

1-15. Example of Tubing Size Selection and Refrigerant Charge Amount

Additional refrigerant charging

Based on the values in Tables 1-2, 1-3, 1-4 and 1-7, use the liquid tubing size and length, and calculate the amount of additional refrigerant charge using the formula below.

$$\text{Required additional refrigerant charge (kg)} = [56 \times (a) + 26 \times (b)] \times 10^{-3}$$

(a): Liquid tubing Total length of $\phi 9.52$ (m) (b): Liquid tubing Total length of $\phi 6.35$ (m)

● Charging procedure

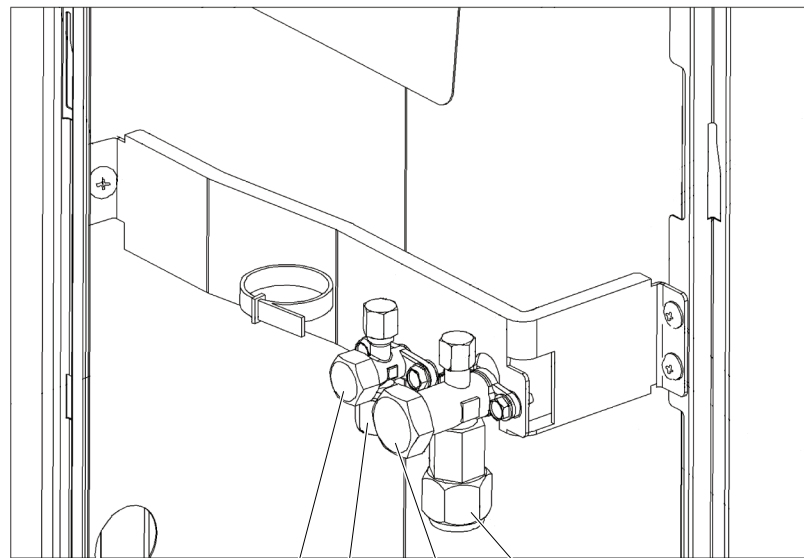
Be sure to charge with R410A refrigerant **in liquid form**.

1. After performing a vacuum, charge with refrigerant from the liquid tubing side. At this time, all valves must be in the "fully closed" position.
2. If it was not possible to charge the designated amount, operate the system in Cooling mode while charging with refrigerant from the gas tubing side. (This is performed at the time of the test run. For this, all valves must be in the "fully open" position.)

Charge with R410A refrigerant in liquid form.

With R410A refrigerant, charge while adjusting the amount being fed a little at a time in order to prevent liquid refrigerant from backing up.

- After charging is completed, turn all valves to the "fully open" position.
- Replace the tubing covers as they were before.



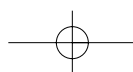
Tightening torque for valve stem cap: 19~21 N·m ④ ① Tightening torque: 68~82 N·m

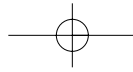
Tightening torque: 34~42 N·m ③ ② Tightening torque for valve stem cap: 28~32 N·m



CAUTION

1. R410A additional charging absolutely must be done through liquid charging.
2. The R410A refrigerant cylinder has a gray base color, and the top part is pink.
3. The R410A refrigerant cylinder includes a siphon tube. Check that the siphon tube is present. (This is indicated on the label at the top of the cylinder.)
4. Due to differences in the refrigerant, pressure, and refrigerant oil involved in installation, it is not possible in some cases to use the same tools for R22 and for R410A.





1-6. Straight Equivalent Length of Joints

Design the tubing system by referring to the following table for the straight equivalent length of joints.

Table 1-5 Straight Equivalent Length of Joints

Gas tubing size (mm)		12.7	15.88	19.05
90° elbow		0.30	0.35	0.42
45° elbow		0.23	0.26	0.32
U-shape tube bend (R60- 100 mm)		0.90	1.05	1.26
Trap bend		2.30	2.80	3.20
Y-branch distribution joint		Equivalent length conversion not needed.		
Ball valve for service		Equivalent length conversion not needed.		

Table 1-6 Required Copper Tubing Dimensions

Unit: mm

Material		O				
Copper tubing	Outer diameter	6.35	9.52	12.7	15.88	19.05
	Wall thickness	0.8	0.8	0.8	1.0	1.0

1-7. Additional Refrigerant Charge

Additional refrigerant charge amount is calculated from the liquid tubing total length as follows.

Table 1-7 Amount of Refrigerant Charge Per Meter, According to Liquid Tubing Size

Narrow tubing size	Amount of refrigerant charge/m (g/m)
φ6.35	26
φ9.52	56

Required amount of charge = (Amount of refrigerant charge per meter of each size of liquid tube × its tube length) + (...) + (...)

*Always charge accurately using a scale for weighing.

Table 1-8 Refrigerant Charge Amount at Shipment (for outdoor unit)

Heat pump unit (kg)	SPW-CR365GXH56	SPW-CR485GXH56	SPW-CR605GXH56
	3.5	3.5	3.5
Cooling only unit (kg)	SPW-CR365GX56	SPW-CR485GX56	SPW-CR605GX56
	3.5	3.5	3.5

1-8. System Limitations

Table 1-9 System Limitations

Outdoor units (Type)	365	485	605
Number of max. connectable indoor units	6	8	9
Max. allowable indoor/outdoor capacity ratio	50 – 130%		

