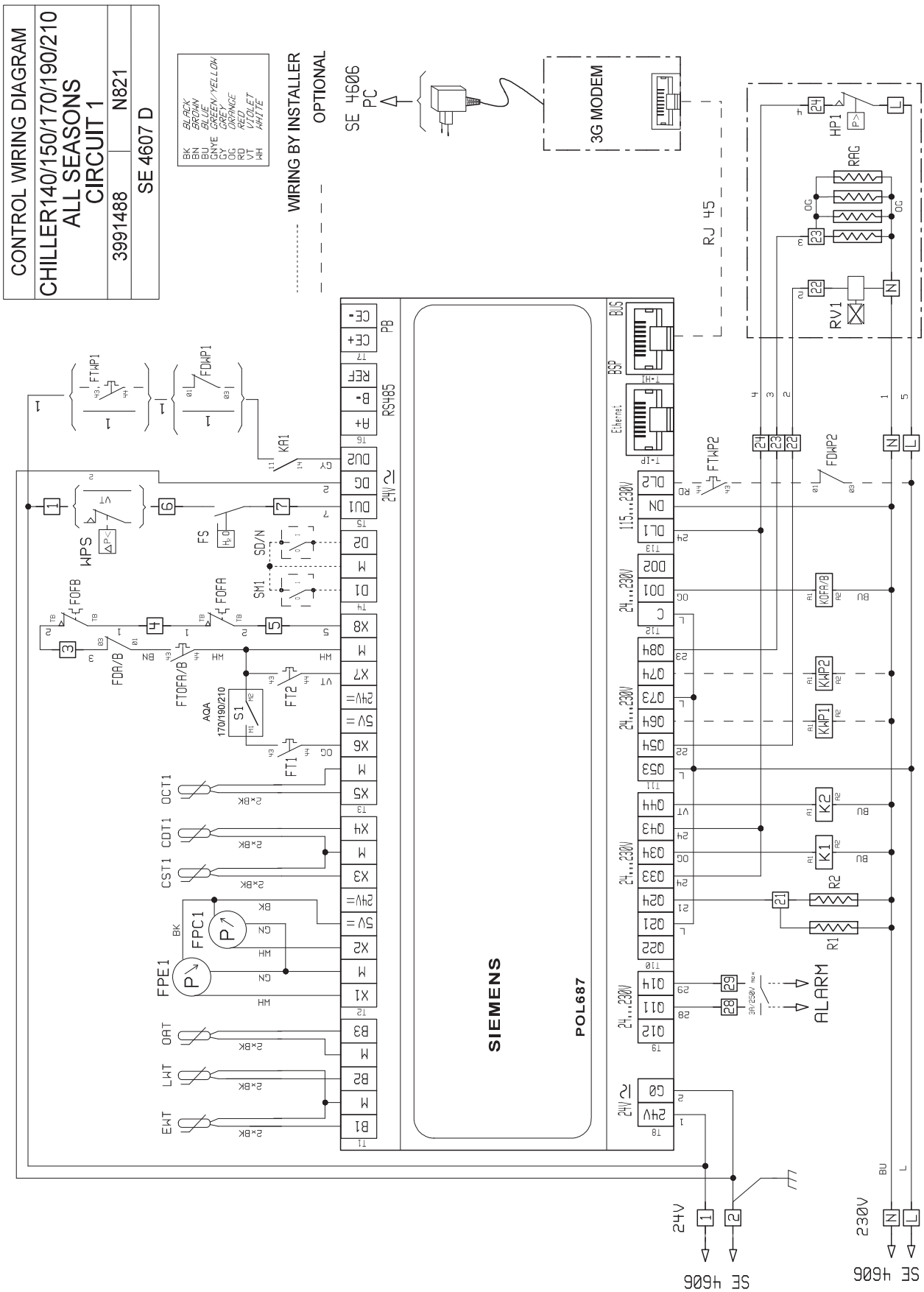
POWER - CIRCUIT 1 TTS



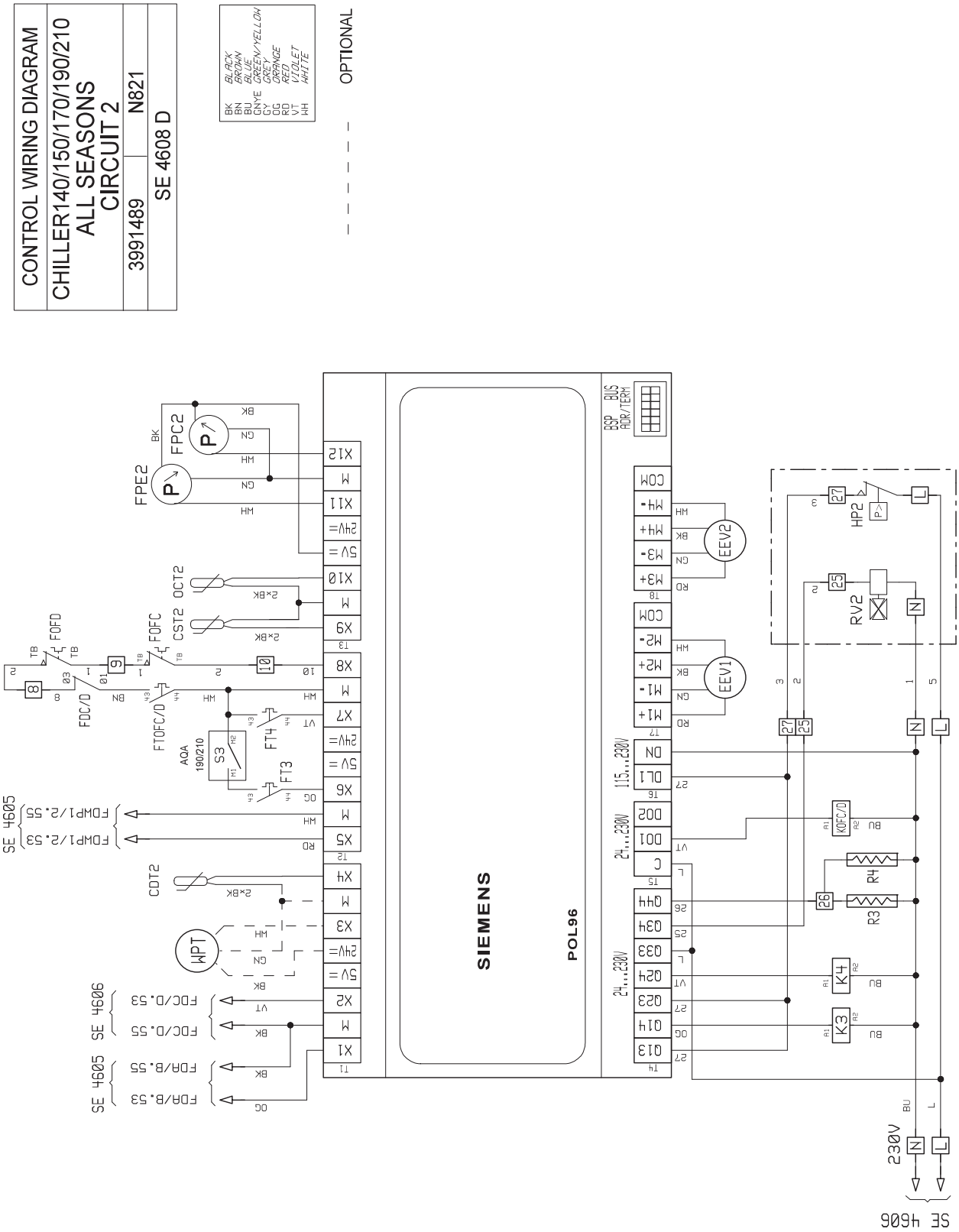
POWER - CIRCUIT 2 TTS



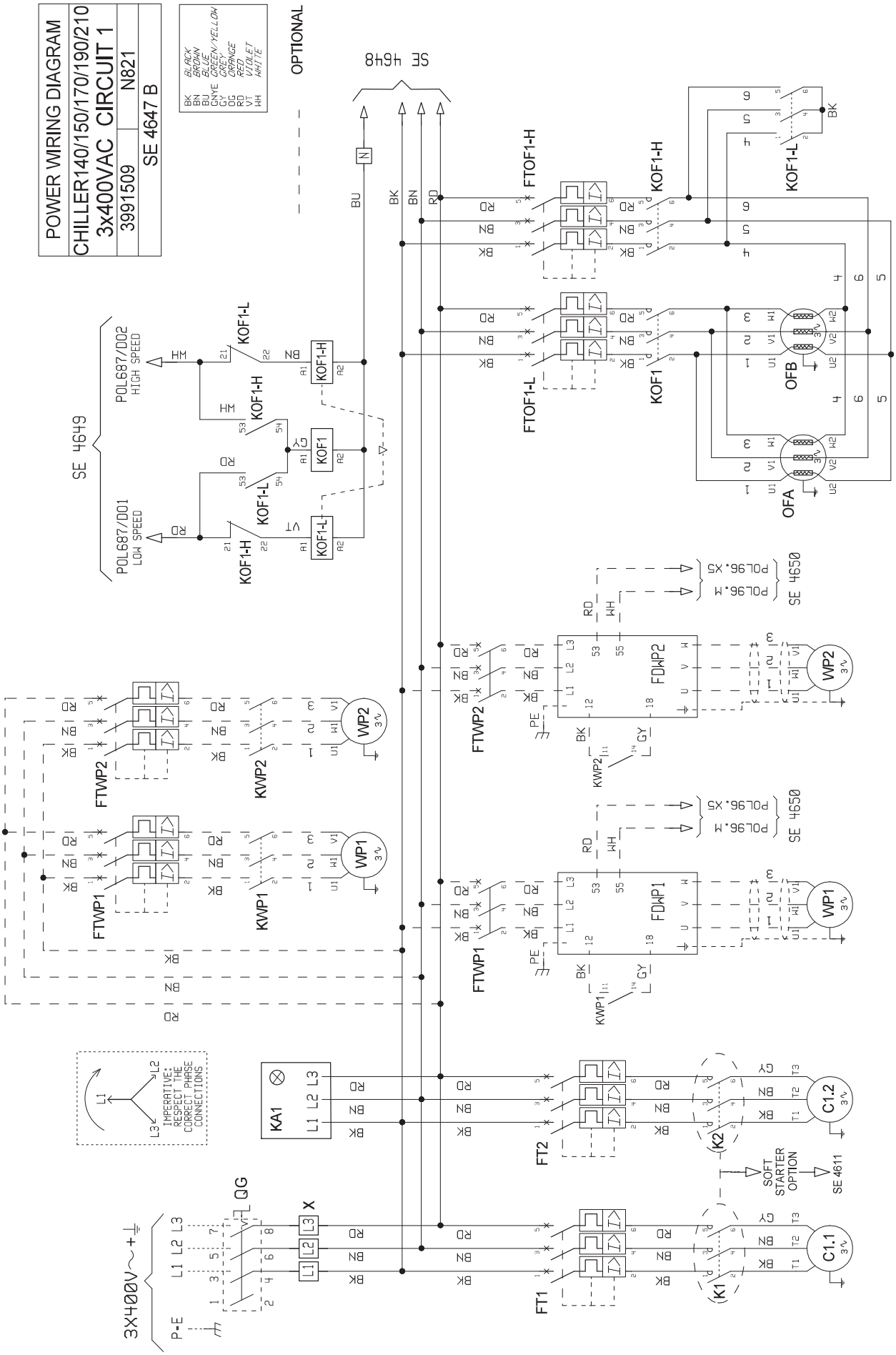
CONTROL - CIRCUIT 1 TTS



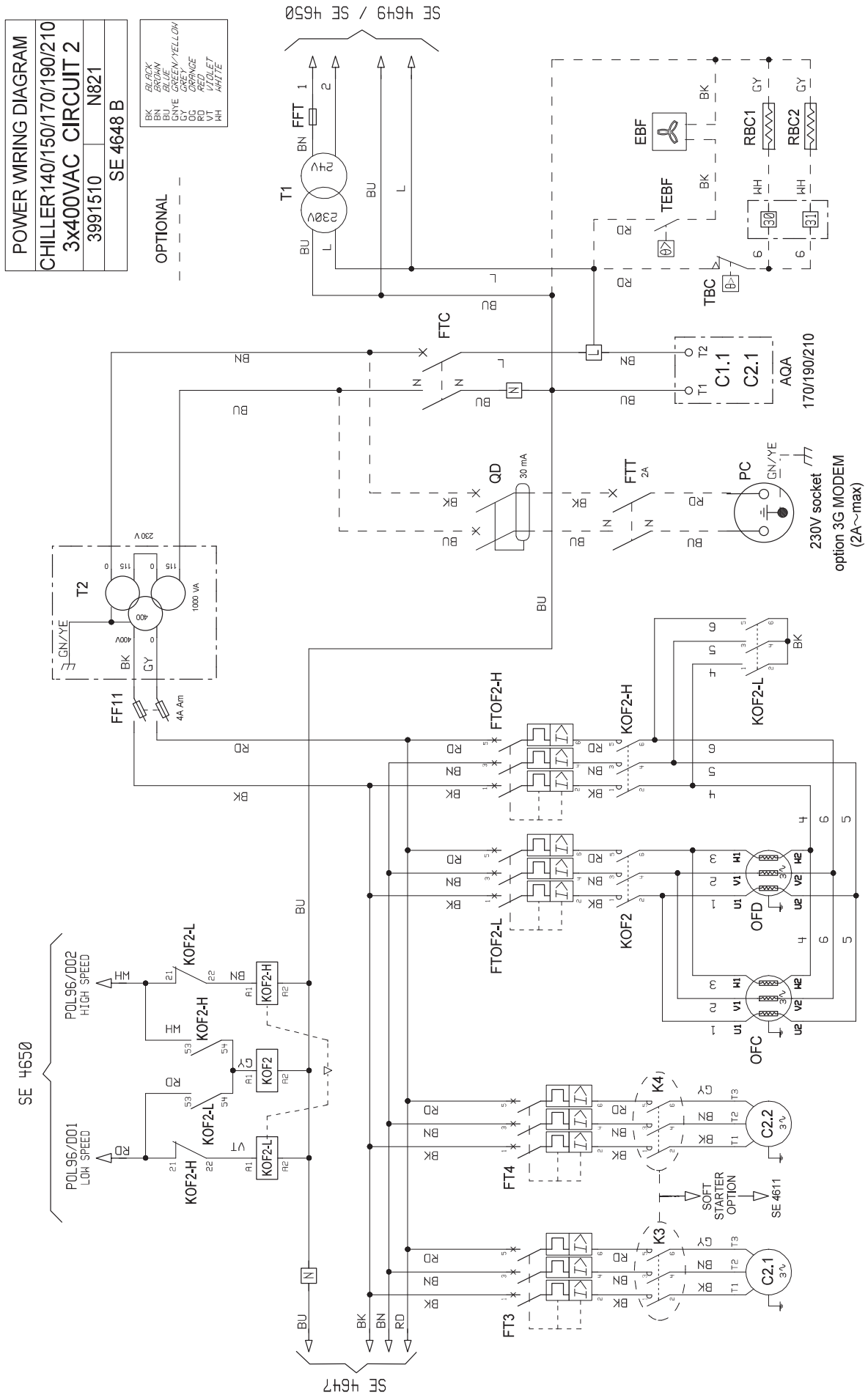
CONTROL - CIRCUIT 2 TTS



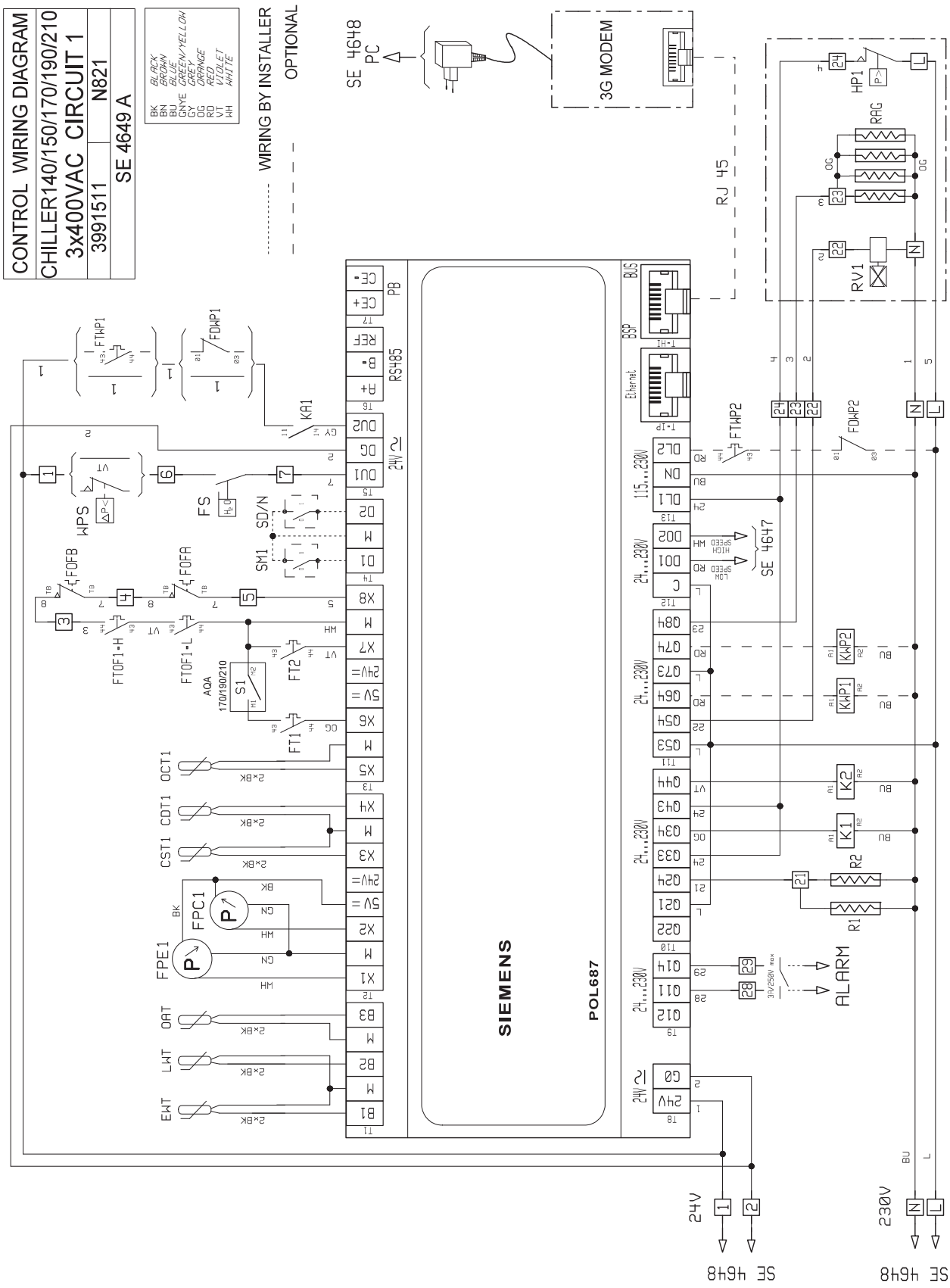
POWER - CIRCUIT 1 - WITHOUT NEUTRAL



POWER - CIRCUIT 2 - WITHOUT NEUTRAL



CONTROL - CIRCUIT 1 - WITHOUT NEUTRAL

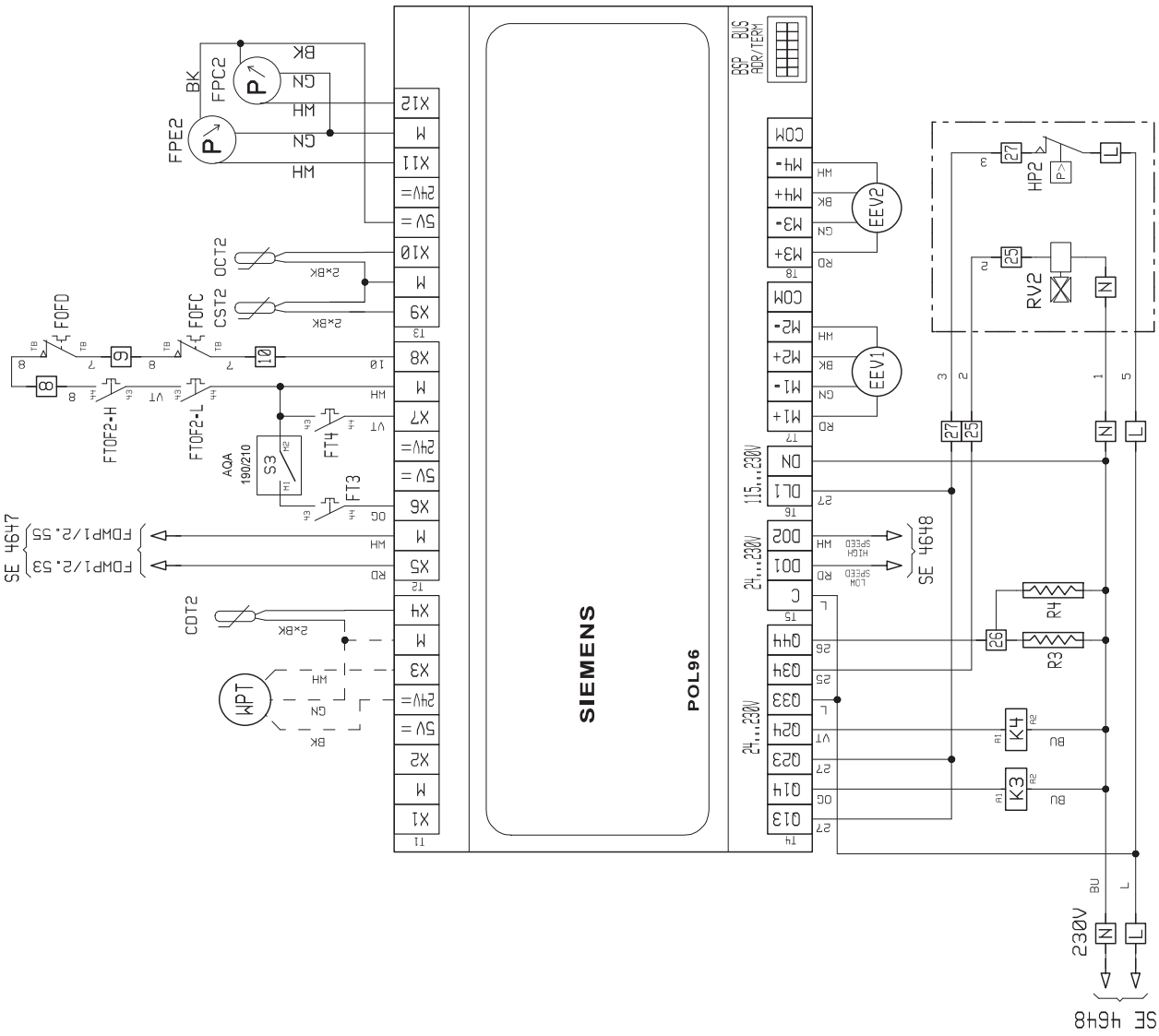


CONTROL - CIRCUIT 2 - WITHOUT NEUTRAL

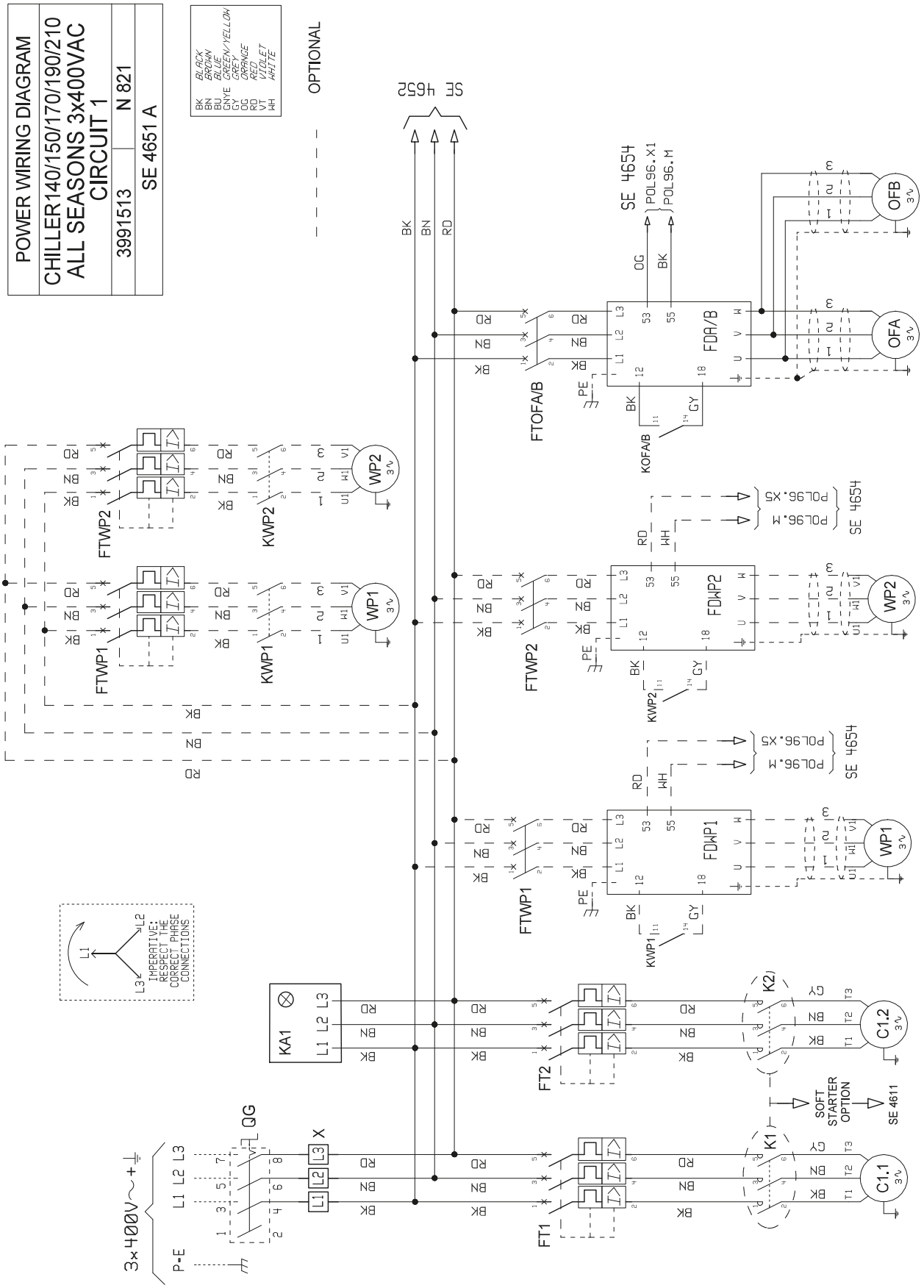
CONTROL WIRING DIAGRAM	
CHILLER140/150/170/190/210 3x400VAC CIRCUIT 2	
3991512	N821
SE 4650 A	

BK	BLACK
BN	BROWN
BU	BLUE
GNYE	GREEN-YELLOW
GY	GREY
OG	ORANGE
RD	RED
VT	VIOLET
WH	WHITE

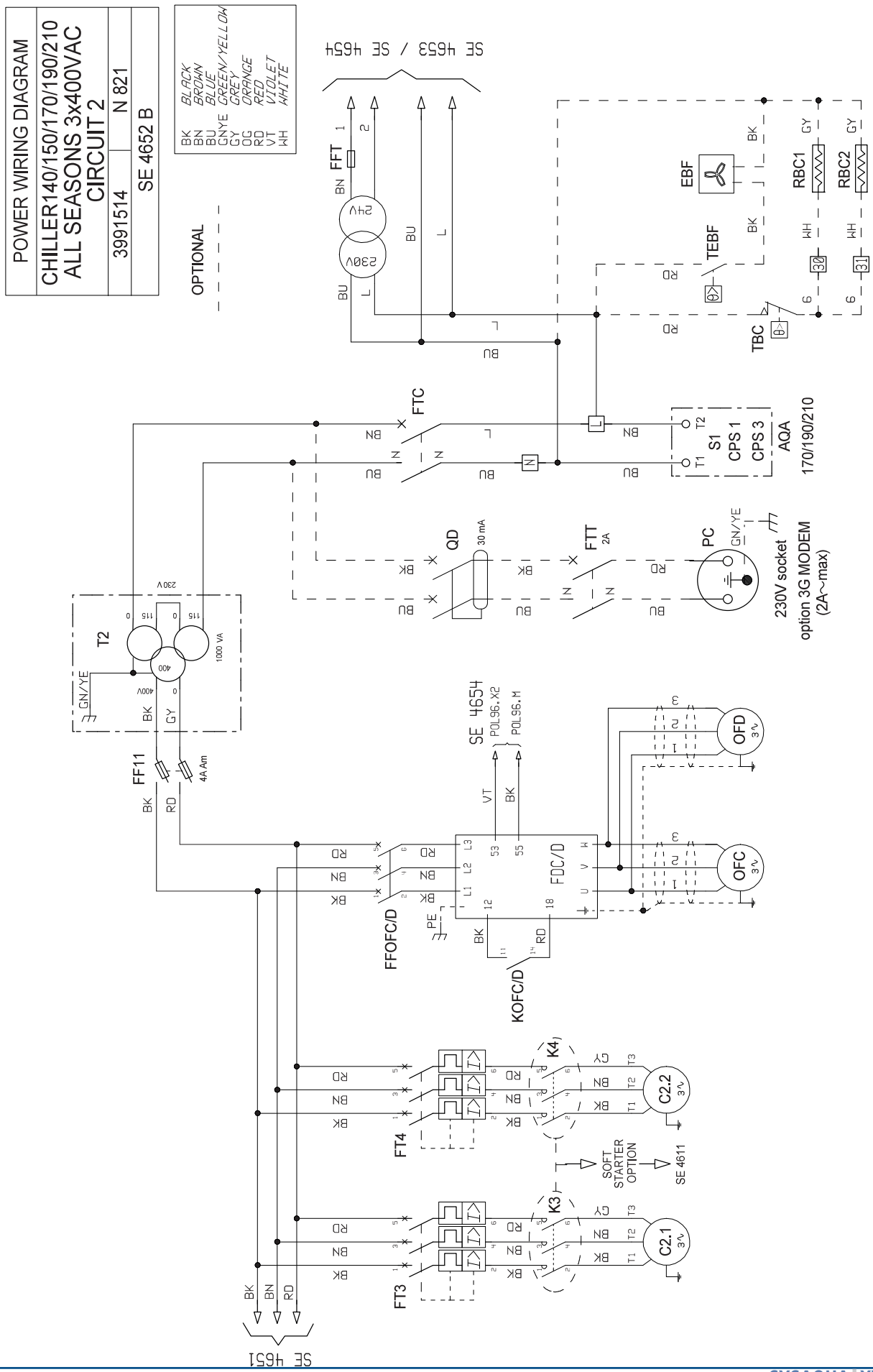
OPTIONAL



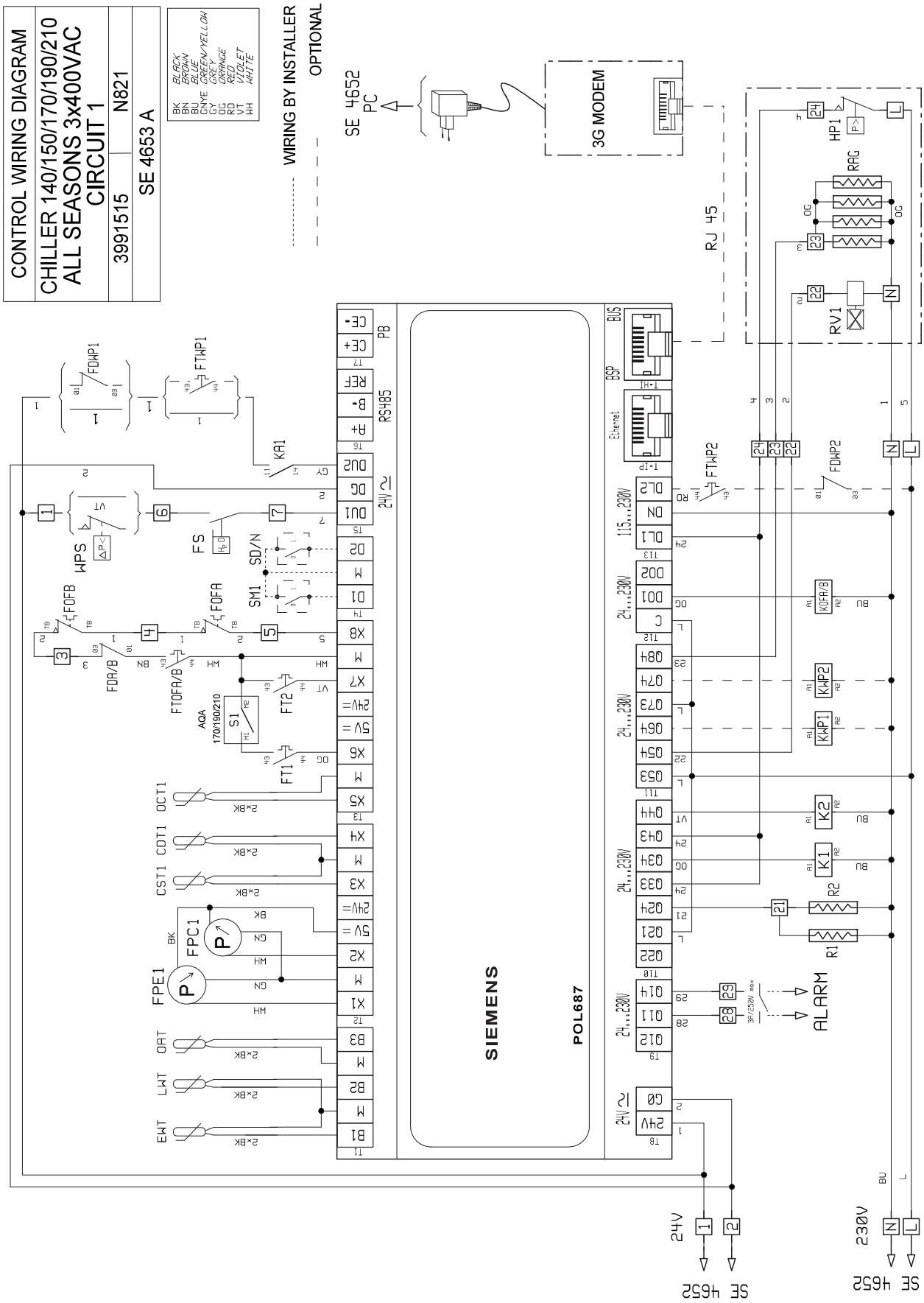
POWER - CIRCUIT 1 TTS - WITHOUT NEUTRAL



POWER - CIRCUIT 2 TTS - WITHOUT NEUTRAL



CONTROL - CIRCUIT 1 TTS - WITHOUT NEUTRAL



CONTROL - CIRCUIT 2 TTS - WITHOUT NEUTRAL

CONTROL WIRING DIAGRAM

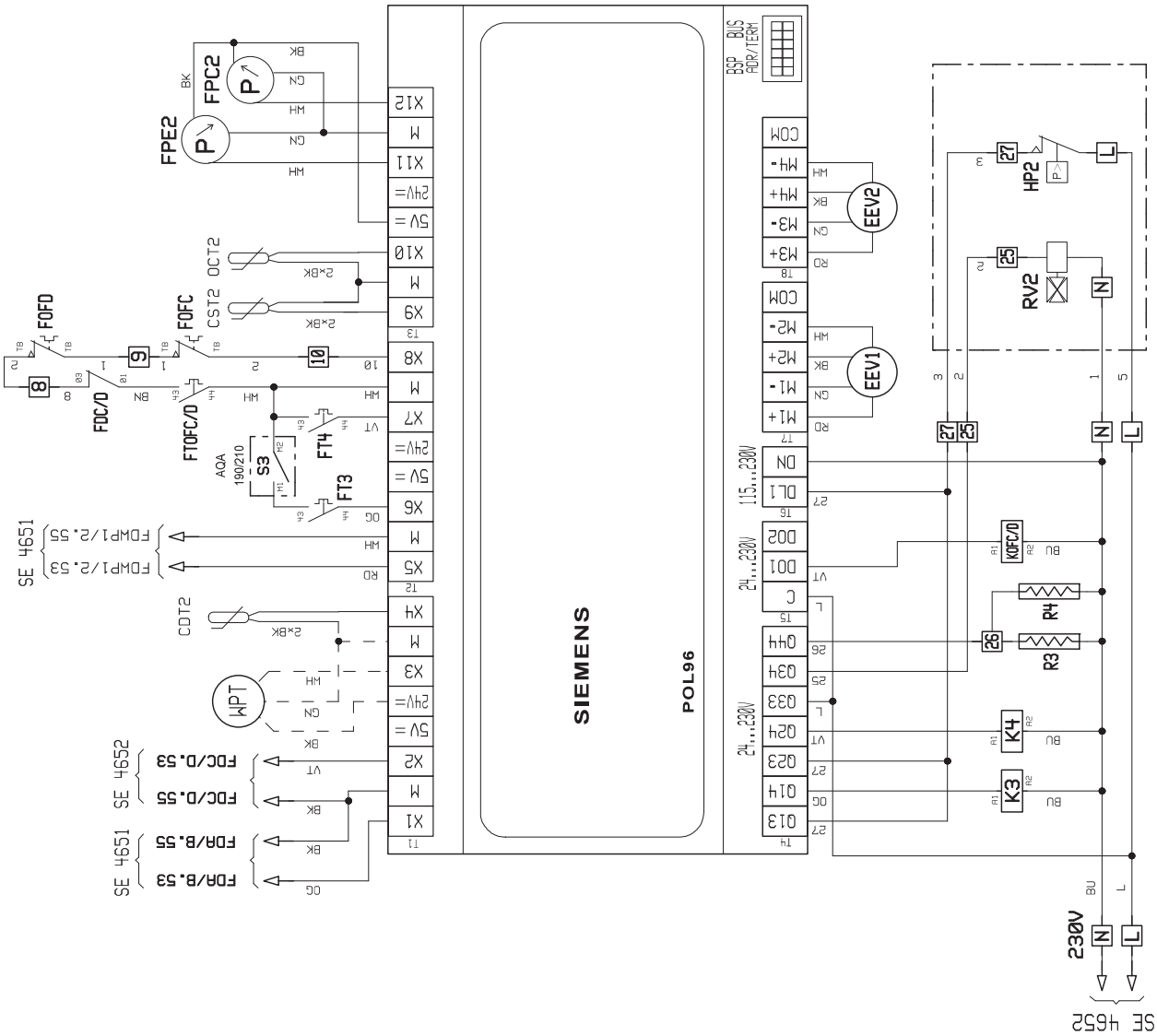
CHILLER 140/150/170/190/210
ALL SEASONS 3x400VAC
CIRCUIT 2

3991516 | N 821

SE 4654 B

BK BLACK
BR BROWN
BU BLUE
GNYE GREEN-YELLOW
GY GREY
OG ORANGE
RD RED
VT VIOLET
WH WHITE

OPTIONAL



START UP FORM / FICHE DE MISE EN SERVICE

CUSTOMER INFORMATION:

Order number: ..... Job name: .....

Contractor: ..... Installation address: .....

.....

Contact: ..... ☎: .....

INSTALLER INFORMATION:

Company: ..... Address: .....

.....

Contact: ..... ☎: .....

COMMISSIONING INFORMATION:

Company: ..... Address: .....

.....

Contact: ..... ☎: .....

UNIT IDENTIFICATION:

	140	150	170	190	210
SYSAQUA.L					
SYSAQUA.H					

Unit serial number: .....

	YES	NO
Simple pump		
Double pump		
Buffer tank		

	YES	NO
All seasons kit		
Soft Starter		

Compressor 1-1 serial number: Compressor 1-2 serial number: .....Compressor 2-1 serial number:
Compressor 2-2 serial number: .....

INSTALLATION CHECKING:

	YES	NO		YES	NO
Recommanded free clearance			Water connection, cleaning, rinsing, air bleed		
Level installation			Anti-frost protection of the water loop		
Unit correctly mounted on supplied dampers			Installation thermal load reaches at least 50%		
Power supply compatible with unit specifications			Mesh filter at the inlet of the unit		
State-of-art power cable section and wiring to the unit			Minimum water flowrate available		
Ground cable is wired			Flowswitch cut-out checked		
Main electrical protection suits the unit			Crankcases heaters are energized since 12 hours		
All electrical connections are correctly tightened					
Ground continuity on all pipes					

OBSERVATIONS:

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INSTALLATION MEASUREMENTS:

Ambient temperature: ..... Ambient humidity: .....

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ELECTRICAL MEASUREMENTS:

Voltage L1-N: ..... Voltage L1-L2:: .....

Voltage L1-L3: ..... Voltage L2-L3:: .....

.....

Voltage unbalance less than 2 %

YES	NO
☐	☐

Never start the unit if the voltage unbalance is over 2 %. Please, contact your electricity supplier for help.

	VOLTAGE			NOMINAL CURRENT		
	L1-L2	L1-L3	L2-L3	L1	L2	L3
Comp. 1-1						
Comp. 1-2						
Comp. 2-1						
Comp. 2-2						
Fan A						
Fan B						
Fan C						
Fan D						
Pump 1						
Pump 2						

THERMODYNAMICS MEASUREMENTS:

% of capacity	%	%	%	%
Evaporating pressure	bar	bar	bar	bar
Evaporating temperature	°C	°C	°C	°C
Suction temperature	°C	°C	°C	°C
Condensing pressure	bar	bar	bar	bar
Condensing temperature	°C	°C	°C	°C
Liquid line temperature	°C	°C	°C	°C
Discharge temperature	°C	°C	°C	°C
High pressure switch cut-out	bar	bar	bar	bar

HYDRAULICS MEASUREMENTS:

Inlet temperature	°C	Vmax (VARIABLE PRIMARY FLOW)	%
Outlet temperature	°C	Vmin (VARIABLE PRIMARY FLOW)	%
BPHE inlet pressure	kPa	Vstdby (VARIABLE PRIMARY FLOW)	%
BPHE outlet pressure	kPa	Water pressure setpoint	bar
Glycol type & contents	%		

REMARKS:

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TECNICIAN
Name:
Sign-in:

CLIENT
Name:
Sign-in:

As part of our ongoing product improvement programme, our products are subject to change without prior notice. Non contractual photos.

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6 : +33 (0)2 32 32 55 13

J38538GB

IOM AQA 02-N-5GB
Part number : **J38358GB**
Supersedes : **IOM AQA 02-N-4GB**