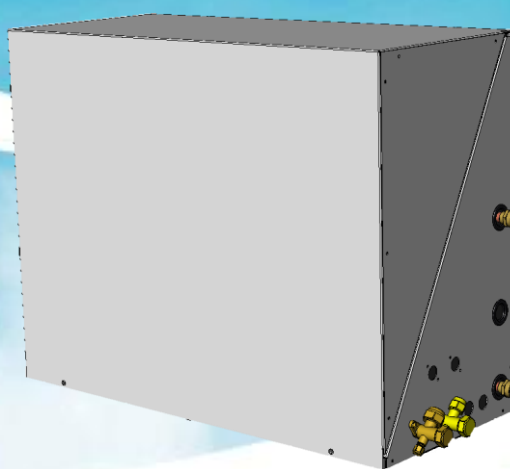


INSTALLATION, OPERATION AND MAINTENANCE MANUAL



FW RANGE – Water cooled condensing units

R513A

Cooling only

Monosplit

Three-phase

FW18QY – FW24QY – FW36QY – FW40QY – FW50QY

Le spécialiste de la climatisation sans unité extérieure



LTB
Air Conditioning

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1 INTRODUCTION

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

- FW18QY (model code WQG104).
- FW24QY (model code WQG105).
- FW36QY (model code WQG106).
- FW40QY (model code WQG107).
- FW50QY (model code WQG108).

A water condensing split system consists of:

- An indoor unit (IU) which can be a wall mount unit, ceiling cassette, ducted indoor unit or floor mounted/ceiling console.
- A condensing unit (CU) connected to the water network (town water, water loop).

The fitting must be carried out by a person with the right competences and legal capacities. 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.

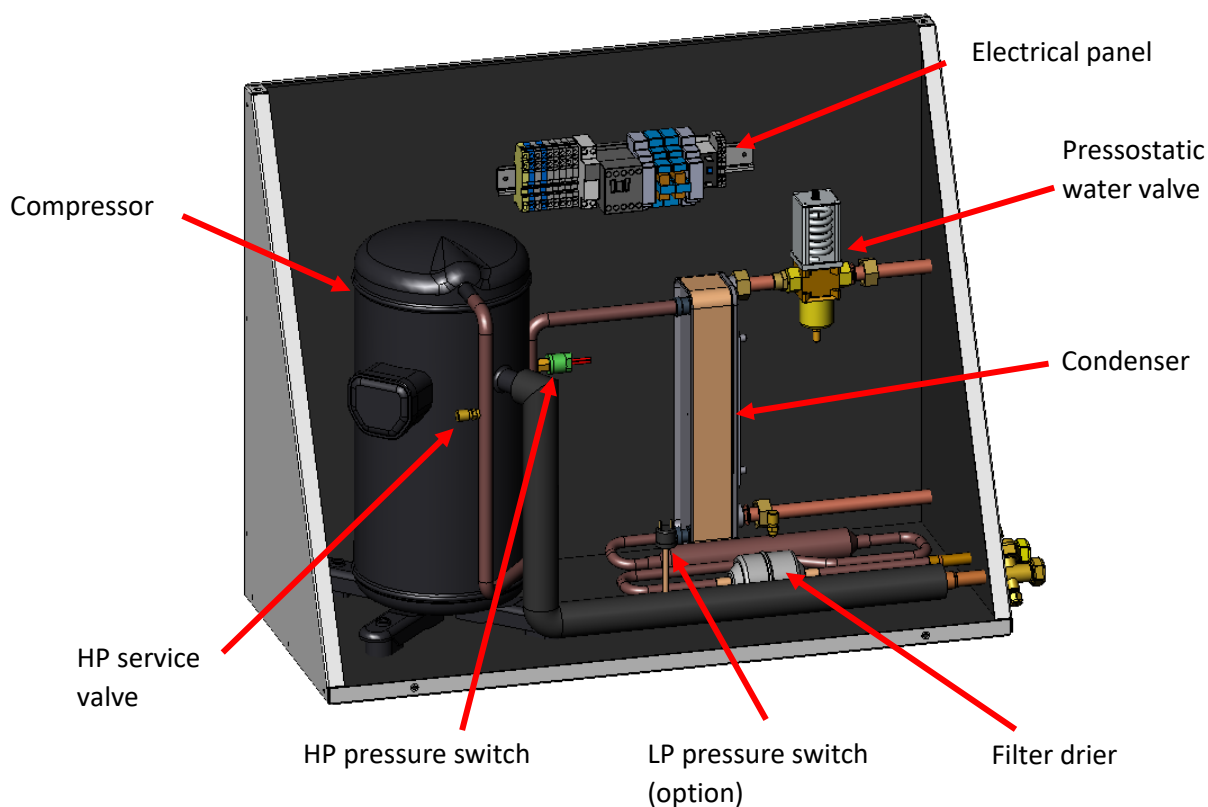
The machine must not be carried or placed upside-down. It must be stocked inside and perfectly sheltered from rain and snow, etc. Weather variations (high or low temperatures) must not damage the unit. Very high temperatures (from 60°C) may damage certain plastic parts and cause permanent damage. Moreover,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

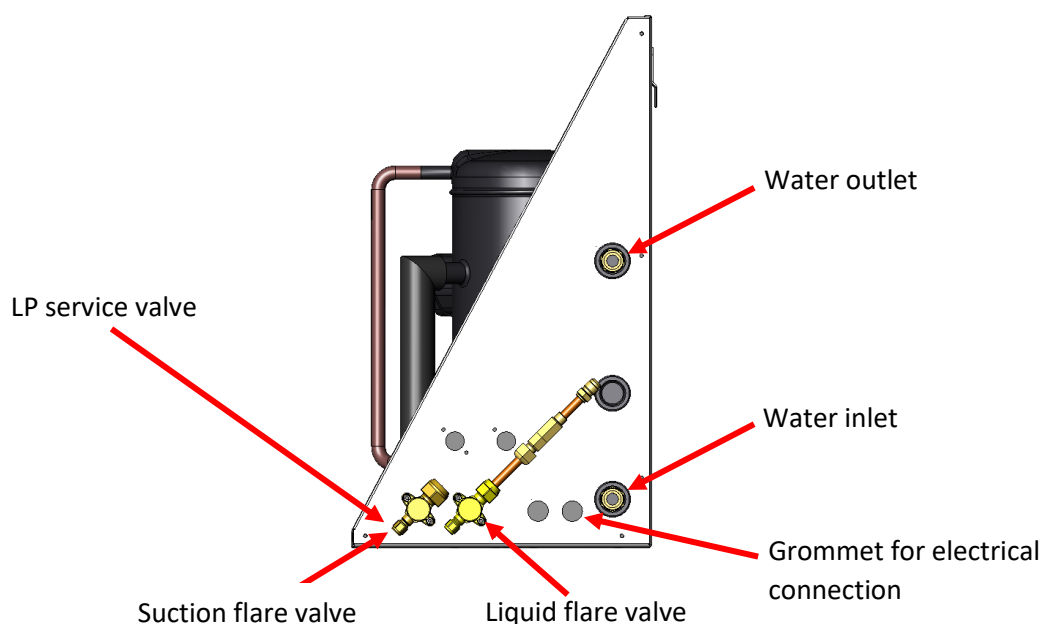
3 DESCRIPTION OF THE GOODS

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):

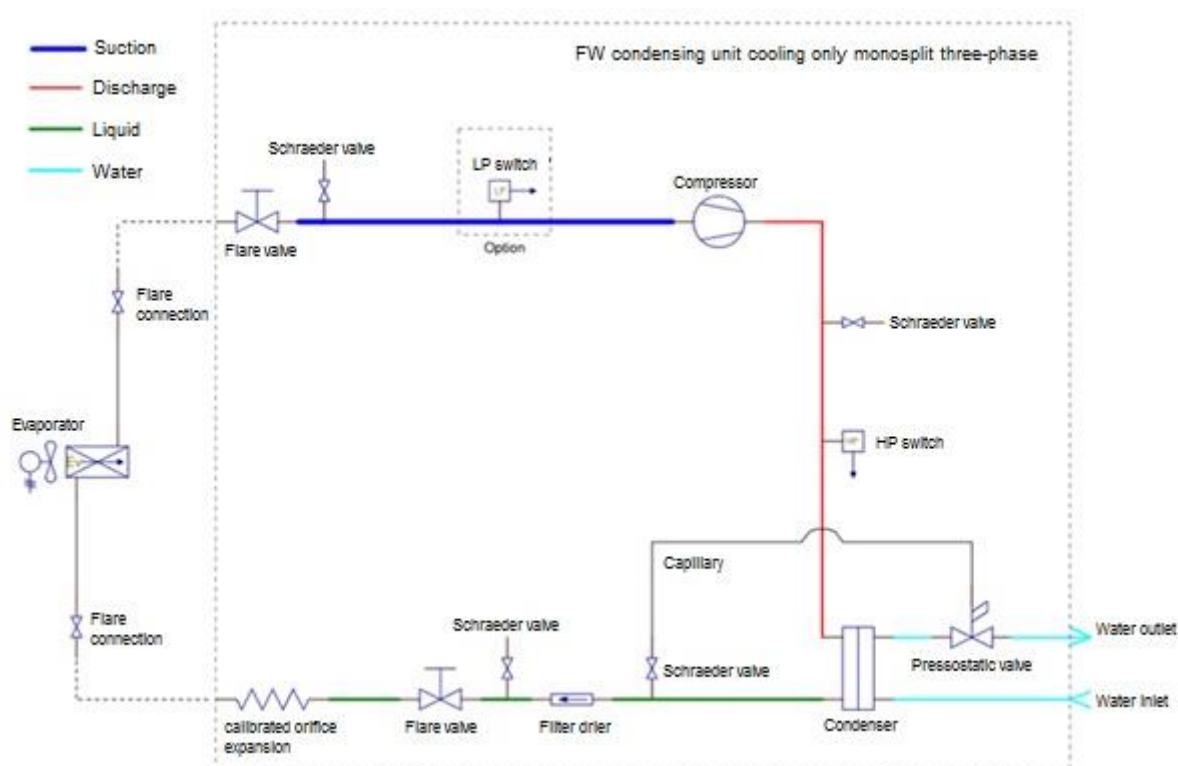
		WITHOUT LP switch	WITH LP switch
Enhance noise insulation	WITHOUT	AH	BH
	WITH	CH	DH

Example: WQG106DH = FW36Q6 with the options « LP switch » and « Enhanced noise insulation ».

For special applications, a GC model can be declined with a special option pack. The last digit of the option pack can for example be "N", which corresponds to a version without a pressure-activated water valve.

Example: WQG106DN = FW36Q6 with the options "BP pressure switch" + "Reinforced sound insulation" but without the pressostatic water valve.

5 FLUIDIC DIAGRAM



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 OF THE UNITS

This section explains how to choose the location to install and set up the CU.

Concerning the IU, please refer to its own documentation (supplied with the IU).

Choice of location:

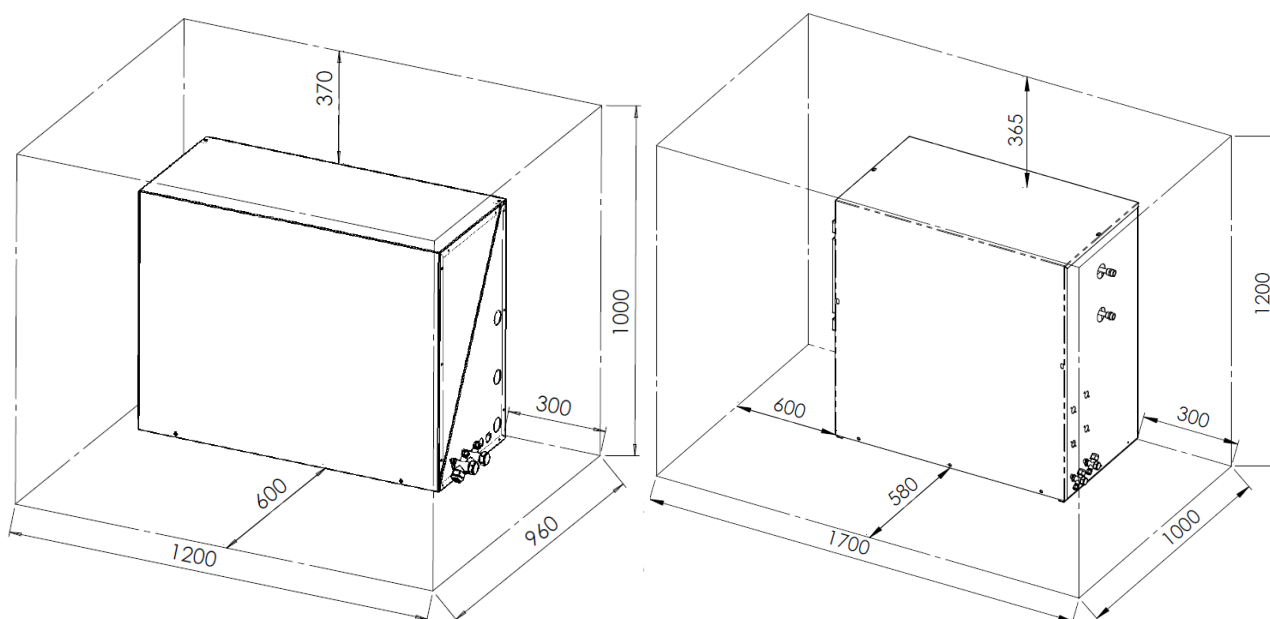
Make sure the support on which the CU is installed is solid. CUs must be installed in a non-aggressive environment. It is therefore necessary to avoid places with aggressive vapours, splashes of liquid, a high dust, a marine atmosphere.



Care must be taken to ensure that the GC remains **accessible** for maintenance and **respect the service spaces** that are defined for:

- Easy access to the CU.
- Easy access to the flared valves and water connections.
- Removing the cover.
- Reading the ID-plate.
- Fitting of accessories (water filter, water flow meter).

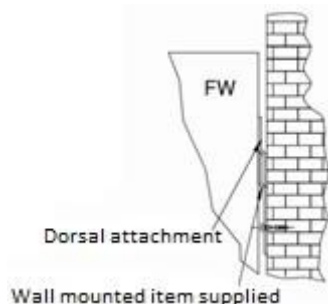
The service spaces are as follows:



Setting up :

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: installation of the GC (on feet, brackets, etc.) and fixing of the CU on the bottom.

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.

7 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 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.

Some IUs do not have the same connection diameter as the CU. You must then install an adapter on the CU or IU. **This is delivered in a separate cardboard box.**

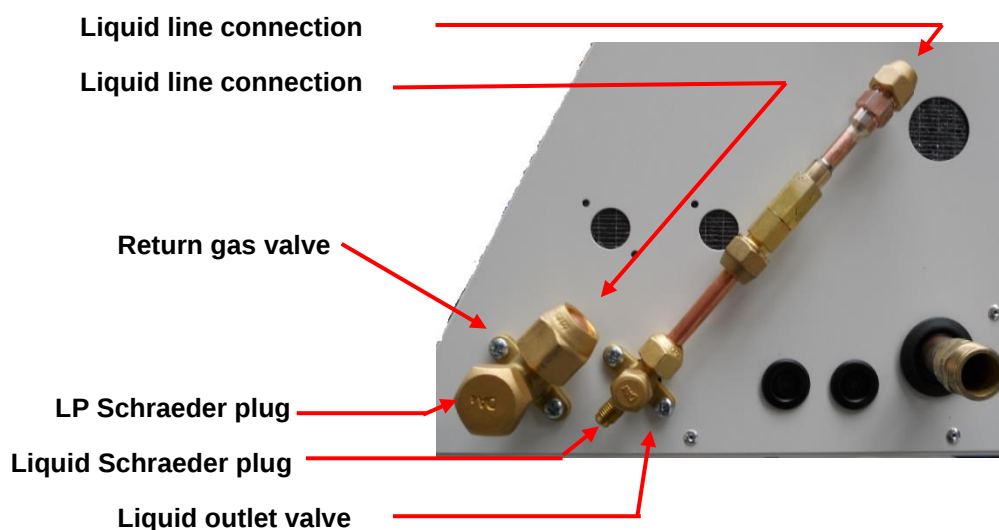
The realization of flares for the link on the flare connections should be neat. The presence of burr, crack, a too small or too large flaring surface may cause leakage.



Flared valves must be kept closed during connection.

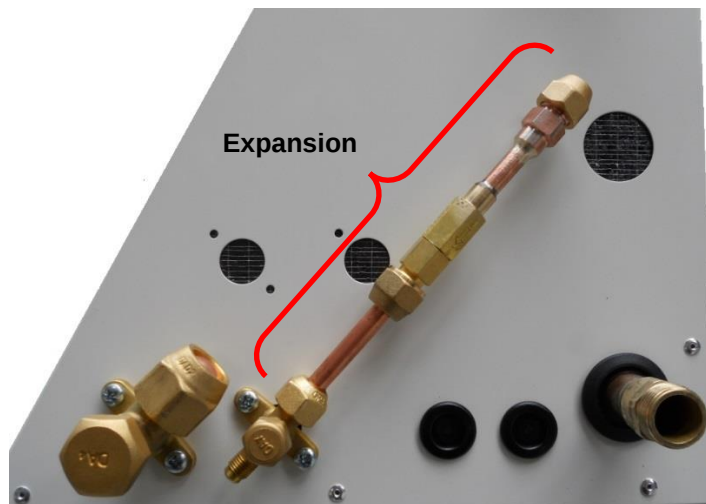
The tightening torques for the flared valves are:

Diameter ["]	1/4	3/8	1/2	5/8	3/4	7/8
Torque [N/m]	14 to 18	33 to 42	50 to 62	63 to 77	81 to 99	110 to 130



8 INSTALLATION : EXPANSION VALVE CONNECTION

The expansion is made by a calibrated brass orifice. This orifice is mounted in a fitting, which is delivered on the CU liquid flare valve:



The arrow on the connector containing the calibrated orifice indicates the unexpanded direction. This arrow must go from the IU to the CU:



Arrow indicating the direction of the IU towards the CU

The expansion's orifice must be mounted as shown below:



Expansion orifice

Arrow indicating the direction of the IU towards the CU

9 INSTALLATION : HYDRAULIC CONNECTION

The units are delivered with 2 flexible hoses + washers to be easily connected to the water network.

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 frost-free
- 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 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 supplied with town water with a temperature of +15°C and a pressure of 4 bar, with a wide tolerance around these values.

The rated water flows (e.g. to provide the rated cooling capacity) of CUs are summarized in the tables below:

Rated water flow for a water inlet temperature of +15°C					
Size FW	18	24	36	40	50
Water flow [L/h]	150	230	270	270	360

Rated water flow for a water inlet temperature of +30°C					
Size FW	18	24	36	40	50
Water flow [L/h]	250	460	510	510	600

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 cable when IU is without electrical heating					
Size FW	18	24	36	40	50
Section [mm ²]	5G2.5mm ²	5G2.5mm ²	5G2.5mm ²	5G2.5mm ²	5G4mm ²
Max. current [A]	7.0	8.0	12.0	12.5	18.0

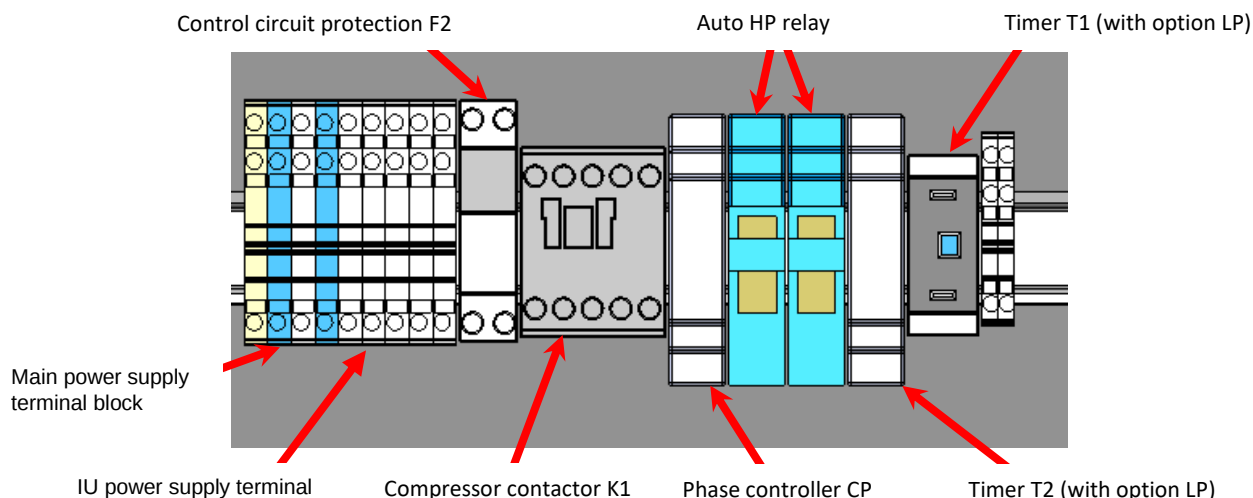
CU power cable when IU is a cassette with electrical heating e					
Size FW	18	24	36	40	50
Section [mm ²]	5G2.5mm ²	5G2.5mm ²	5G2.5mm ²	5G2.5mm ²	5G2.5mm ²
Max. current [A] (cooling mode)	6.5	7.0	9.0	9.5	12.5
Max. current [A] (heating mode)	6.5	9.5	9.5	9.5	9.5

CU power cable when IU is a ducted indoor unit with electrical heating					
Size FW	18	24	36	40	50
Section [mm ²]	5G2.5mm ²	5G6mm ²	5G6mm ²	5G6mm ²	5G6mm ²
Max. current [A] (cooling mode)	7.0	8.0	12.0	12.5	18.0
Max. current [A] (heating mode)	10.5	20.0	29.5	29.5	33.5

The fuse chosen for the installation at the power supply board must be of the motor support type (i.g. D-curve).

CUs are supplied with a 6A fuse (see F2 in the [wiring diagram paragraph 18](#)). 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). The fuse must be of the motor support type (i.g. AM).

Below an example of a CU's 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 $\frac{1}{4}$ 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).

The CU and the IU must be connected according to the wiring diagram ([see paragraph 18](#)) 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 : FILLING OF REFRIGERATING GAS



The intervention must be carried out by a person with the **appropriate skills and qualifications**. In particular, it must have the **certificate of suitability for the handling of refrigerants**. In addition, the company employing this person must have a **certificate of ability**.

Once the connections have been made, airtightness must be checked keeping the **flared valves closed**:

- Pressurizing dehydrated nitrogen and pressure maintenance control. Check sensitive areas with a leak detector.
- Vacuum drawing: obtain a pressure of 10^{-4} bar and maintain it for 1 hour. Then check the vacuum resistance.

Once the airtightness is checked, the flare valves must be opened. CUs are delivered loaded for a distance of 4 meters of piping. If the lengths are higher, the load must be completed, compressor running, using a load balance, while controlling the overheating and **respecting the [operating ranges in paragraph 15](#)**.

Size FW	18	24	36	40	50
Basic load	900 g	950 g	1 000 g	1 000 g	1 050 g
Additional load	55 g / meter				

The refrigerant is R513A.

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

12 USE : UNIT START-UP

This paragraph applies to both the first start-up and the post-intervention startups.



The intervention must be carried out by a person with the **appropriate skills and qualifications**. In particular, it must have the **certificate of suitability for the handling of refrigerants**. In addition, the company employing this person must have a **certificate of ability**.

Before starting up the unit, you must:

- Check the electrical connections are well tightened and that fuse holder F2 is triggered.
- Check the CU is well evened.
- Check the IU is well evened and that the condensate drain is well connected.
- Check that the power supply voltage at terminals L and N of the CU is correct.
- Check that the flare valves are open.
- Check that the CU is well supplied with water.

The **start of the installation is done via the IU**. When the IU is in cooling demand, it sends the starting instructions to the CU's compressor. The compressor will start and will circulate the refrigerant.

There is a waiting time of up to 3 minutes for CUs without the LP pressure switch option and up to 8 minutes for CUs with the LP pressure switch option 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 (option): 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 starts again after a 5-minute short cycle time delay (T1). It should be noted that the T2 delay allows this safety to be shunted during the first 5 minutes of compressor start-up.



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. The receipt by LTB of this correctly completed form determines the warranty validation.

13 USE : COMMON PROBLEMS

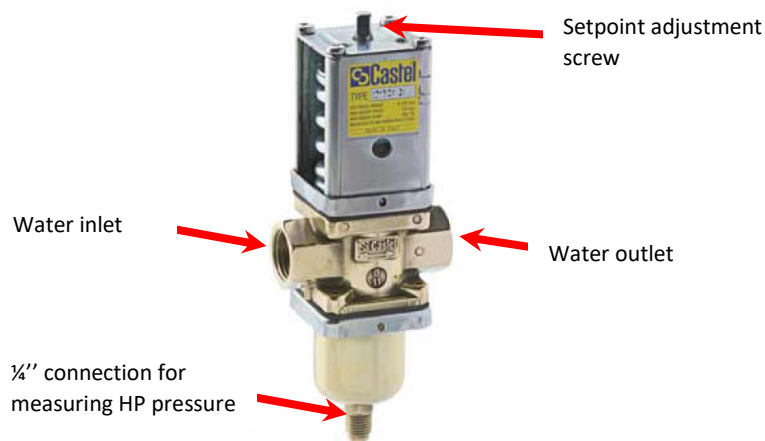
Ci-dessous un tableau regroupant une liste de défauts fréquents :

Default	Probable causes	Action to be taken
The installation does not turn on	No power supply	Check voltage
	Bad wiring	Check position of the disconnecting switch
The IU is on but does not start	Installation in security mode	Check wiring
	Bad wiring	Check error codes of the IU
The IU is in cooling demand but the compressor does not start. (The voltage is 230V on terminal 1 but the compressor does not start.)	Installation in security mode	Check the securities of the CU
	Bad wiring	Check wiring
	The anti-short-cycle delay has not expired yet	Check the HP, LP securities of the CU
The installation starts but pressures are abnormal	Unadapted refrigerant load	Check the phase controller
	Gas leakage	Wait 3 to 8 minutes, see paragraph 10
	Water flow too low	Remove or add fluid
	Unadapted water temperature	Check airtightness
	Non-tight compressor valves	Check water flow (measure, DT water)
	Dirty filter	Check water temperature
		Change compressor
		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 water flow passing through the condenser according to the pressure measured in the high pressure line of the refrigeration circuit (= HP pressure), 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 setpoint. If the valve is already fully open, 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 setpoint. The valve must close completely when the compressor stops.

The pressostatic water valve is set at the factory. Its setting should normally not be changed. However, it may be necessary to adjust the pressostatic valve, for example:

- When changing the pressostatic valve for a new valve,
- In case the pressostatic valve has been disrupted,
- 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. The adjustment can be made using a screwdriver or a valve adjustment ratchet wrench. Turning the screw clockwise decreases the setpoint.

In case the CU is installed in a room with a high temperature, it is possible that the ambient temperature around the CU is high enough that, even when stopped, the valve is partially open. In these conditions, the valve set point must be increased to allow the valve to close when the compressor stops.

A poorly adjusted pressostatic water valve may cause 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	+43°C

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

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

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

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

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

Minimum HP temperature	+35°C
Maximum HP temperature	+60°C

16 USE : PHASE CONTROLLER

The CU's compressor is a Scroll type. The compression mode allows only one rotation direction, which is determined by the phase sequence feeding the compressor.

The phase controller is a security that prevents the compressor from starting if the phases are not in the right order. It also prevents the compressor from starting if a phase is missing.

The phase controller has two LEDs:

- Green LED : Lights if the phase controller is powered.
- Yellow LED : Lights if the phases are in the right order.

Both phase controller LEDs must be on to allow startup.



17 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 system, with at least **one maintenance every year**.

During the maintenance, it is necessary to:

- Check the filter condition of the IU and CU, clean and change them if needed.
- Check the functioning of the split-system by taking measurements (see commissioning form).
- Check that the HP pressure switch cuts and resets. It is possible to cause an HP shutdown by closing the CU water supply.
- Check that the LP pressure switch (option) cuts and resets. It is possible to cause a LP shutdown by closing CU suction flare valve.
- Check for refrigerant leaks.
- Check for no premature wear of the various components.
- Check that the electrical connections are well tightened.
- Check that there is no overheating of electrical cables.
- Check out correct evacuation from the IU to the condensate tray and clean if necessary.
- Check that the pressostatic water valve is not scaled and check that it operates correctly. In particular, it must be checked that it cuts the water flow when the compressor is stopped.

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.

[illegible]

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19 COMMISSIONING FORM

Name intervener		
Date of intervention		
CU reference and serial number	Reference :	SN :
Compressor reference and serial number	Reference :	SN :
IU reference and serial number	Reference :	SN :
Refrigerant		
Liquid- and suction line diameter	Liquid :	Suction:
Length refrigerant tube connections		
Height refrigerant tube connections		
Presence of water filter	YES	/ NO
Circuit breaker characteristic at the head of the installation	Cut : A	Type:
Control protection fuse value		
HP pressure switch test	Cut : bar	Reset : OK / NOK
LP pressure switch test	Cut : bar	Reset : OK / NOK
Final load of the installation		
CU supply voltage		
Compressor current measure		
IU current measure		
HP measure		
LP measure		
Suction measure		
Discharge measure		
Liquid measure		
Water inlet temperature measure		
Water outlet temperature 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.

20 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.

If necessary, we restore it to working order and return it to you free of charge in the case of warranty coverage.

21 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.