INSTALLATION AND MAINTENANCE MANUAL

Panasonic®

"Original Language"

Heat Pump Chiller

This Heat Pump Chiller uses the refrigerant R410A.

Model No.

	Outdoor Unit	
Class	Standard without buffer tank	With buffer tank
140	U-140CWNB	U-140CWBL
150	U-150CWNB	U-150CWBL
170	U-170CWNB	U-170CWBL
190	U-190CWNB	U-190CWBL
210	U-210CWNB	U-210CWBL

Read through the Installation Instructions before you proceed with the installation. In particular, you will need to read under the " IMPORTANT ! " section at the top of the page.

Panasonic. **IMM_ECOI-W_140-210_EN_09.19**

September 2019

Contents

IMPORTANT!
Please Read Before Starting

This air conditioner must be installed by the sales dealer or installer.
This information is provided for use only by authorized persons.
For safe installation and trouble-free operation, you must:

- Carefully read this instruction booklet before beginning.
- Follow each installation or repair step exactly as shown.
- This air conditioner shall be installed in accordance with National Wiring Regulations.
- This equipment complies with EMC directive 2014/30/EU.
- Pay close attention to all warning and caution notices given in this manual.

WARNING This symbol refers to a hazard or unsafe practice which can result in severe personal injury or death.

CAUTION This symbol refers to a hazard or unsafe practice which can result in personal injury or product or property damage.

If Necessary, Get Help

These instructions are all you need for most installation sites and maintenance conditions. If you require help for a special problem, contact our sales/service outlet or your certified dealer for additional instructions.

In Case of Improper Installation

The manufacturer shall in no way be responsible for improper installation or maintenance service, including failure to follow the instructions in this document.

Notice

The English text is the 'Original language'
The content of this document is intended for use by the manufacturer professional personnel only.

SPECIAL PRECAUTIONS

WARNING When Wiring

ELECTRICAL SHOCK CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. ONLY A QUALIFIED, EXPERIENCED ELECTRICIAN SHOULD ATTEMPT TO WIRE THIS SYSTEM.

- Do not supply power to the unit until all wiring and tubing are completed or reconnected and checked.
- Highly dangerous electrical voltages are used in this system. Carefully see the wiring diagram and section 2 when wiring. Improper connections and inadequate grounding can cause **accidental injury or death**.
- Connect all wiring tightly. Loose wiring may cause overheating at connection points and a possible fire hazard.
- Provide a power outlet to be used exclusively for each unit.
- ELCB must be incorporated in the fixed wiring. Circuit breaker must be incorporated in the fixed wiring in accordance with the wiring regulations.

	Circuit breaker
U-140CW...	125A
U-150CW...	125A
U-170CW...	160A

	Circuit breaker
U-190CW...	160A
U-210CW...	200A

* See Electrical Specifications Fuse rating aM, for systems with alternate pump and fan options.

- Provide a power outlet exclusively for each unit, and full disconnection means having a contact separation by 3mm in all poles must be incorporated in the fixed wiring in accordance with the wiring rules.
- To prevent possible hazards from insulation failure, the unit must be grounded.
- This equipment is strongly recommended to be installed with Earth Leakage Circuit Breaker (ELCB) or Residual Current Device (RCD). Otherwise, it may cause electrical shock and fire in case of equipment breakdown or insulation breakdown.

When Transporting

- It may need two or more people to carry out the installation work.
- Care should be taken when lifting or moving the liquid cooler to reduce the chance of serious injury. Do not attempt to move the equipment without the correct means of lifting.

When Installing…

Select an installation location which is rigid and strong enough to support or hold the unit, and select a location for easy maintenance.

…In Moist or Uneven Locations

Use a raised concrete pad or concrete blocks to provide a solid, level foundation for the outdoor unit. This prevents water damage and abnormal vibration.

…In an Area with High Winds

Securely anchor the outdoor unit down with bolts and a metal frame. Provide a suitable air baffle.

…In a Snowy Area (for Heat Pump-type Systems)

Install the outdoor unit on a raised platform that is higher than drifting snow. Provide snow protection.

When Servicing

- Turn the power OFF at the main power box (mains), wait at least 10 minutes until it is discharged, then open the unit to check or repair electrical parts and wiring.
- Keep your fingers and clothing away from any moving parts.
- Clean up the site after you finish, remembering to check that no metal scraps or bits of wiring have been left inside the unit.

WARNING

- This product must not be modified or disassembled under any circumstances. Modified or disassembled unit may cause fire, electric shock or injury.
- Users must not clean in side the unit. Engage authorized dealer or specialist for cleaning.
- In case of malfunction of this appliance, do not repair by yourself. Contact to the sales dealer or service dealer for a repair and disposal.

CAUTION

- Ventilate any enclosed areas when installing or testing the refrigeration system. Leaked refrigerant gas, on contact with fire or heat, can produce dangerously toxic gas.
- Confirm after installation that no refrigerant gas is leaking. If the gas comes in contact with a burning stove, gas water heater, electric room heater or other heat source, it can cause the generation of toxic gas.

Others

When disposal of the product, comply with national regulations.

CAUTION

- Do not touch the air inlet or the sharp aluminum fins of the outdoor unit. You may get injured.
- Do not sit or step on the unit, you may fall down accidentally.
- Do not stick any object into the FAN CASE.
  You may be injured and the unit may be damaged.

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. Pressure equipment safety

Gas	Fluid Group	PS (bar)	Category (1)	Evaluation module (2)	Notified body
R410A	2	42	2	D1	0062

1) According the 14 § 6 b) article of the directive 2014/68/EU.
2) According the 14 § 2 article of the directive 2014/68/EU.

- These units contain pressurised refrigerant. The pressurised elements within these units should only be disturbed during maintenance by fully qualified and trained personnel.
- Do not damage, bend, or impact the pressurised pipe work.
- Failure to follow these recommendations may result in serious or fatal injury.

1.4. 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 Cl 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 breathing 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.

2.1. Disposal information

Units must be disposed of in accordance with local regulations

Information for Users on Collection and Disposal of Old Equipment and Used Batteries

These symbols on the products, packaging, and/or accompanying documents mean that used electrical and electronic products and batteries should not be mixed with general household waste.
For proper treatment, recovery and recycling of old products and used batteries, please take them to applicable collection points, in accordance with your national legislation and the Directives 2002/96/EC and 2006/66/EC.
By disposing of these products and batteries correctly, you will help to save valuable resources and prevent any potential negative effects on human health and the environment which could otherwise arise from inappropriate waste handling.
For more information about collection and recycling of old products and batteries, please contact your local municipality, your waste disposal service or the point of sale where you purchased the items.
Penalties may be applicable for incorrect disposal of this waste, in accordance with national legislation.

For business users in the European Union

If you wish to discard electrical and electronic equipment, please contact your dealer or supplier for further information.

[Information on Disposal in other Countries outside the European Union]

These symbols are only valid in the European Union. If you wish to discard these items, please contact your local authorities or dealer and ask for the correct method of disposal.

Note for the battery symbol (bottom two symbol examples):

This symbol might be used in combination with a chemical symbol. In this case it complies with the requirement set by the Directive for the chemical involved.

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 ECOi-W 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.

ECOi-W 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 units are filled with an operational refrigerant fluid charge and are subjected to pressure tightness tests.
In cooling operation, the units 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.
For heating operation, the units can produce hot water at temperatures varying between +20°C and +50°C.

5. Contents of package

1 ECOi-W
1 Water filter
1 Bag with the documentation

5.1. Optional accessories

Anti-vibration rubber pads
Spring pads
Isolating valve
Additional optional accessories are available. Please see Technical Data Manual for reference.

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

6. Dimensions

See appendix

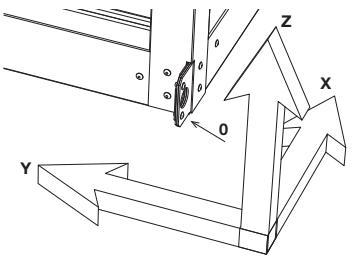
7. Handling

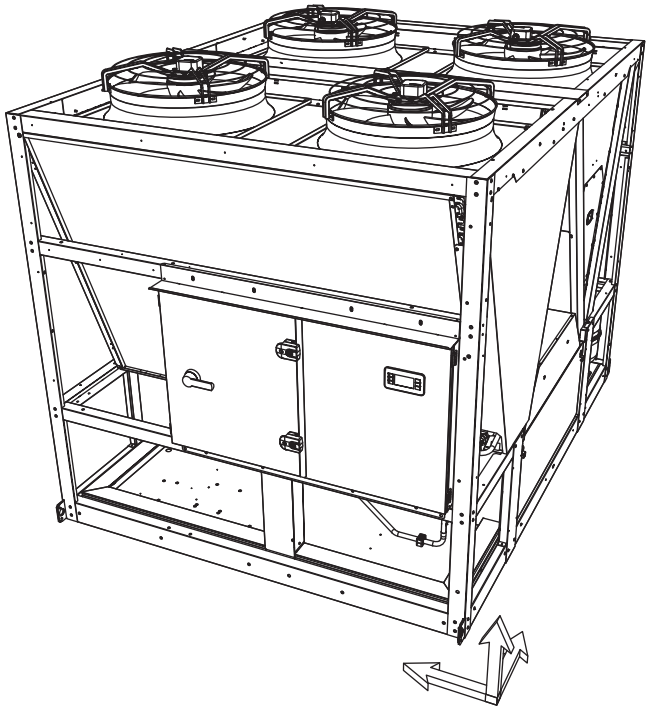
7.1. Net weight

			140	150	170	190	210
Cooling only - Without pump		kg	1422	1425	1515	1584	1847
Heat pump - Without pump		kg	1577	1597	1687	1777	2087
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

	Without pump and without buffer tank			With dual high pressure pump and buffer tank		
	X_G	Y_G	Z_G	X_G	Y_G	Z_G
	mm	mm	mm	mm	mm	mm
140	1241	1063	784	1 465	1 083	745
150	1241	1063	759	1 463	1 082	721
170	1255	1021	758	1 463	1 050	728
190	1253	1067	760	1 455	1 084	734
210	1265	1071	800	1 440	1 086	696





7.3. Handling generalities

The method of handling depends on the model of ECOi-W 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 that no handling damage has occurred.
- All 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 ECOi-W to handling constraints, as only its base is designed for that purpose.

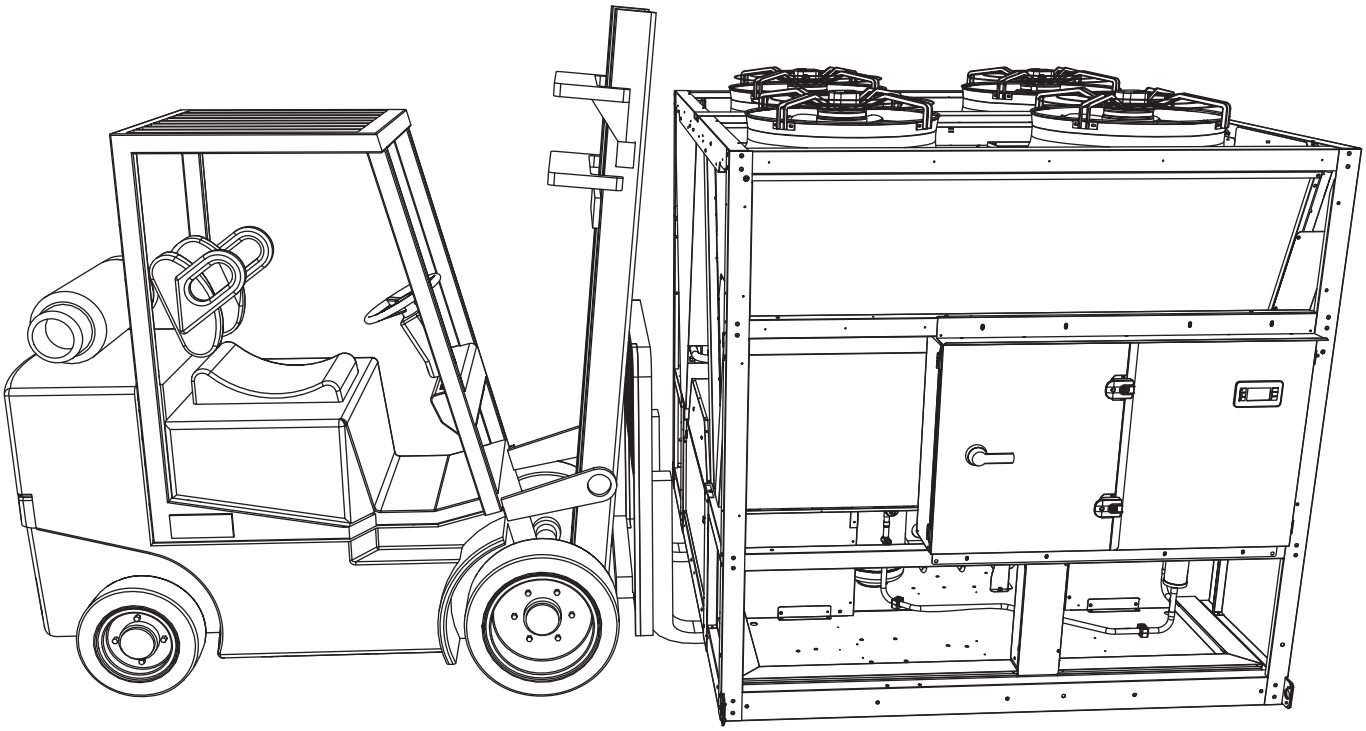
CAUTION Do not tilt the ECOi-W during handling, as it would be irrevocably damaged.

CAUTION Never move the ECOi-W on rollers.

CAUTION When handling the ECOi-W, 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 140/150/170/190/210 models, lift them only along their width.



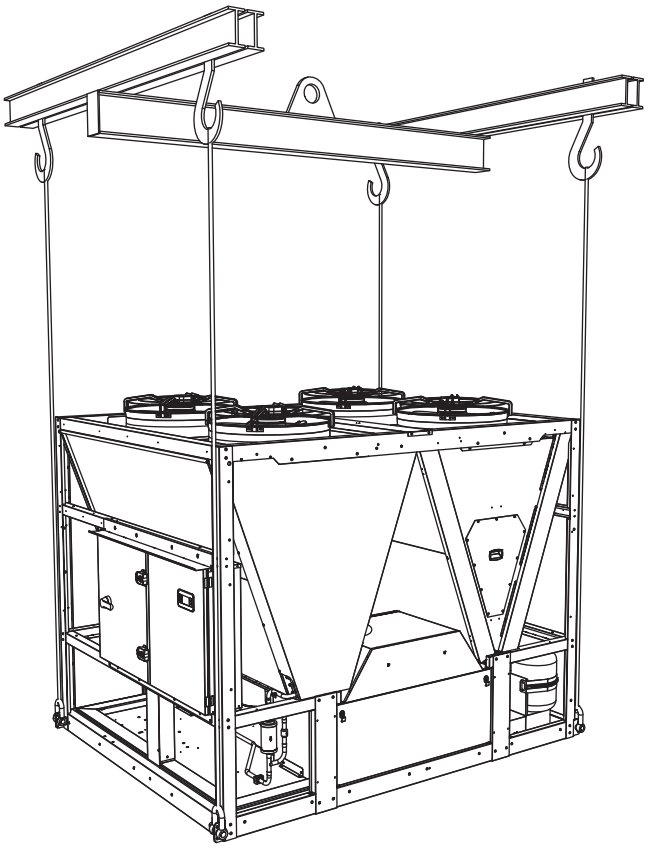
Place a safety wedge between the unit base and the fork lift truck to avoid damaging the unit's structure and casing.

7.3.2. Handling by slinging

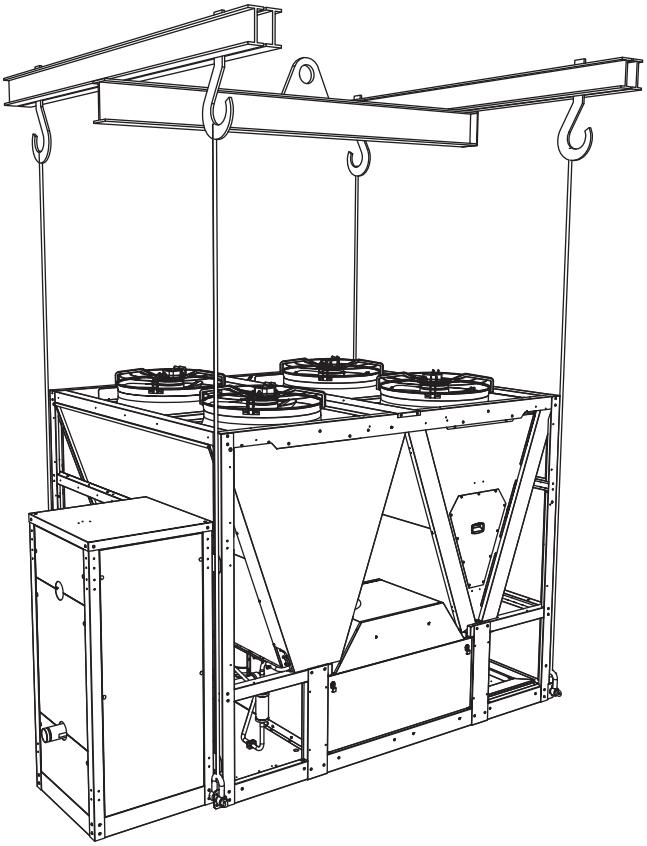
Lifting is also possible by slinging.
A spreader must be used to prevent damage to the machine edges.

CAUTION Slings must never touch the unit casing of ECOi-W.

Without buffer tank



With buffer tank



8. Technical specifications

8.1. Physical characteristics

Models				140	150	170	190	210
Standard without buffer tank				U-140CWNB	U-150CWNB	U-170CWNB	U-190CWNB	U-210CWNB
With buffer tank				U-140CWBL	U-150CWBL	U-170CWBL	U-190CWBL	U-210CWBL
Power supply				400V / 3~ N / 50Hz				
Cooling	Capacity		kW	125,4	137,6	150,9	175,8	195,4
	Power input		kW	43,55	47,77	52,73	64,83	72,54
	Total EER 100% *1		—	2,88	2,88	2,86	2,71	2,69
	Energy class EER *2		—	C	C	C	C	D
	SEER *2		—	3,87	3,87	3,91	3,69	3,68
	ηsc *2		—	152	152	153	145	144
	Energy class SEER		—	C	C	C	C	D
Heating	Capacity		kW	143,7	153,7	170,1	194,9	217,6
	Power input		kW	45,8	50,2	55,4	67,5	78,3
	Total COP 100% *1		—	3,14	3,06	3,07	2,89	2,78
	Energy class COP *2		—	B	B	B	C	D
	SCOP *2		—	3,32	3,36	3,31	3,29	3,23
	ηsh *2		—	138	145	165	185	195
	Energy class SCOP *2		—	A+	A+	A+	A+	A+
Startup type				Direct	Direct	Direct	Direct	Direct
Maximum operating current			A	108	119	136	153	170
Startup current (without Soft Starter)			A	251	262	324	341	396
Startup current (with Soft Starter)			A	130	141	161	178	201
Refrigerant	Type			R410A	R410A	R410A	R410A	R410A
	Number of refrigerant circuit			2	2	2	2	2
	Charge *3		kg	24,70 / 24,70	24,70 / 24,70	24,70 / 33,30	33,30 / 33,30	33,30 / 33,30
Compressors	Number			4	4	4	4	4
	Type			Scroll	Scroll	Scroll	Scroll	Scroll
	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	Number			1	1	1	1	1
	Type			Plate	Plate	Plate	Plate	Plate
Water flow	Cooling		m³/h	21,56	23,65	25,95	30,24	33,62
	Heating		m³/h	33	39	24	32	40
Water pressure drop	Cooling		kPa	24,73	26,45	29,58	33,52	37,44
	Heating		kPa	44	50	31	41	50
Water volume			l	8,49	8,49	12,21	12,21	12,21
Antifreeze heater			W	60	60	120	120	120
Coil	Number			4	4	4	4	4
	Frontal surface		m²	11,88	11,88	11,88	11,88	11,88
	Number of rows			2 + 2	2 + 2	2 + 3	3 + 3	3 + 3
Fan	Number			4	4	4	4	4
	Standard	Air flow	m³/h	56000	56000	71000	86000	83000
		Rotational speed	tr/mn	900	900	900	900	900
		Power input each fan	W	940	940	940 - 1650	1650	1650
Water connections	Type			Victaulic connection				
	Inlet diameter		Inch	2"1/2	2"1/2	2"1/2	2"1/2	2"1/2
	Outlet diameter		Inch	2"1/2	2"1/2	2"1/2	2"1/2	2"1/2
Buffer tank (optional)	Volume		L	300	300	300	300	300
Dimensions without buffer tank	Length		mm	2856	2856	2856	2856	2856
	Width		mm	2210	2210	2210	2210	2210
	Height		mm	2295	2295	2321	2321	2321
Dimensions with buffer tank	Length		mm	3666	3666	3666	3666	3666
	Width		mm	2210	2210	2210	2210	2210
	Height		mm	2295	2295	2321	2321	2321
Weight	Dry weight - Without buffer tank		kg	1577	1597	1687	1777	2087
Acoustical data	Sound power level		dB(A)	85,4	85,4	87,0	88,1	88,1
	Sound pressure level *		dB(A)	53,4	53,4	55,0	56,1	56,1

* Sound pressure levels calculated at 10 meters. Sound pressure levels refer to ISO standard 3744 with parallepiped shape.
*1 According to EN 14511-3:2011.
*2 According to Eurovent.
*3 Indicatives values - see nameplate.

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 ECOi-W 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

8.3. Electric specifications

			140	150	170	190	210
Power supply			400V / 3~ N / 50Hz				
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	396
	Total starting current (with Soft starter)	A	130	141	161	178	201
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	331	347	403
	Total starting current (with Soft starter)	A	136	147	168	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	352	407
	Total starting current (with Soft starter)	A	141	151	172	189	212

IMPORTANT

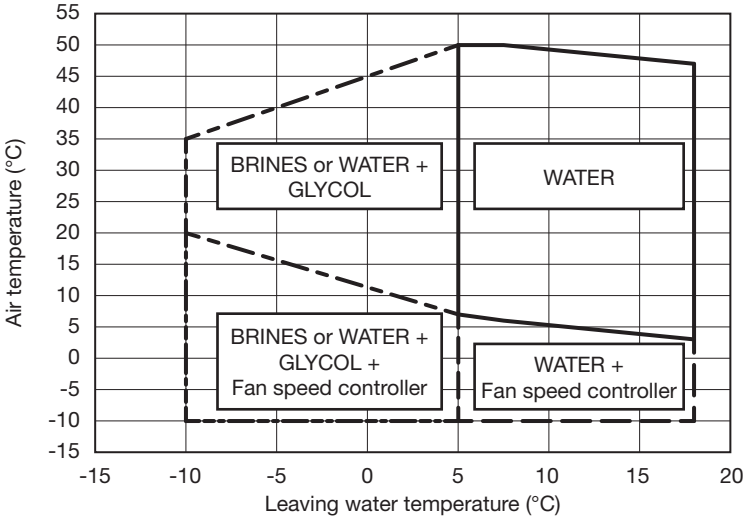
* This data is given for guidance only. Values must be checked and verified at commissioning according to prevailing standards. They depend on the installation and the cables used.

It is mandatory to supply a main fuse or suitable circuit breaking device on the power supply.

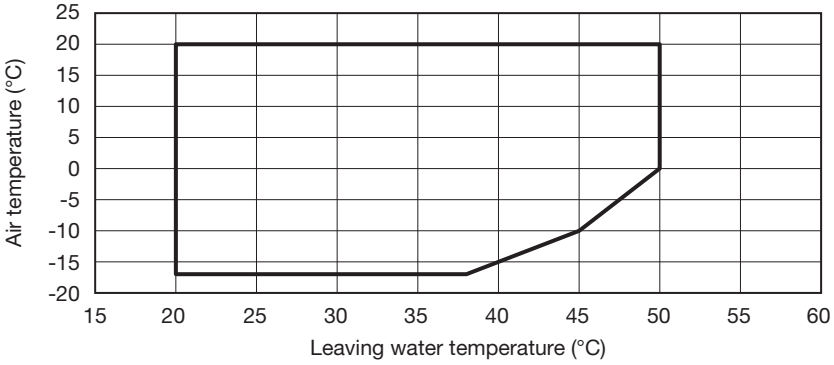
- Fuses not supplied
- Cables not supplied

8.4. Operating limits

8.4.1. Cooling mode



8.4.2. Heating mode*



* 55°C can be achieved with periodic operation. Please contact your local Panasonic sales or service representative for full details.

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 ECOi-W 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 ECOi-W to emissions from chimneys or vents. Fumes charged with soot or grease as well as acidity are likely to clog or damage the condenser irrevocably. This would void the warranty.

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.

9.1.1. 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 ≥100mm above the ground or supporting structure. In this way, 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, optional accessory not supplied with the standard unit).

9.1.2. How to reduce noise pollution

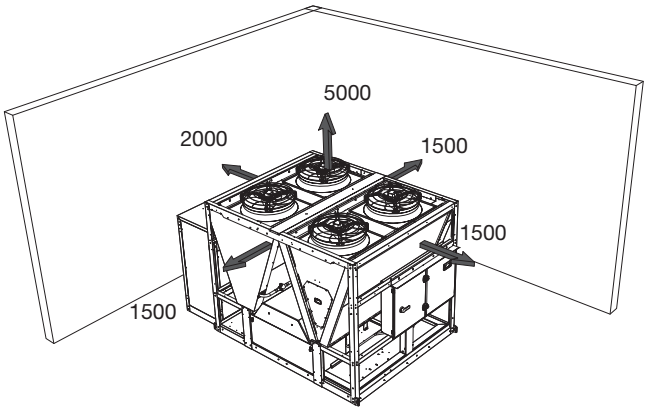
In order to contain noise levels, we equip our appliances with quiet fans and encase the technical compartment in sound-proofed panels. However, noise levels can be reduced even further by following a few installation precautions:

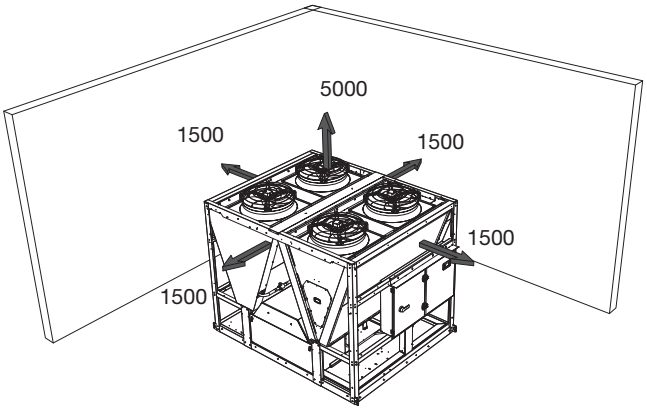
- Do not install the appliance near a window.
- Do not install the unit in enclosed or confined yards, narrow locations where noise may be reflected on walls.
- Install rubber pads or anti-vibration pads (available as an option) under the appliance.
- Do not join the concrete slab supporting the appliance 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 ECOi-W, take care to leave sufficient free clearance on all sides to ensure easy access for maintenance work.
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



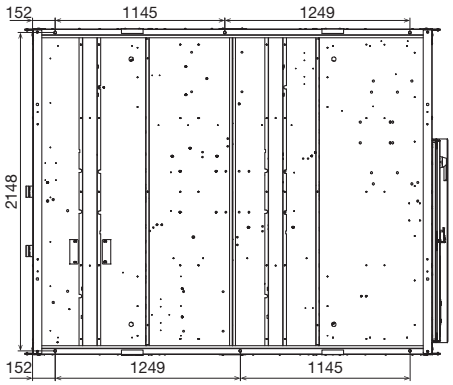


Without buffer tank

CAUTION When several ECOi-W 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 ECOi-W must be flat, and with sufficient strength to withstand the unit's weight with its full liquid load, and occasional presence of maintenance equipment.

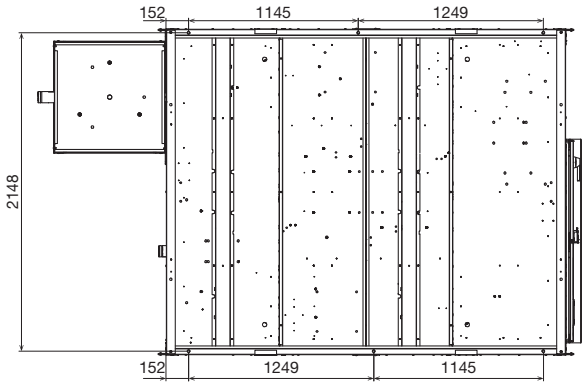


Without buffer tank

The ECOi-W 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 ECOi-W and the positions of supports allow for an installation minimizing vibrations. However, the installers can use anti-vibration rubber pads (supplied optionally).

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 main hydraulic circuit will provide a constant water flow on the refrigerating fluid/water plate exchanger 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 help to 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 points on the water circuit.
- Drain points at all low points to allow complete circuit draining
- A circulation pump guaranteeing flow necessary for the operation of the ECOi-W unit. This may be a pump fitted within the unit.
- A diaphragm expansion tank fitted with a safety pressure relief valve and draining valve must be visible.
- A low water pressure sensor (available as option), 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 electrolytic corrosion.

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).

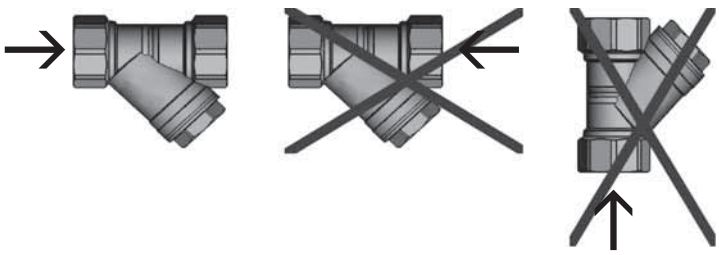
CAUTION The warranty does not cover damage due to corrosion resulting from electrolytic phenomena.

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 ECOi-W inlet pipe.

Failure to install the filter to the inlet of the ECOi-W could result in blockage within the plate heat exchanger. Should there be insufficient water flow rate, it may result in IRREVOCABLE damage.

A filter mesh ≤800µm is required.



CAUTION The manufacturer's warranty is void if the filter supplied with the ECOi-W 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 ECOi-W and the main network. Proper operation of the control and safety devices is ensured only when the water volume is sufficient.

For cooling only operation, 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

When utilising heating mode, a water volume equal to 6,5 L/kW is recommended, so that energy reserves are 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 or volumiser must be added to the installation, to increase the water volume up to the minimum required value.

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 or volumiser is compulsory to guarantee sufficient thermal inertia and satisfactory temperature stability.

A buffer 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 buffer tank:
- 140/150/170/190/210 models: 300L

10.3.1. Cooling only operation

		140	150	170	190	210
Minimum water volume in the system application air conditioning	L	469	515	565	658	731
Minimum water volume in the system application process		1340	1470	1612	1878	2088

10.3.2. Heating operation

		140	150	170	190	210
Minimum water volume in the system	L	935	1000	1106	1268	1415

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:

		140	150	170	190	210
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 ECOi-W.

Fully rinse all water pipes before final connection to the ECOi-W.

When using an off-the-shelf acid rinsing solution, implement a temporary branching around the ECOi-W 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 directives applicable on site (this is not under manufacturer responsibility).

CAUTION Glycol concentration in the installation's hydraulic circuit must be entered in the controller upon start-up. This parameter setting changes the safety and alarm triggering threshold limits. An incorrect value may cause malfunctions and potential 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 flow rate: 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 concentrated, the hydraulic circuit components may be damaged and the ECOi-W unit may not perform normally. In this case, unit warranty will be void.

CAUTION For Heat pump models, if the outdoor temperature is likely to fall below +1°C, provide means 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 ECOi-W must not run on a network with open loops, this is likely to cause incidents related to oxygenation, or with non treated table water.

Using improperly treated or non treated water in the ECOi-W may cause scaling, erosion, corrosion, 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 pitting 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 25°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 < 8)

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 resistivity 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.

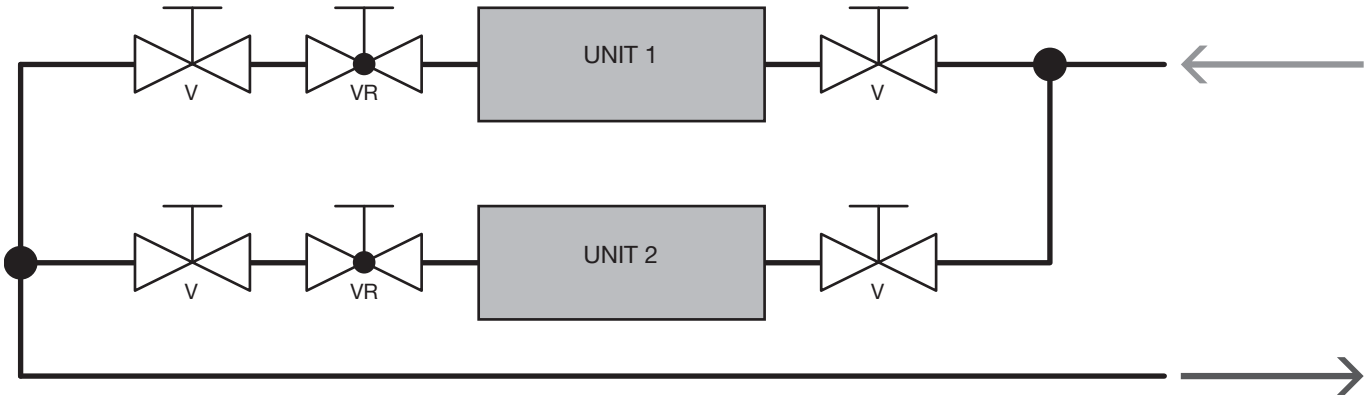
It is important to ensure that the mains water supply pressure is sufficient to fill the installation.

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 purge valves 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 (Tichelmann loop system) in order to reduce the pressure loss in each unit's circuit.

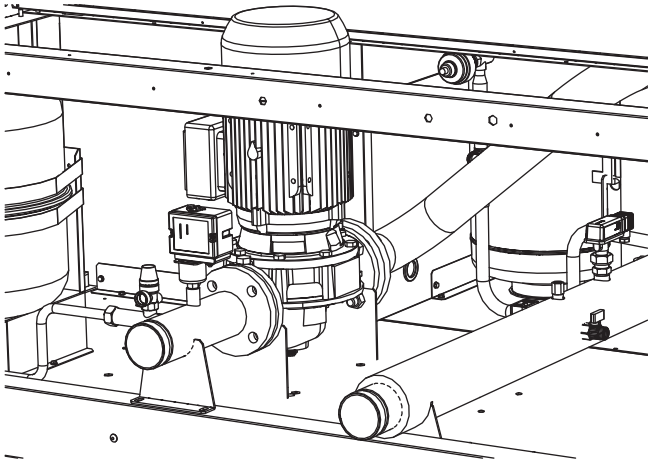


V: Isolating valves. VR: Balancing valves.

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 over pressurising the circuit. The installer must install a drain pipe at the safety valve to allow for removal of water.



11. Wiring diagram and legend

11.1. Wiring diagram

See appendix

11.2. Legend

N 821			
SE4595	ECOi-W 140 to 210 circuit 1	Power	3P 400V / 50Hz +/- 10%
SE4596	ECOi-W 140 to 210 circuit 2	Power	3P 400V / 50Hz +/- 10%
SE4597	ECOi-W 140 to 210 circuit 1	Control	1P 230V / 50Hz +/- 10%
SE4598	ECOi-W 140 to 210 circuit 2	Control	1P 230V / 50Hz +/- 10%
SE4605	ECOi-W 140 to 210 All Seasons circuit 1	Power	3P 400V / 50Hz +/- 10%
SE4606	ECOi-W 140 to 210 All Seasons circuit 2	Power	3P 400V / 50Hz +/- 10%
SE4607	ECOi-W 140 to 210 All Seasons circuit 1	Control	1P 230V / 50Hz +/- 10%
SE4608	ECOi-W 140 to 210 All Seasons circuit 2	Control	1P 230V / 50Hz +/- 10%

SE4647	ECOi-W 140 to 210 circuit 1	Power	3P 400V / 50Hz +/- 10%
SE4648	ECOi-W 140 to 210 circuit 2	Power	3P 400V / 50Hz +/- 10%
SE4649	ECOi-W 140 to 210 circuit 1	Control	1P 230V / 50Hz +/- 10%
SE4650	ECOi-W 140 to 210 circuit 2	Control	1P 230V / 50Hz +/- 10%
SE4651	ECOi-W 140 to 210 All Seasons circuit 1	Power	3P 400V / 50Hz +/- 10%
SE4652	ECOi-W 140 to 210 All Seasons circuit 2	Power	3P 400V / 50Hz +/- 10%
SE4653	ECOi-W 140 to 210 All Seasons circuit 1	Control	1P 230V / 50Hz +/- 10%
SE4654	ECOi-W 140 to 210 All Seasons circuit 2	Control	1P 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 13
The electrical installation and wiring of this unit must comply with local electrical installation standards.

- Three phase 400V ~ 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 400V ~ 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 thermal protection / nominal intensity of the contactors (class AC3)

Models		**140**	**150**	**170**	**190**	**210**
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.

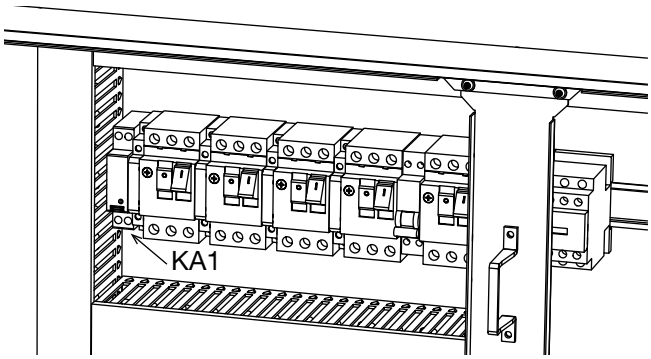
The electrical installation must be performed by a fully qualified electrician, and in accordance with local electrical standards and the wiring diagram corresponding to the unit model.
Any modification performed without manufacturers prior authorisation may result in the unit's warranty being declared 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 a fuse to protect the units against short circuits is recommended. The fuse sizes are displayed in the table in § "Electric specifications", page 13

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 13).

Voltage differences between each phase must not exceed 2 %.
If the imbalance is unacceptable, call the distribution company to have this anomaly corrected.

CAUTION Supplying the unit with a line imbalance exceeding the acceptable value will result in the warranty being void.

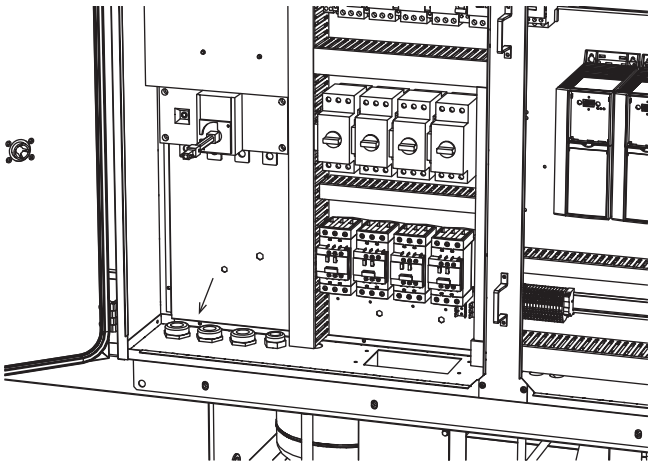
CAUTION Correction of the excessive centralized power factor (>0,95) may generate transient phenomena dangerous for the motors and contactors of the unit during the start and stop phases. Check instant voltages during these phases.

These units are equipped with a switch used to locally isolate the 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 cable terminations suited to the cross-section of the connecting cable.

Copper cable only



13. Control

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

13.1. Order of priority for control systems

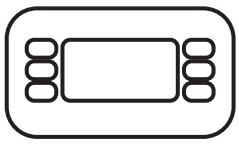
The integrated controller in the ECOi-W can be managed by various interfaces and systems. The order of priority for each drive system is as follows:

1. Timing programming: this scheduling is integrated in the controller
2. BMS: the remote supervision transmits it commands according to the communication protocols
3. 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

Schedule

Remote BMS



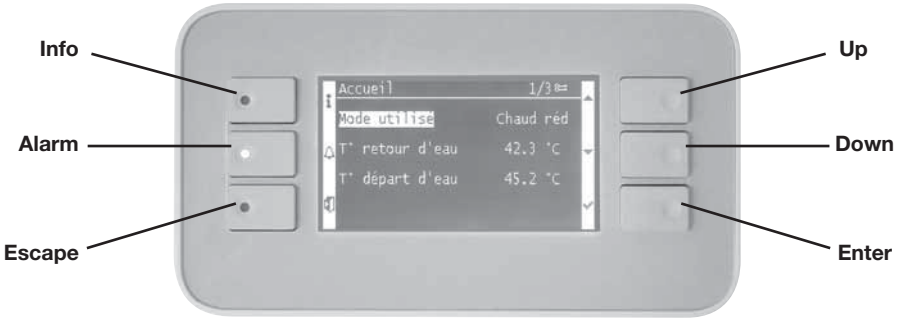
Local HMI

External contacts

Highest Priority

13.2. User interface

This terminal has a liquid crystal display and 6 buttons.



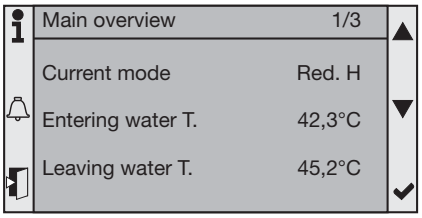
13.2.1. Keypad

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 3. It is used to access a submenu 4. Activate the modification of a setting 5. Validate the modification of a setting

13.2.2. Home page

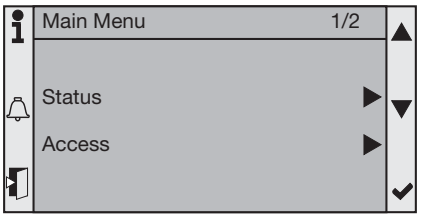
The home page is used to quickly display the state of the machine by displaying the following information:

- Operating mode
- Water return temperature
- Water flow temperature



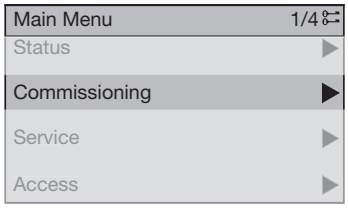
13.2.3. Main menu

Pressing the “Info” button displays this screen directly.
The authorized menus are displayed according to the access menu selected:



Menu	Final user	Installer	Maintenance
Access	✔	✔	✔
Status	✔	✔	✔
Commissioning	✘	✔	✔
Service	✘	✘	✔
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 menu.
To change the access menu, 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 menu

Final user	Installer	Maintenance
		

The menu access level key symbols are indicated in the top right hand corner of the control display screen.

Final User level only allows access to the Final User menus. Installer Level can access Installer and Final User Level menus. Maintenance Level can access all menus.

13.3. Initial settings

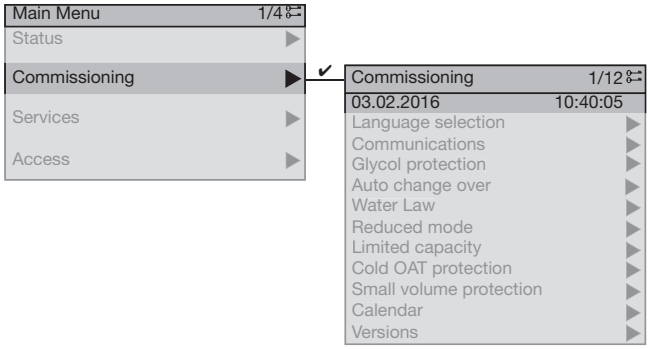
Open the electrical box and check that all circuit breakers are open except for FTC.

Before starting up the ECOi-W for the first time, the “Installation” menu must be configured.

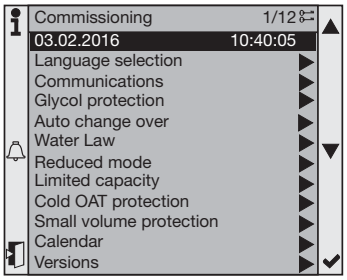
13.3.1. Time settings

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 “Commissioning” section. The first line of the menu is used to set the date and time.

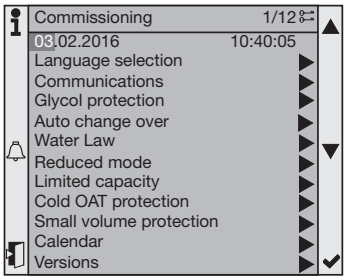


The date and time line will appear as highlighted.
Press the "Enter" button ✔ to activate the change of date.



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

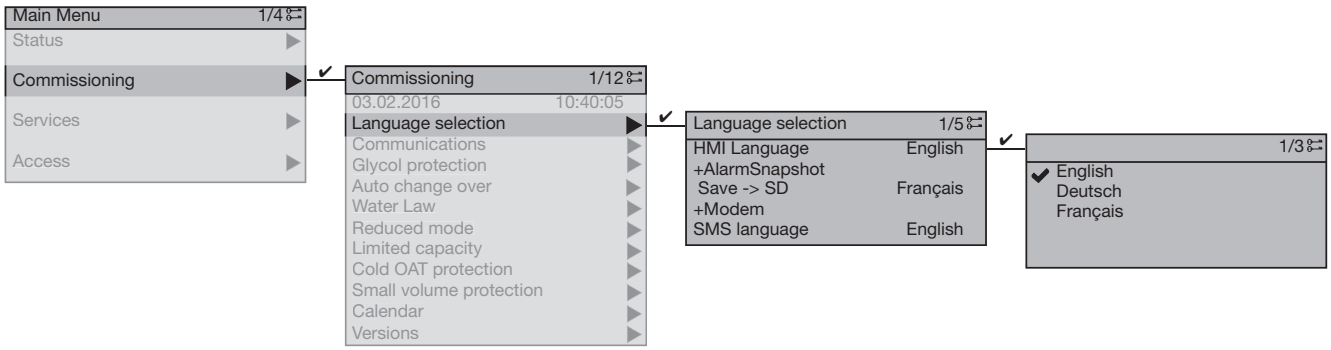
Press once on the ✔ button to approve the defined value and move on to the next setting.



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

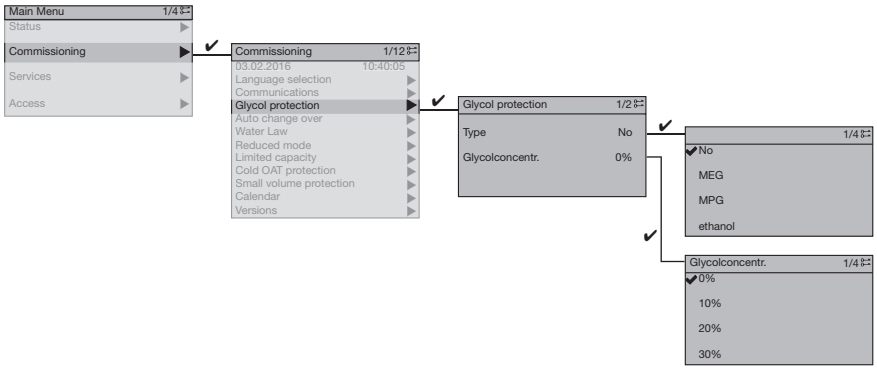
Select the languages required according to the application.



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.



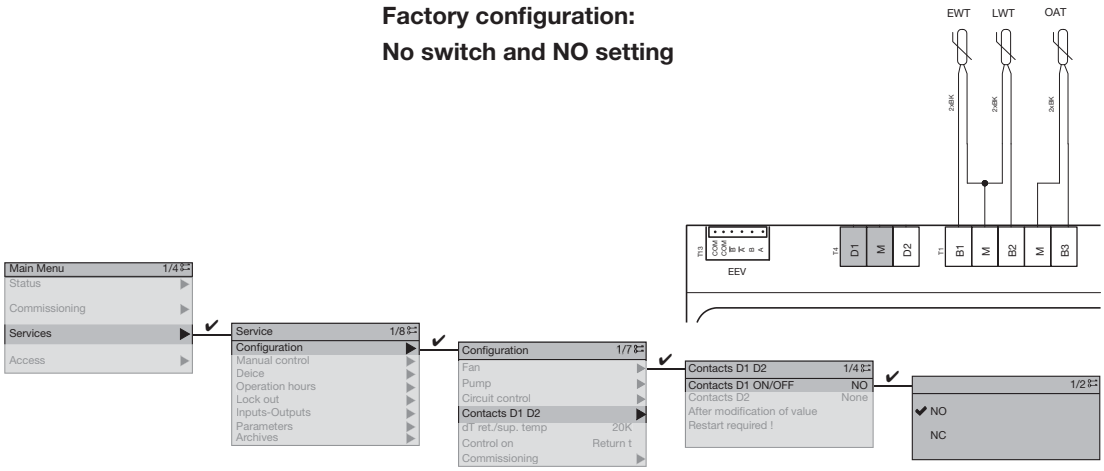
13.4. Launching the ECOi-W system

13.4.1. Configuring input D1

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

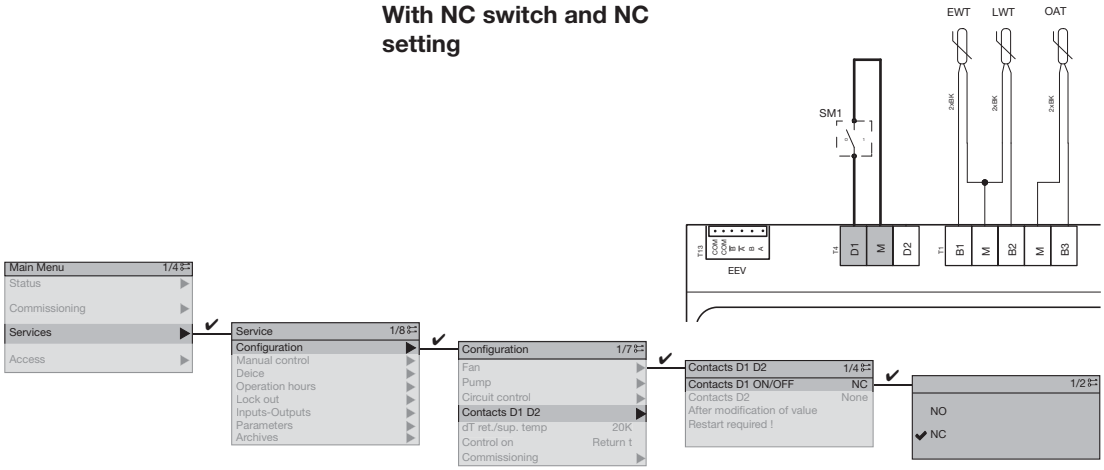
This input's behavior must be defined. This input takes priority over all other control systems.

Factory configuration:
No switch and NO setting



NO: the ECOi-W can only be started if the contact is open.

With NC switch and NC setting

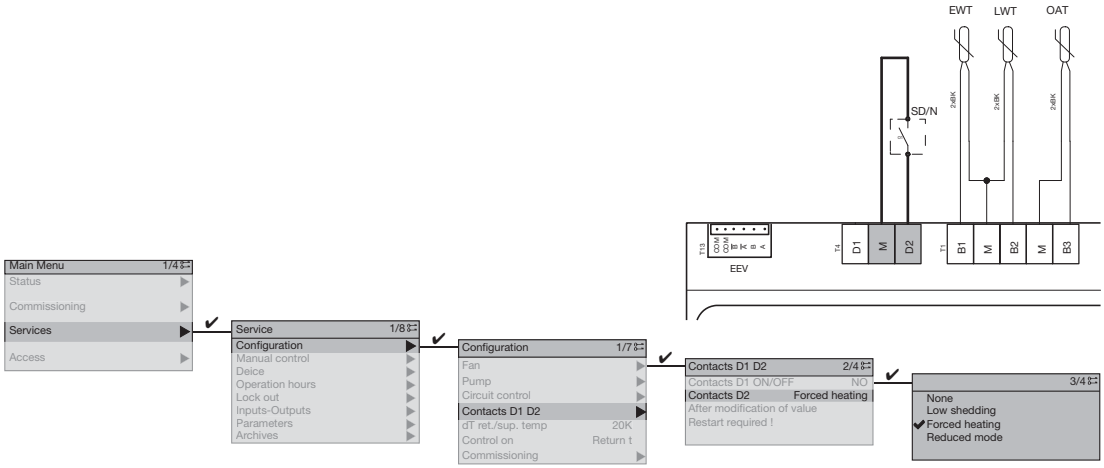


NC: the ECOi-W can only be started if the contact is closed.

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

13.4.2. Configuring input D2

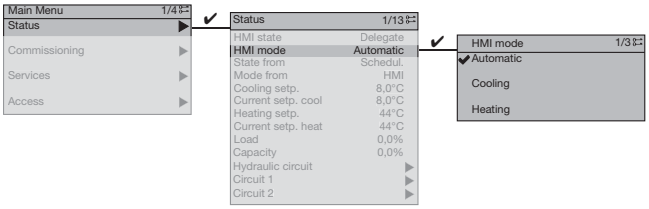
During installation, a switch can be connected onto the D2 digital input.
The operating mode defined for this input takes priority over all control systems such as the HML, BMS or calendar.



The input can be configured with the function values defined below:
- None
- Low shedding
- Forced Heating
- Reduced mode

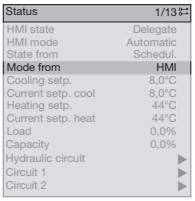
Further information regarding this contact's configuration can be found in the user manual, § CASCADE OF PRIORITIES.

13.4.3. Heat/cool selection



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.

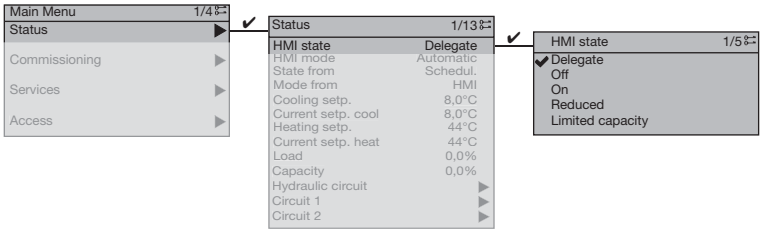


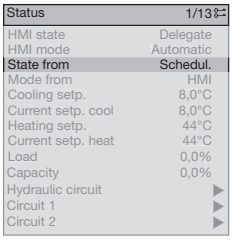
CAUTION The automatic change-over mode is activated if the local mode and the BMS mode are set to "Auto".

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 35
- Limited capacity: Refer to the § “Limited capacity”, page 35





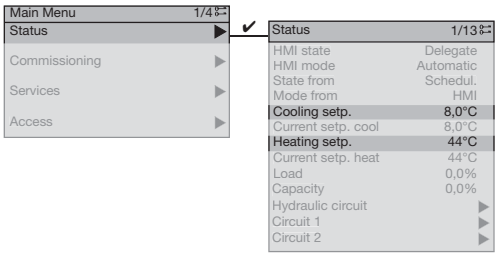
The “State from” line states which element requested the current status:

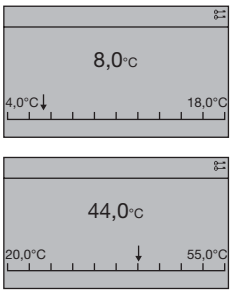
- Cont.off: on/off digital input
- Cont.ext: D2 configurable digital input (in “Reduced mode” or “Limited capacity”
- HMI: User interface
- BMS
- Schedul

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

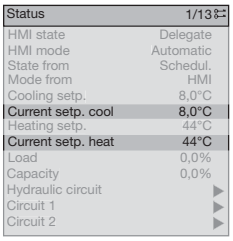




These setpoints are fixed and restricted to the unit’s operating limits.
They can however be adjusted with the “Water law” and “Reduced mode” options, which are deactivated by default.

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.

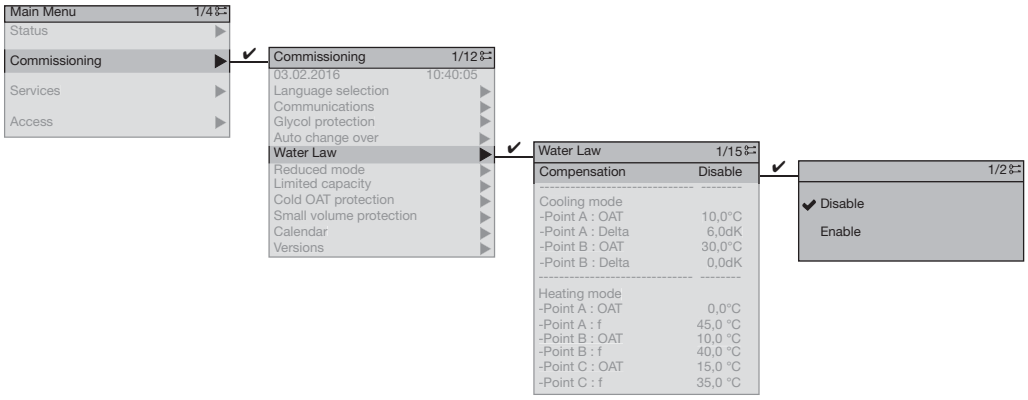


13.4.6. Water law

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.



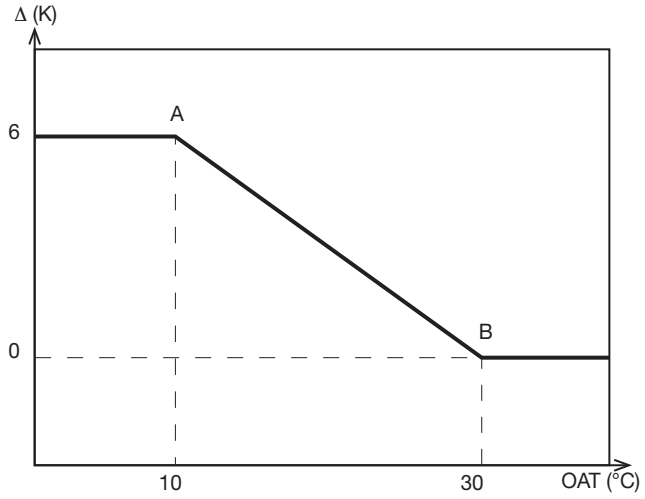
CAUTION If the automatic heat/cool changeover mode is selected, weather compensation is enabled by default. The default weather compensation values are applied without using the weather compensation menu settings.

13.4.7. Cool mode

The water law introduces correction D 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

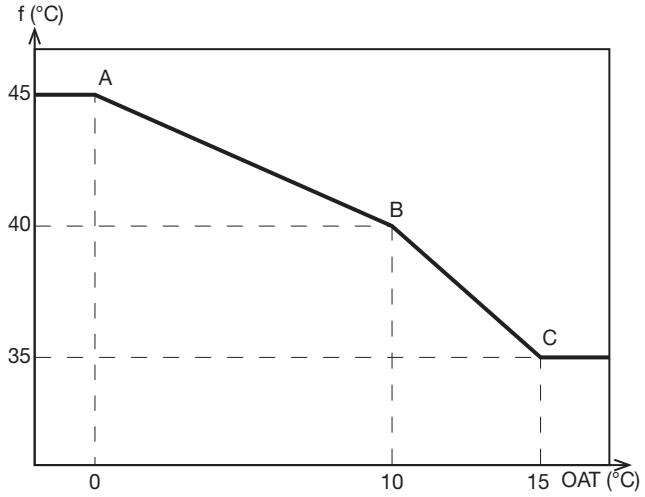
Points	Coordinates	Unit	Min.	Max.	Default
A	**OAT**	**°C**	10	30	10
	Delta	**K**	Δ_B	8	6
B	**OAT**	**°C**	20	36	30
	Delta	**K**	0	D_A	0

13.4.7.1. Heat mode

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

- water law setpoint = f(OAT)

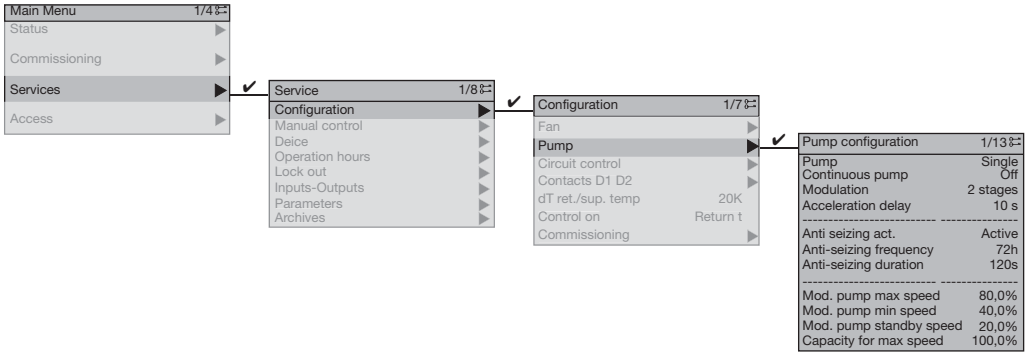
Function f is restricted between 20 and 50°C. It is defined by points A, B and C in the graph below. The values indicated are factory values.



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	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
C	**OAT**	**°C**	OAT_B	50	15
	f	**°C**	20	f_B	35

13.4.8. "Variable primary flow" option

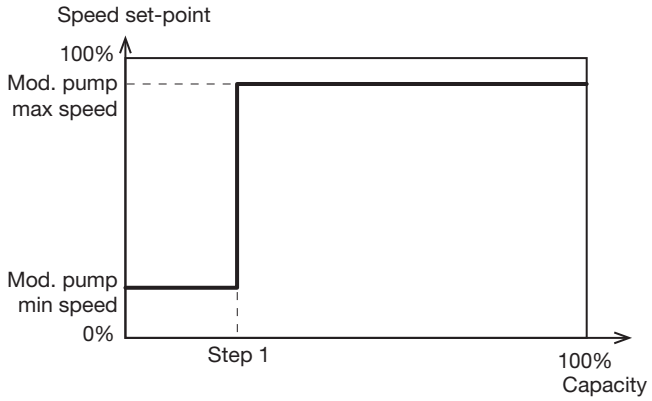


The "Variable Primary Flow" option is used to modulate the power of the hydraulic pump This modulation is obtained by powering the pump through a frequency inverter.

CAUTION The minimum frequency of the pump must not be less than the manufacturer's recommendations (e.g. 30Hz) and must ensure a sufficient flow rate for the unit (Refer to the § "Physical characteristics", page 11).

13.4.8.1. 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.

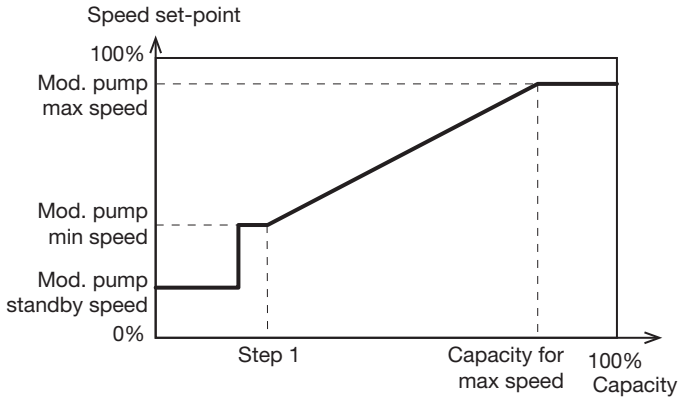


Pump configuration	1/13
Pump	Single
Continuous pump	Off
Modulation	2 stages
Acceleration delay	10 s
Anti seizing act.	Active
Anti-seizing frequency	72h
Anti-seizing duration	120s
Mod. pump max speed	80,0%
Mod. pump min speed	40,0%
Mod. pump standby speed	20,0%
Capacity for max speed	100,0%

Setting	Default	Min.	Max.
Mod. pump max speed	100%	0%	100%
Mod. pump standby speed	60%	0%	100%

13.4.8.2. 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.



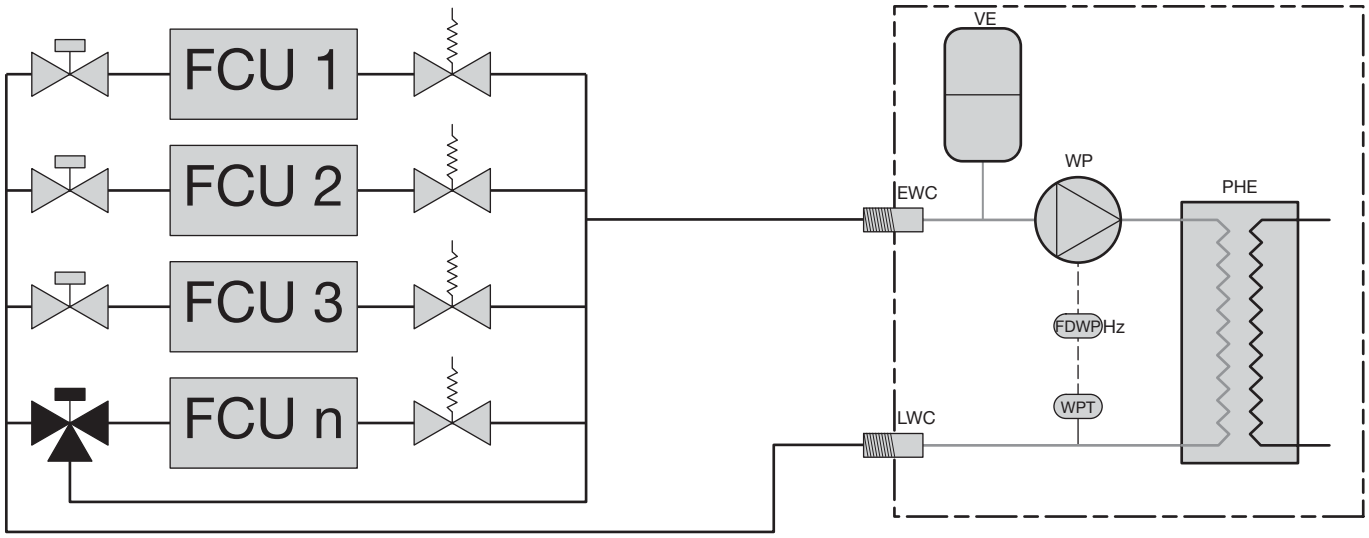
Pump configuration	1/13
Pump	Single
Continuous pump	Off
Modulation	2 stages
Acceleration delay	10 s
Anti seizing act.	Active
Anti-seizing frequency	72h
Anti-seizing duration	120s
Mod. pump max speed	80,0%
Mod. pump min speed	40,0%
Mod. pump standby speed	20,0%
Capacity for max speed	100,0%

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%

13.4.8.3. Constant output pressure mode

The controller manages 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.

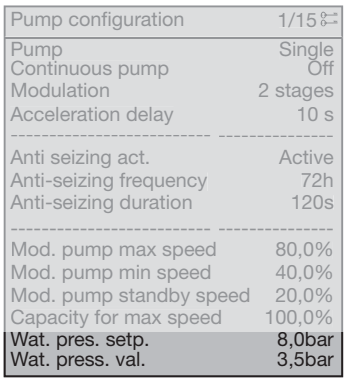


Installation of one or more three-way valves on the facility to maintain the minimum required pressure.

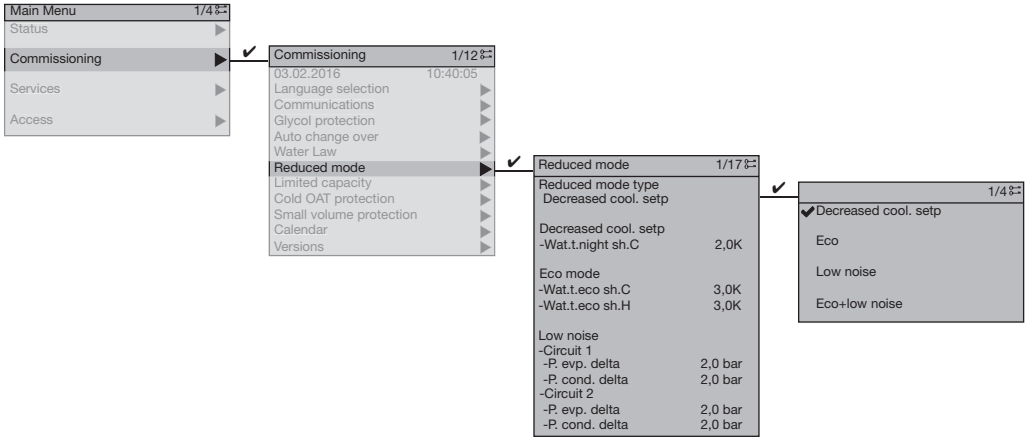
1. Set all units in demand to open all the valves (load = 100%).
2. Set the water pressure setting to a high value (example: 8,0 bar)
3. Check that the output is in line with ECOi-W requirements.
4. Read the pressure value in the system (example: 3,5 bar).
5. Set the water pressure setting to the read 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



13.4.9. Reduced mode



Reduced mode can have the following configurations:

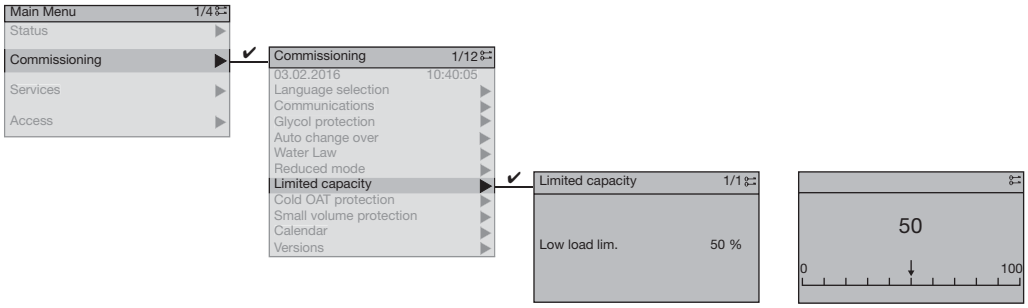
- Decreased cool. setp
  This function is only available if the unit is in cool mode. It can cool the building at night when electricity is less expensive.
- Eco
  Heat and cool setpoints are respectively lowered and raised to reduce the unit's electrical consumption.
- Low noise
  In cool mode, the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

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

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

13.4.10. Limited capacity

Limited capacity is occasionally used to limit the electricity consumption of the ECOi-W to prevent exceeding the electric power capacity of the installation site.

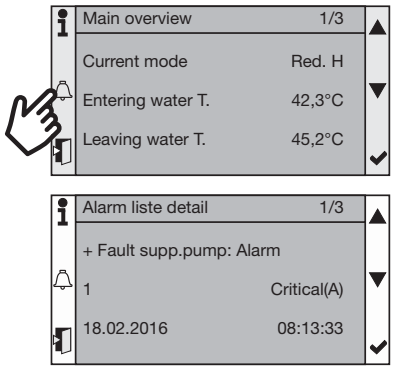


The "Limited capacity" mode activation can be triggered in the following ways:

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

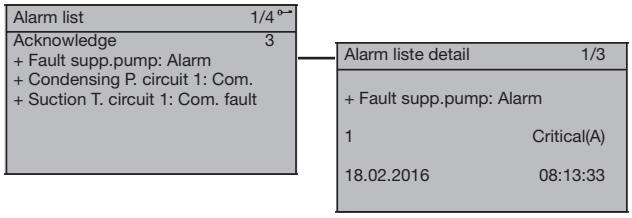
13.5. Alarms

Trigger all circuit breakers. Silence the alarm.



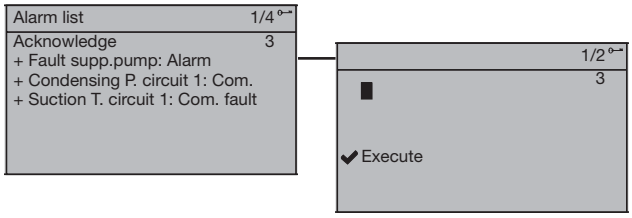
If at least one alarm or warning is in progress, the alarm button flashes.
Press the 'Alarm' button to access the latest current alarm. The screen displays the latest alarm activated with a description, the date and time at which it occurred.

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.

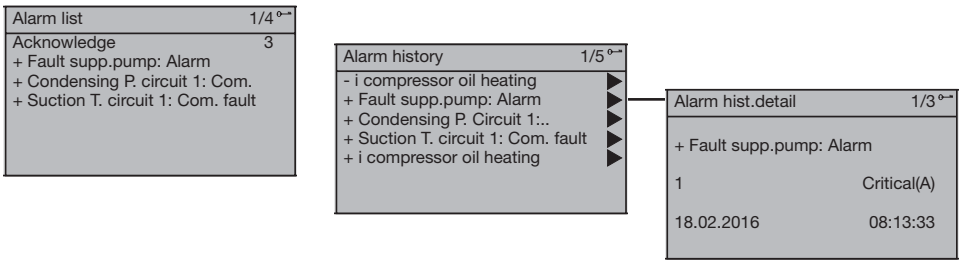


The first "Remove" line is used to remove alarms that are not active but require acknowledgment. To do this:
- ensure that you have an "Installation" or "Maintenance"' access menu
- select this line, validate and select "Execute".

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



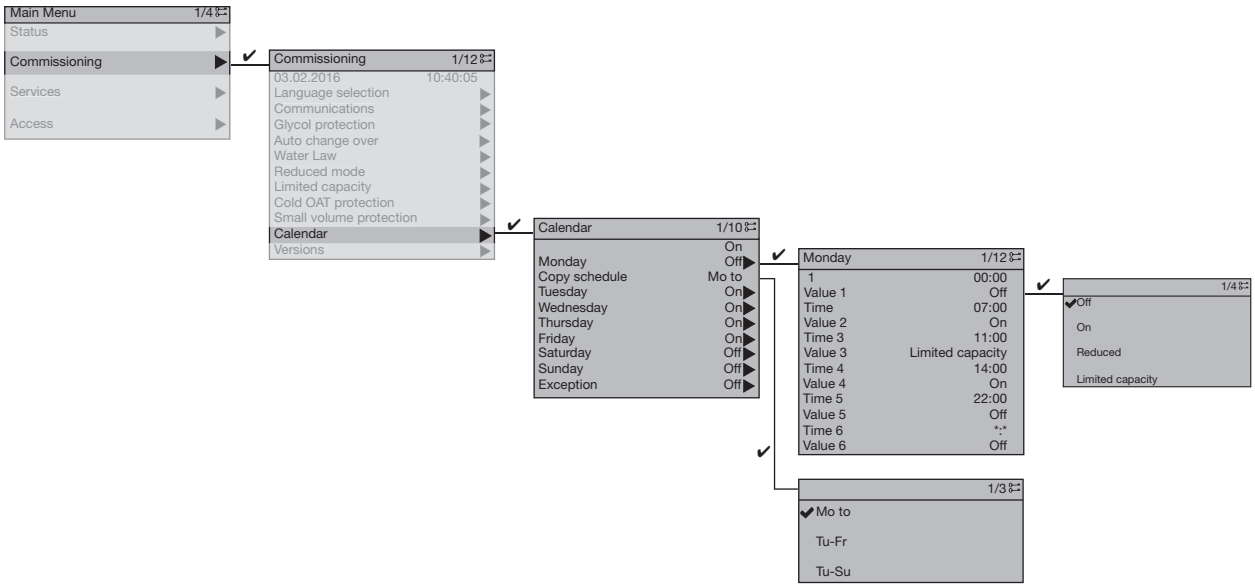
If the list of alarms is displayed, pressing the "Alarm" button takes you to the alarm history. Here again, the detail of the alarms can be displayed (max. 50).



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 within each time slot, indicates the current mode at the time of programming. (Example: Monday, slot 1, Value 1 = OFF).

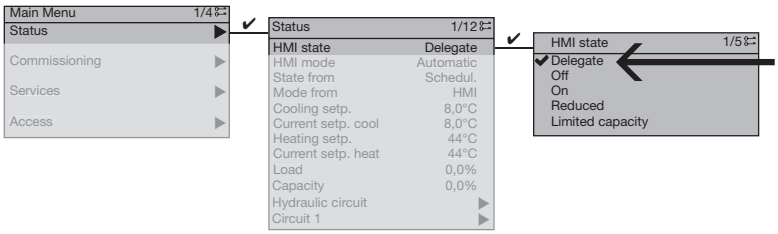


In the Monday submenu, 6 operating intervals can be selected. For each time, select the mode at which the unit must operate:

- 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 Thorough safety precautions shall always be taken when performing startup and service. 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 crankcase heaters have been energised for at least 12 hours.

14.1.1. Visual check

1. Check for 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 (applicable to heating operation only).
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 ≥100mm above the ground or supporting structure.
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 are in effect.
2. Correctly sized fuses or circuit breakers have 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 suitable 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 19).
3. Check that venting and draining caps are properly closed.
4. Check the presence, direction and position of the supplied water, filter upstream of the appliance (mesh ≤ 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
Check for any unusual noises or vibration in the running components.

14.2.2. Phase rotation protection
If there is an issue with the electrical supply phases, 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 equipped 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.

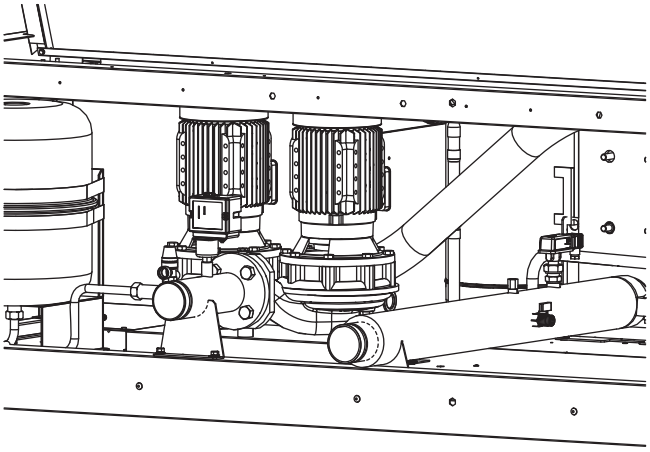
14.2.4. Compressor and refrigeration system
1. Running check: Start the compressor. Check for any unusual noise or vibration.
2. Operating Pressures: Operate the unit for at least 20 minutes and ensure that the refrigerant pressures are stabilised, and check that they are within the normal operating range.
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 11. Running the unit with a low water flow is dangerous, as it could result in irrevocable damage to the components as well as to the plate exchanger. If the unit is run with insufficient flow, performance will not be optimised.

14.2.5.1. Pump management
The pump operates as long as the ECOi-W 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:
- Operation signal sent to first motor, but no flow is detected
- Thermal protection is activated for 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
  - Pump thermal protection is activated
- Double pump:
  - Second pump motor activated and no flow
  - Thermal protection is activated for both motors



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 prior permission from the After Sales Service 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, a 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 spare parts service, 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 ECOi-W:
- 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 ECOi-W 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 the tandem compressors)
- 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 ECOi-W is running, perform an audible 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	Months				
			1	3	4	12	24
			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 for lack of gas bubbles in the fluid line			✘			
2.3	Check for lack of humidity in the refrigerating fluid			✘			
2.4	Check that pipes or capillaries do not rub and vibrate				✘		
2.5	Check that 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 tightness of compressor fastening screws				✘		
2.9	Check the crankcase heaters are powered on during the stop cycle		✘				
2.10	Check cleanliness of the coil	Clean if required		✘			
2.11	Test the oil for contamination	Change the oil if required				✘	
2.12	Check for filter drier clogging	Replace if required		✘			
2.13	Check the operation of the high pressure switch	Replace if required	✘				
2.14	Check for lack of refrigerating fluid leak (visual + leak detector if necessary)	Repair				✘	
2.15	Check reversing valve operation				✘		
2.16	Check the condition of the anti-vibration mounts	Replace if required			✘		
3 - Hydraulic circuit							
3.1	Check the state of the hydraulic installation, 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 fastening and tightness of the pipe connections	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 build-up					✘	
3.8	Check the state of the pipework 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	Months				
			1	3	4	12	24
			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 excessive 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 heat 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 electrical cabinet with compressed air to remove any dust or other contaminants building up			✘		✘	
4.10	Check the motor windings are insulated			✘			
5 - Fan(s)							
5.1	Check for 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 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 - Control							
6.1	Check the condition of the alarms	Acknowledge them after taking them into consideration	✘				
6.2	Check the operating set-points		✘				
6.3	Check the operation of all probes		✘				

17.3. Maintenance procedures

17.3.1. Refrigerant circuit

At least once per year, this equipment must be submitted to leakage checks, 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 cooling mode to determine whether the group's charge is correct by checking actual sub-cooling.

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 pipework, 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, purged and recharged accordingly.

CAUTION Compressors use polyester oil. During maintenance interventions on the compressor, or if the refrigeration circuit has to be opened at any point, do not forget that this type of oil is highly hygroscopic, and avoid exposing it to the atmosphere for long periods. If exposed for any length of time, any remaining oil should be removed and the oil charge replaced.

WARNING Protect the ECOi-W 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. It may be necessary to repeat this process several time. If excessive moisture is present, it may be necessary to remove the entire refrigerant charge, then purge and refill the system with a virgin refrigerant charge.

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 free from foreign materials (leaves, wires, insects, slag, etc.). A dirty coil will result in an increase in electrical consumption. 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 pressurised 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 exchanger

Verify the pressure difference between the inlet and the outlet of the plate heat exchanger. If the water pressure and flow rate values do not correspond to the pressure loss curves available in § "Hydraulic pumps curves", page 61, there may be fouling of the plate heat exchanger. 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 ECOi-W control system. By default when the ECOi-W 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 ECOi-W 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 pressurise 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 set 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 Supply Company.
	Compressor motor short–circuited.	Check the continuity of the motor winding.
	Compressor seized	Replace the compressor.
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.

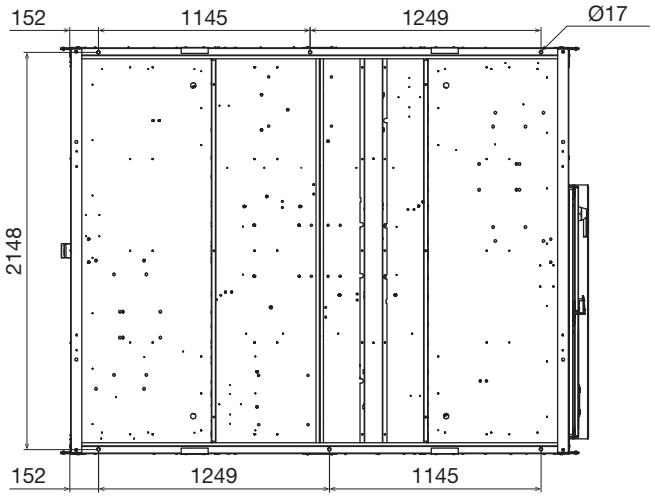
Problem	Probable cause	Solution
Circuit stoppage further to the high pressure thermostat being activated.	Incorrect operation of the high pressure pressostat.	Check the operation of the pressostat. Replace it if required.
	Outlet valve partially closed.	Open the valve. Replace it if required.
	Non-condensable 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.	Check all valves are opening.
	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.	Chemically clean 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.

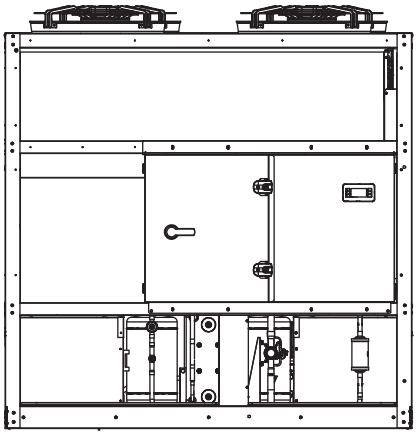
APPENDIX

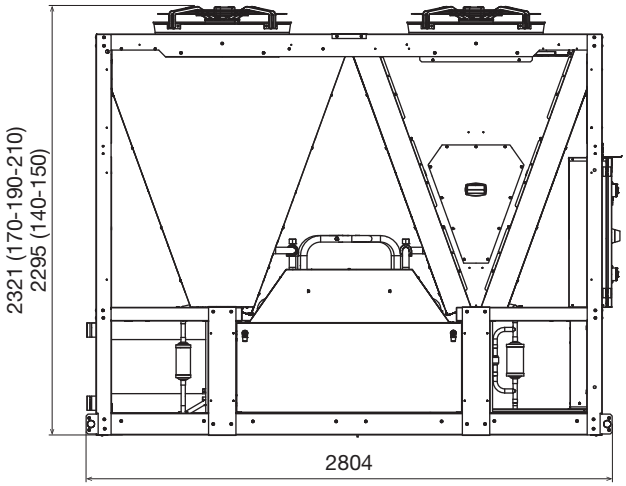
Contents

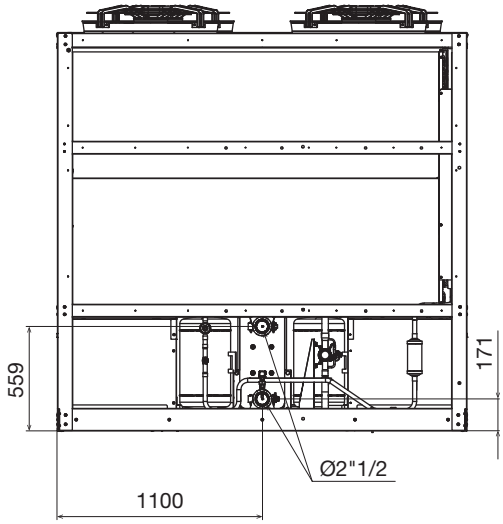
Dimensions

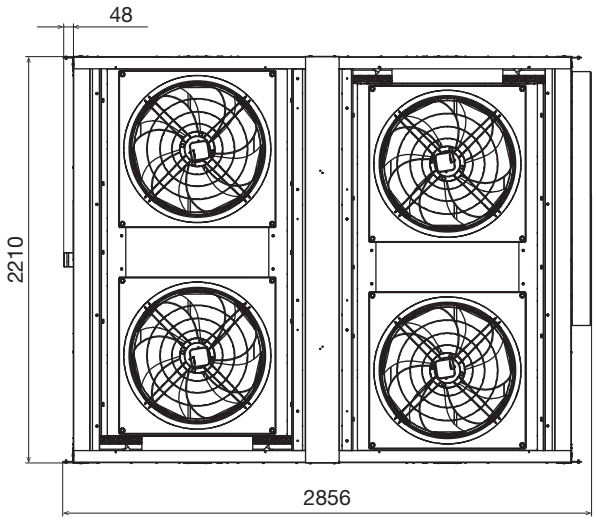
ECOi-W 140 to 210 without pump

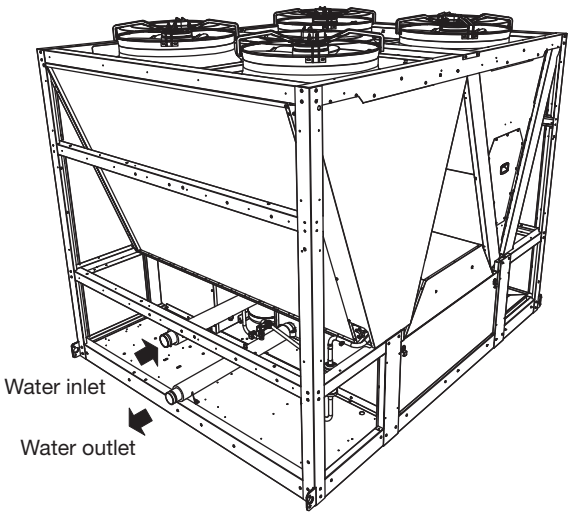






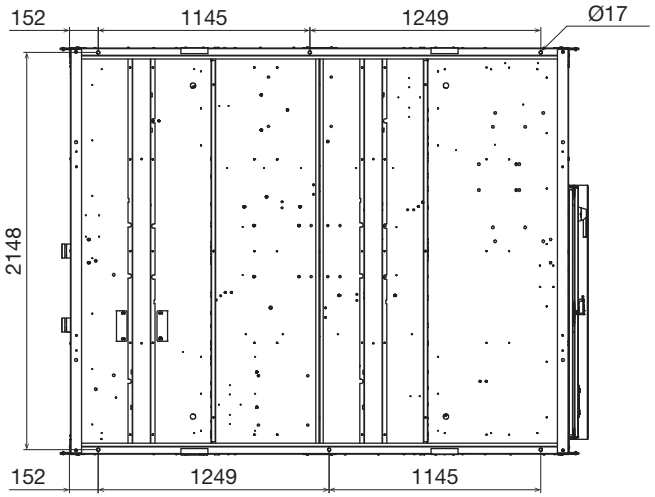


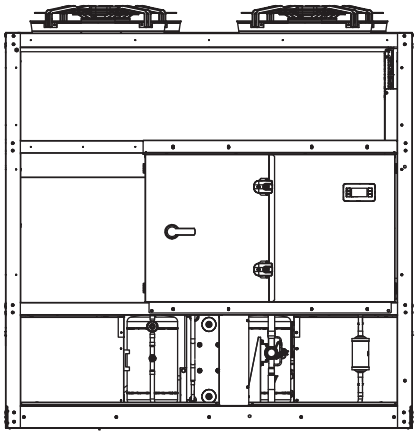


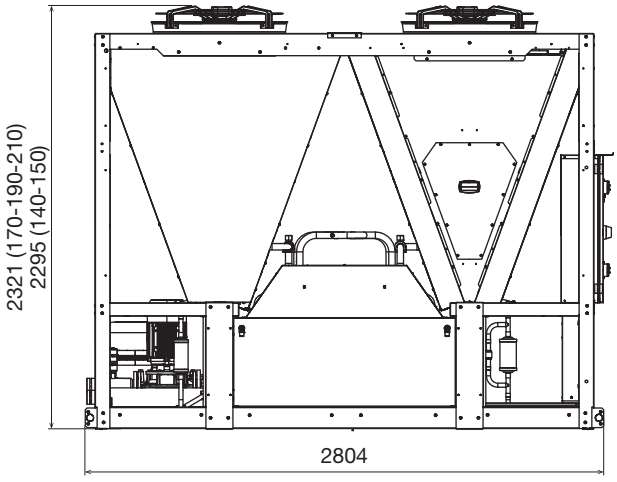


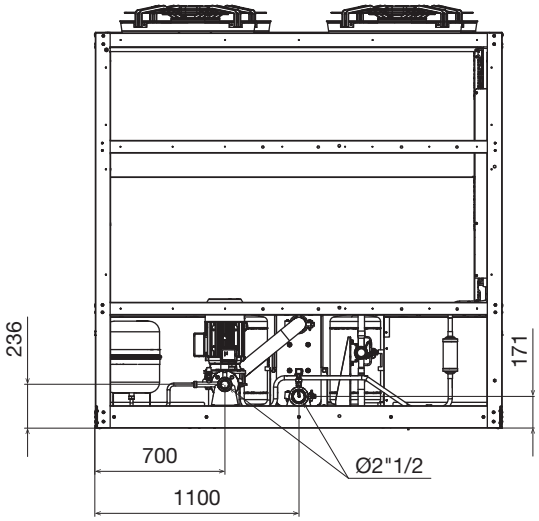
Dimensions

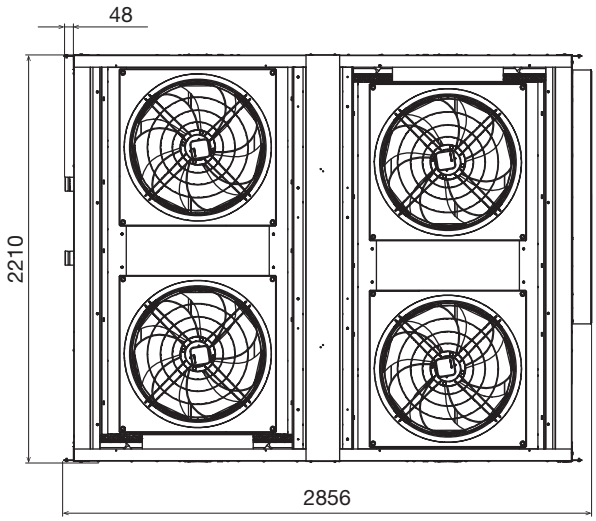
ECOi-W 140 to 210 with 1 pump

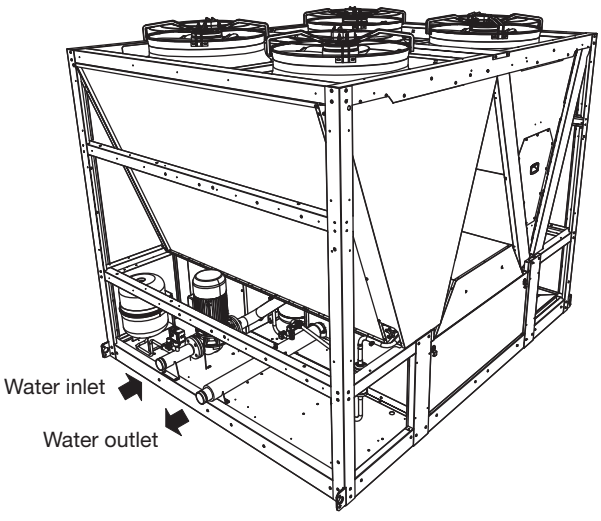






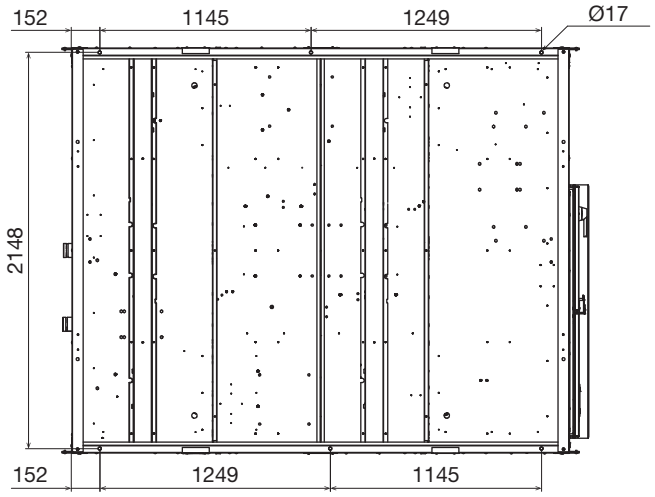


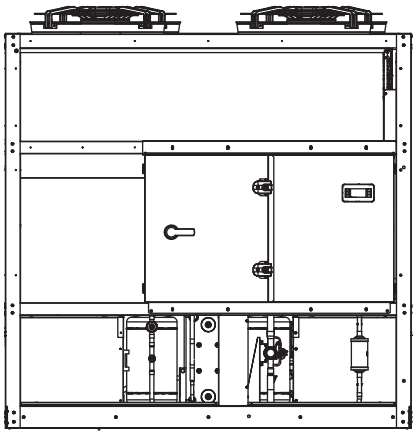


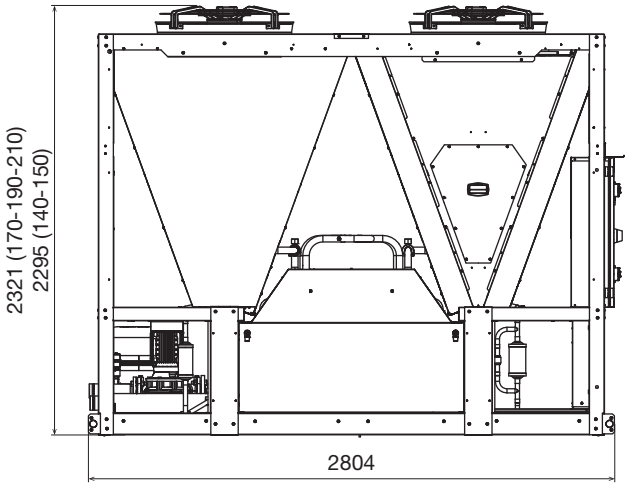


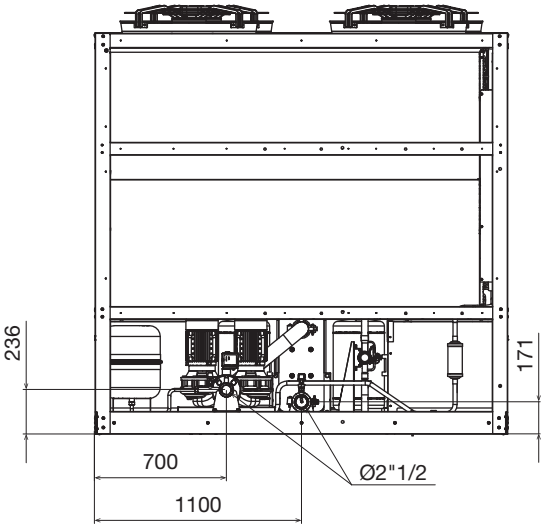
Dimensions

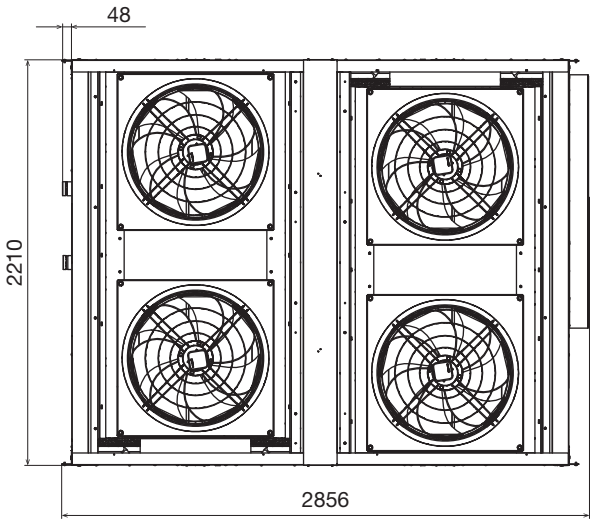
ECOi-W 140 to 210 with 2 pumps

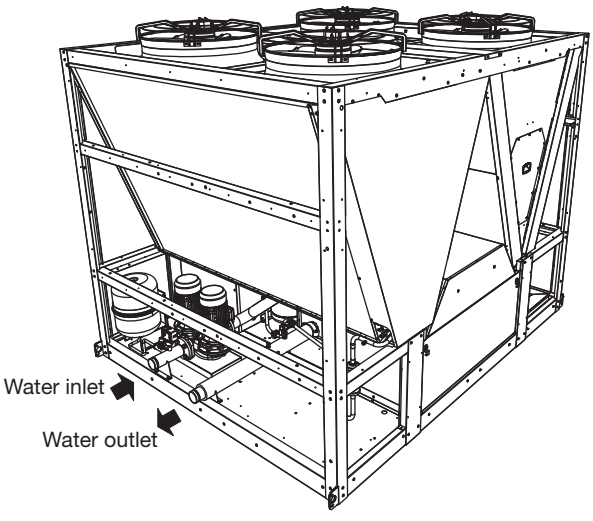






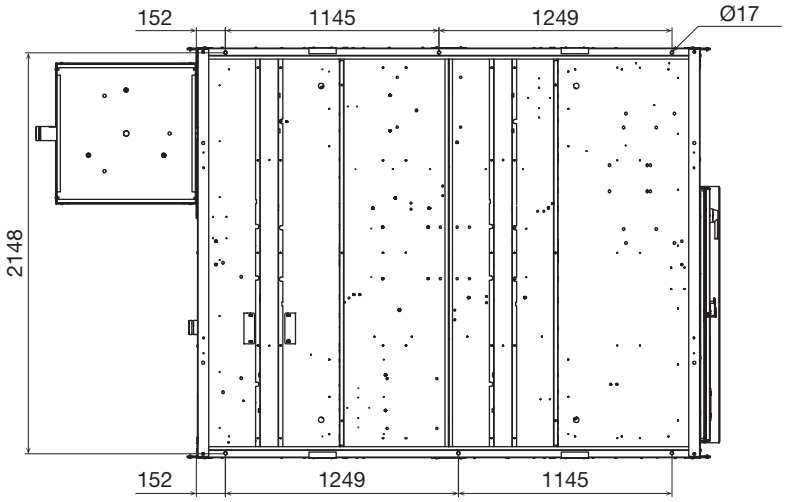


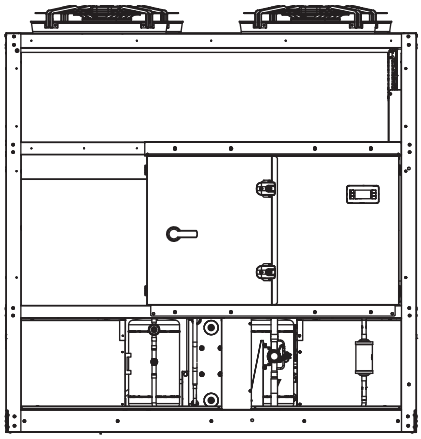


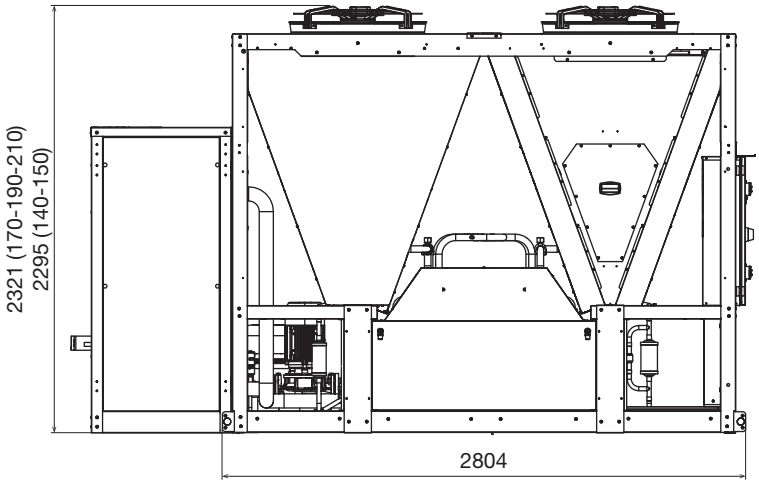


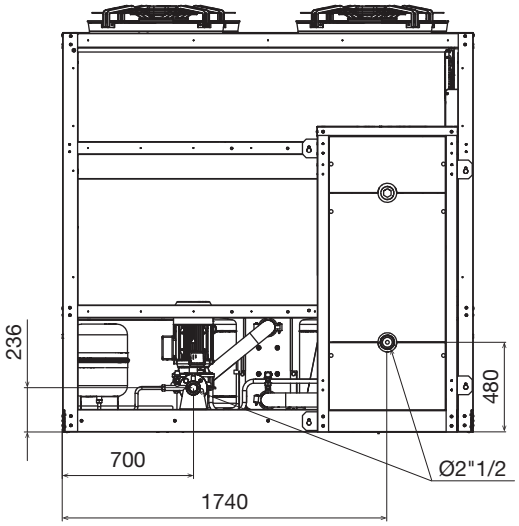
Dimensions

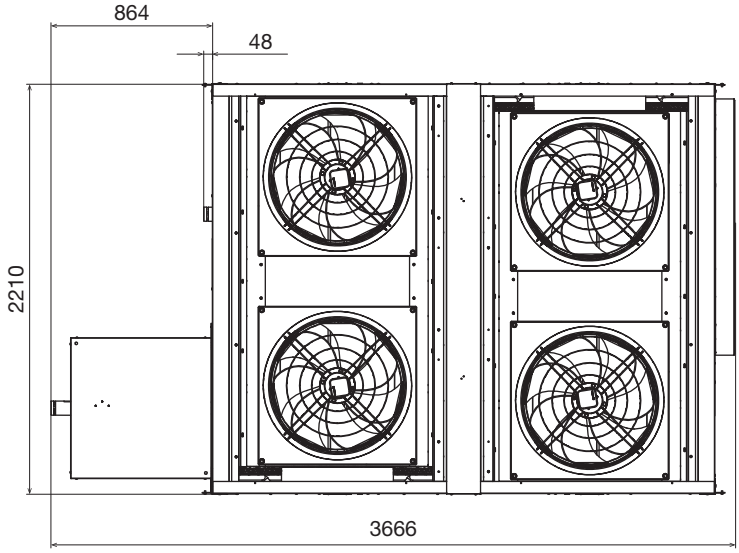
ECOi-W 140 to 210 with 1 pump and buffer tank

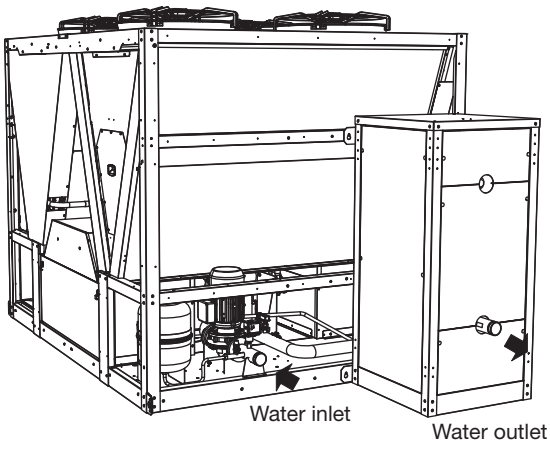






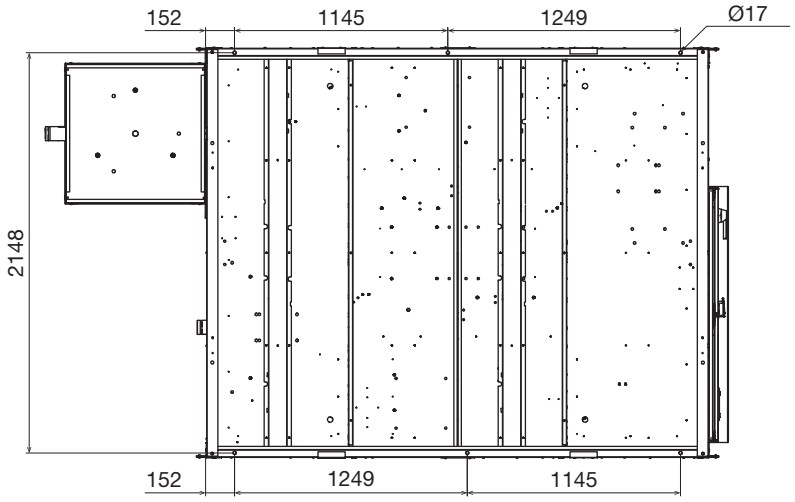


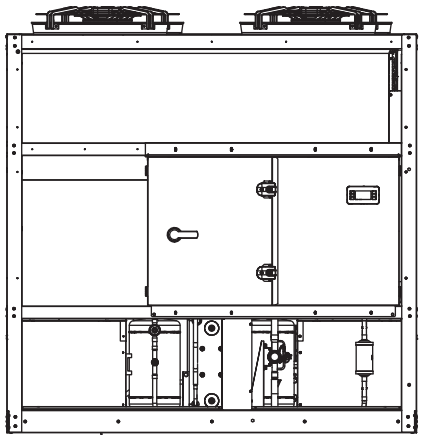


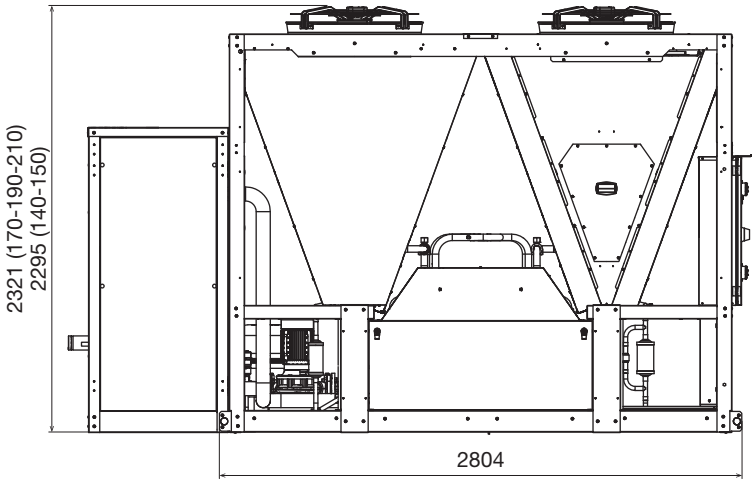


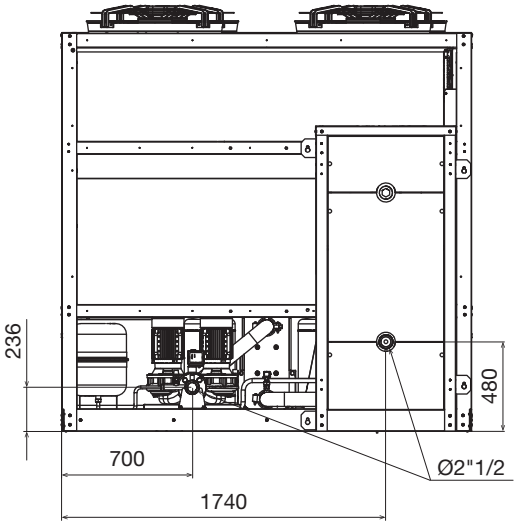
Dimensions

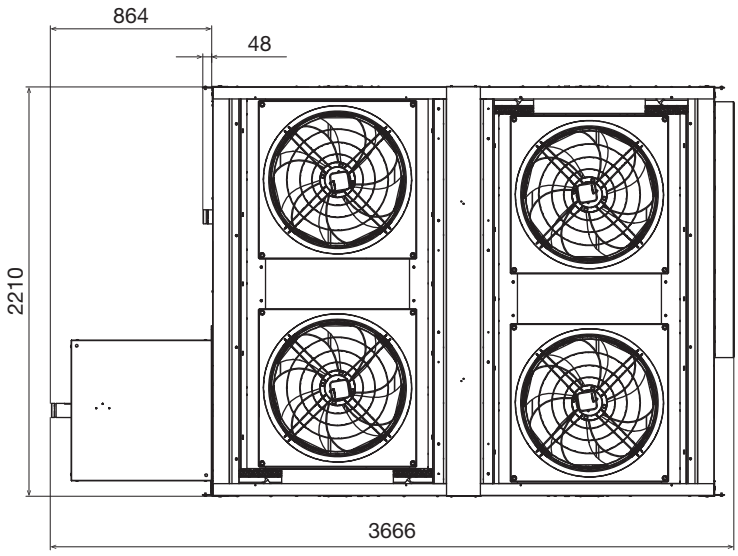
ECOi-W 140 to 210 with 2 pumps and buffer tank

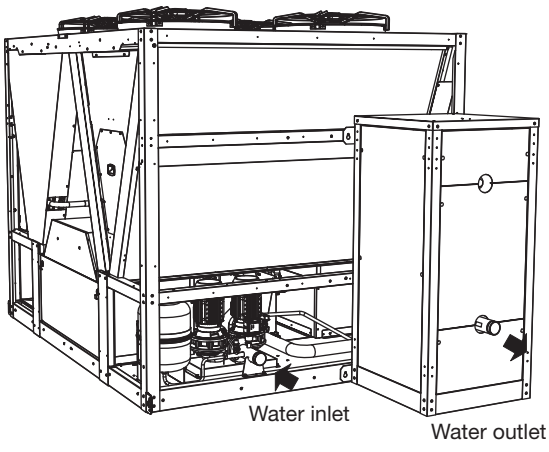










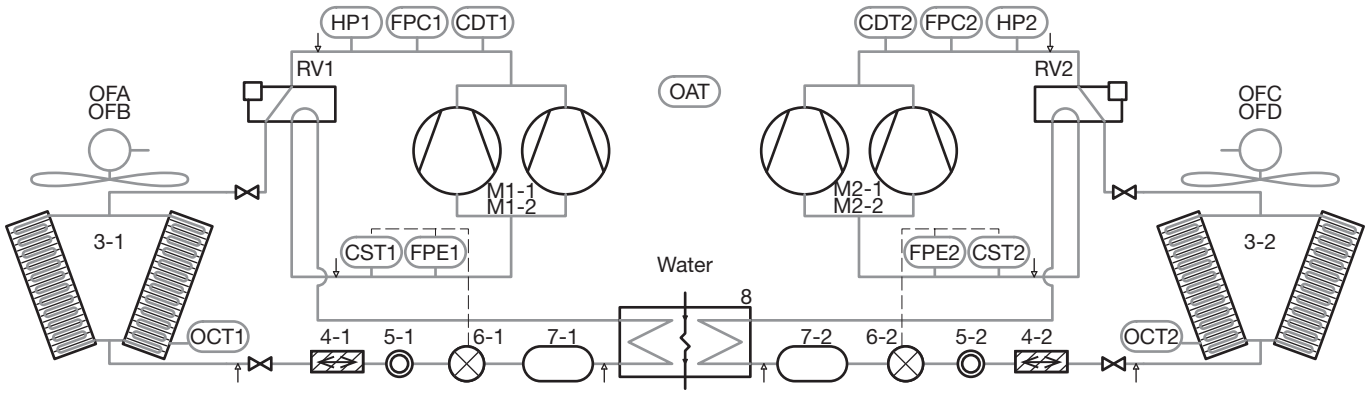


Refrigerant circuit diagram

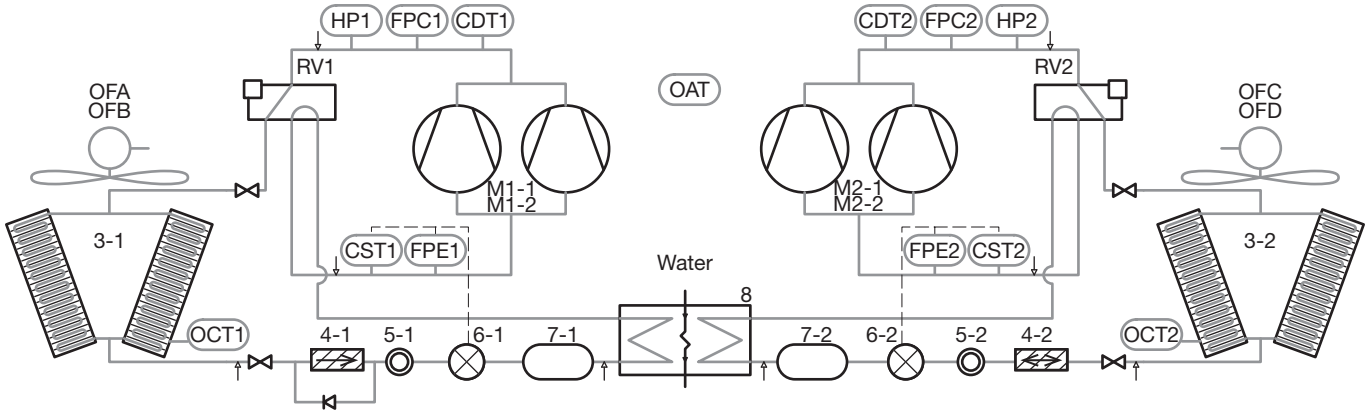
M1-1 **M1-2** **M2-1** **M2-2**	circuit 1 circuit 1 circuit 2 circuit 2	Compressors 1 Compressors 2 Compressors 1 Compressors 2
RV1 **RV2**	circuit 1 circuit 2	Cycle reversing valve
OFA/B **OFC/D**	circuit 1 circuit 2	Outdoor fans motor
3-1 **3-2**	circuit 1 circuit 2	Air condenser
4-1 **4-2**	circuit 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 (active 42 bar)
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

Refrigerant circuit diagram

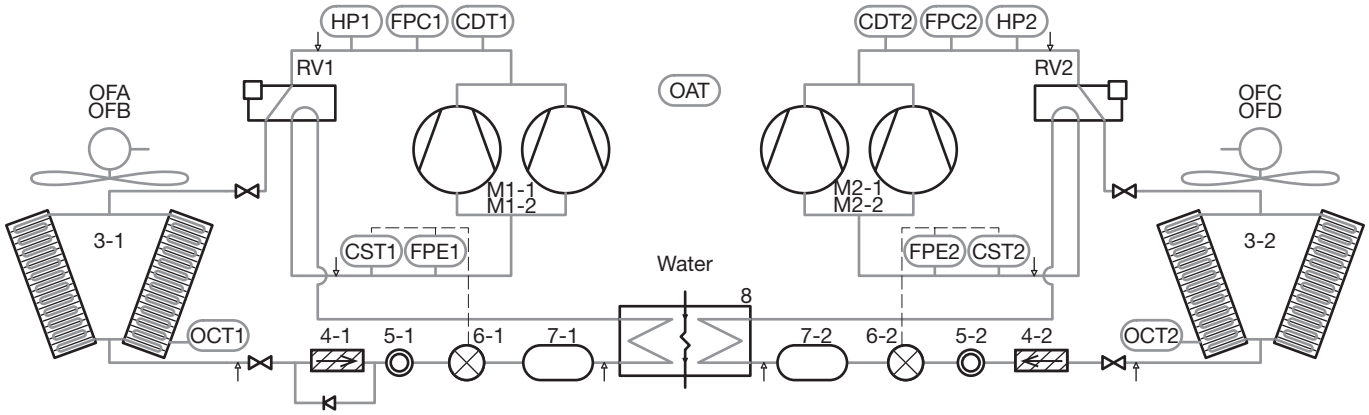
140 and 150 models



170 models



190 and 210 models



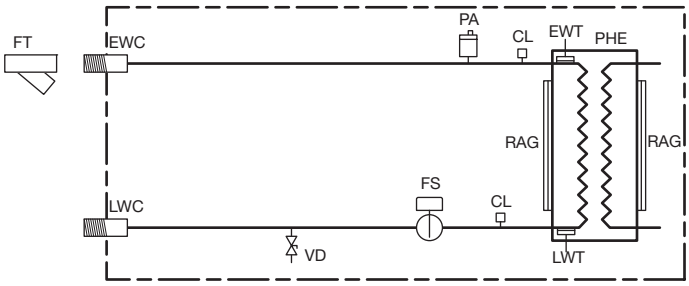
Hydraulic circuit diagram

Recommended installation	
FC	Flexible connection
VV	Drain valve
VA	Globe valve
VR	Water charging valve
MN	Manometer

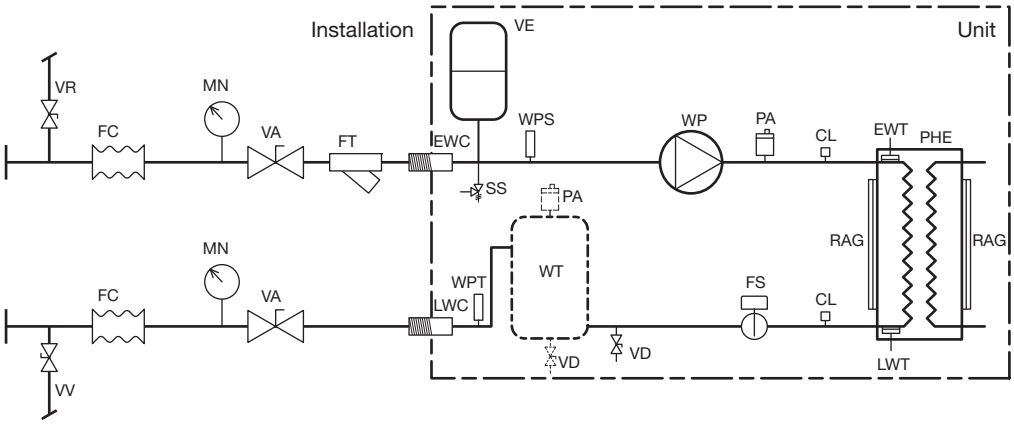
Hydraulic circuit	
FT	Filter (supplied loose)
EWC/LWC	Inlet/outlet Victaulic- 2''1/2
VE	Pressure expansion tank
WPS	Low water pressure switch (optional)
SS	Safety valve
WP	Pump
PA	Automatic air vent
CL	Pressure tap 3/8''
EWT	Inlet water temperature sensor
LWT	Outlet water temperature sensor
PHE	Plate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

Hydraulic circuit diagram

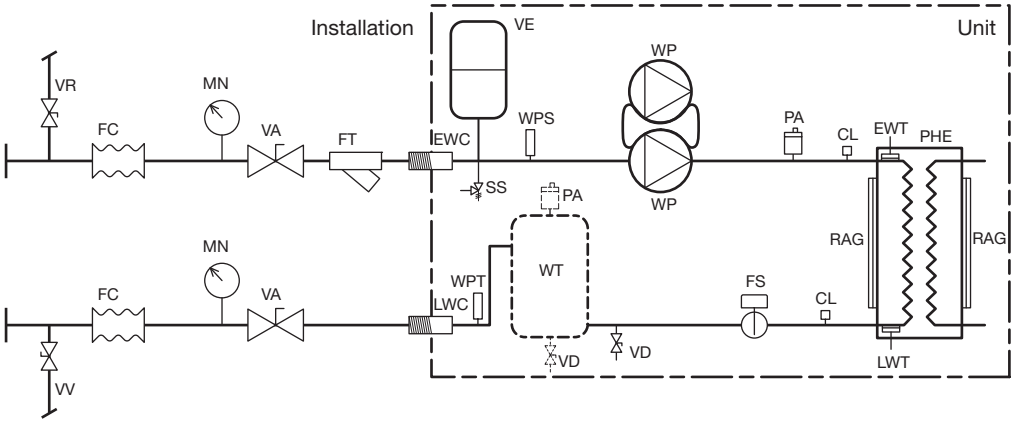
Without pump version



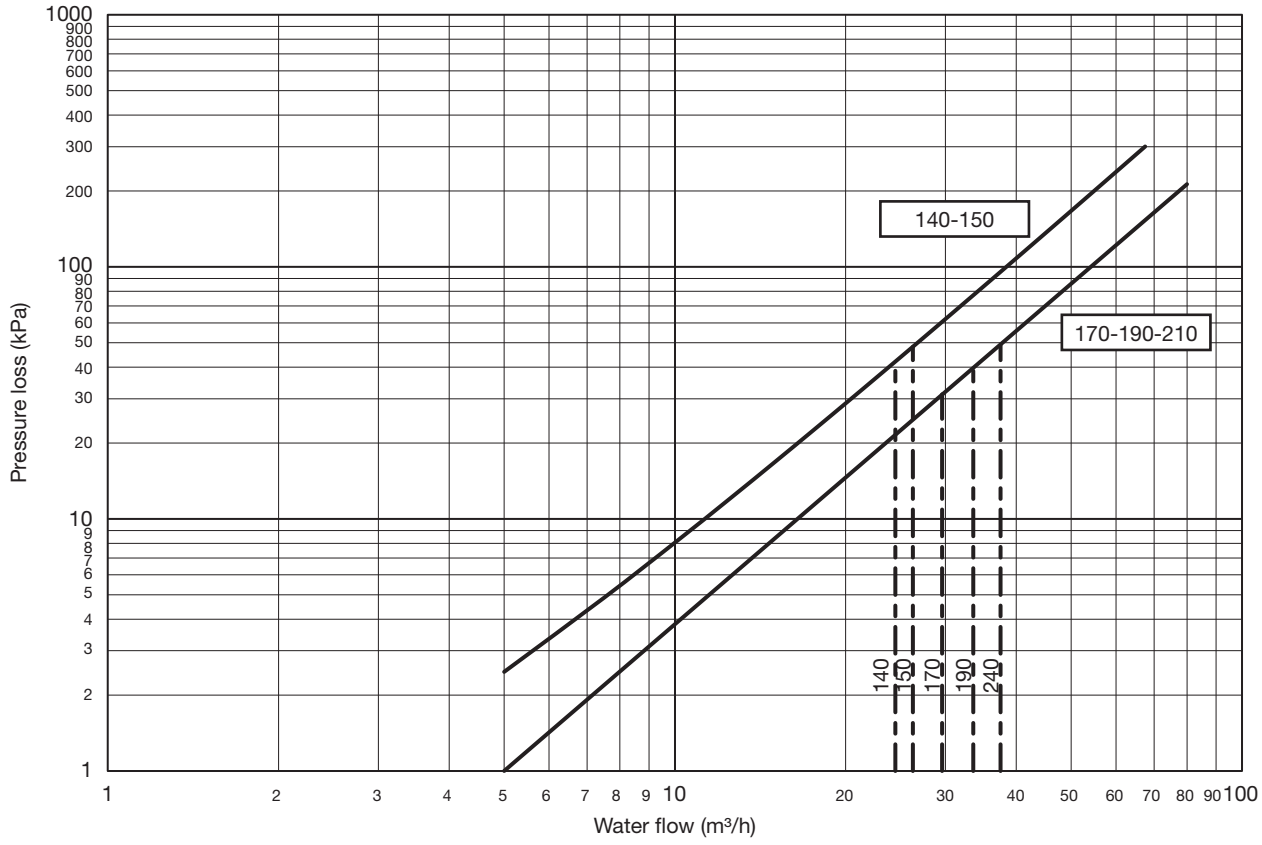
Recommended installation - Single pump version



Recommended installation - Double pump version

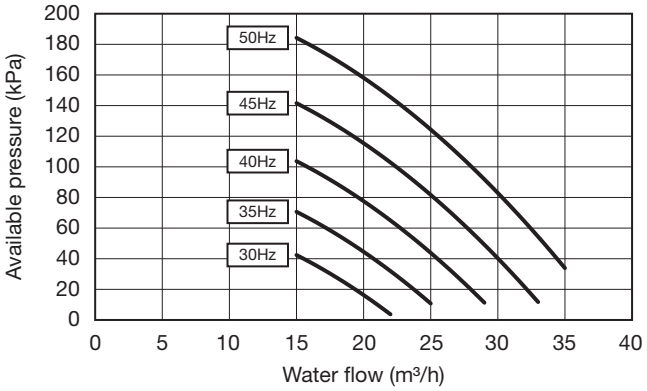


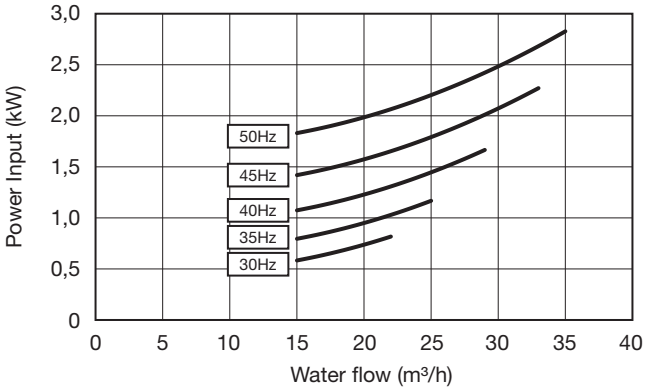
Pressure losses



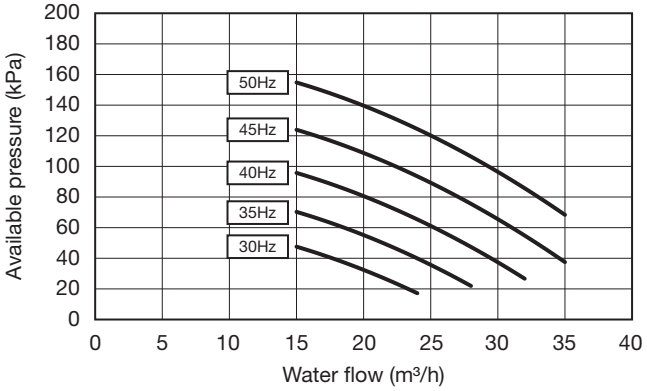
Hydraulic pumps curves

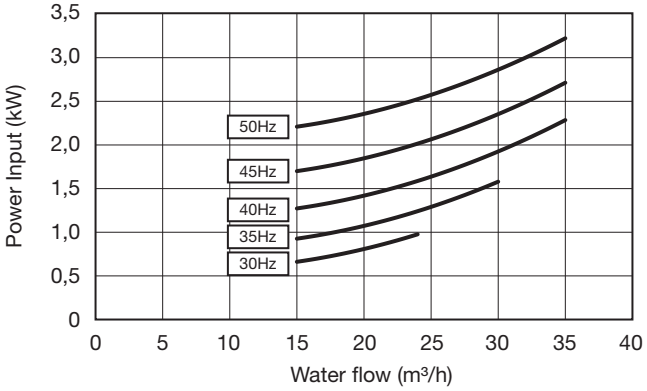
ECOi-W 140 - 150 - 170 - Standard pump



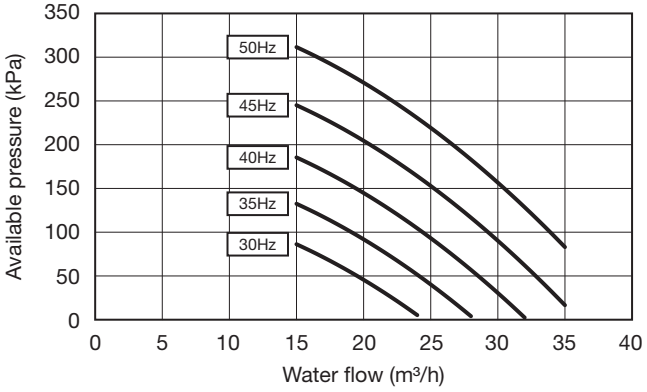


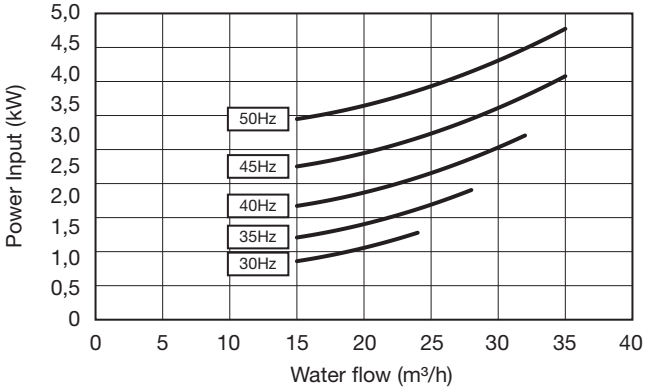
ECOi-W 190 - 210 - Standard pump



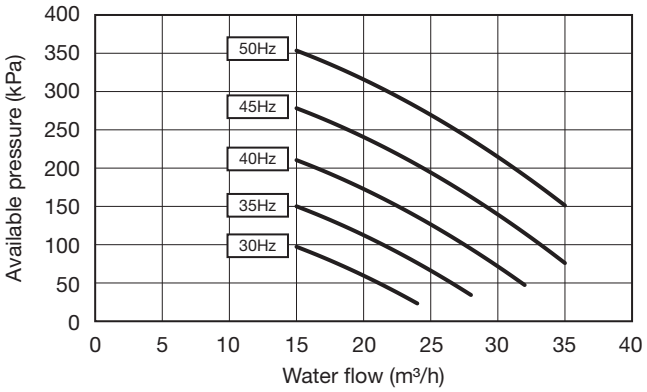


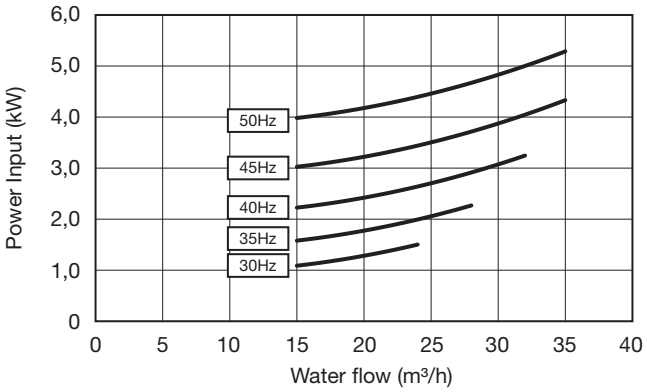
ECOi-W 140 - 150 - 170 - 190 - High pressure pump





ECOi-W 210 - High pressure pump





Wiring diagram

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.

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

Legend

	Power supply
	Description
QG	Main section switch
KA1	Three phase network control relay (phase sequence and cut-out)
FT1/2	Magneto-thermal circuit breaker for circuit 1 compressors
FT3/4	Magneto-thermal circuit breaker for circuit 2 compressors
K1/2	Power circuit contactor for circuit 1 compressors
K3/4	Power circuit contactor for circuit 2 compressors
C1-1/1-2	Compressors 1 and 2 of circuit 1
C2-1/2-2	Compressors 1 and 2 of circuit 2
R1/2	Crankcase heater for circuit 1 compressors
R3/4	Crankcase heater for circuit 2 compressors
FTC	Control circuit magneto-thermal circuit breaker
FTOF1-L	Magneto-thermal circuit breaker for circuit 1 outdoor fans
FTOF1-H	Magneto-thermal circuit breaker for circuit 1 outdoor fans
FTOF2-L	Magneto-thermal circuit breaker for circuit 2 outdoor fans
FTOF2-H	Magneto-thermal circuit breaker for circuit 2 outdoor fans
KOF1	Power contactors for circuit 1 outdoor fans
KOF1-L	Power contactors for circuit 1 outdoor fans
KOF1-H	Power contactors for circuit 1 outdoor fans
KOF2	Power contactors for circuit 2 outdoor fans
KOF2-L	Power contactors for circuit 2 outdoor fans
KOF2-H	Power contactors for circuit 2 outdoor fans
OFA/B	Circuit 1 outdoor fan motors
OFC/D	Circuit 2 outdoor fan motors
S1/S3	Compressor internal safety device
FF11	Fuse carrier (three phase version without neutral)
T2	400V/230V transformer (three phase version without neutral)

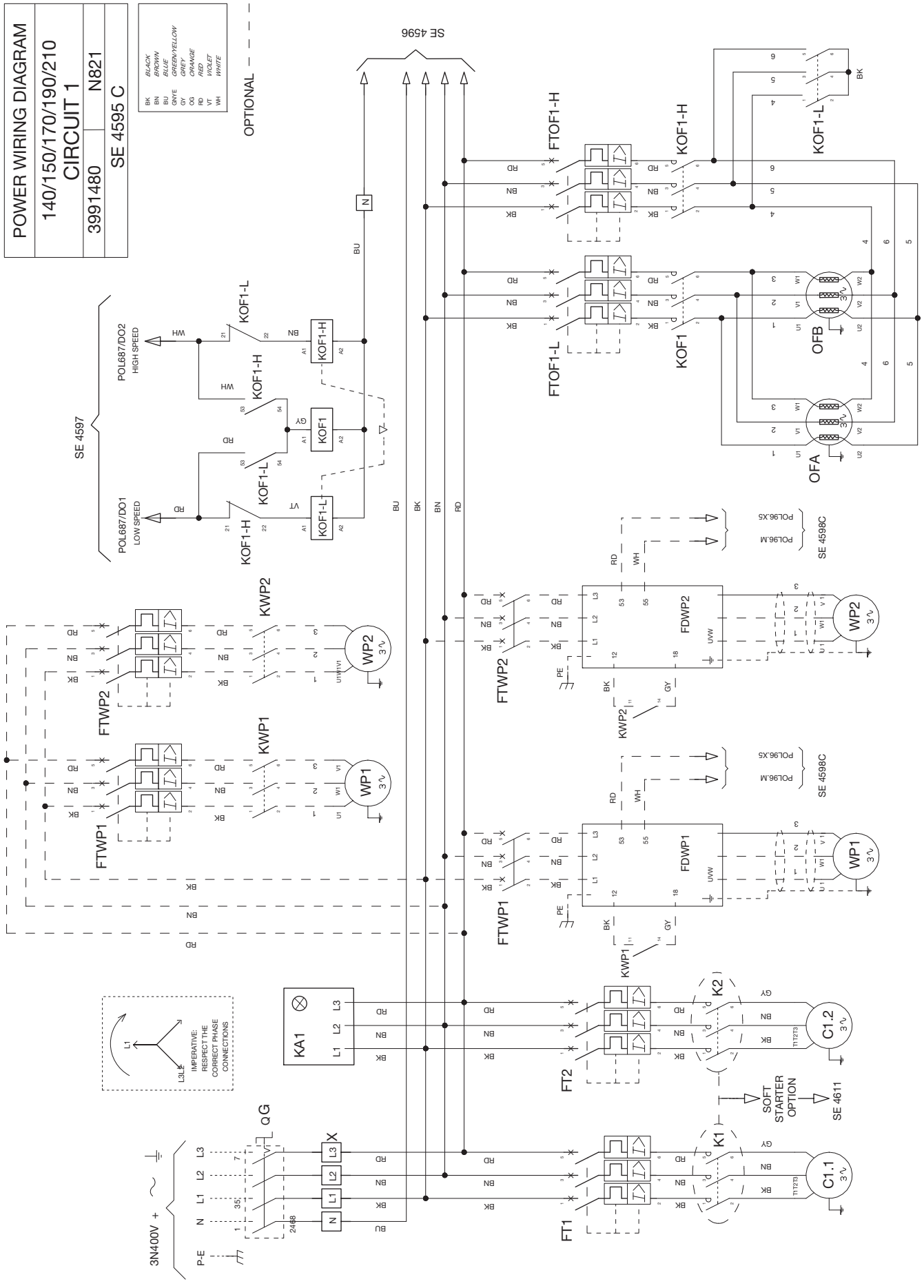
Legend

	Control and regulation
	Description
POL687/096	CHILLER controller
T1	CHILLER controller transformer
FFT	Fuse carrier secondary circuit of t1
FT1/2	Additional magneto-thermal circuit breaker for circuit 1 compressors
FT3/4	Additional magneto-thermal circuit breaker for circuit 2 compressors
FTOF1-L	Additional magneto-thermal circuit breaker for circuit 1 outdoor fans
FTOF1-H	Additional magneto-thermal circuit breaker for circuit 1 outdoor fans
FTOF2-L	Additional magneto-thermal circuit breaker for circuit 2 outdoor fans
FTOF2-H	Additional magneto-thermal circuit breaker for circuit 2 outdoor fans
FOFA/B	Internal protection for circuit 1 outdoor fan motors
FOFC/D	Internal protection for circuit 2 outdoor fan motors
FS	Flow switch
WPS	Low water pressure switch (optional)
HP1	Circuit 1 high pressure pressostats automatic reset
HP2	Circuit 2 high pressure pressostats automatic reset
EEV1	Circuit 1 electronic expansion valve
EEV2	Circuit 2 electronic expansion valve
K1/2	Circuit 1 compressor power circuit contactor
K3/4	Circuit 2 compressor power circuit contactor
RAG	Antifreeze electric heater
RV1	Circuit 1 4-way cycle reversing valve (optional)
RV2	Circuit 2 4-way cycle reversing valve (optional)
KA1	Three phase network control contactor
FPE1	Circuit 1 low pressure transducer
FPE2	Circuit 2 low pressure transducer
FPC1	Circuit 1 high pressure transducer
FPC2	Circuit 2 high pressure transducer
OCT1	Circuit 1 condenser outdoor temperature sensor
OCT2	Circuit 2 condenser outdoor temperature sensor
CDT1	Circuit 1 discharge temperature sensor
CDT2	Circuit 2 discharge temperature sensor
CST1	Circuit 1 suction temperature sensor
CST2	Circuit 2 suction temperature sensor
OAT	Outdoor air temperature sensor
EWT	Inlet water temperature sensor
LWT	Outlet water temperature sensor
S1	Circuit 1, compressor 1 internal safety device
S3	Circuit 2, compressor 1 internal safety device
SM1	ON/OFF switch
SD/N	Night / day switch (not supplied)
SS/W	Summer / winter (closed in winter) (not supplied)

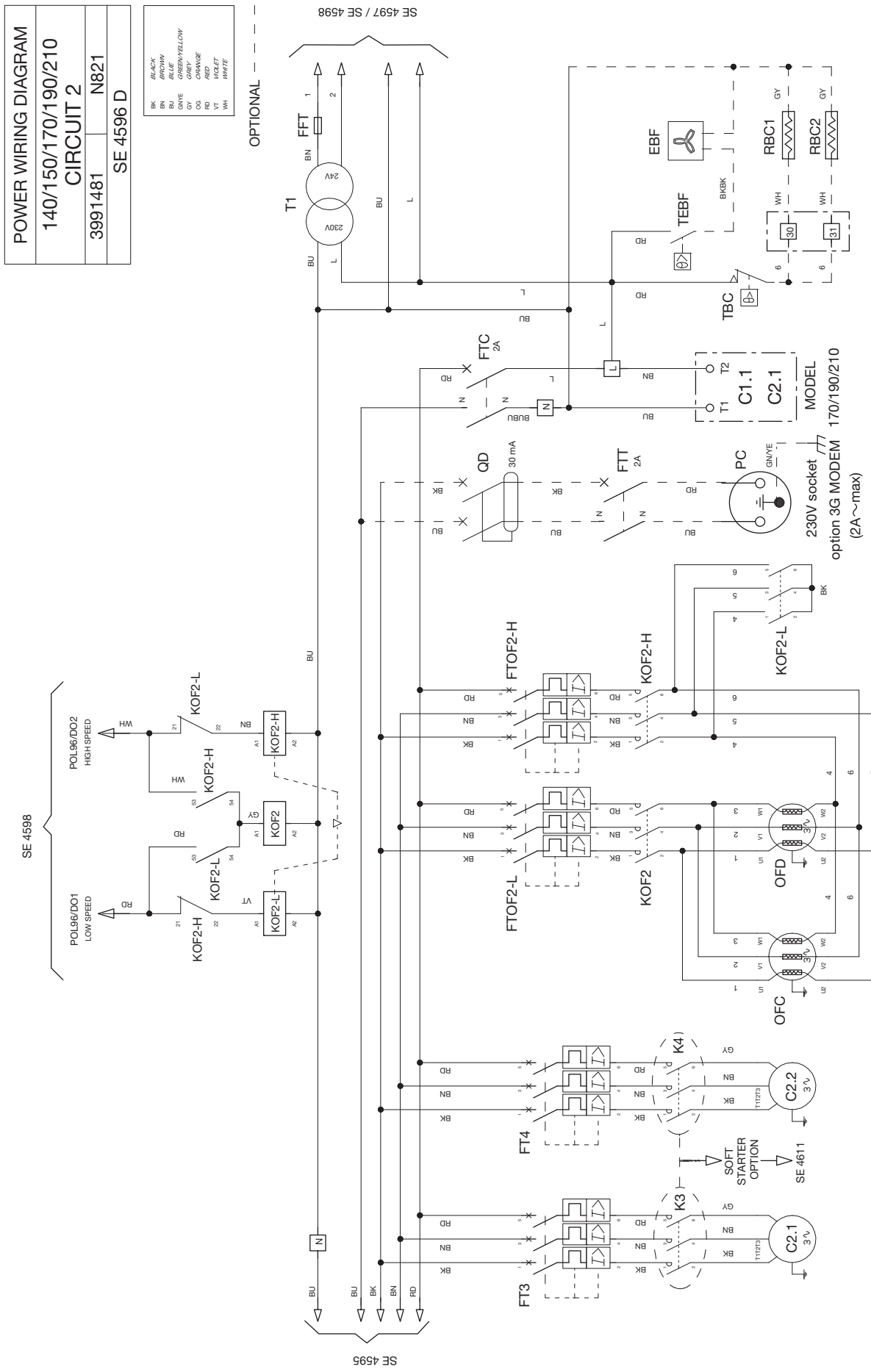
Legend

	Options
	Description
	Option pump
FTWP1/2	Water pump motor magnetothermal circuit breaker
KWP1/2	Water pump motor power contact
WP1/2	Water pump
FDWP1/2	Three phase frequency inverter of water pump motor
WPT	Hydraulic pressure sensor
	All Seasons option
FTOFA/B	Circuit 1 magnetic circuit breaker for outdoor fans
FTOFC/D	Circuit 2 magnetic circuit breaker for outdoor fans
FDA/B	Circuit 1 three phase frequency inverter for outdoor fans
FDC/D	Circuit 2 three phase frequency inverter for outdoor fans
KOFA/B	Circuit 1 three phase frequency inverter command relay for outdoor fans
KOFC/D	Circuit 2 three phase frequency inverter command relay for outdoor fans
	Option soft starter
S.ST1/2/3/4	Soft starter
	Nordic Pack
TBC	Drain pan electric heater thermostat
RBC1	Circuit 1 drain pan antifreeze electric heater
RBC2	Circuit 2 drain pan antifreeze electric heater
	Electrical panel optional fan
TEBF	Electrical panel fan thermostat
EBF	Electrical panel fan

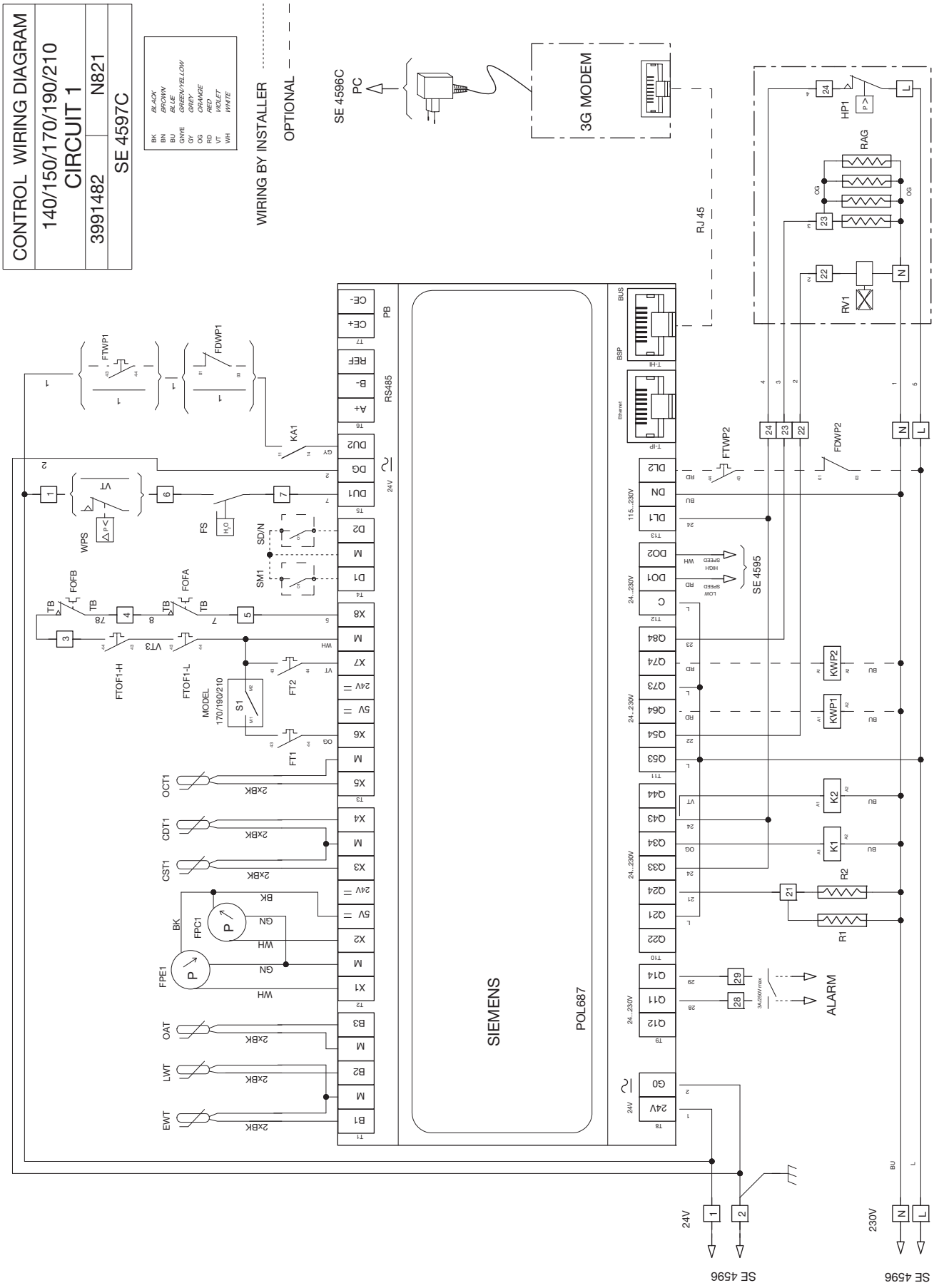
Power - Circuit 1



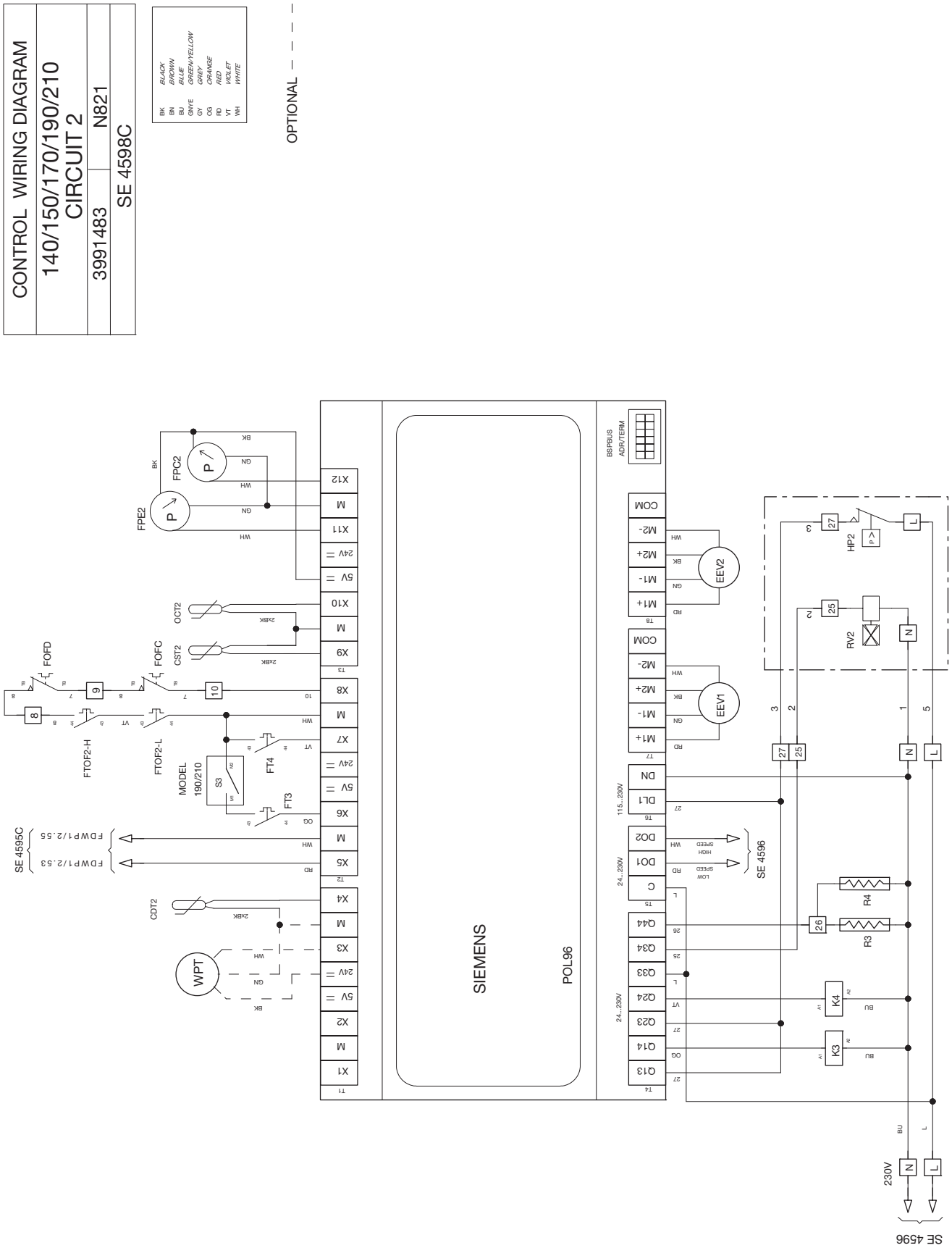
Power - Circuit 2



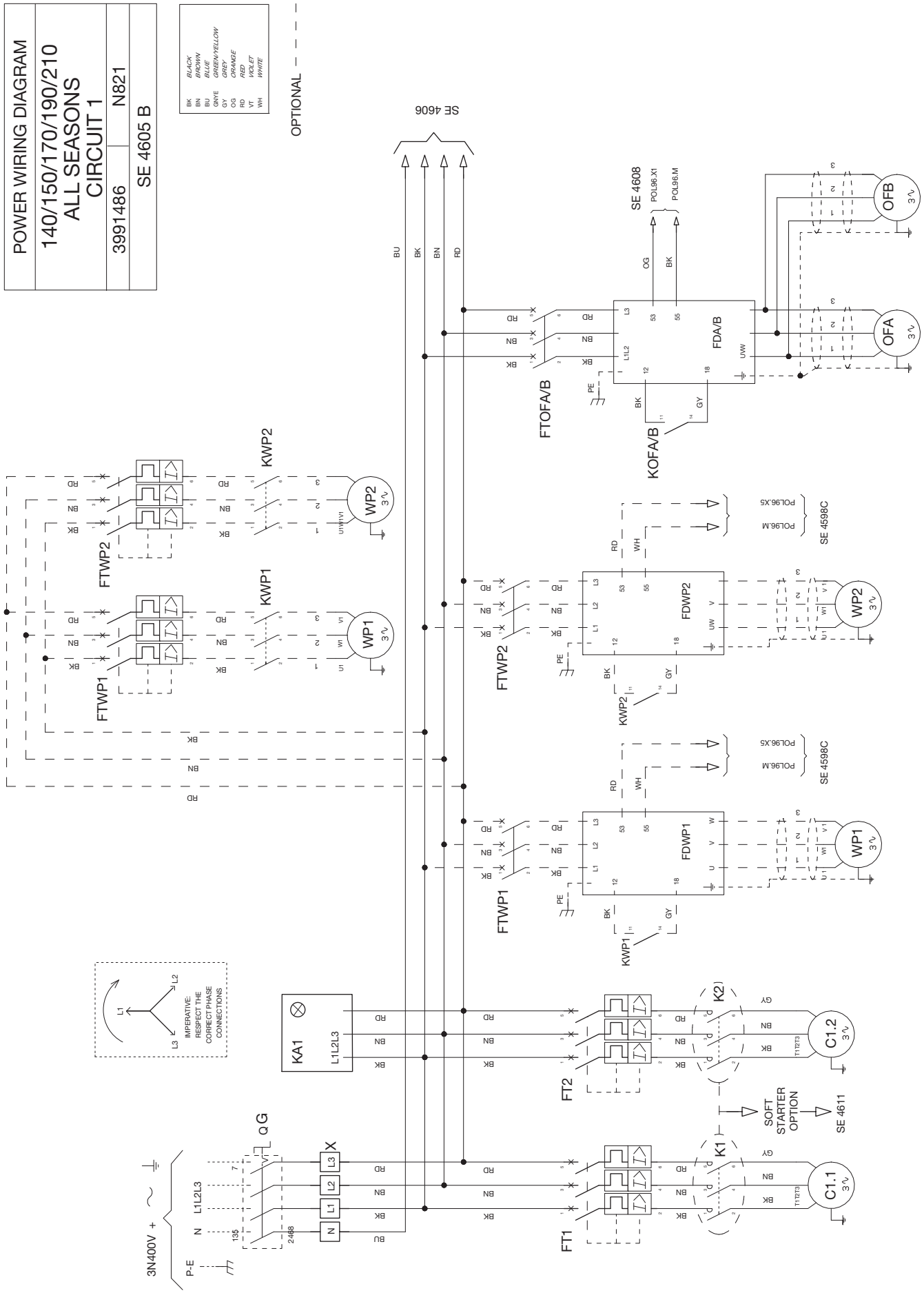
Control - Circuit 1



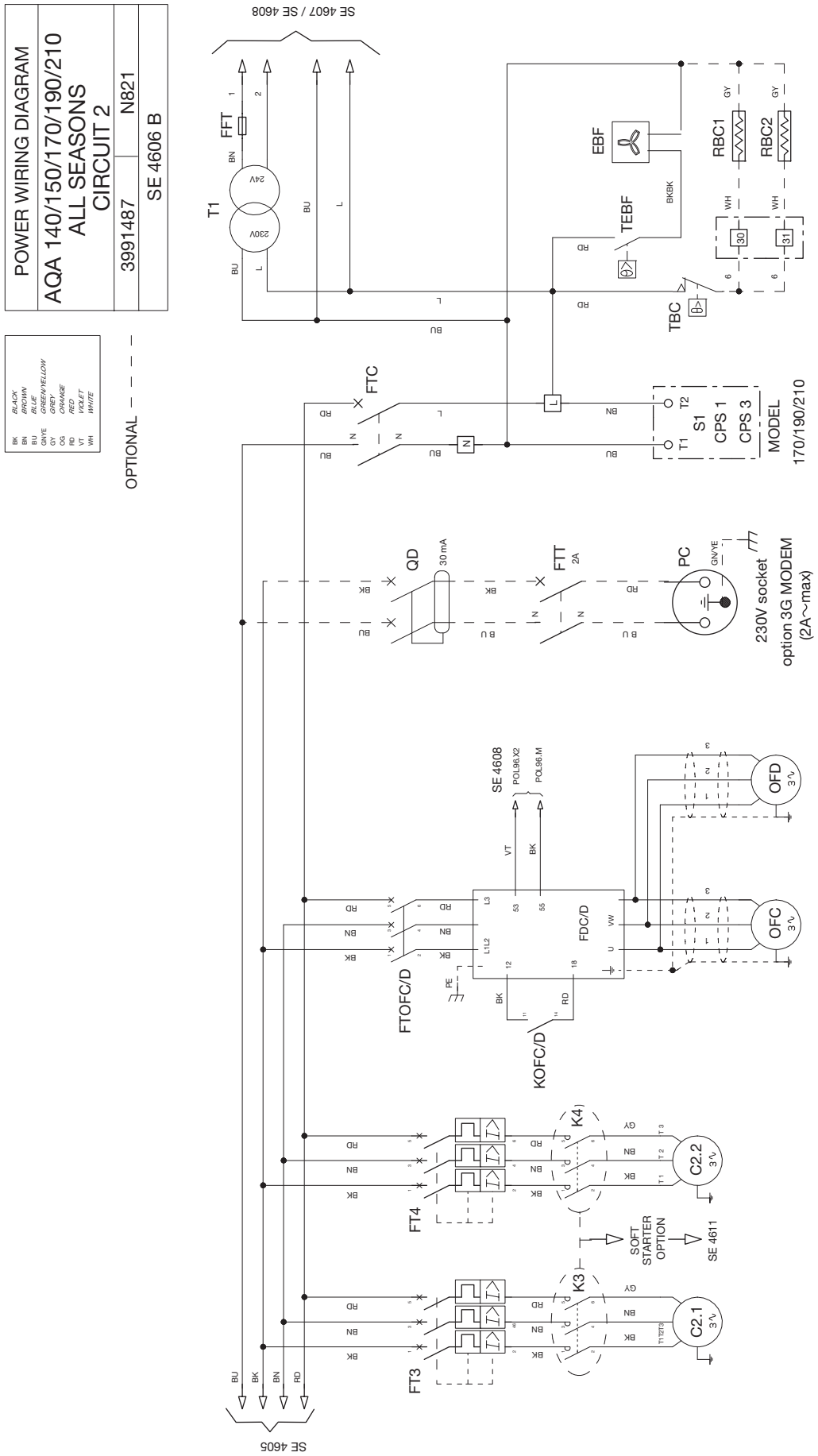
Control - Circuit 2



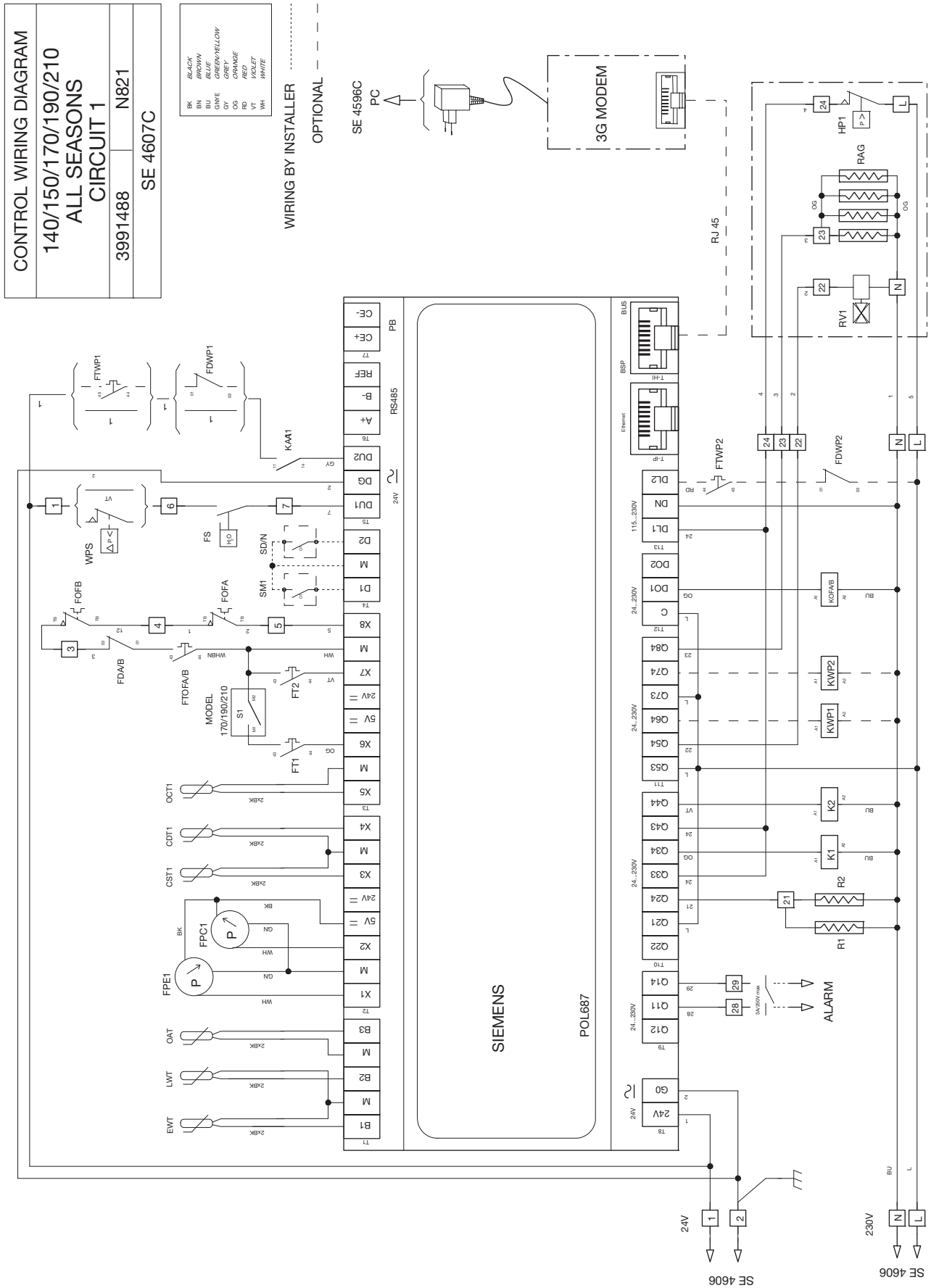
Power - Circuit 1 All Seasons



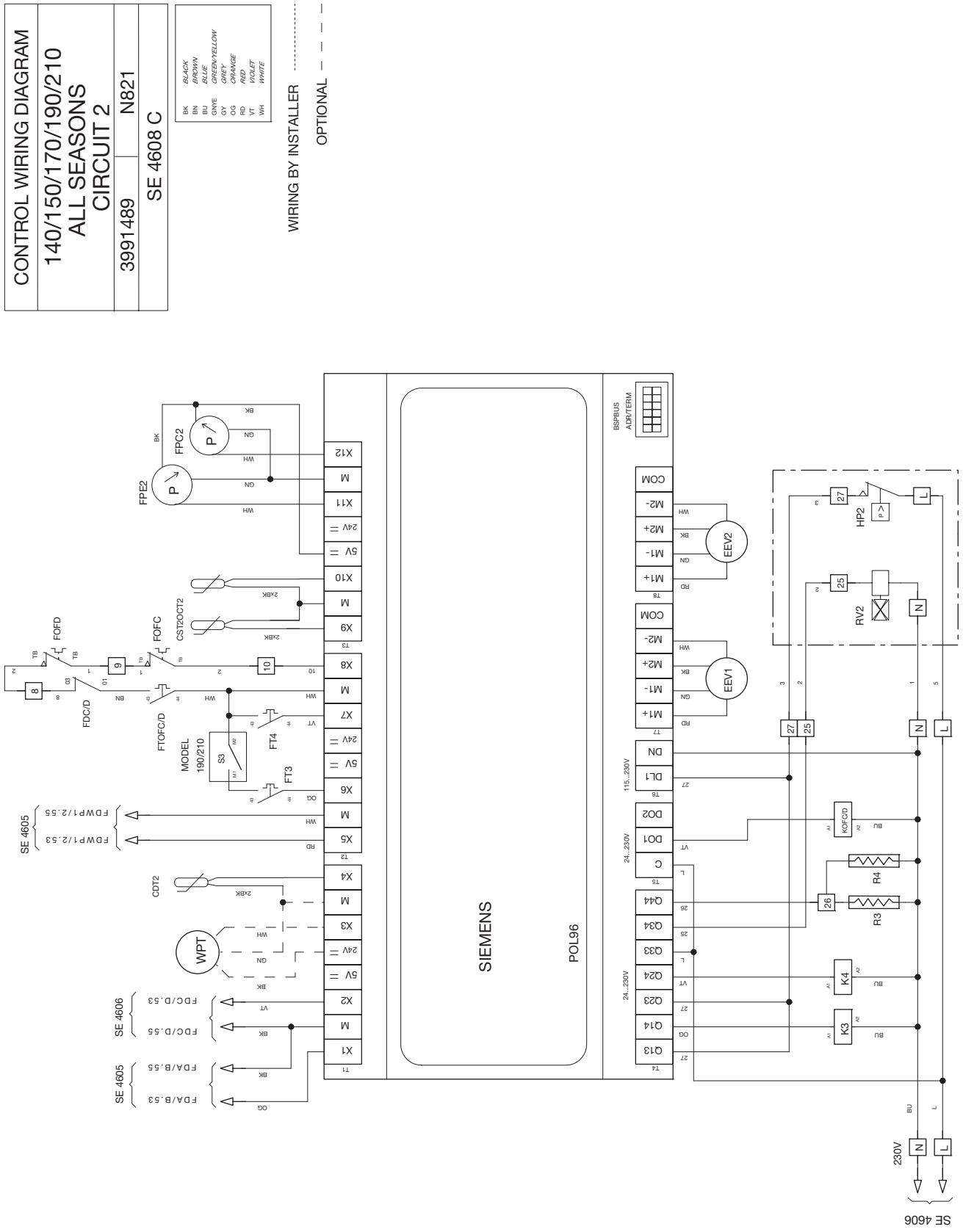
Power - Circuit 2 All Seasons



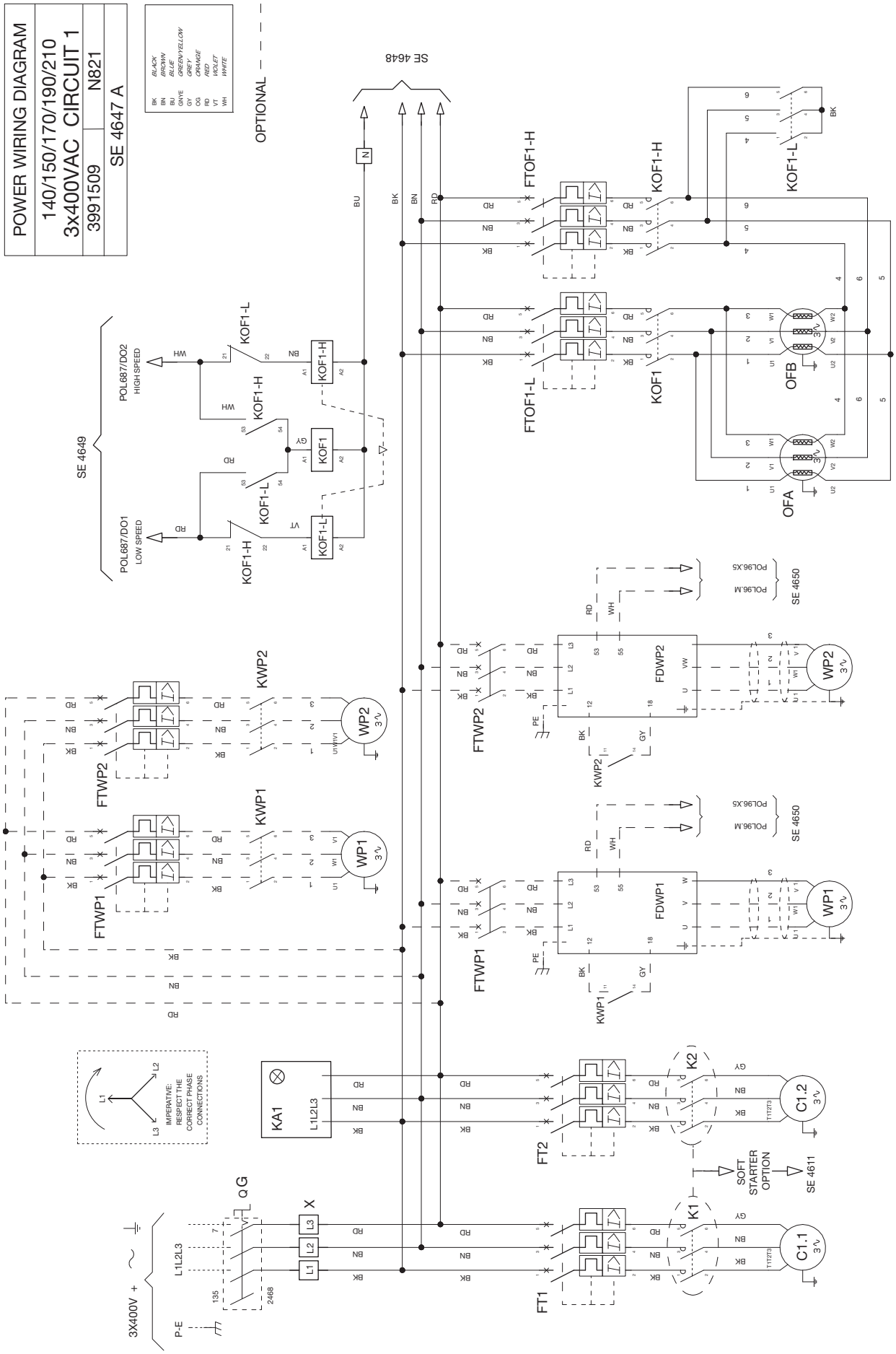
Control - Circuit 1 All Seasons



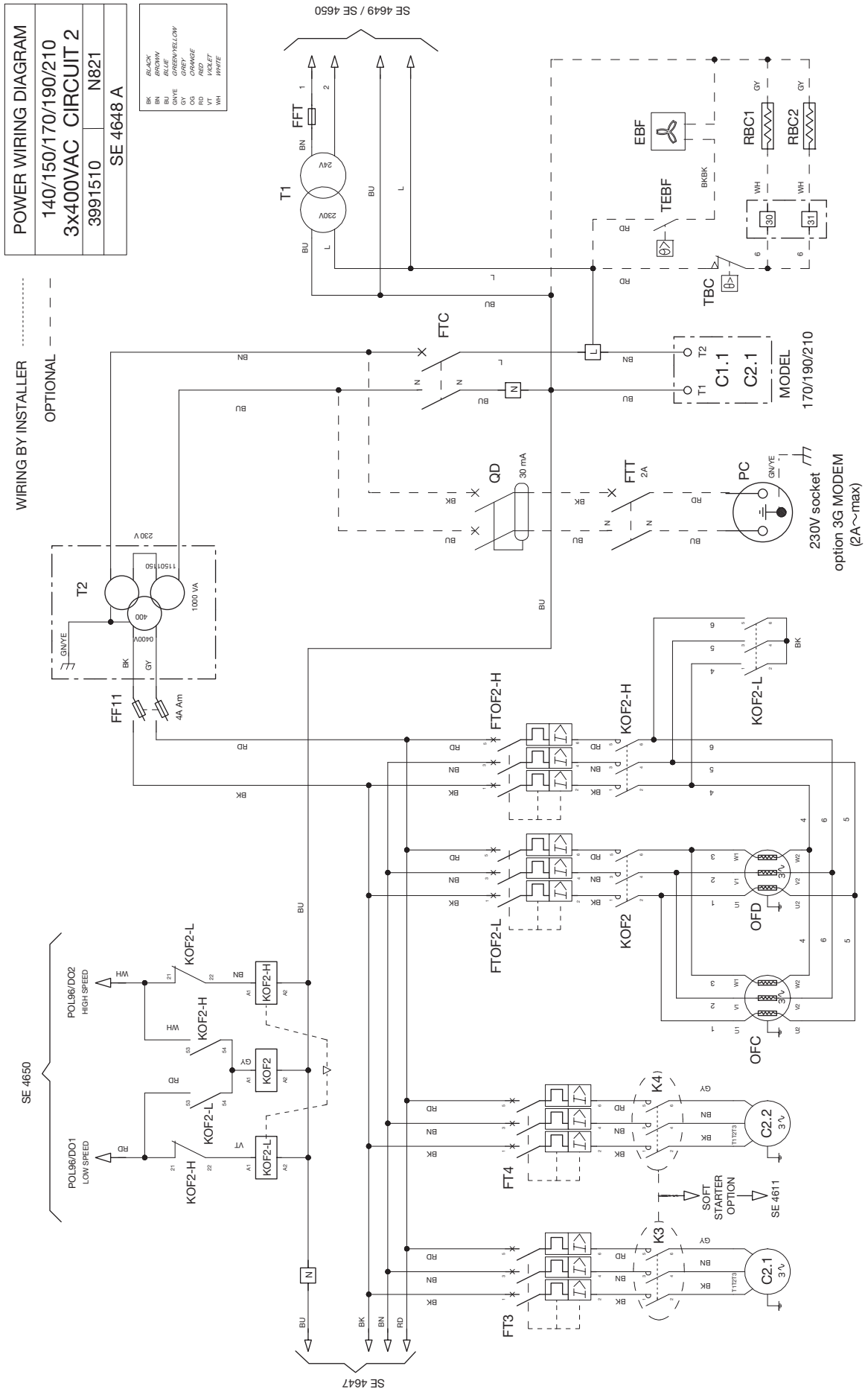
Control - Circuit 2 All Seasons



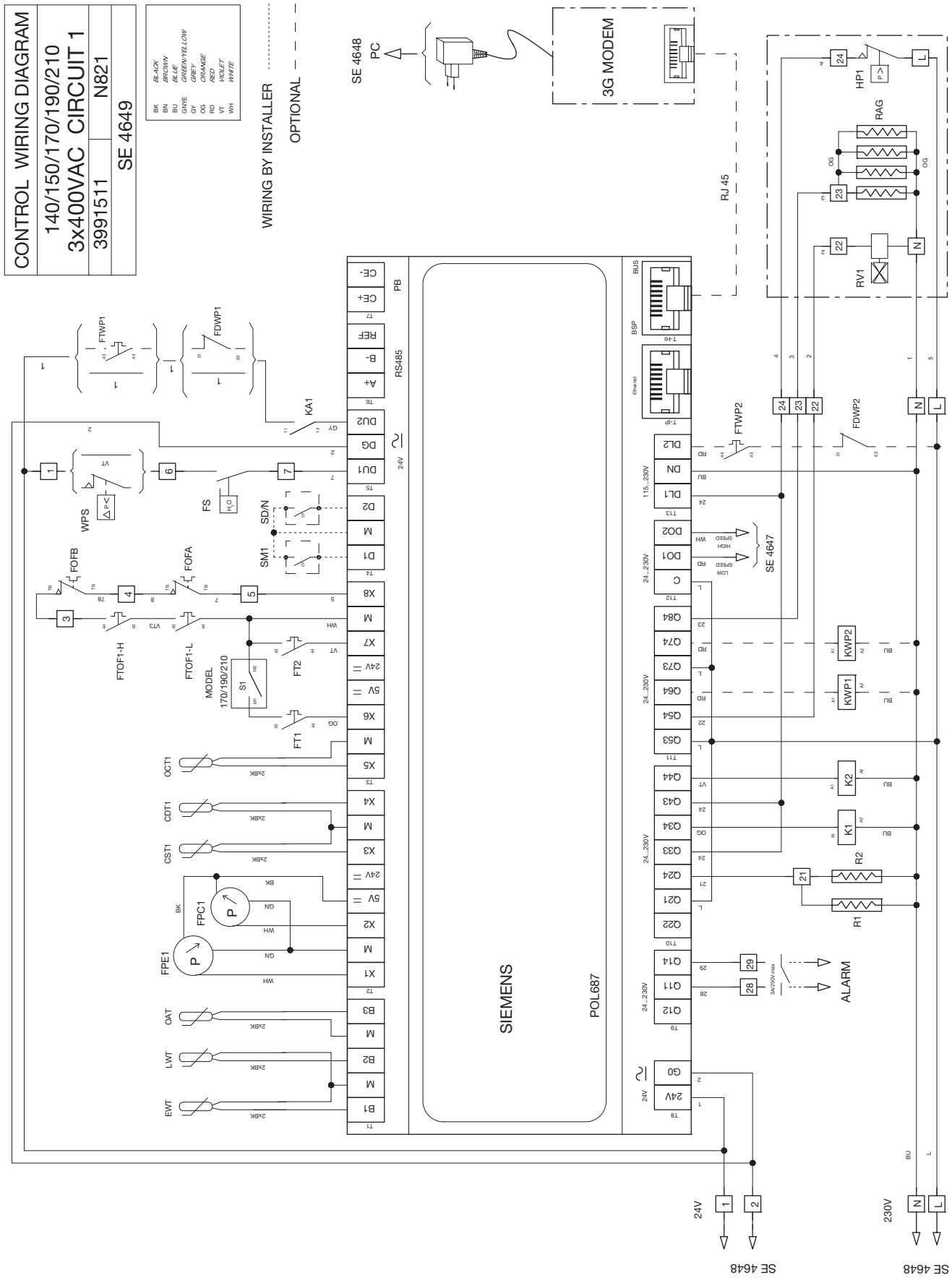
Power - Circuit 1 - without neutral



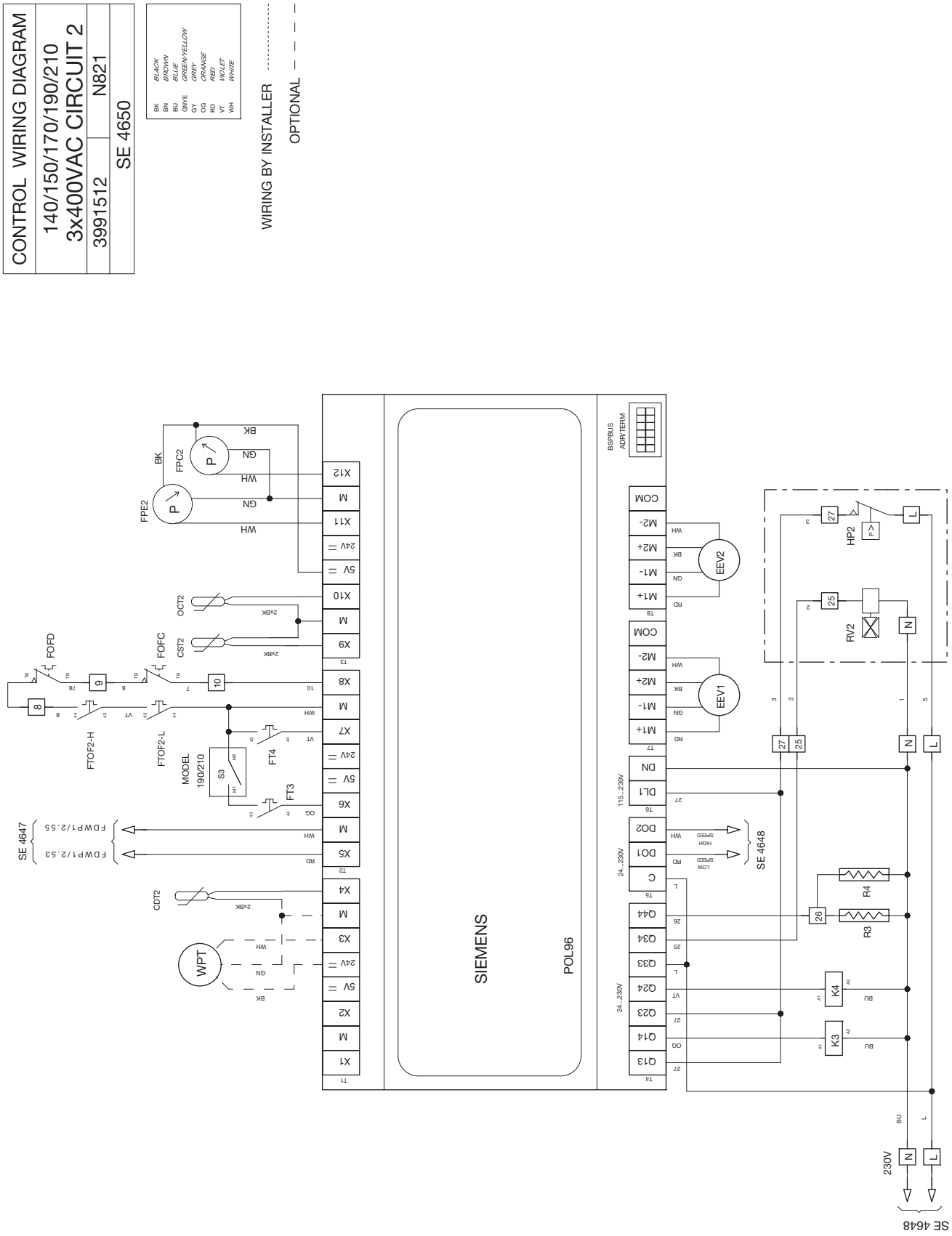
Power - Circuit 2 - without neutral



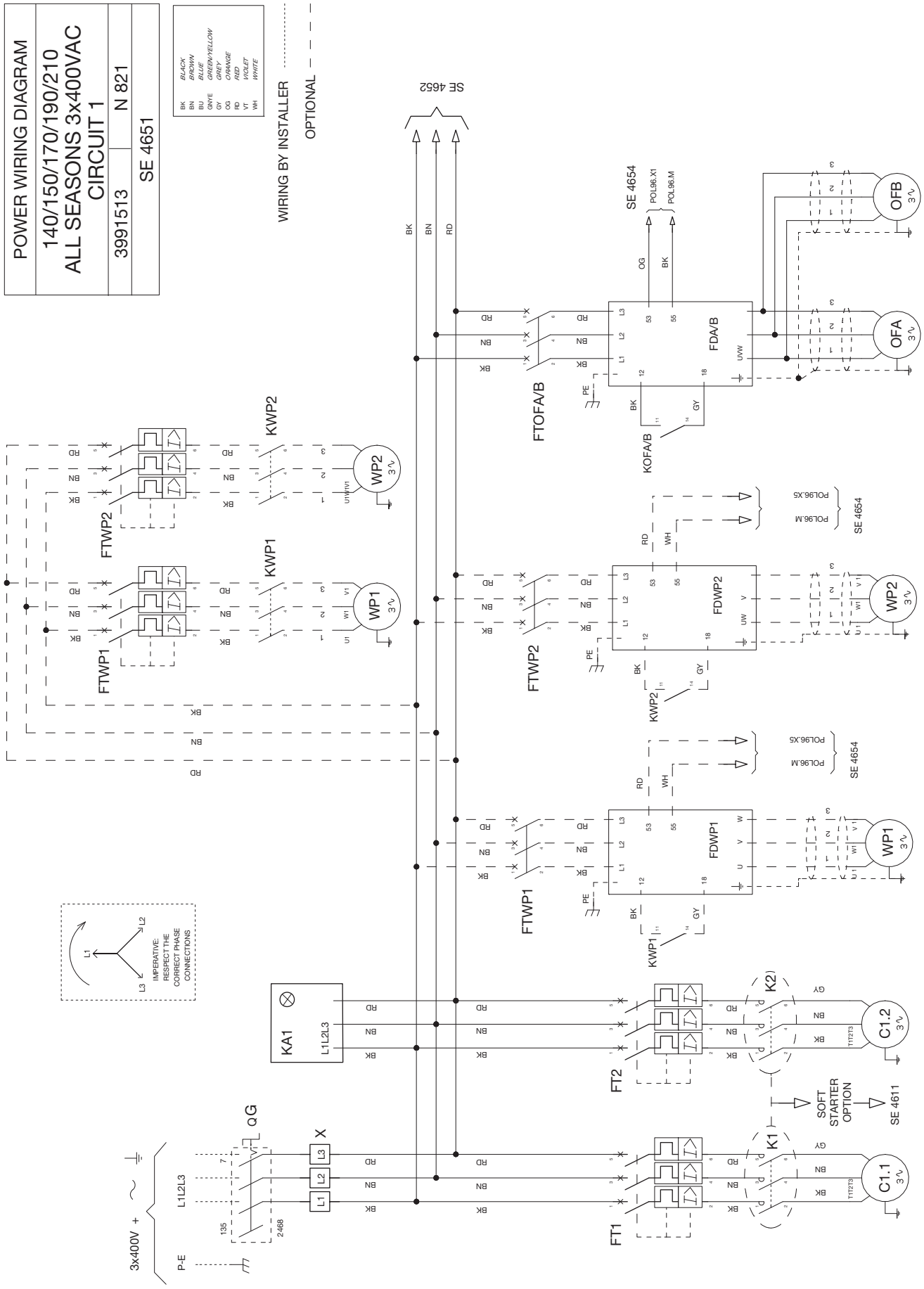
Control - Circuit 1 - without neutral



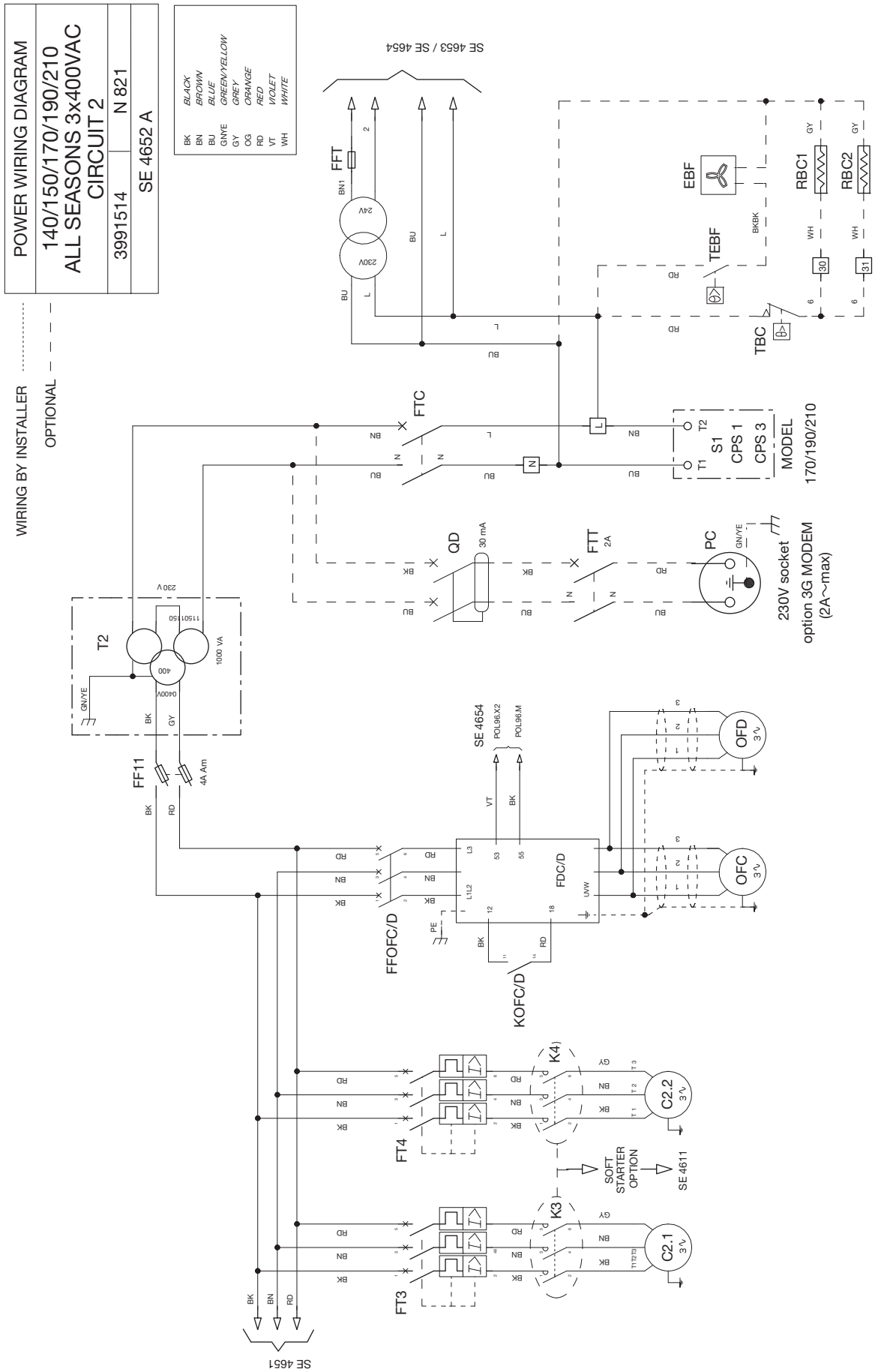
Control - Circuit 2 - without neutral



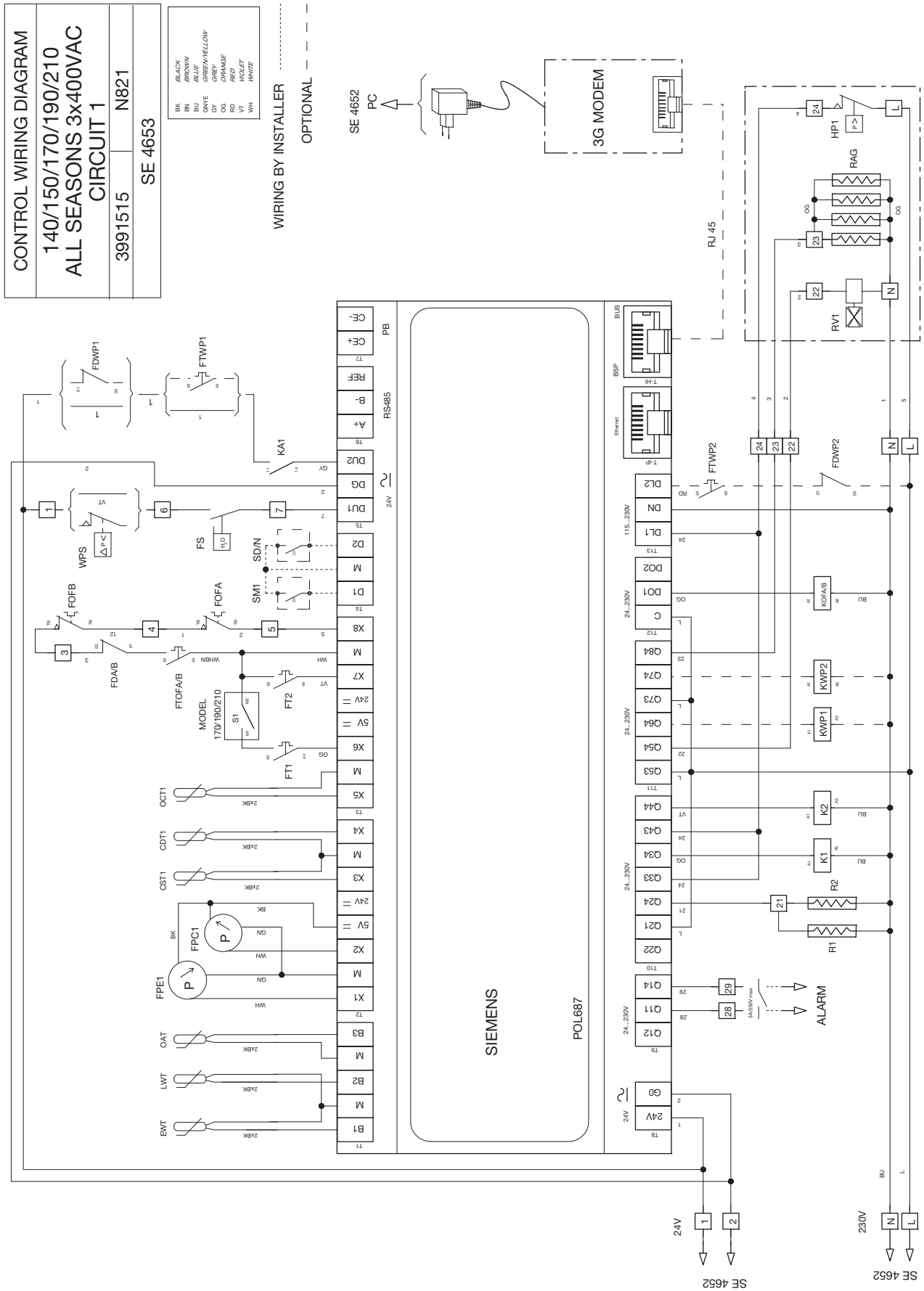
Power - Circuit 1 All Seasons - without neutral



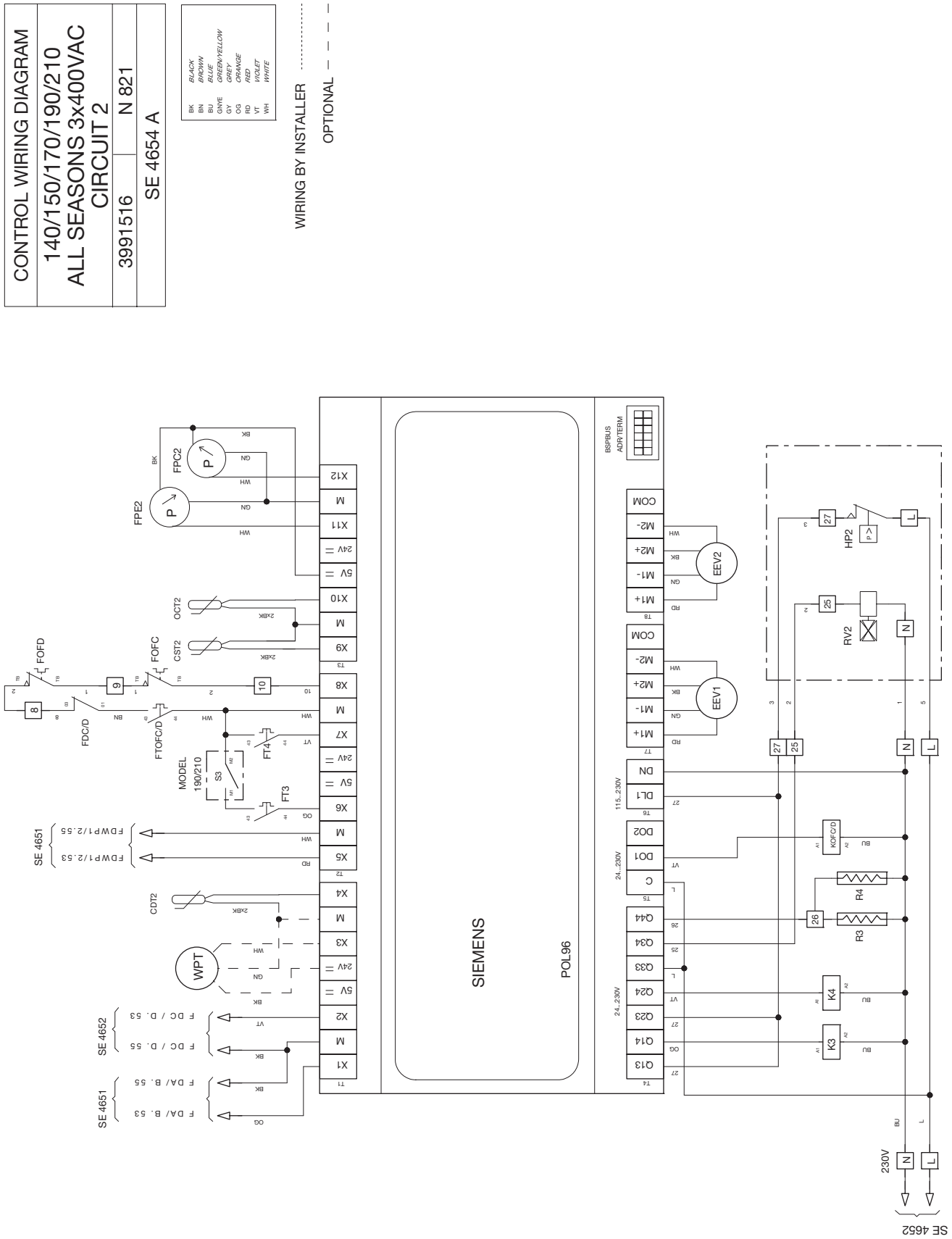
Power - Circuit 2 All Seasons - without neutral



Control - Circuit 1 All Seasons - without neutral



Control - Circuit 2 All Seasons - without neutral



Start up form

Customer information:

Order number: .....
Contractor: .....
Contact: .....

Job name: .....
Installation address: .....
☎: .....

Installer information:

Company: .....
Contact: .....

Address: .....
%: .....

Commissioning information:

Company: .....
Contact: .....

Address: .....
%: .....

Unit identification:

140	150	170	190	210

Unit serial number: .....

	YES	NO
Single pump		
Double pump		
Buffer tank		

	YES	NO
All Seasons kit		
Soft Starter		

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

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

Installation checking:

	YES	NO
Recommended free clearance		
Level installation		
Unit correctly mounted on supplied dampers		
Power supply compatible with unit specifications		
Supply cable is correctly sized		
Ground cable is wired		
Main electrical protection suits the unit		
All electrical connections are correctly tightened		
Ground continuity on all pipes		

	YES	NO
Water connection, cleaning, rinsing, air bleed		
Anti-frost protection of the water loop		
Installation thermal load reaches at least 50%		
Mesh filter at the inlet of the unit		
Minimum water flow rate available		
Flowswitch cut-out checked		
Crankcases heaters are energized since 12 hours		

Observations:

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Start up form

Installation measurements:

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

Electrical measurements:

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

	YES	NO
Voltage unbalance less than 2 %	☐	☐

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

Hydraulic measurements:

Inlet temperature	°C
Outlet temperature	°C
BPHE inlet pressure	kPa
BPHE outlet pressure	kPa
Glycol type & contents	%

Vmax (VARIABLE PRIMARY FLOW)	%
Vmin (VARIABLE PRIMARY FLOW)	%
Vstdby (VARIABLE PRIMARY FLOW)	%
Water pressure setpoint	bar

Remarks:

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TECNICIAN
Name:
Sign-in:

CLIENT
Name:
Sign-in:

Authorised representative in EU
Panasonic Testing Centre
Panasonic Marketing Europe GmbH
Winsbergring 15, 22525 Hamburg, Germany

www.aircon.panasonic.eu

Panasonic. **IMM_ECOI-W_140-210_EN_09.19**
September 2019