




temperzone R410A Split Systems Installation Guide

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R410A Models

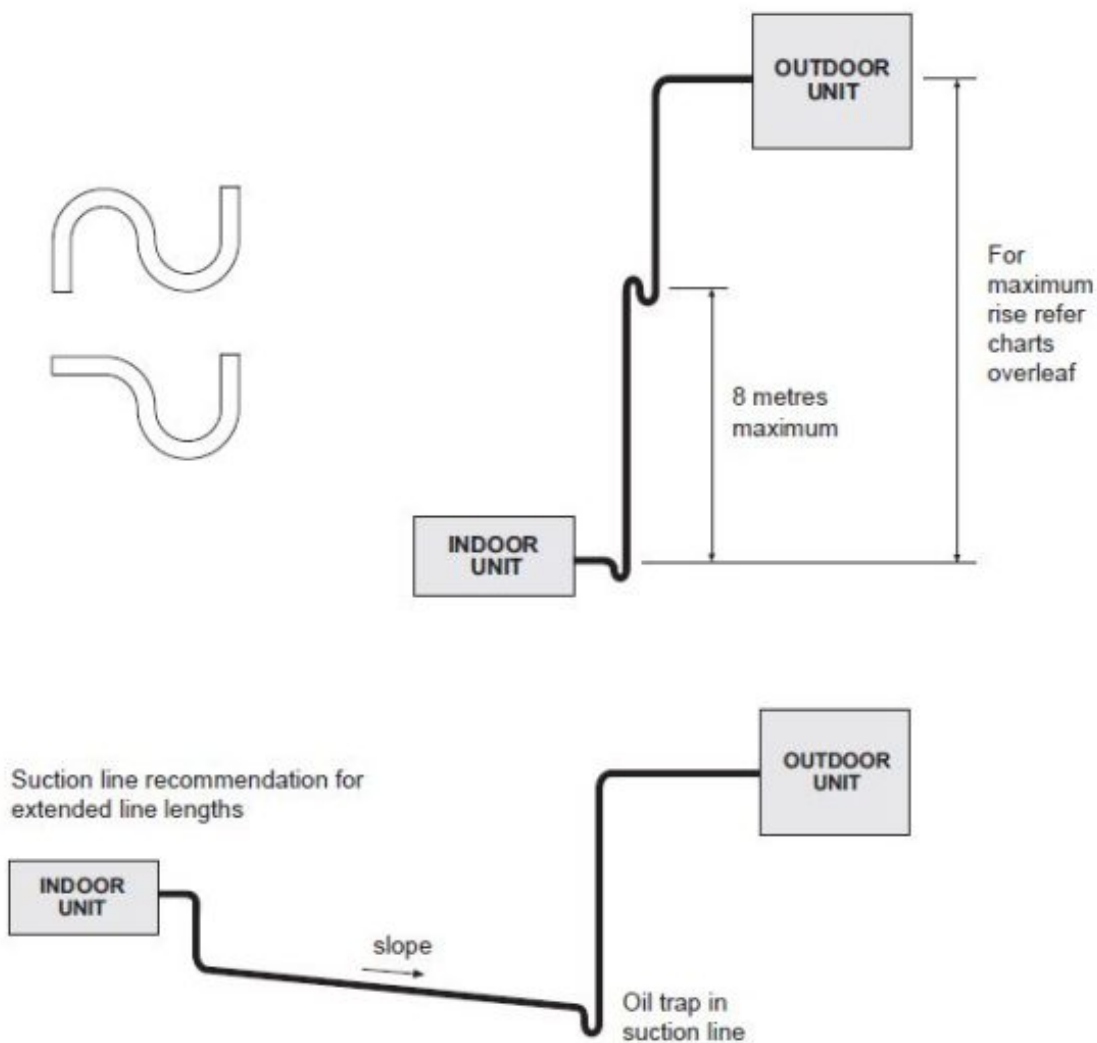
1. Piping

1. Use clean sealed refrigeration grade piping.
2. Pipe to be cut ONLY with a pipe cutter.
3. Use long radius bends (2 x pipe dia.)
4. Insulate the suction (gas) line, seal all insulation joints and insulate the liquid lines on all units with EEV's in outdoor unit.
5. By-flow type filter dryers may be fitted in the liquid line .
6. Include a process point on the interconnecting pipework.
7. Ensure all open pipe ends are sealed until the final connection is made.
8. Purge pipes using Nitrogen during brazing.
9. Immediately before removing any brazed seals on pipe stub connections of outdoor units, release any residual

pressure using Schraeder valves provided on the pipework after the shut-off valves. Warning: Failure to do so may cause injury.

2. Oil Traps

Oil traps must be fitted to vertical suction risers where outdoor unit is above indoor unit. Fit a trap at the bottom of the vertical rise and then at 8 m (maximum) intervals.



3. Piping Insulation

Suction Liquid



4. Sizing of Extra Suction Accumulation

Where extra suction accumulation is stipulated in Table 2 (p.9), it is because the total charge for the system pipe length exceeds the combined compressor shell and suction accumulator (if fitted) holding capacity.

There are alternative ways to provide extra accumulation;

- i. If an accumulator is fitted, remove and replace it with an accumulator one size larger. If there is insufficient room inside the Outdoor Unit, locate the replacement outside the unit.
- ii. Add an accumulator (in series or parallel with any existing accumulator) large enough to accommodate the additional charge at 60% full.

Example:

An additional accumulator is required for an ISD/OSA combination with an intended line length of over 30 m, where the additional charge rate is 100g/m.

Total line length: 40 m

Additional charge: 10 m x 100 g = 1000g = 1 kg

Specific volume of refrigerant HFC-410A: 0.87 l/kg

Volume required: $\frac{1 \times 0.87}{0.6 \text{ (60\% full)}} = 1.45 \text{ litres (i.e. 1450 ml)}$

The extra accumulator is unlikely to fit inside the unit so it will need locating outside. An accumulator with connections the same size as the suction line will be added and this will usually have more volume than is required.

5. Evacuation Procedure

(Pre-Charged Outdoor Units)

Evacuate the Indoor Unit plus interconnecting pipework to achieve a vacuum of 500 microns which is to be held for 15 mins. The use of an electronic vacuum gauge is essential for this exercise.

6. Pre-Charged Units

Pre-charged condensing units include the Base Charge for the unit set plus charge sufficient for the line length shown in the tables and stated in the unit's installation instructions.

7. Refrigerant Charging

Refrigerant charge to be introduced as liquid only and by weight or volume (not by system pressure or sight glass). Sight glasses are not recommended because of flash gas in liquid line.
temperzone recommends accurate charging/adding of refrigerant using digital refrigeration scales (spring balance is not acceptable).

For units supplied pre-charged, the actual line length and the final charge is crucial to correct operation. If you fear some charge has been lost, recover all the existing charge and re-charge accurately.

8. Superheat

On units without electronic expansion valves, superheat must be checked at the service valve on cooling cycle during commissioning. Ensure superheat is between 3°C to 5°C when the indoor air temperature is in the range 21°C to 27°C and the outdoor air temperature is in the range 24°C to 35°C.

If the conditions of the day do not allow this, use the heating cycle (on a reverse cycle unit) or other heat source to raise the indoor air temperature to about 24°C.

For further information on measuring Superheat, visit our website.

9. Refrigerant Pipe Sizes

Suction/Liquid line sizes given in the following tables are interconnecting pipe sizes and are not necessarily the same size as the pipe stub connections exiting the Indoor or Outdoor unit.

On any unit with variable capacity compressors, do not oversize the interconnecting piping as this will reduce the refrigerant velocities significantly with the associated danger of not returning the oil to the compressor.

10. Oil

Oil should be added on extended line lengths (refer tables overleaf).

For compressors with a sight glass fitted, add oil to maintain the level in the sight glass after 15 minutes running time.

Rotary compressors and some inverter compressors designed for R410A use polyvinylether oil (PVE). While it is acceptable to top up (max. 5%) with mineral oil or polyolester oil (POE) it is best practice to use PVE oil.

Most scroll compressors designed for R410A use polyol ester oil (POE), typically Emcarate RL22CF, RL32CF or RL32-3MAF oil. Do not use mineral oil.

Please refer to the unit specification data sheet to ensure the use of the correct oil.

11. Crankcase Heaters

Crankcase heaters are fitted to all compressors. Disconnect the crankcase heater if the total line length is less

than 8 m.

12. Pipe Length Capacity Loss

Maximum line lengths given represent actual measured line length between Indoor and Outdoor units. The equivalent line length is significantly more than actual line length because it includes an allowance for bends and vertical piping. Use the equivalent line length when calculating pressure losses or performance losses.

13. Commissioning

Each outdoor unit is supplied with a Commissioning Sheet to assist installers completing the Start Up Procedure outlined in the Installation & Maintenance pamphlet. The sheet includes a pulley adjustment guide for belt driven indoor units if applicable. We recommend you complete the form, send a copy to temperzone and keep the original yourself for possible future reference.

14. Manufacturer's Note

The manufacturer reserves the right to make changes at any time without notice or obligation. Should any instruction in this guide conflict with any Installation & Maintenance pamphlet supplied with a unit, then the most recently dated publication should be considered correct.

Table 1 SPLIT SYSTEM PIPING REQUIREMENTS

Model	Compressor	Standard Unit Limitations			Maximum Vertical Separation		Refrigerant Charging		Oil Charging		Oil Type
		Suction	Liquid	Max. Line Length ft/m	Outdoor Unit above Indoor Unit ft/m	Indoor Unit above Outdoor Unit ft/m	Precharge for 10m Line Length (R410A) kg	Additional Charge for Pipe Line Length g/m (R410A)	A/C Oil Beyond ft/m	Additional Oil kg/m	
OSA 66PKS	Scroll ZP24 KSE-PF2	16	9.5	48	20	20	2.15	90	None up to 48		PCE 12-3MNF (or equivalent)
OSA 87PKS	Scroll ZP31KSE-PF2	16	9.5	48	20	20	3.68**	90	None up to 48		PCE 12-3MNF (or equivalent)
OSA 116RK3D*	Scroll ZPD42 KSE-PF2	16	9.5	60	20	20	4.45*	90	40	10 m/m	PCE 12-3MNF (or equivalent)
OSA 116RK7G*	Scroll ZPD42 KSE	16	9.5	60	20	20	4.45*	90	40	10 m/m	PCE 12-3MNF (or equivalent)
OSA 141RK3G**	Scroll ZPD61 KSE-PF2	16	9.5	20	20	20	4.50**	90	None up to 20		PCE 12-3MNF (or equivalent)
		18	9.5	60	20	20	4.50**	90	40	10 m/m	PCE 12-3MNF (or equivalent)
		16	9.5	20	20	20	4.50**	90	None up to 20		PCE 12-3MNF (or equivalent)
OSA 141RK7G**	Scroll ZPD61 KSE	16	9.5	60	20	20	4.50**	90	None up to 20		PCE 12-3MNF (or equivalent)
		18	9.5	60	20	20	4.50**	90	40	10 m/m	PCE 12-3MNF (or equivalent)
OSA 164RK7G	Scroll ZPD81 KSE	16	9.5	60	20	20	6.70	90	40	10 m/m	PCE 12-3MNF (or equivalent)
OSA 164RK7F	Scroll ZPVE38	16	9.5	60	20	20	5.95	90	40	10 m/m	PCE 12-3MNF (or equivalent)
OSA 164RK7G	Scroll ZPD72 KSE	16	9.5	60	20	20	6.50	90	40	10 m/m	PCE 12-3MNF (or equivalent)
OSA 204RK7F	Scroll D4552A3F-11MD1	22	13	60	20	20	10.00	100	40	20 m/m	PCE 12-3MNF (or equivalent)
OSA 224RK7G	Scroll ZPD83 KSE	22	13	60	20	20	10.60	100	40	20 m/m	PCE 12-3MNF (or equivalent)
OSA 204RK7F	Scroll AMB60FIAHT	26	13	90	20	20	11.90	100	40	20 m/m	PVE PVE6BD (or equivalent)
OSA 204RK7G	Scroll ZPD114	26	13	90	20	20	13.00	100	40	20 m/m	PCE 12-3MNF (or equivalent)
OSA 204RK7F	Scroll AMB70FIAHT	26	13	90	20	20	12.10	100	40	20 m/m	PVE PVE6BD (or equivalent)
OSA 324RK7G	Scroll ZPD122KCE-TFD	28	13	90	20	20	12.60	100	40	20 m/m	PCE 12-3MNF (or equivalent)

Estimating Effective Line Length for Performance Loss

The tabled data (right) is based on Long Radius 90° bends (2 x pipe dia.).

No allowance has been included for any effect from vertical lift.

Suction Line Bend	Equivalent Pipe Length
16 mm	0.30 m
19 mm	0.42 m
22 mm	0.50 m
28 mm	0.61 m
35 mm	0.76 m

* For ISDL/OSA 116 combinations deduct 0.7kg when 10m or less.
 ** For ISU/OSA 141 combinations deduct: 0.5kg when 10m or less; or 0.75kg when 5m or less.
 *** For ISDL/OSA 87 combinations deduct 0.5kg when 10m or less.

Table 2 SPLIT SYSTEM PIPING REQUIREMENTS

Model	Compressor	Standard Unit Limitations		Approximate Performance Loss (Cooling Cycle) % per 10ft	Common to Both Standard & Extended Line Lengths		Extended Line Lengths				Extended Line Lengths			
		Suction	Liquid		Max Line Length ft	Maximum Vertical Separation Outdoor Unit above Indoor Unit ft	Indoor Unit above Outdoor Unit ft	Refrigerant Charging		Oil Charging		Maximum Line Length when Extended ft	Additional Requirements	
								Precharge for 15ft Line Length (R410A) lb	Additional Charge for Pipe Line Length (ft) lb	Add Oil Served in	Additional Oil in lbs			Oil Type
OSA 310RKT8	Scroll ZP61KCE (x2)	22 (x2)	13 (x2)	60	2.10	20	28	6.6 per system	180	40	20	POE	80	
OSA 315RKT80	Scroll ZP61KCE Scroll ZP61KCE	22 (x2)	13 (x2)	80	2.10	20	28	6.6 per system	180	40	20	POE	80	
OSA380RKT8	Scroll ZP61KCE (x2)	22 (x2)	13 (x2)	60	2.10	20	28	6.55 per system	180	40	20	POE	80	
OSA380RKT80	Scroll ZP61KCE Scroll ZP61KCE	22 (x2)	13 (x2)	80	2.10	20	28	6.55 per system	180	40	20	POE	80	
OSA 485RKT8	Scroll ZP81KCE (x2)	22 (x2)	13 (x2)	80	2.10	20	28	7.6 per system	180	40	20	POE	80	Extra Suction Accumulation (3lb accumulator heater) required to be fitted. Compressors and accumulators must be fitted with heaters.
OSA 485RKT8 from serial number 886000	Scroll ZP81KCE (x2)	22 (x2)	13 (x2)	80	2.10	20	28	7.6 per system	180	40	20	POE	80	
		28 (x2)	13 (x2)	80	0.75	20	28	7.6 per system	180	40	20	POE	80	As per "Extra Suction..." below.
OSA 510RKT8	Scroll ZP110KCE (x2)	28 (x2)	13 (x2)	80	1.50	20	28	10.3 per system	180	40	20	POE	80	
		36 (x2)	13 (x2)	80	0.70	20	28	10.3 per system	180	40	20	POE	80	As per "Extra Suction..." below.
OSA 510RKT80	Scroll ZP110KCE = (Eco)	28 (x2)	13 (x2)	80	1.50	20	28	10.3 per system	180	40	20	POE	80	As per "Extra Suction..." below for line lengths over 60ft.
		28 (x2)	13 (x2)	80	1.50	20	28	12.6 per system	180	40	20	POE	80	
OSA 610RKT8	Scroll ZP120KCE (x2)	36 (x2)	13 (x2)	80	0.70	20	28	12.6 per system	180	40	20	POE	80	As per "Extra Suction..." below.
		28 (x2)	13 (x2)	80	1.80	20	28	12.6 per system	180	40	20	POE	80	As per "Extra Suction..." below for line lengths over 60ft.
OSA 610RKT80 (Eco)	Scroll ZP120KCE = ZPD120KCE	28 (x2)	13 (x2)	80	1.80	20	28	12.6 per system	180	40	20	POE	80	As per "Extra Suction..." below for line lengths over 60ft.

OGA 840RKT8	Scroll ZH181 (x2)	35 (x2)	16 (x2)	50	2.00	20	20	12.3 per system	170 per system	40	30	POE	90	Extra Suction Accumulation (ie accumulator heater) required to be fitted. Compressors and accumulators must be fitted with heaters. For the sizing of extra suction accumulation please refer to clause 4 on page 3 of this document.
		41 (x2)	16 (x2)	50	3.80	20	20	12.3 per system	170 per system	40	30	POE	90	
OGA 860RKT8G (Eco)	Scroll ZP164KCE + ZP2154KCE	35 (x2)	16 (x2)	50	2.00	20	20	12.3 per system	170 per system	40	30	POE	90	As per "Extra Suction..." above for line lengths over 60m.
OGA 950RKT8	Scroll ZP162 (x2)	35 (x2)	16 (x2)	50	2.00	20	20	14.4 per system	170 per system	40	30	POE	90	As per "Extra Suction..." above.
	or Scroll ZP180 (x2)	41 (x2)	16 (x2)	50	3.80	20	20	14.4 per system	170 per system	40	30	POE	90	
OGA 950RKT8G (Eco)	Scroll ZP162KCE + ZP2162KCE	35 (x2)	16 (x2)	50	2.00	20	20	14.4 per system	170 per system	40	30	POE	90	As per "Extra Suction..." above for line lengths over 60m.
Estimating Effective Line Length for Performance Loss								Suction Line Bend		Equivalent Pipe Length		Standard Unit Limitations allow the unit to be installed without any extra protection other than adjustment of the refrigeration gas and/or oil charge. Extended Line Lengths require adjustment to oil charge, refrigerant gas charge and the additional requirements listed above.		
When calculating performance losses for long line lengths allowances must be made for bends in the pipework. The tabulated data (right) is based on Long Radius 90° bends (2 x pipe dia.). Add this allowance for every bend to the total line length to calculate an "effective" line length for performance loss.								25 mm		3.61 m				
								35 mm		3.76 m				
								41 mm		3.80 m				



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