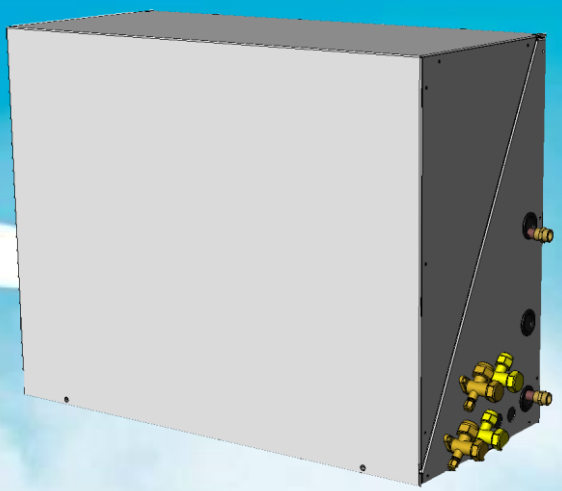
INSTALLATION, OPERATION AND MAINTENANCE MANUAL



FW RANGE – Water cooled condensing units

Cooling only – Bisplit – single-phase – R513A

FW209Q6 – WQG201
FW0914Q6 – WQG202
FW0918Q6 – WQG203
FW214Q6 – WQG204
FW1418Q6 – WQG205
FW218Q6 – WQG207

Le spécialiste de la climatisation sans unité extérieure

Air Conditioning

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1 INTRODUCTION

The present document constitutes the installation, operation and maintenance manual for the following water condensing units:

- FW209Q6 (model code WQG201).
- FW0914Q6 (model code WQG202).
- FW0918Q6 (model code WQG203).
- FW214Q6 (model code WQG204).
- FW1418Q6 (code modèle WQG205).
- FW218Q6 (model code WQG207).

A bisplit water condensing split system consists of:

- Two indoor units (IU) which can be wall mount units, ceiling cassettes, ducted indoor units or floor mounted/ceiling consoles.
- A condensing unit (CU) connected to the water network (town water, water loop).

The fitting must be carried out by a person with appropriate skills and qualifications. This person must respect the standing rules and regulations. The builder declines any responsibility and the guarantee will no longer be applicable if the fitting instructions have not been respected. A case of any doubt or for any additional detailed information, please contact your local retailer.

2 RECEIPT AND STORAGE OF THE GOODS

Please inspect the goods on receipt before unpacking. Any choc may have caused serious damage to unit's function which will not be taken under warranty.



In case of any deterioration, detailed reservations must be made and immediately sent by registered letter to the carrier indicating the damages observed. A copy of the letter must also be sent to the builder or to the retailer.

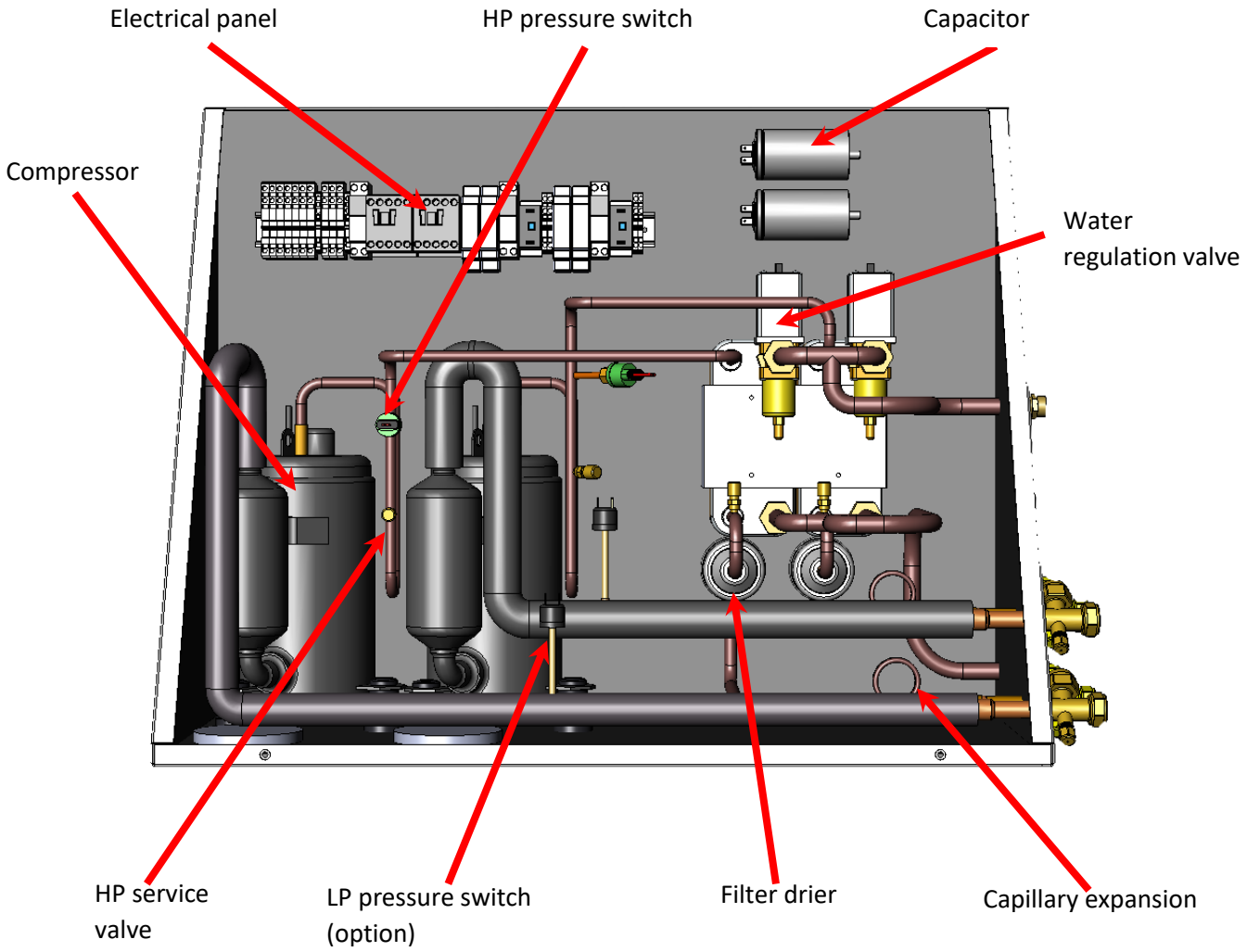
The machine must not be carried or placed upside-down. It must be stocked inside and perfectly sheltered from rain and snow, etc. Weather variations (high or low temperatures) must not damage the unit. Very high temperatures (from 60°C) may damage certain plastic parts and cause permanent damage. Moreover, certain electronical components may not function properly.

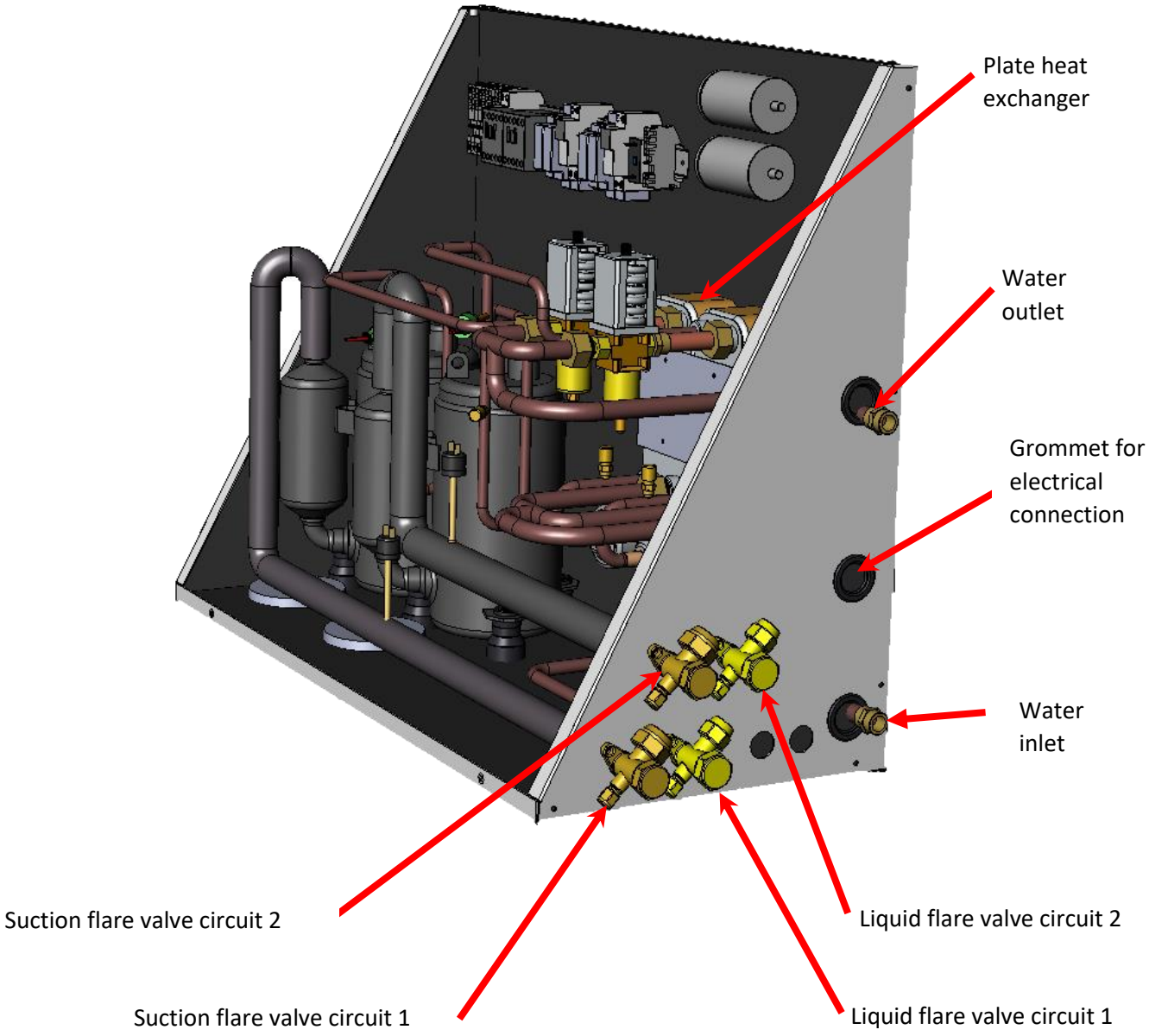
3 DESCRIPTION OF THE PACKAGE

Each CU is supplied with:

- A wall mount fixing rail.
- 2 water connection flexible hoses with 4 flat washers.
- An installation, operation and maintenance manual containing the **electrical drawing** and the **commissioning form**

4 DESCRIPTION OF THE UNIT





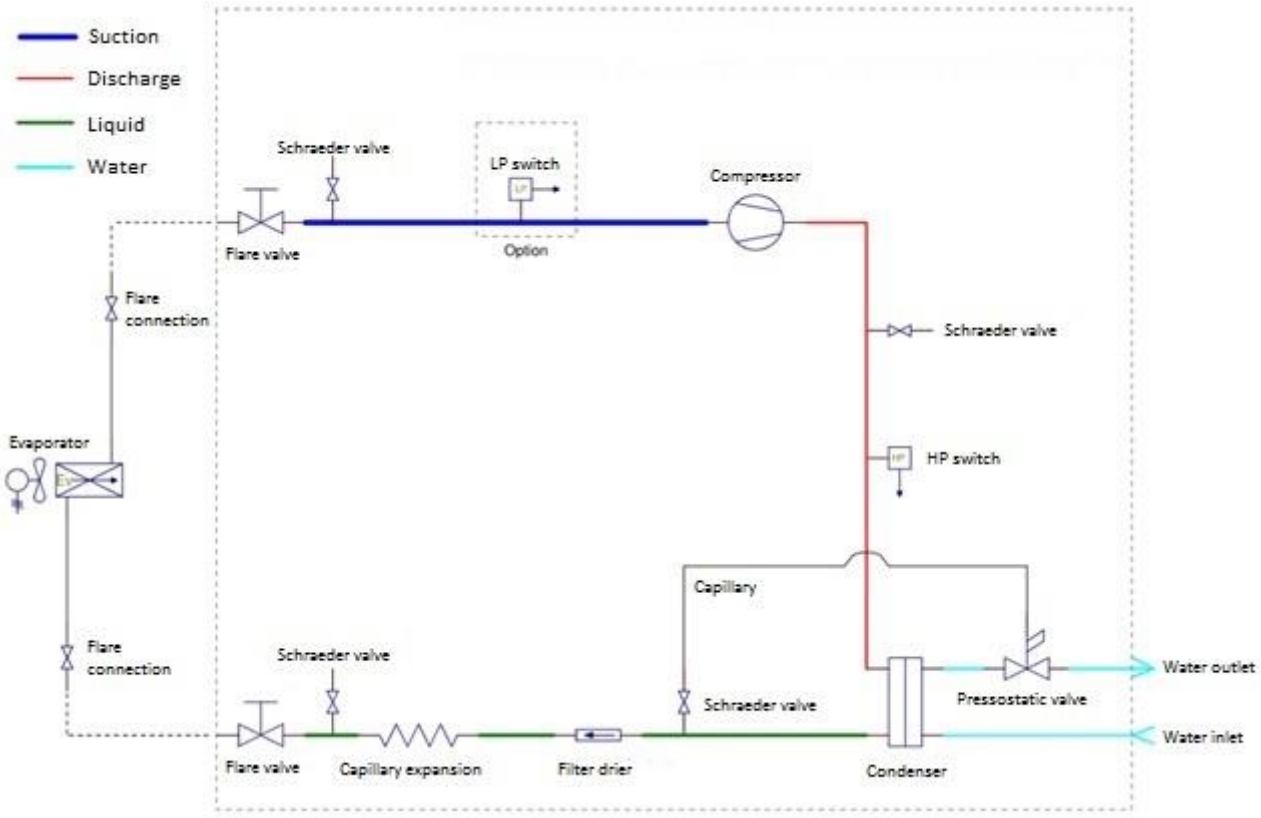
Each CU model exist in 4 versions specified by its option pack which corresponds to the last two digits of the article code (the first 6 being the model code):

		WITHOUT LP switch	WITH LP switch
Enhance noise insultation	WITHOUT	AH	BH
	WITH	CH	DH

Example : WQG204**DH** = FW214Q6 with the options « LP switch » and « Enhanced noise insulation ».

5 FLUIDIC DIAGRAM

Refrigerant circuits are independent. The diagram below corresponds to one of the circuits:



The refrigerant is R513A. It is classified A1 according to the NF EN378 standard.

The HP pressure switch cuts off at 22 bar and resets at 18 bar.

The LP pressure switch cuts off at 0.5 bar and resets at 1.5 bar.

The maximum operating pressure (OP) of the high pressure part of the refrigeration circuit is 22 bar.

The maximum operating pressure (OP) of the low pressure part of the refrigeration circuit is 15 bar.

The minimum operating temperature (OT) is -25°C.

The maximum operating temperature (OT) is +80°C.

All models are classified category I.

The maximum operating pressure of the hydraulic circuit is 10 bar.

6 INSTALLATION : CHOICE OF LOCATION

This paragraph explains how to choose the location for the CU and the piping connecting to the IU. Concerning the IU, please refer to its documentation.

It is necessary to ensure the solidity of the CU support. This support must resist the weight of the unit (indicated on its nameplate), but it must also be sufficiently robust not to transmit vibrations. For example, it is not recommended to install the CU on a wooden floor.

The location must meet 2 criteria:

1. Respect the service spaces.
2. Respect of the minimum volume of the location.

The criteria concerning the minimum volume and the minimum surface area to be respected are based on the following classifications:

→ Access category: a = general access (see NF EN371-1:2016 paragraph 5.1).

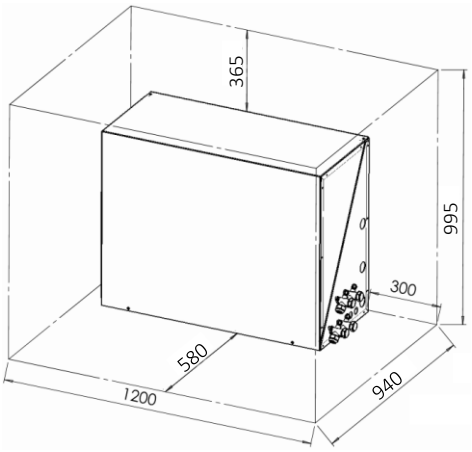
→ Location class: I = Mechanical equipment located in the occupied space (see NF EN371-1:2016 paragraph 5.3).

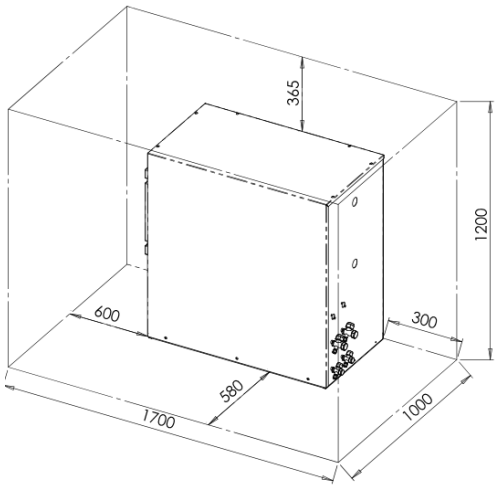
Criterion 1 – Service spaces:

Respecting service spaces allows:

- Easily access the CU.
- Easily access flare valves and water connections.
- Allow the cover to be removed.
- Read the nameplate.
- Allow the installation of accessories (water filter, flow rate valve).
- Allow good ventilation of the interior of the CU via the ventilation grilles.

The service areas to be respected are as follows:





The values given for service spaces are the minimum values to be respected.

Criterion 2 - minimum space volume:

The minimum volume is determined according to standard NF EN371-1:2016 Annex C. It is calculated according to the toxicity of the refrigerant: too high a concentration of the refrigerant in the event of a leak presents risks for a person present in the space where the CU is installed.

Where the spaces surrounding the space where the CU is installed are, by construction or design, not airtight (compared to the space where the CU is installed), then they may be considered part of the space where the CU is installed (void spaces above false ceilings, access passages, ducts, movable partitions, doors with grilles or skewed doors).

The minimum volume to be respected for the space where the CU is installed is:

Total load [g]	400	800	1000	1200	1400	1600	1800	2000	2200	2400	2600
Minimum volume [m^3]	1,3	2,5	3,1	3,7	4,3	4,9	5,5	6,1	6,7	7,3	8,0

The constraint on the minimum volume of the location is determined by the access category (a) and the class of the location (I). According to table C.1 of NF EN371-1:2016 Appendix C, there may no longer be a minimum volume to respect if:

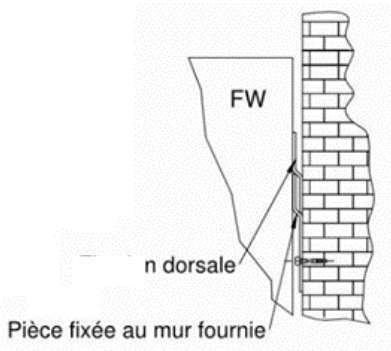
→ If the access category is less restrictive (category b, business or professional offices for example).

→ If the class of the location is less restrictive (class II, CU in a machine room for example).

7 INSTALLATION OF THE UNITS

It is possible to install the CU in two ways:

- First possibility: hanging the CU against a wall using its back mounting rail (supplied with the CU) :



- Second possibility: placing the GC on the ground on an anti-vibration system.

All precautions should be taken to avoid the transmission of vibrations. If the vibrations are an important part of the installation, it is necessary to favor an installation according to the second possibility.

8 INSTALLATION : FRIGORIFIC CONNECTIONS

All the usual precautions should be taken when setting up the refrigerant connections. In particular, it is necessary to limit the number of bends, to make a 2% gradient on the suction line and to make the necessary oil traps in order to have a good oil circulation. It must also be ensured that the connections are plugged in order to prevent any impurity or moisture penetration during the installation.

The installation of refrigeration connections must comply with standard NF EN 378.

The maximum distance between the CU and the IU is 20 linear meters and the maximum height difference is 5 m. The length of the liquid line as that of the suction line should not exceed 20 meters.

The IUs do not all have the same connection diameter as the CU for the suction line or for the liquid line. You must then install the adaptations at the IU level. **These are delivered in a separate cardboard package.**

The creation of the flares for the connection on the flare fittings must be careful. The presence of a burr, crack, too small or too large a flare surface can cause leakage.



Flared valves must be kept closed during connection.

The tightening torques for the flare nuts are:

Diameter ["]	1/4	3/8	1/2	5/8
Torque [N/m]	14 to 18	33 to 42	50 to 62	63 to 77

9 INSTALLATION : HYDRAULIC CONNECTION

In order to limit clogging of the plate heat exchanger and optimize CU operation, it is advisable to install a strainer filter (Ø 0.1mm) on the CU water inlet piping. This filter must remain easily accessible for the operator so that he can perform a periodical check. A strainer filter performing this function is available as an accessory. It is delivered separately and to be connected at a workmanlike manner.

All precautions should be taken. In particular, it must be ensured that:

- All piping is protected against freezing
- There is no high point where an air pocket could be formed.
- The pipes have a sufficient section for the water flow that is to be established.
- The available water flow and water pressure are sufficient.

The proper functioning of the CU depends on the good quality of the heat exchange between the refrigerant and the water to reject calories. The water inlet temperature and the flow rate are essential parameters for the proper functioning of the installation:

- If the water temperature is slightly too high or the flow rate is too low, the power output can be lower than the rated power.
- If the water temperature is too high or the flow rate too low, the CU will get into safety (HP cut).

CUs are designed to operate when fed with tap water with a temperature of +15°C and a pressure of 4 bar, with a wide tolerance around these values.

The rated water flows (eg, to provide the rated cooling capacity) of CUs are summarized in the tables below:

FW bisplit - Nominal water flow depending on water inlet temperature.						
Size FW	209	0914	214	0918	1418	218
Water flow [L/h] for T° = +15°C	140	170	200	220	250	300
Water flow [L/h] for T° = +30°C	200	250	300	350	400	500

10 INSTALLATION : ELECTRICAL CONNECTION OF THE CU

The installation must be carried out by a person with the appropriate skills and qualifications.

The installation must be switched off before any intervention, by cutting the power supply of the CU.

The choice of the cables must be made by the installer to comply with the standards in force at the time of installation. Among others, the installer will have to pay attention to the electrical powers absorbed in all life phases of the installation. The installer must also mount the necessary protections.

The CU provides power to the IU. The selection of the CU power supply cable must therefore take into account the presence or absence of the "electrical heating" function on the IU. Suggestions regarding the supply cables of the CU are given in the table below, but **the final decision remains the responsibility of the installer**.

CU power supply when the IU is wall-mounted, console, cassette or ducted type without electric heating						
Size FW	209	0914	0918	214	1418	218
Power supply cable	3G6mm²	3G6mm²	3G6mm²	3G6mm²	3G6mm²	3G6mm²
Max. current [A] (with IU)	14.0	18.2	20.5	22.4	24.7	27.0

CU power supply when the IU is **duct type with electric heating**						
Size FW	209	0914	0918	214	1418	218
Power supply cable	3G6mm²	3G6mm²	3G6mm²	3G6mm²	3G6mm²	3G6mm²
Max. current [A] (cooling mode)	14.0	18.2	20.5	22.4	24.7	27
Max. current [A] (heating mode)	18.4	19.7	19.7	21.0	21.0	21.0

The protection chosen for the installation at the power supply panel must be of the motor support type (i.e. D curve).

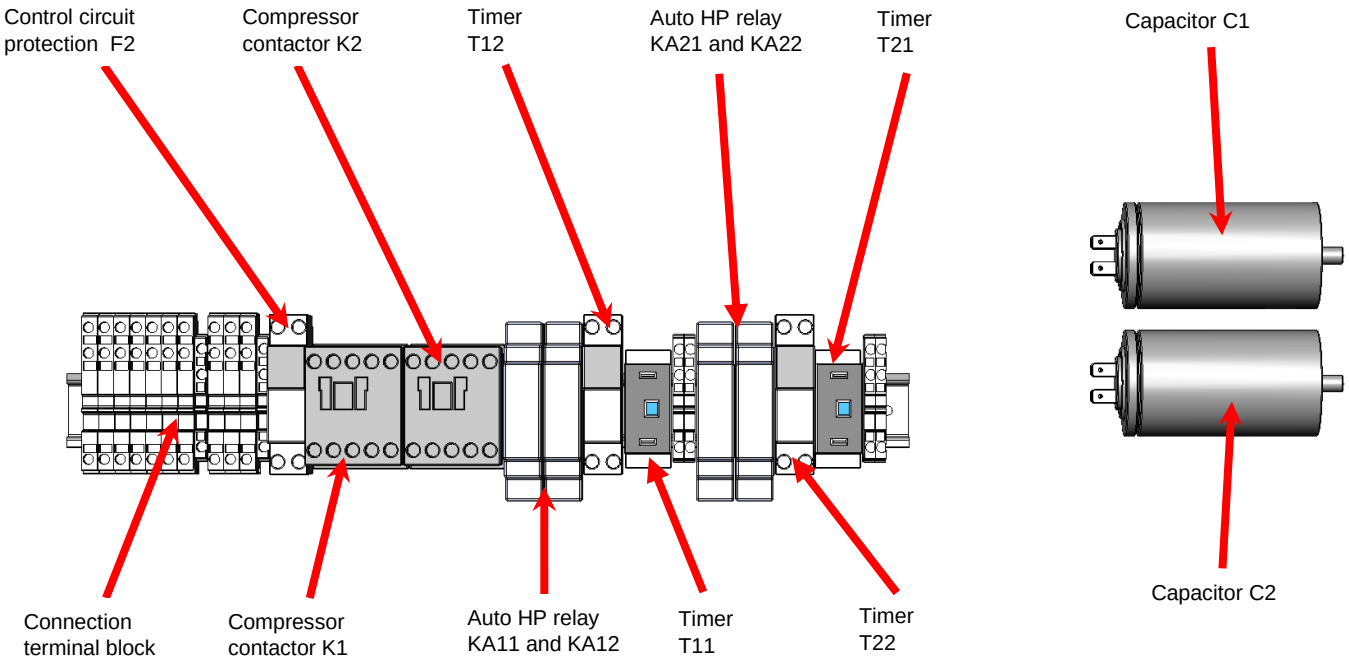
CUs are supplied with a 6A fuse (see F2 in the wiring diagram paragraph 17). It must therefore be changed if the IU has the "electrical heating" function, the fuse to be installed is **supplied with the IU** (in its electrical box). To check the value of the fuse, refer to the table below.

Control fuse protection – F2						
Size FW	209	0914	0918	214	1418	218
IU w/o electrical heating	6A	6A	6A	6A	6A	6A
IU with elec heating : KI + KI	ND	10A	10A	16A	16A	16A
IU with elec heating : KI + GI	16A	16A	16A	25A	25A	25A
IU with elec heating : GI + KI	16A	25A	25A	25A	25A	25A
IU with elec heating: GI + GI	25A	25A	25A	25A	25A	25A

The fuse must be type aM if the IU is without electric heating and gG if the IU is with electric heating.

The final choice of power supply cable is the responsibility of the installer.

Below is an example of a CU electrical box:



Timers T1 and T2 are present when the condensing unit is delivered with the LP switch option. These times are factory set and this setting must be checked:

→ Timer T1 is the anti-short cycle timer. It must be set open ¼ turned clockwise.

→ The timer T2 is the one that allows the shunt of the LP at startup. It must be set first cursor on 20M and second cursor on 5. (Red light fixed in action then flashing when deactivated).

It is necessary to connect the CU and the IU according to the electrical diagram (see paragraph 17) and the interconnection diagram supplied with the indoor unit.

The installer checks the correct positioning of the switches of his indoor unit. (Refer to the IU documentation).

11 INSTALLATION : REFRIGERANT GAS CHARGE

The intervention must be carried out by a person with the **appropriate skills and authorizations**. In particular, he/she must have the **certificate of aptitude for handling refrigerants**. In addition, the company employing this person must have the **certificate of capacity**.

When the connections are made, it is necessary to **check the tightness by always keeping the flare valves closed**:

- Pressurizing dehydrated nitrogen (30 bar maximum) and monitoring pressure maintenance. Check sensitive areas using a leak detector.
- Vacuum: obtain a pressure of 10^{-4} bar and maintain it for 1 hour. Then check the vacuum resistance.

Once the tightness has been verified, the flare valves must be opened. The CUs are delivered loaded for a distance of 4 meters of piping. If the lengths are greater, the charge must be completed with the compressor running, using a load balance, while controlling overheating and **respecting the operating ranges** **paragraph 15****.**

Size FW	07	09	14	18	24	36
Basic load	650 g	750 g	850 g	900 g	950 g	1 150 g
Additional load	32 g / meter			55 g / meter		

The final load of the installation must be reported by the installer on the condensing unit.

12 USE : UNIT START-UP

This paragraph concerns both the first start-up and starts following an intervention.



The intervention must be carried out by a person with the **appropriate skills and authorizations**. In particular, he/she must have the **certificate of aptitude for handling refrigerants**. In addition, the company employing this person must have the **certificate of capacity**

Before starting, it is necessary, among other things, to:

- Check that the CU and IU are correctly mounted.
- Check that the electrical connections are all tight, with proper earthing.
- Check that the voltage of the power supply at terminals L and N of the CU is compliant.
- Check that the refrigeration connections are compliant, with proper insulation and protection.
- Check that the nuts are tight and without gas leaks.
- Check that the flare valves are open.
- Check that the CU is well supplied with water and at the correct temperature.
- Check the general condition of the installation and components.

The installation is started via the IU. When the IU is in cooling demand, it sends a start order to the CU compressor. The compressor must therefore start operating and circulate the refrigerant. There is a waiting time of up to 8 minutes for the CUs between a cooling demand made via the remote control and the compressor start.

The CU is equipped with the following security features:

- HP pressure switch: it stops the compressor when the pressure is higher than 22 bar. Its reset is automatic (turn off the UI and turn it back on.
- LP pressure switch: it stops the compressor when the pressure is less than 0.5 bar. When the pressure rises above 1.5 bar, the pressure switch closes automatically and the compressor restarts after a delay of 5 minutes (T1). Note that the T2 time delay allows this safety to be bypassed during the first 5 minutes of compressor startup.



It is important to **carry out complete operational tests during commissioning and to record the measurements on the commissioning sheet** (provided with this documentation). The same tests must also be carried out during the maintenance phases and any troubleshooting interventions.

A complete test must include at least the following measures:

- Temperature measurement of HP, LP, compressor discharge, liquid, compressor suction.
- Temperature measurement of the water in- and outlet.
- Measurement of the current absorbed by the compressor and the IU.



The commissioning form must be completed and returned. Receipt by LTB of this correctly completed form conditions the validation of the guarantee.

13 USE : COMMON DEFAULTS

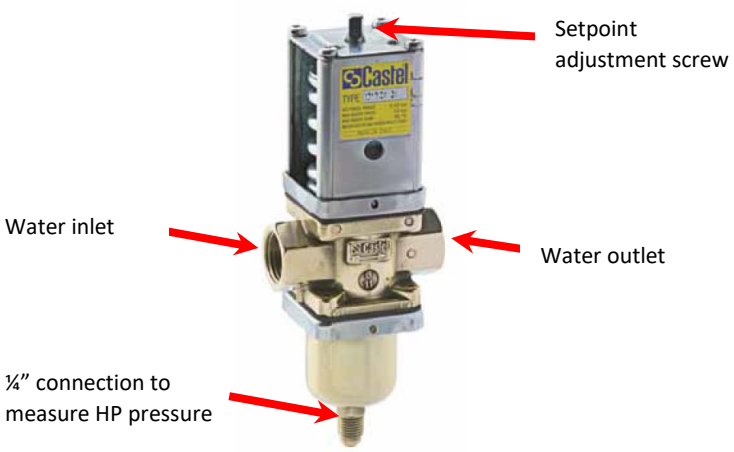
Ci-dessous un tableau regroupant une liste de défauts fréquents :

Default	**Probable causes**	**Action to be taken**
The installation does not turn on	No power supply	Check voltage
		Check position of the disconnecting switch
	Bad wiring	Check wiring
The IU is on but does not start	Installation in security mode	Check error codes of the IU
		Check the securities of the CU
	Bad wiring	Check wiring
The IU is in cooling demand but the compressor does not start.	Bad wiring	Check wiring
	Installation in security mode	Check the securities of the CU
	The anti-short-cycle delay has not expired yet	Wait 3 to 8 minutes, see paragraph 10
The installation starts but pressures are abnormal	Unadapted refrigerant load	Remove or add fluid
	Gas leakage	Check airtightness
	Water flow too low	Check water flow (measure, DT water)
	Unadapted water temperature	Check water temperature
	Non-tight compressor valves	Change compressor
	Dirty filter	Check condition of the filter

The warranty does not cover the damage caused in case of incorrect implementation or -use.

14 USE: ADJUSTMENT OF THE PRESSOSTATIC WATER VALVE

The pressostatic water valves regulate the flow of water passing through the condenser according to the HP pressure measured in the high-pressure part of the refrigeration circuit, in order to maintain the HP pressure constant, at its set value.



If the HP pressure increases, then the valve will open and the water flow will increase. The HP pressure will then return to its set value. If the valve is already open to the maximum, then the HP pressure will increase.

If the HP pressure decreases, then the valve will close and the water flow will decrease. The HP pressure will then return to its set value. The valve must close completely when the compressor stops.

The pressostatic water valve is factory set for a water pressure of approximately 4 bar. It may be necessary to adjust the pressure valve:

- If the water network pressure is higher or lower than 4 bar,
- When changing the pressostatic valve with a new valve,
- In the event that the pressure switch valve has been out of adjustment,
- If the CU is installed in a room where the temperature is relatively high.

The setpoint setting can be changed by turning the adjustment screw located on the top of the valve. Adjustment can be made using a screwdriver or a valve adjustment ratchet wrench. Turning the screw clockwise reduces the setpoint value.

The correct setting of the pressostatic valve is that which leads to the following condensing temperatures:

	FW 07 Q6	FW 09 Q6	FW 14 Q6	FW 18 Q6	FW 24 Q6	FW 36 Q6
Condensing temperature	+60°C	+60°C	+65°C	+55°C	+53°C	+60°C

These values provide the nominal performance of the CU.

An incorrectly adjusted pressostatic water valve can result in excessive water consumption.

15 USE : OPERATING LIMITS

To preserve the integrity of the CU, make sure that the **water inlet temperature** of the unit is always between the values given in the following table:

Minimum water inlet temperature	+5°C
Maximum water inlet temperature	+50°C

In order to preserve the integrity of the GC, it is necessary to ensure that the **external ambient temperature when the Cu is operating** is always between the values given in the following table:

Minimum ambient temperature – operating	+5°C
Maximum ambient temperature – operating	+45°C

In order to preserve the integrity of the GC, it is necessary to ensure that the **external ambient temperature when the CU is stopped** is always between the values given in the following table:

Minimum ambient temperature – when stopped	-25°C
Maximum ambient temperature – when stopped	+60°C

In order to preserve the integrity of the CU, it is necessary to ensure that the **LP temperature** of the CU is always between the values given in the following table:

Minimum LP temperature	-10°C
Maximum LP temperature	+10°C

In order to preserve the integrity of the CU, it is necessary to ensure that the **HP temperature** of the CU is always between the values given in the following table:

Minimum HP temperature	+35°C
Maximum HP temperature	+70°C

16 MAINTENANCE

The maintenance must be carried out by a person with the appropriate skills and qualifications.

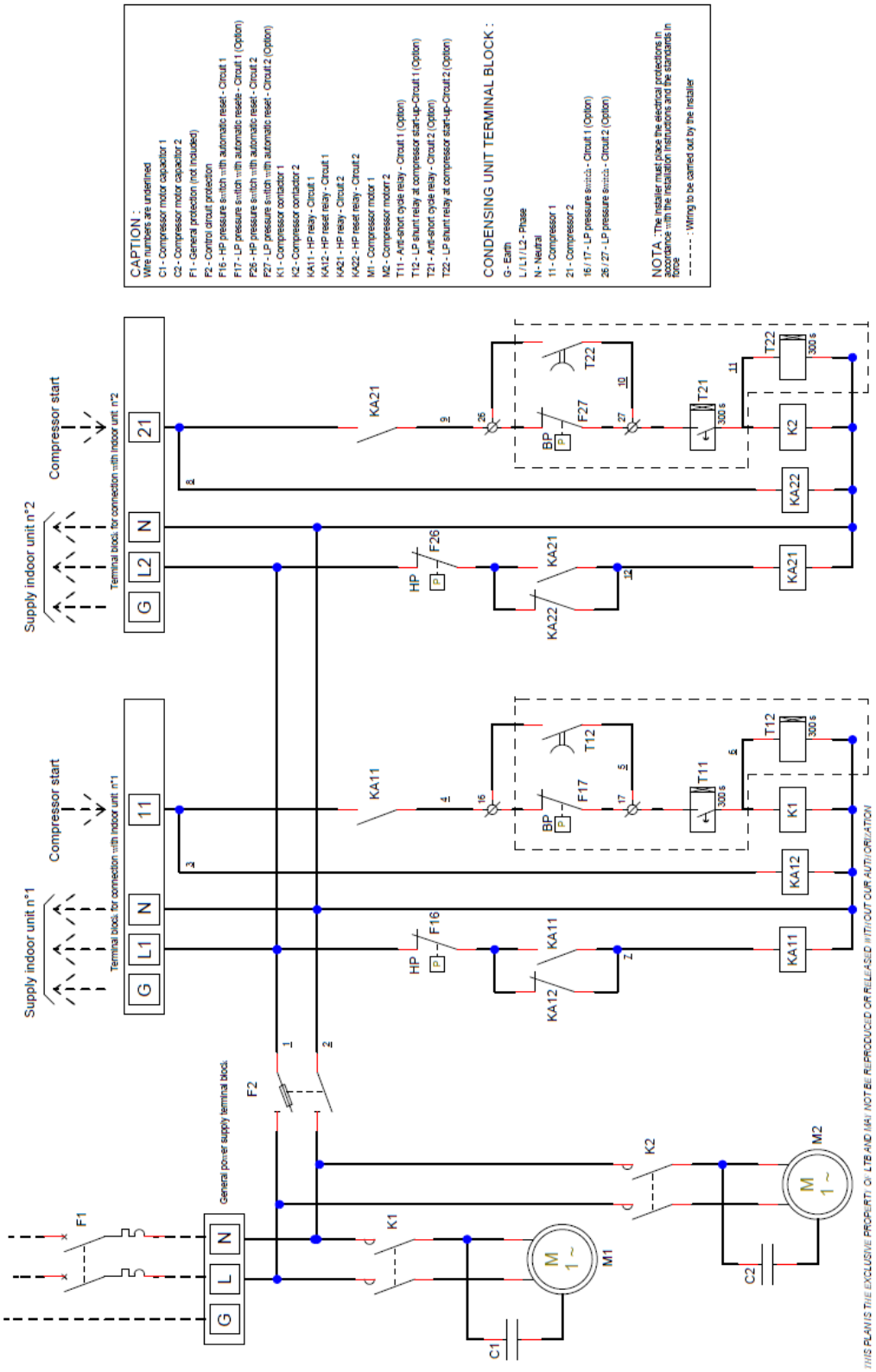
The maintenance frequencies are to be adapted according to the environment and the context of the use of the split sytem, with at least **one maintenance every year**.

During the maintenance, among other things, it is necessary to:

- Check the condition of the UI air filter and the GC water filter, clean or change them if necessary.
- Check that the HP pressure switch cuts and resets. It is possible to cause an HP cut-off by closing the water supply to the CU.
- Check that the LP pressure switch (option) cuts and resets. It is possible to cause an LP cut-off by closing the GC suction flare valve.
- Check that there is no refrigerant leak.
- Check that there is no premature wear of the various components.
- Check that the electrical connections are tight and that there is no abnormal heating of the electrical cables.
- Check the flow of the IU condensate pan and clean if necessary.
- Check the condition of the refrigeration connections and that the insulation and protection are compliant.
- Check that the pressure switch valve is not scaled and check its proper operation. In particular, it is necessary to check that it cuts off the water flow when the compressor is stopped.
- Check the condition of the capacitor. The capacitor is class C = 3000 operating hours. Change it if necessary.
- Check the operation of the split by taking the appropriate readings (see commissioning sheet).

All interventions on the refrigerant circuit must comply with the rules of practice and regulations in force. In particular, it is necessary to recover the refrigerant before opening the circuit and fill the circuit with dehydrated nitrogen before any solder.

17 ELECTRICAL DRAWING



18 COMMISSIONING FORM

Name intervener	
Date of intervention	

CU reference and serial number	Reference :	SN :
Refrigerant		
CU supply voltage		
Circuit breaker characteristic at the head of the installation	Cut : A	Type :
Control protection fuse value		
Water filter presence	YES / NO	

	Circuit 1 :		Circuit 2 :	
Compressor reference and serial number	Ref. :	SN :	Ref. :	SN :
IU reference and serial number	Ref. :	SN :	Ref. :	SN :
Liquid- and suction line diameter	Liquid :	Suction :	Liquid :	Suction :
Length refrigerant tube connections				
Height refrigerant tube connections				
HP pressure switch test	Cut : bar	Reset : OK / NOK	Cut : bar	Reset : OK / NOK
Final load of the installation				
Compressor current measure				
IU current measure				
HP measure				
LP measure				
Suction measure				
Discharge measure				
Liquid measure				
Water inlet temperature measure				
Water outlet temperaure measure				
Air inlet temperature and RH measure				
Air outlet temperature measure				

A copy of the commissioning sheet (photo, scan, etc.) must be sent to LTB (sav@ltb.fr) for coverage of the machine warranty under the LTB general sales conditions.

19 WARRANTY

Our warranty is 2 years for condensing units and indoor units.

It remains 1 year for spare parts.

Our warranty covers parts and repairs in our factory (see General Terms and Conditions of Sale, WARRANTY article on http://www.ltb.fr). Our after-sales service procedure for the parts warranty is as follows :

• Order by the customer of the valued spare part, specifying that it is a request under warranty.

• Opening of an after-sales service file by LTB and communication to the customer of the after-sales service file number and a pre-filled return slip.

• Delivery of the spare part by LTB. The corresponding delivery note will be the subject of the issue of an invoice at the end of the month.

• Return by the customer of the defective part accompanied by the return slip (which specifies the after-sales service file number).

• Expertise of the part to decide on the warranty coverage.

• If the warranty is accepted, credit note issued by LTB for the invoiced amount (spare part and shipping).

We also carry out machine repairs under warranty

(Cases of repairs or diagnostics too complex to be carried out on site).

You return the defective machine to us, we analyze the defects and we decide on the warranty coverage.

20 END OF LIFE RECYCLING

Disposal must be carried out by a person with the appropriate skills and authorizations.

The applicable standard in Europe is the NF EN378 standard. Paragraph 6 EN 378-4 specifies the procedure to follow.

The installation contains refrigerant oil as well as refrigerant. These products present a risk of environmental pollution and fire or even explosion. They must therefore be disposed of in accordance with the regulations in force.

The refrigerant can be regenerated or discarded. An analysis of this determines the procedure to follow.

Oil that cannot be reprocessed must be stored in an appropriate separate container and then disposed of according to current regulations.

The CU must be the subject of selective collection with a view to its recycling or revalorization. You must contact the distributor if necessary.