Piping work

CDU-S

CDU-M

CDU-L

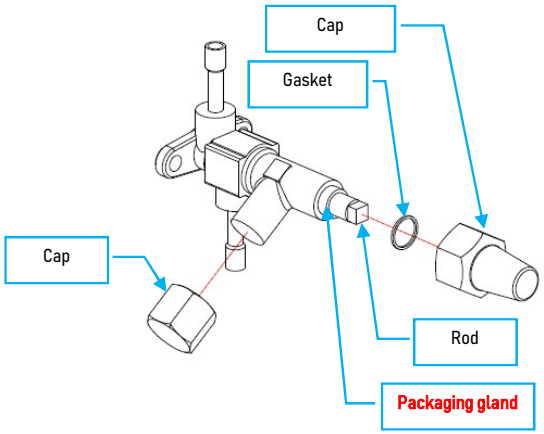
1. Using service valves
2. Connecting CDU to evaporators
3. Leakage test
4. Vaccum process
5. R744 Load

Nov 2021

100% CO2 cpndensing units

ECO-FRIENDLY REVOLUTION

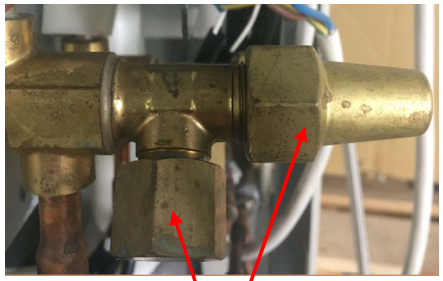
1.1. Using service valves



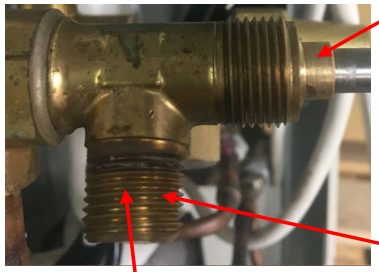
Loosen the packing gland before any manipulation of the rod.
Tighten the packing gland when the manipulation of the rod is finished.
Failure to loosen the packing gland may cause damage to the rod as well as valve leaks.

Below are the tightening torques to be applied to use the service valve

Service valves (mm)	Service port cap (Nm)	Rod (Nm)	Rod access cap (Nm)	Packaging gland (Nm)
Suction valve: 6.35 mm (1/4")	12 to 14	13 to 17	25 to 35	9 to 11
Discharge valve: 9.53 mm (3/8")				



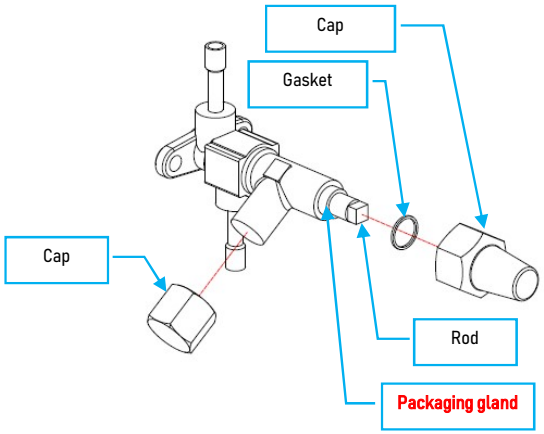
1. Unscrew and remove the protective covers



2.Connect the CDU to the manifold
Male outlet **G 3/8"**

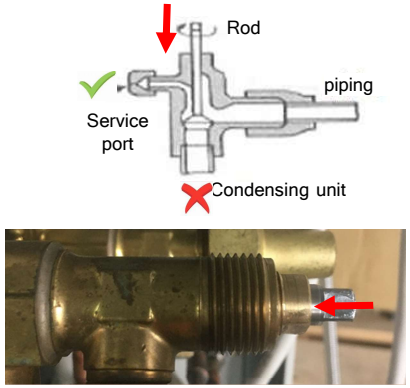
Example of connection
Inlet G 3/8" female
Outlet ¼" SAE

1.2. Using service valves

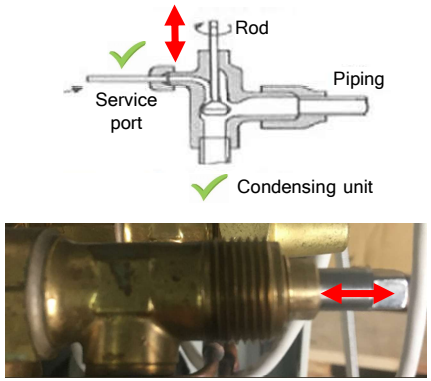


Loosen the packing gland before any manipulation of the rod.
Tighten the packing gland when the manipulation of the rod is finished.
Failure to loosen the packing gland may cause damage to the rod as well as valve leaks.

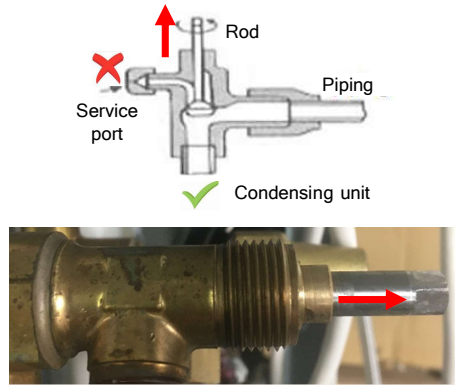
The condensing unit is delivered with the valves in the closed position.
Before use, the group circuit contains nitrogen (1 to 2 bars).



Valve in fully closed position (rod in forward position).
The group is isolated from the rest of the circuit



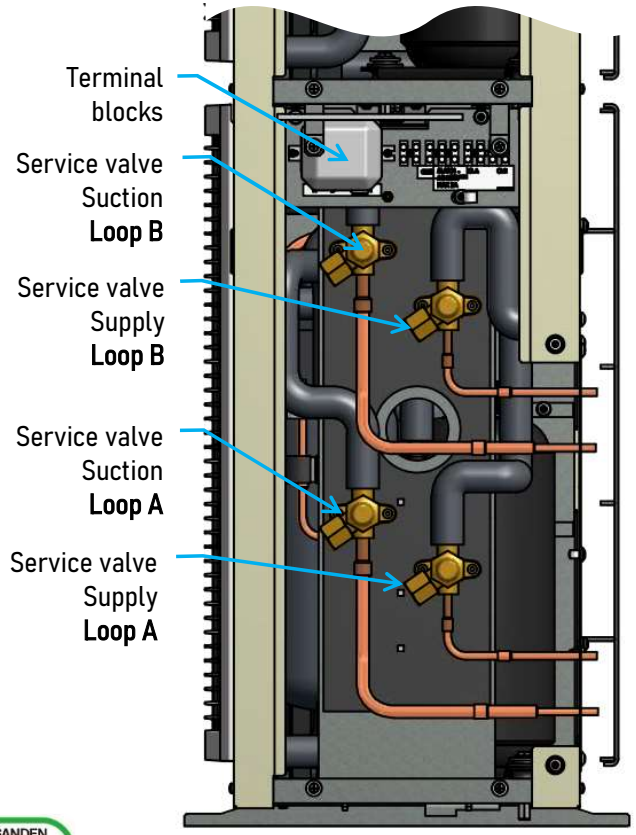
Valve in intermediate position.
The 3 outputs, service port, condensing unit and refrigeration circuit communicate



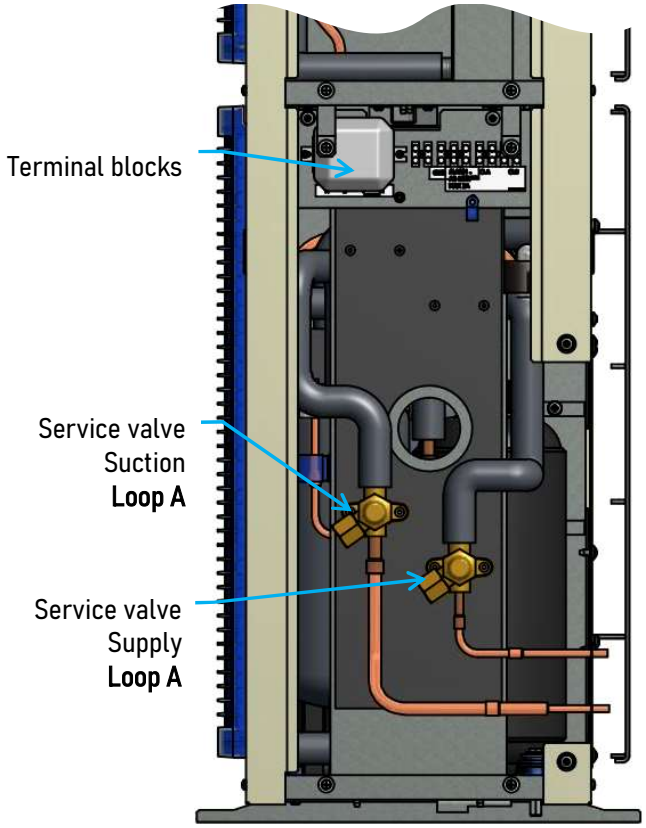
Valve in fully open position (rod in rear position).
The service port is isolated from the rest of the circuit

2.1 Connecting CDU to evaporators

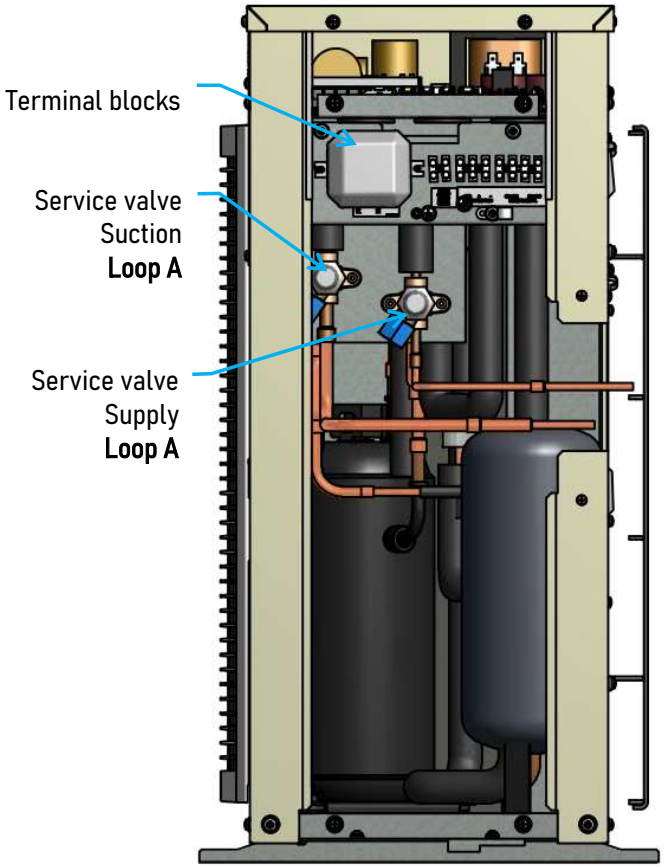
CDU-L
R06A2C



CDU-M
R04A1C
R04A1D



CDU-S
R02A1D



2.2 Connecting CDU to evaporators

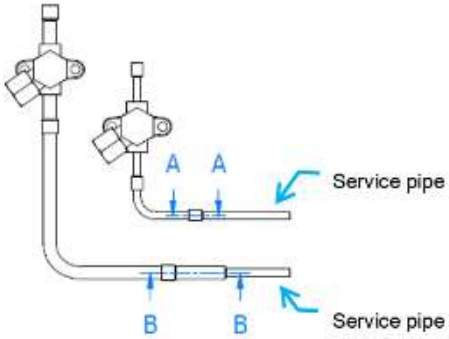
1. Removing service pipes

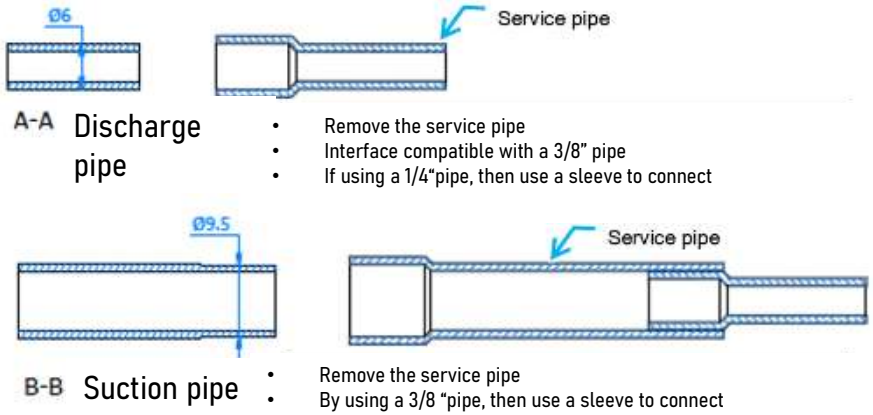
2. Insertion of piping to evaporator

3. Brazing

The group is delivered with service pipes

Group copper connections diameter
Discharge pipe: ∅6 mm (~1/4")
Suction pipe: ∅9.5mm (~3/8")



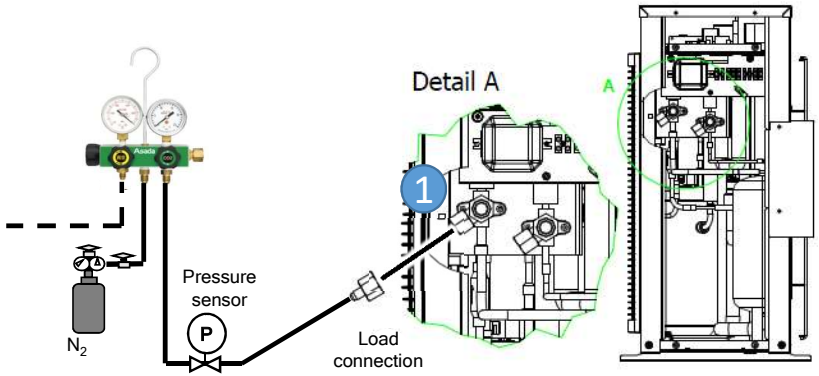


- Remove the service pipe
- Interface compatible with a 3/8" pipe
- If using a 1/4"pipe, then use a sleeve to connect

- Remove the service pipe
- By using a 3/8 "pipe, then use a sleeve to connect

1. Check that the expansion valves of evaporators are opened
2. Before soldering, set up a nitrogen flow to prevent an oxidation deposit on the inner side of the tubes and protect the valves from overheating with a damp cloth.
3. During soldering, be careful not to burn the insulation and other components of the unit

3. Leakage test



Maintain nitrogen pressure during 24h ✓

Note : when the CDU is turned on, reading the internal pressures of the CDU (Ps and Pd) in order to cross-reference the pressure information with the manometer used.

1. Perform the leakage test operation by pressurizing the circuit with nitrogen. Open the CDU valves to test the entire circuit.

2. Switch on the condensing unit and wait 20 sec for initialization (guarantee of the integrated expansion valve in the open position). Leave the CLA / CLB / CHC switches under the display in the OFF position, to avoid any start of the device

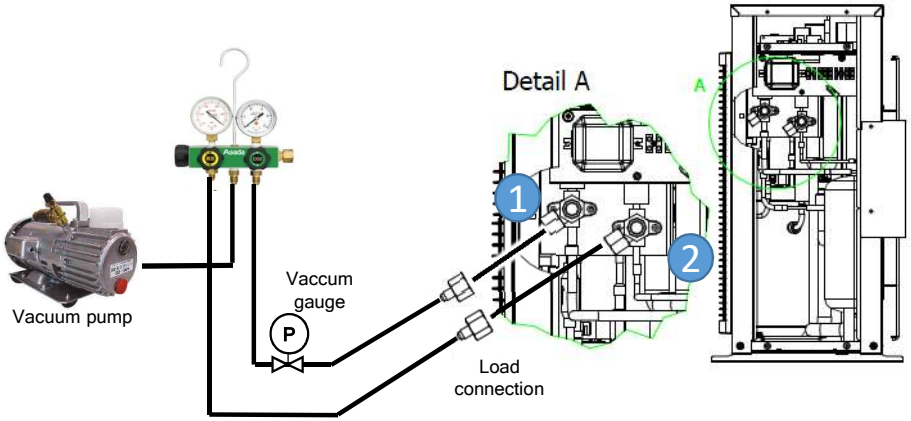
3. In the case of a multi-evaporator installation, make sure that the expansion valves of the evaporator stations are opened (forcing switch on or adding a magnetic coil)

4. Charge with nitrogen through the suction charge port. (1)
   If there is a 60bar safety valve, charge nitrogen at a slightly lower pressure. If not, charge with nitrogen at a pressure slightly below 80 bars.

5. Control nitrogen pressure with a manometer
   Maintain the test under pressure for 24 hours in order to detect pressure drops linked to micro-leaks.

6. Check brazes with a leakage detector or a bubble leak detection.

4. Vacuum process



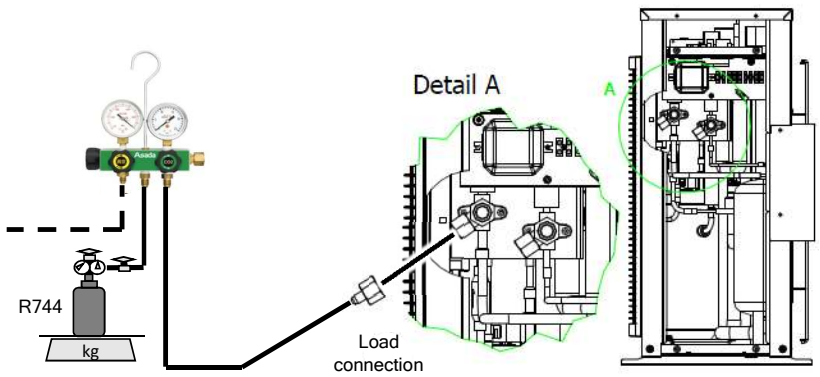
Maintain nitrogen pressure during 24h

Note: when the CDU is on, reading the internal pressures of the CDU (Ps and Pd) does not allow the vacuum to be measured, because the minimum pressure displayed is 0bars

Before carrying out the R744 charge, configure the CDU in relation to the application (MT or LT), setting the low pressure in particular (see Software guide)

1. **Use CO2 compatible manifolds as well as dedicated transcritical CO2 hoses (R744)**
2. After the leak test, release the nitrogen contained in the circuit through the suction valve (1) to prevent oil loss. When the pressure has decreased, nitrogen release can also continue with the discharge valve (2).
   If the evacuation operation follows degassing of R744, use the same method.
3. When the pressure reaches 1 bar, connect the manifold to the vacuum pump as well as to the 2 service valves of the cooling loop
4. **Use a vacuum gauge for vacuum measurement and control**
5. Check the tightness of the connections
6. Put the service valves in the middle position
7. **Create a vacuum for 3 hours from the 2 service valves of the loop, maintain an internal pressure of -1 bar.**

5. R744 Load



Evaluate the R744 load according to the volume of the evaporators as well as the length and diameter of the pipes (See load calculation guide)

Operating parameters (check dedicated guide)

Access to the reading parameters is described in the display and software guide

Purge hoses from both sides.
Keep the hoses connected to the valves throughout the load finetuning process

1. **Use R744 transcritical compatible manifolds as well as dedicated CO2 hoses (R744)**
2. **Plug the load connection to the service valve on the suction side.** Position the CO2 bottle on the scale and carry out a tare
3. **Break the vacuum (vapor state). Then charge the R744 with the compressor off.**
4. If the pressures equalize and the load is not complete, start the CDU and the concerned loop (front switch under the display). The cooling demand is necessary to start the compressor.
5. The filling continues. **When the load reaches the calculated 80% load, close the service valve.**
6. Check that the low pressure (Ps) is at the set point (Ps0) and check its stability. When the low pressure remains below the setpoint, the system lacks load. Proceed by additions of 100g.
7. When the low pressure (Ps) is stable at the setpoint (Ps0), check the discharge pressure (Pd) in relation to the setpoint (Pd0). If the discharge pressure is lower than the setpoint, the system is underloaded. Proceed by adding 50g.
8. The discharge temperature (Td) is another indicator of a lack of load if it is too higher than the values given in the table with the operating parameters.
9. When the temperature at the evaporator is close to the setpoint, the total superheat can be verified with the suction temperature (Ts) and the low pressure (Ps). It must be between (5 and 10K). If the superheat is too great, it is an indicator of a lack of charge. Proceed by adding 50g.
10. Wait at least 10 minutes after CO2 adding, to recheck the parameters and judge if a new load is necessary.
11. Other factors such as superheat in the evaporators or filling the batteries are other indicators of the system load.