

# QUICK START-UP GUIDE



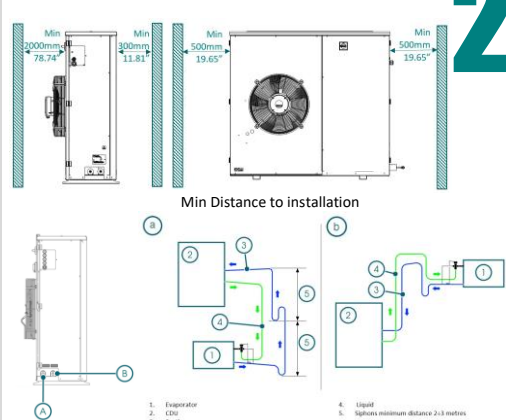
**CO2ONE UL VERSION Condensing unit and split system**



**FOR CONDENSING UNIT AND SPLIT SYSTEM HANDLING AND INSTALLATION OPERATIONS, CAREFULLY READ THE MANUALS.**

# 1

## INSTALLATION



Piping rules between condensing unit and evaporator

- CAUTION: The nominal diameters of the refrigerant lines (suction line and liquid line) shown in the refrigeration diagram are calculated for a **MAXIMUM LENGTH** of 98ft (30m).
- CAUTION: Slowly release the holding charge through ports RSS RSLIQ

Braze connection only:

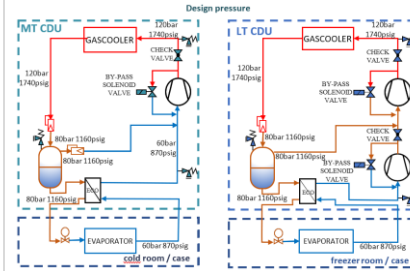


1-Cut the cap 2- Prepare for brazing 3-Braze the line

# 2

## DESIGN PRESSURE LINE COMPONENTS

Line components like piping, fittings, valves, evaporators, etc, must follow the rules on the tables below



Line	CDU design pressure	CDU Safety valves set	Add Lines components design pressure
Liquid line	80bar 1160psig	80bar 1160psig	Only ≥ 80bar 1160psig
Suction line	60bar 870psig	60bar 870psig	Only ≥ 45bar 652psig

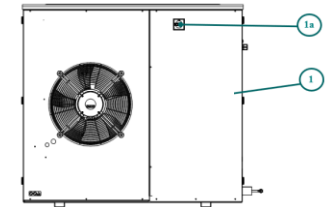
Line	CDU design pressure	CDU Safety valves set	Add Safety valves set
Liquid line	80bar 1160psig	80bar 1160psig	No
Suction line	60bar 870psig	60bar 870psig	Yes, with design pressure < 60 bar 870psig

\* The CDU gives the possibility to also protect the line components please check the guide of safety valves to know the limit

# 3

## PRESSURE TEST

Strength and tightness test must use inert gas, such as nitrogen, in the pipework and connections used in the installed site. Open the compressor door (1) with the main switch(1a) in OFF position.



Isolate the condensing unit by closing R1 and R2 ball valves so that only the suction line, liquid line and the evaporator are tested. At the same time open the RSS suction service valve and RSLIQ liquid service valve to remove the risk of over pressure inside the condensing unit during the tests.



CAUTION: Strength and tightness test must be performed according to the regulations in the country of installation.

To avoid damaging the components, do not exceed the pressure test value of 1,1 x PS where PS is the design pressure of the specific circuit.

## POWER SUPPLY CONNECTION

The first electrical operation to be performed on the machine, even before energizing it, is wiring the various devices that compose it. Make sure to follow the electrical diagram of the component.



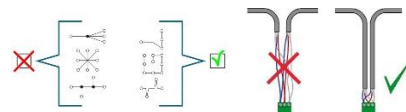
CAUTION: When laying cables, avoid common paths between the power cables and signal cables (such as network cables, 0/10V, etc.).

# 4

# 5

## NETWORK CONNECTION

For RS485 serial line wiring it is recommended to use BELDEN 8762 AWG20 type shielded cable and to keep the length of the line as short as possible (RS485 max 3280ft/1000m). Do not create bifurcations on the line or star connections.



In case of split system follow also step 17

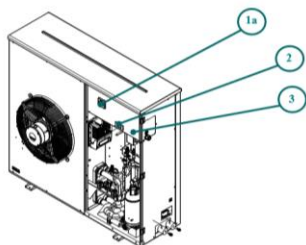
## PREPARATION FOR START-UP

Before having the complete system running make sure that all electronic thermostatic valves or the users are correctly programmed.

To start the system it is necessary to follow this sequence of operations:

- Set the disconnecter (1a) of the electrical panel (3) to ON to energize the condensing unit;
- Set the electronic control to ON via the display (2) and carry out the operations indicated.

In case of split system follow also step 18



# 6

# 7

## DISPLAY



# 8

BUTTONS		ASSOCIATED FUNCTIONS
	ALARM	Shows the list of active alarms and access to the alarm logs.
	PRG	Enters the main menu.
	BACK	Return to the previous page.
	UP	Switches to the upper value in a list or increases the value of a variable highlighted by the cursor.
	DOWN	Switches to the lower value in a list or decreases the value of a variable highlighted by the cursor.
	ENTER	Enters the selected sub-menus or confirm the set values.

## LED INDICATORS MANAGEMENT

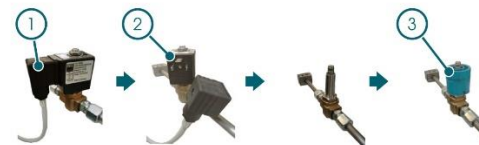
BUTTONS		ASSOCIATED FUNCTIONS
Red		Flashing: Active alarms not seen. Fixed: Alarms seen.
Yellow		Hecu CO2 Control in state of ON.
Green		Hecu CO2 Control in powered status.

## EVACUATION

After the test, release the internal pressure by opening the valves:

- RSD discharge;
- RSLIQ liquid;
- RSS suction;
- R1 main suction
- R2 main liquid

For BT/LT machines, a magnet must be used to open the YVO solenoid valve, as shown in the figure below, with the machine powered off. remove the connector (1); remove the coil (2); insert the magnet (3).



The back pressure valve (HPV) after the gascooler must be forced open, by one of the following procedures:  
•remove the valves' stator coil and insert and rotate the magnet (OPTIONAL EEV MAG0000).



• refer to the VACUUM PROCEDURE MANUAL MODE instructions in the chapter Preparation for start-up of the manual condensing unit

# 9

## VACUUM

The duration of the vacuum phase is variable as it depends on several factors, but must nevertheless be at least 24 hours. In addition, the vacuum level of at least **45psi 0.3 mbar**, that must be reached, have to remain constant over time.



CAUTION: Before proceeding with the vacuum phase, check that all the valves on the machine and on the system are open.



CAUTION: The vacuum phase can take place when the machine is not electrically powered.



CAUTION: Do NOT start the compressors in vacuum conditions and without refrigerant, to avoid irreparable damage.



The IND1 indicator of liquid passage must be green to indicate the absence of humidity.

The service valves to which the vacuum pump must be connected are the following:

- RSD discharge;
- RSLIQ liquid;
- RSS suction;

The YVO valve and the back pressure valve (HPV) after the gascooler must be open.

# 10

**OIL PRE-CHARGE**

Before terminating the vacuum procedure, **0.22lb 100g of oil** must be filled in the circuit.

# 11

The oil in the compressor is PAG 100 (polyalkylene glycol) made by FUCHS RENISO PAG 100.



Caution: Do not use any oil other than the one specified by the manufacturer. For further information, contact the Manufacturer's Technical Department.

Proceed as follows:

- Close general suction valve R1;
- Close general liquid valve R2;
- Also close valve R3 (BT/LT versions only);
- Use service valve RSS to charge the oil while applying suction with the vacuum pump to service valve RSD (TN/MT versions) or RS1 (BT/LT versions);
- when pre-charge is complete, close the RSS valve and RSD valve (TN/MT) or RS1 valve (LT/BT);
- continue the vacuum procedure by re-opening R1 and R2 valves while the vacuum pump is connected to RSS and RSD (both opened).

**REFRIGERANT PRE-CHARGE**

# 12

The refrigerant must be only carbon dioxide –CO<sub>2</sub> – R744 Purity ≥ 99.99% H<sub>2</sub>O ≤ 10 ppm, O<sub>2</sub> ≤ 10 ppm, N<sub>2</sub> ≤ 50 ppm or higher.



CAUTION: The first part of refrigerant charge, or pre-charge, must ONLY take place in the vapor phase.



CAUTION: Mark down the refrigerant charge

For the refrigerant pre-charge the following are necessary:

- leave the magnet on the YVO valve (if present) as explained before.
- that the condensing unit and therefore the compressor/s are in the OFF position from the electronic control keyboard;
- check that the valves and HPV back pressure valve are opened to ensure that the entire refrigeration circuit is open.

The pre-charge ends when pressure in all part of the circuit is **145psi 10 bar**. The charging points are RSD, RSLIQ, RSS.

**ON-OFF**

# 13



CAUTION: Reassemble the coil of high valves (HPV) and the YVO valve solenoid coil (if present) before switching the power supply ON.

Switch the main power supply in ON position  
Change the status of the unit on the controller to ON position

	Press the key	
	Press the key	
	The cursor will move onto the first figure of the password. Enter the password "0000" then press the key	
	Select the "A. Unit Status" item	
	Press the key	
	Select the "c.On/Off" option	
	Press the key	
	Press the key	

**REFRIGERANT CHARGE**

# 14

For the refrigerant charge the followings are necessary:

- Reassemble the coils of high valves (HPV) if previously removed
- Reassemble the YVO valve solenoid coil (if present)
- Switch the condensing unit and/or the compressors ON from electronic control
- Charge the refrigerant into RSLIQ valve in liquid phase and RSS valve in vapor phase



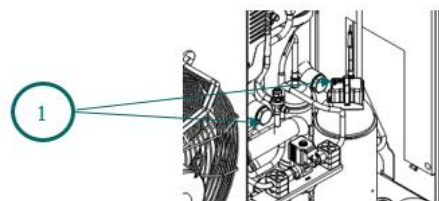
CAUTION: The evaporators must be activated. Activate the evaporators gradually and one at a time if multiple users are present.



CAUTION: Mark down the refrigerant charge

Refrigerant charging ends when liquid level in the receivers is just above half of the visual indicator (1) and there aren't bubbles in the IND1 indicator in stable running conditions.

The passage indicator also detects the presence of humidity, which must not be present. If any is found, the system must be stopped and the vacuum and charging phases repeated.



**OIL CHARGE**

# 15

The amount of oil may need to be adjusted depending on the refrigerant charge, with reference to the following table.

REFRIGERANT LOAD R744	UP TO 13lb/6kg	OVER 13lb/6kg
OIL LOAD PAG100	DO NOT ADD OIL	ADD 0.11lb/50g OIL FOR EACH 2.2lb/1kg of REFRIGERANT IN EXCESS



CAUTION: DO NOT add more than 0.55lb/ 250g of oil at a time. If more oil is needed, repeat the above procedure.

Proceed as follows:

- Switch the evaporators OFF and wait for the compressor/s to stop
- Switch the condensing unit OFF by the electronic control
- Close the suction valve R1
- Close R3 valve (BT/LT versions only)
- Carefully vent the R744 to atmosphere from RSD (TN/MT versions) or RS1(BT/LT versions) and RSS valve
- Use RSS valve to charge oil while applying suction with the vacuum pump to service valve RSD (TN/MT versions) or RS1 (BT/LT versions)
- Once filling is completed, close the RSS valve, and continue with the vacuum phase to the value previously described
- Isolate the service valves and remove the vacuum pump
- Re-open the previously closed valves R1 and R3(BT/LT versions only);
- Switch on the condensing unit on by electronic control
- Switch on the evaporators one
- Wait that the system is stabilized and no alarms are present;

**CONDENSING UNIT COMMISSIONING**

# 16

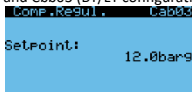
The condensing unit is now ready except for a few parameters.

If condensing unit controller operates in a stand alone mode (no networked connectivity to Carel evaporator controllers) the unit needs only a fixed suction setpoint.

This setpoint is the evaporator manufacturer's design evaporating temperature (saturated suction).

Access to the HECU controller can be made through the front panel key pad or by connecting a PGD1 handheld set up unit supplied separately.

The setpoint is also factory set. The defaults, for the TN/MT and BT/LT versions, are given in pages Cab03 and Cbb03 (BT/LT configuration).



If the condensing unit is combined with a dedicated evaporator controllers (MPXPRO, DC cella), the suction setpoint regulation is not fixed, but floating when serial communications with evaporator are available.

The floating suction pressure setpoint can vary over an adjustable range. This range is indicated in page Cab04, conforming with the limits set in Cab02.

Comp. Regul.	Cap04	Comp. Regul.	Cap04
Setpoint limits	Energy Saving		
Minimum: 8.0bars	Maximum floating setpoint: 16.0bars		
Maximum: 16.0bars	Minimum floating setpoint: 12.0bars		

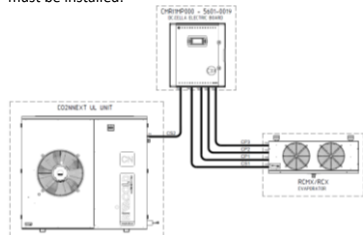
Wait until the system is stable and perform the necessary optimisations, referring to the manual and to the software manual of the controls.  
In case of split system see step 19

1bar = 14.5psig 1°F = 1.8 x °C + 32 1°F = 1.8 x K  
Example evaporating temperature: MT 32°F / 0°C  
LT -22°F / -30°C = 192psig / 13.26bar

**PREPARATION FOR START-UP OF SPLIT SYSTEM**

# 17

Before stating the split system, the kit of cables (option) must be installed.



The kit of cables can be ordered separately in different lengths, and consists of 5 cables:

- CS2= RS 485 connection
- CS1= signal connection (low voltage)
- CP1/2/3= power connection

The condensing unit, the coldroom controller (DC cella controller), and the EEV driver on the evaporator are connected over an RS485 network.

The condensing unit is pre-configured by the manufacturer and needs only to be powered-up and follow the procedure below on the condensing unit controller:

	Press ESC for 10second to start the Autodetection evaporator	
	Press DOWN to continue	
	Press ENTER to complete the configuration.	

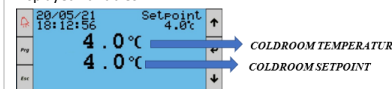
The evaporator wirings involve both the defrost and fan connections but also EVD ICE connection; everything is fully pre-cabled.

Go back to step 7

**START-UP FOR COLD ROOM CONTROLLER "DC CELLA"**

# 18

Displayed variables



ICON	FUNCTION	NORMAL OPERATION		FLASHING
		ON	OFF	
	Assistance	-	-	Alarm, e.g. faulty EEPROM and sensor
	HACCP	HACCP function enabled	-	HACCP alarm logged (HA / HF)
	Door	Door open	Door closed	Door open and door open alarm tripped
	Compressor	On	Off	Waiting for activation
	Fan	On	Off	Waiting for activation
	Degrees Fahrenheit	Displays the temperature in degrees Fahrenheit	-	-

MAIN MENU: press the in the start screen to display the main menu

ICON	ASSOCIATED FUNCTIONS	Flashing on the display
	Sets the controller to ON/OFF;	-
	Turns the light on/off	-
	Activates/deactivates manual defrost	Waiting for activation
	Configures the setpoint, Confirm value	-
	Increment / decrement value (flashing)	-

Go back to step 8

**SPLIT SYSTEM COMMISSIONING**

# 19

Check the followings before system start up:

- Serial cable connection (RS-485) between the CO2NNEXTcondensing and the DC Cella panel;
- Serial cable connection (RS-485) between the EVD Ice driver and the DC Cella panel;
- Power cable connection to the heating elements and evaporator fans;
- EVD Ice driver power connection;
- System power on.

The DC Cella controller controls communications between the components and if a connection failure is reported, check the serial connections.

Changing the setpoints

	Standard display	
	Press SET to displays the setpoints, then press it again to enter edit mode	
	Press UP/DOWN to select the value.	
	Press SET to confirm or ESC to return to the standard display.	

Rivacold offers a set of default configurations suited to every type of system and food.

1°F = 1.8 x °C + 32 1°F = 1.8 x K  
Example coldroom temperature: MT 32°F / 0°C  
LT -4°F/ -20°C

Wait until the system is stable and perform the necessary optimisations, referring to the manual and to the software manual of the controls.