temperzone
climate innovations

SPLIT SYSTEMS INSTALLATION GUIDE

(R410A Models)

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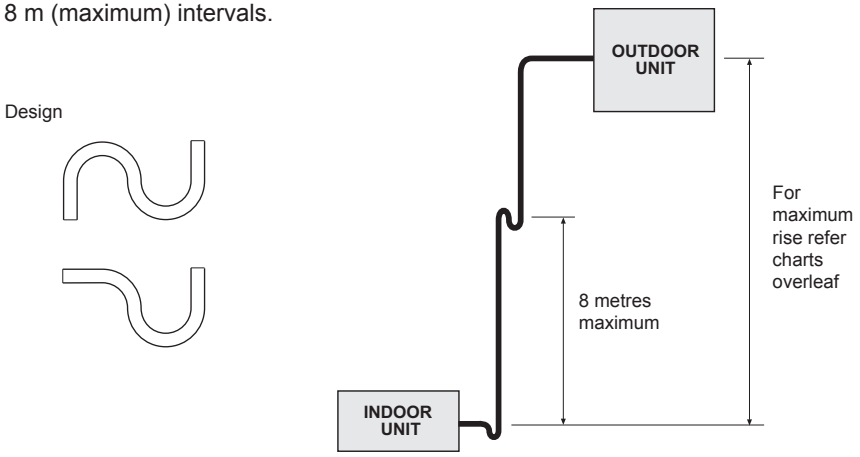
INSTALLATION REQUIREMENTS

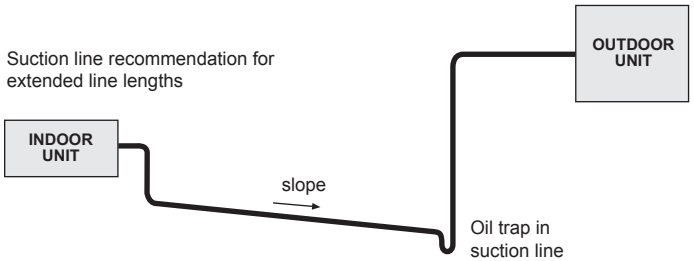
1 Piping

i. Use clean sealed refrigeration grade piping.
ii. Pipe to be cut ONLY with a pipe cutter.
iii. Use long radius bends (2 x pipe dia.)
iv. Insulate the suction (gas) line, seal all insulation joints and insulate the liquid lines on all units with EEV's in outdoor unit.
v. By-flow type filter dryers may be fitted in the liquid line .
vi. Include a process point on the interconnecting pipework.
vii. Ensure all open pipe ends are sealed until the final connection is made.
viii. Purge pipes using Nitrogen during brazing.
ix. 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

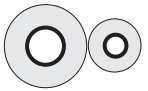
Oil traps must be fitted to vertical suction risers where outdoor unit is above indoor unit. Fit a trap at the bottom of the vertical rise and then at 8 m (maximum) intervals.





3 Piping Insulation

Suction **Liquid**



Insulate both lines

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 accomodate 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 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

(Units Supplied Pre-Charged)

Model	Compressor	Standard Unit Limitations			Maximum Vertical Separation		Refrigerant Charging		Oil Charging		Oil Type
		Suction	Liquid	Max. Line Length m	Outdoor Unit above Indoor Unit m	Indoor Unit above Outdoor Unit m	Precharge for 10m Line Length (R410A) kg	Additional Charge for Pipe Line Length g/m (R410A)	Add Oil Beyond m	Additional Oil ml/m	
OSA 66RKS	Scroll ZP24 KSE-PFZ	16	9.5	40	20	20	3.15	50	None up to 40		POE 32-3MAF (or equivalent)
OSA 87RKS	Scroll ZP31KSE-PFZ	16	9.5	40	20	20	3.65***	50	None up to 40		POE 32-3MAF (or equivalent)
OSA 116RKSG*	Scroll ZPD42 KSE-PFZ	16	9.5	60	20	20	4.45*	50	40	10 ml/m	POE 32-3MAF (or equivalent)
OSA 116RKTG*	Scroll ZPD42 KSE	16	9.5	60	20	20	4.45*	50	40	10 ml/m	POE 32-3MAF (or equivalent)
OSA 141RKSG**	Scroll ZPD51 KCE-PFZ	16	9.5	20	20	20	4.50**	50	None up to 20		POE 32-3MAF (or equivalent)
		19	9.5	60	20	20	4.50**	50	40	10 ml/m	POE 32-3MAF (or equivalent)
OSA 141RKTG**	Scroll ZPD51 KSE	16	9.5	20	20	20	4.50**	50	None up to 20		POE 32-3MAF (or equivalent)
		19	9.5	60	20	20	4.50**	50	40	10 ml/m	POE 32-3MAF (or equivalent)
OSA 164RKTG	Scroll ZPD61 KCE	19	9.5	60	20	20	5.70	50	40	10 ml/m	POE 32-3MAF (or equivalent)
OSA 184RKTF	Scroll ZPV038	19	9.5	60	20	20	5.95	50	40	10 ml/m	POE 32-3MAF (or equivalent)
OSA 194RKTG	Scroll ZPD72 KCE	19	9.5	60	20	20	6.50	50	40	10 ml/m	POE 32-3MAF (or equivalent)
OSA 224RKTF	Scroll DA550A3F-11MD1	22	13	60	20	20	10.50	100	40	20 ml/m	POE 32-3MAF (or equivalent)
OSA 224RKTG	Scroll ZPD83 KCE	22	13	60	20	20	10.50	100	40	20 ml/m	POE 32-3MAF (or equivalent)
OSA 294RKTF	Scroll ANB66FVAMT	28	13	90	20	20	11.90	100	40	20 ml/m	PVE FVC68D (or equivalent)
OSA 294RKTG	Scroll ZPD104	28	13	90	20	20	13.00	100	40	20 ml/m	POE 32-3MAF (or equivalent)
OSA 324RKTF	Scroll ANB78FVAMT	28	13	90	20	20	13.10	100	40	20 ml/m	PVE FVC68D (or equivalent)
OSA 324RKTG	Scroll ZPD122KCE-TFD	28	13	90	20	20	12.50	100	40	20 ml/m	POE 32-3MAF (or equivalent)

Estimating Effective Line Length for Performance Loss

When calculating performance losses for long line lengths allowances must be made for bends in the pipework.
The tabled 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.
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

Standard Unit Limitations allow the unit to be installed without any extra protection other than adjustment of the refrigeration gas and/or oil charge.

* 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

(Units Supplied Pre-Charged)

Model	Compressor	Standard Unit Limitations			Common to Both Standard & Extended Line Lengths								Extended Line Lengths	
					Approximate Performance Loss (Cooling Cycle)	Maximum Vertical Separation		Refrigerant Charging		Oil Charging			Maximum Line Length when Extended	
		Suction	Liquid	Max Line Length m	% per 10m	Outdoor Unit above Indoor Unit m	Indoor Unit above Outdoor Unit m	Precharge for 10m Line Length (R410A) kg	Additional Charge for Pipe Line Length g/m	Add Oil Beyond m	Additional Oil ml/m	Oil Type	m	Additional Requirements
OSA 310RKTB	Scroll ZP57K3E (x2)	22 (x2)	13 (x2)	60	2.10	20	20	6.6 per system	100	40	20	POE	60	
OSA 310RKTBG	Scroll ZP57K3E Scroll ZPD67KCE	22 (x2)	13 (x2)	60	2.10	20	20	6.6 per system	100	40	20	POE	60	
OSA380RKTB	Scroll ZP67KCE (x2)	22 (x2)	13 (x2)	60	2.10	20	20	6.55 per system	100	40	20	POE	60	
OSA380RKTBG	Scroll ZP67KCE Scroll ZPD67KCE	22 (x2)	13 (x2)	60	2.10	20	20	6.55 per system	100	40	20	POE	60	
OSA 465RKTB	Scroll ZP83KCE (x2)	22 (x2)	13 (x2)	30	2.10	20	20	7.6 per system	100	40	20	POE	60	Extra Suction Accumulation (c/w accumulator heater) required to be fitted. Compressors and accumulators must be fitted with heaters.
OSA 465RKTB from serial number 800,000	Scroll ZP83KCE (x2)	22 (x2)	13 (x2)	60	2.10	20	20	7.6 per system	100	40	20	POE	60	
		28 (x2)	13 (x2)	90	0.75	20	20	7.6 per system	100	40	20	POE	90	As per "Extra Suction..." below.
OSA 570RKTB	Scroll ZP103KCE (x2)	28 (x2)	13 (x2)	60	1.50	20	20	10.3 per system	100	40	20	POE	60	
		35 (x2)	13 (x2)	90	0.70	20	20	10.3 per system	100	40	20	POE	90	As per "Extra Suction..." below.
OSA 570RKTBG (Eco)	Scroll ZP104KCE + ZPD104KCE	28 (x2)	13 (x2)	60	1.50	20	20	10.3 per system	100	40	20	POE	90	As per "Extra Suction..." below for line lengths over 60m.
OSA 670RKTB	Scroll ZP120KCE (x2)	28 (x2)	13 (x2)	60	1.50	20	20	12.5 per system	100	40	20	POE	60	
		35 (x2)	13 (x2)	90	0.70	20	20	12.5 per system	100	40	20	POE	90	As per "Extra Suction..." below.
OSA 670RKTBG (Eco)	Scroll ZP122KCE + ZPD122KCE	28 (x2)	13 (x2)	60	1.50	20	20	12.5 per system	100	40	20	POE	90	As per "Extra Suction..." below for line lengths over 60m.
OSA 840RKTB	Scroll SH161 (x2)	35 (x2)	16 (x2)	50	2.00	20	20	12.3 per system	170 per system	40	30	POE	90	Extra Suction Accumulation (c/w 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	0.80	20	20	12.3 per system	170 per system	40	30	POE	90	
OSA 840RKTBG (Eco)	Scroll ZP154KCE + ZPD154KCE	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.
OSA 950RKTB	Scroll ZP182 (x2) or Scroll ZP180 (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.
		41 (x2)	16 (x2)	50	0.80	20	20	14.4 per system	170 per system	40	30	POE	90	
OSA 950RKTBG (Eco)	Scroll ZP182KCE + ZPD182KCE	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

When calculating performance losses for long line lengths allowances must be made for bends in the pipework.
The tabled 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.

Suction Line Bend	Equivalent Pipe Length
28 mm	0.61 m
35 mm	0.76 m
41mm	0.80 m

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.

temperzone

AUCKLAND
temperzone Ltd
38 Tidal Road,
Mangere South, Manukau 2022.
Private Bag 93303,
Otahuhu, Manukau 1640.
Phone 0-9-279 5250
Fax 0-9-275 5637
Email sales@temperzone.co.nz

WELLINGTON
Phone 0-4-569 3262
Email wgtn@temperzone.com

CHRISTCHURCH
Phone 0-3-379 3216
Email chch@temperzone.com

SINGAPORE
temperzone Ltd
1 Claymore Drive #08-13
Rear Block, Orchard Towers
Singapore 229594
Phone SNG 6733 - 4292
Fax SNG 6235 - 7180
Email sales@temperzone.com.sg

SYDNEY
temperzone australia pty ltd
14 Carnagie Pl, Blacktown, NSW 2148
PO Box 8064, Seven Hills West NSW 2147
Phone (02) 8822 - 5700
Fax (02) 8822 - 5711
Email sales@temperzone.com.au

MELBOURNE
Phone (03) 8769 - 7600
Email vicsales@temperzone.com.au

ADELAIDE
Phone (08) 8115 - 2111
Email sasales@temperzone.com.au

PERTH
Phone (08) 6399 - 5900
Email reception@airskill.com.au

BRISBANE
Phone (07) 3308 - 8333
Email qldsales@temperzone.com.au

NEWCASTLE
Phone (02) 4962 - 1155
Email salesmcintoshair.com.au

LAUNCESTON
Phone (03) 6331 - 4209
Email info@hvac-supplies.net

Visit our website www.temperzone.com

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