

Refrigerant Charging

- The units detailed on this guide are pre-charged with R-410A refrigerant. Should there be a need to add or remove some refrigerant, it is recommended to follow the charging method explained below.
- Never allow R-410A refrigerant to vent into the atmosphere. It is an offence to release refrigerant in Australia. Always reclaim refrigerant using equipment and container dedicated for R-410A system use only.
- All work must be carried out in accordance with Australia and New Zealand refrigerant handling code of practice.
- Only qualified personnel are allowed to perform any work described in this guide and specifically work related to addition or removal of refrigerant.
- R-410A refrigerant must always be charged in liquid state.
- Only during the compressor running condition can the system be charged through the suction service port on the compressor suction line.
- Changes in refrigerant charge must be noted to a label that is fixed to the unit for future reference.



R-410A refrigerant has POE oil that rapidly absorbs moisture. The maximum time any system can be opened to atmosphere is 15 minutes.

Charging Method: Subcooling and Superheat

Parameters:

LLT = Liquid Line Temperature

SLT = Suction Line Temperature

SCT = Saturated Condensing Temperature

SST = Saturated Suction Temperature

Cooling and Heating Operation:

Adjust the refrigerant charge to obtain the correct super heat and sub-cool for optimal performance as follows:

1. Ensure that air filters are fitted and total system airflows are achieved. (Air filters are not supplied with the unit, it is the responsibility of the installing contractor to provide and fit adequate return air and fresh air filters).
2. Connect service gauges to the shut off valves.
3. Start the unit in cool mode ensuring that the compressor is in operation before taking service gauges reading. Allow the system to stabilise for next 15 - 30 minutes before recording.
4. Record the discharge pressure, suction pressure, liquid line temperature and suction line temperature for all the refrigeration circuits.

Discharge Pressure = _____ kPa

Suction Pressure = _____ kPa

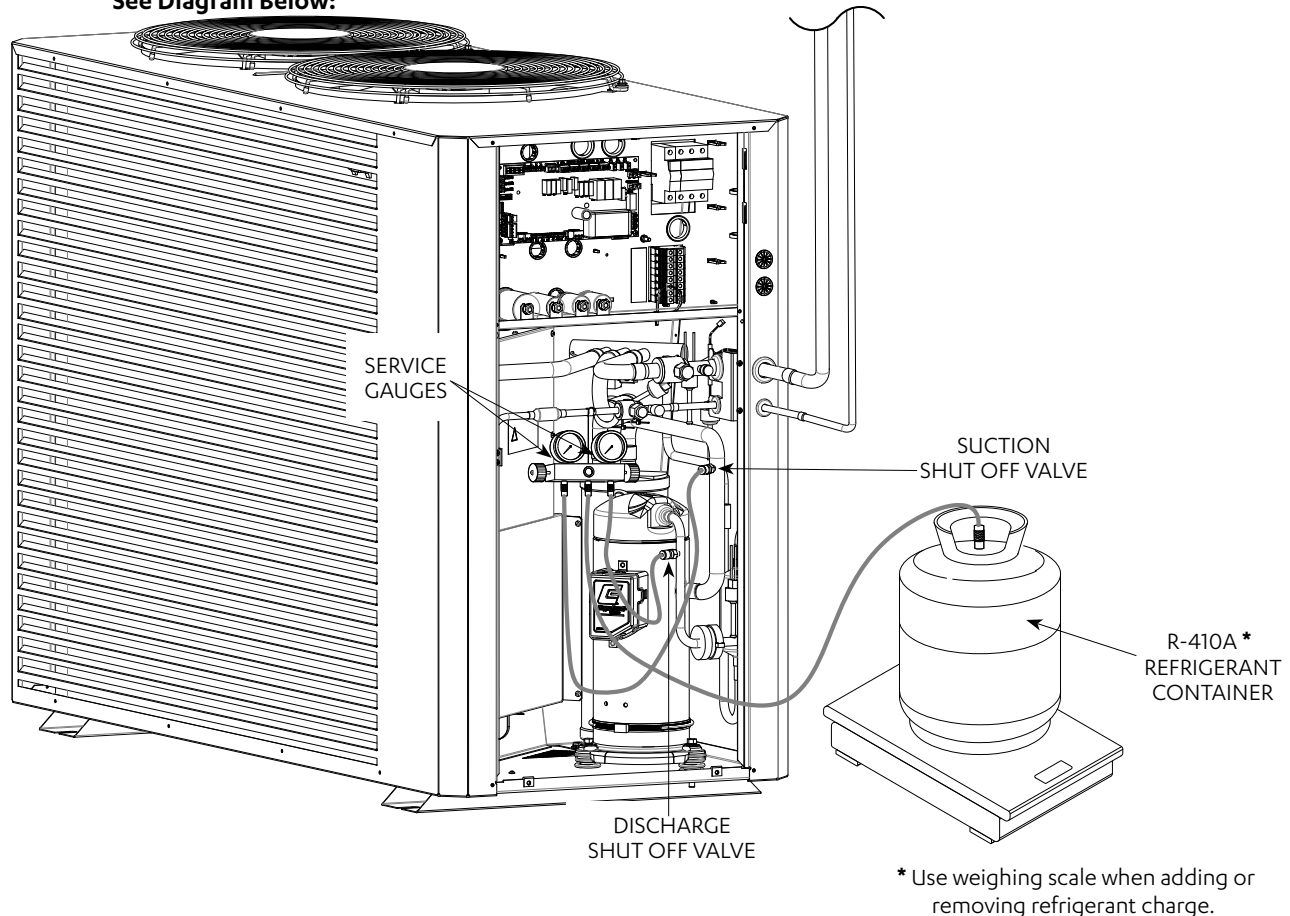
Liquid Line Temperature (**LLT**) = _____ °C

Suction Line Temperature (**SLT**) = _____ °C

NOTES

- Accurate pressure and temperature measuring tools should be used to achieve satisfactory results.
- The sensors of thermocouple must be in good contact with the area being measured and must be insulated in order to obtain correct reading.
- For illustration purpose only. Valve location may vary depending on unit model.

See Diagram Below:



Checking for Subcooling

1. From the R-410A Pressure / Temperature Chart record the corresponding Saturated Condensing Temperature (**SCT**) at the given discharge pressure.
2. Calculate the system subcooling using the formula below:

$$\text{Subcooling} = \text{SCT} - \text{LLT}$$

3. If subcooling is within the range (see charging table), there is no need to add/remove refrigerant.
 - If subcooling is lower than minimum, the system is undercharged, it is necessary to add refrigerant.
 - If subcooling is higher than maximum, the system is overcharged, it is necessary to remove refrigerant.

Allow the systems to stabilise (15 - 30 mins) and repeat the steps 1-3 until subcooling falls within the range specified in the Subcooling/Superheat Table below.

Checking for Superheat

Maintaining the correct superheat is important for ensuring the evaporator is achieving maximum capacity and avoiding excessive liquid refrigerant returning to the compressor.

1. From the R-410A Pressure/Temperature Chart record the corresponding Saturated Suction Temperature (**SST**) at the given suction pressure.
2. Calculate the system super heat using the formula below:

$$\text{Superheat} = \text{SLT} - \text{SST}$$

3. If superheat is within the range (see charging table), there is no need to add/remove refrigerant.
 - If superheat is lower than minimum, it means that liquid refrigerant may be returning to compressor. It is necessary to remove refrigerant or check EEV settings.
 - If superheat is higher than maximum, it means that refrigeration capability of evaporator is not fully maximised. It is necessary to add refrigerant charge or check EEV settings.

Allow the systems to stabilise (15 - 30 mins) and repeat the steps 1-3 until superheat falls within the range specified in the table below.

Subcooling/Superheat Table			
Cooling		Heating	
Subcooling	Superheat	Subcooling	Superheat
4 - 8	2 - 8	10 - 14	2 - 8

NOTES

The above subcooling and superheat recommendations are based on the following rated conditions:

- Cooling: 35°C DB outdoor, air entering indoor at 27°C DB / 19°C WB.
- Heating: 7°C DB / 6°C WB outdoor, air entering indoor at 20°C DB Nominal indoor airflow.

CHARGING TABLE

Temp °C	Pressure KPa	Temp °C	Pressure KPa	Temp °C	Pressure KPa	Temp °C	Pressure KPa
-60	-34.4	-28	194.9	4	805.9	36	2090.7
-59	-30.7	-27	206.9	5	834.1	37	2145.5
-58	-26.8	-26	219.2	6	862.9	38	2201.3
-57	-22.8	-25	231.9	7	892.6	39	2258.2
-56	-18.6	-24	245.1	8	922.8	40	2316.1
-55	-14.2	-23	258.7	9	953.8	41	2375.1
-54	-9.6	-22	272.6	10	985.4	42	2435.1
-53	-4.8	-21	286.9	11	1017.8	43	2496.2
-52	0.8	-20	301.7	12	1050.9	44	2558.5
-51	5.3	-19	316.9	13	1084.7	45	2621.8
-50	10.7	-18	332.6	14	1119.2	46	2686.2
-49	16.3	-17	348.7	15	1154.6	47	2751.8
-48	22.2	-16	365.2	16	1190.7	48	2818.5
-47	28.2	-15	382.3	17	1227.5	49	2886.4
-46	34.0	-14	399.7	18	1265.2	50	2955.5
-45	40.9	-13	417.7	19	1303.6	51	3025.7
-44	47.8	-12	436.2	20	1342.9	52	3097.2
-43	54.8	-11	455.1	21	1382.9	53	3169.9
-42	62.1	-10	474.6	22	1423.9	54	3243.7
-41	69.6	-9	494.6	23	1465.7	55	3318.9
-40	77.4	-8	515.1	24	1508.3	56	3395.2
-39	85.5	-7	536.2	25	1551.8	57	3472.9
-38	93.9	-6	557.8	26	1596.2	58	3551.8
-37	102.5	-5	579.9	27	1641.4	59	3631.9
-36	111.5	-4	602.6	28	1687.6	60	3713.5
-35	120.8	-3	625.9	29	1734.6	61	3796.3
-34	130.4	-2	649.8	30	1782.6	62	3880.5
-33	140.3	-1	674.3	31	1831.6	63	3965.9
-32	150.5	0	699.4	32	1881.5	64	4052.8
-31	161.1	1	724.9	33	1932.3	65	4140.9
-30	171.9	2	751.3	34	1984.1	66	4230.6
-29	183.3	3	778.3	35	2036.9	67	4321.5