temperzone
QUALITY AIR CONDITIONING

SPLIT SYSTEMS INSTALLATION GUIDE

(R22 Models)

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Web Version

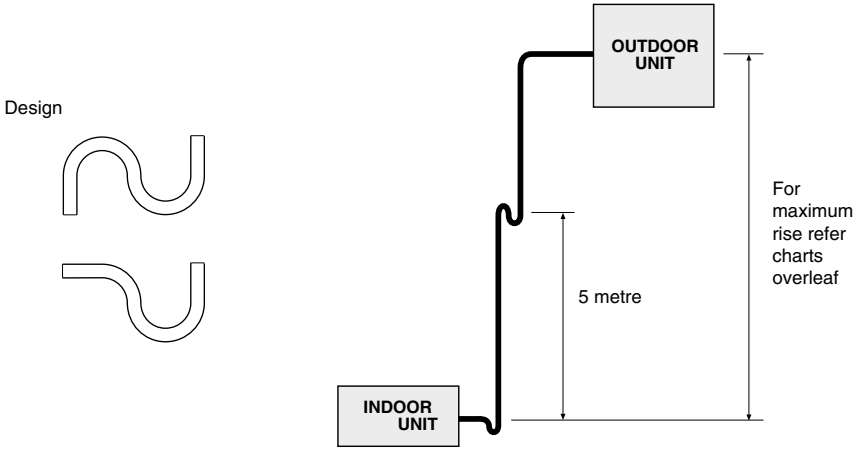
INSTALLATION REQUIREMENTS

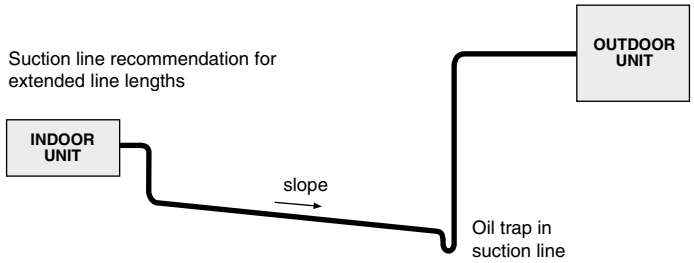
1 Piping

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 and seal all insulation joints.
v. Filter dryers may be fitted in the liquid line (bi-flow type on reverse cycle systems).
vi. Include a process point on the interconnecting pipework.
vii. Ensure all open pipe ends are sealed until the final connection is made.
viii. Immediately before removing any brazed seals on pipe stub connections of outdoor units, release any residual pressure using Schraeder valves provided on 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 5 m (maximum) intervals.

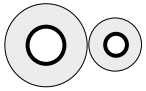




3 Piping Insulation

Suction **Liquid**

Minimum requirement. Standard for cooling only systems.



Recommended for reverse cycle systems

Hot Gas Bypass line (where fitted)

Must be insulated. (Do not run in insulation with any other pipe)

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.

Total line length: 40 m

Additional charge: 10 m x 50 g = 500 g

Specific volume of refrigerant HCFC-22: 0.79 l/kg

Volume required: $\frac{0.5 \times 0.79}{0.6 \text{ (60\% full)}}$ = 0.65 (i.e. 650 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 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.

Non Pre-Charged Outdoor Units

Evacuate both the high and low pressure sides of the system simultaneously 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 Table 1 (p.6) and stated in the unit's installation instructions. Note: Systems with compressors using POE oil as a lubricant have a greater pre-charge than those using mineral oil.

7 Refrigerant Charging

Refrigerant charging to be by weight or volume (not by pressure or sight glass). Sight glasses are not recommended because of flash gas in liquid line.

temperzone recommends accurate charging/adding of refrigerant using one of two methods :

1. Digital refrigeration scales (spring balance is not acceptable)
2. Pre-calibrated charging cylinder.

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

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. Return to cooling cycle and blank off the outdoor coil to raise the head pressure to 240–280 psig (1750–1950 kPag).

For further information on measuring Superheat, visit our web page

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.

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 sightglass after 15 minutes running time.

Scroll compressor labels indicate the oil type, either 'MIN' for mineral or 'POE' for polyol ester. Additionally, an 'E' at the end of the model description (e.g. ZR28K3E) indicates use polyol ester oil. If polyol ester oil specified, use *Emcarate RL22CF, RL32CF or RL32-3MAF* oil. If mineral oil specified, use *Suniso 4GS* or similar. If in doubt contact **temperzone** or the compressor manufacturer/agent.

11 Crankcase Heaters

Fit crankcase heaters to compressor/s and suction accumulators (if fitted) for line lengths in excess of 30 m. Whenever crankcase heaters are fitted, 24 hour power supply is essential **otherwise warranty is void**.

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. 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.

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Table 1 SPLIT SYSTEM PIPING REQUIREMENTS

(for Units Supplied Pre-Charged)

Model	Compressor Ref.	STANDARD UNIT LIMITATIONS						MAXIMUM VERTICAL SEPARATION		ADDITIONAL REQUIREMENTS FOR EXTENDED LINE LENGTHS							
		Suction Line mm OD	Liquid Line mm OD	Max. Line Length m	Precharge [1] for 10m Line Length kg (R22) Using Mineral Oil	Precharge [1] for 10m Line Length kg (R22) Using POE Oil	Additional Charge for Pipe Length [1] g/m (R22)	Outdoor Unit above Indoor Unit (R.C./C.O.) [5] m	Indoor Unit above Outdoor Unit m	Suction Line mm OD	Liquid Line mm OD	Maximum Line Length m	Base Charge before any allowance for line length kg	Additional Charge for Pipe Length [1] g/m (R22)	Add Oil Beyond m	Additional Oil [6] ml/m	Compressor Crankcase Heaters Required Beyond [7] m
OSA 29	RM 5512	13	6	15	0.775	n/a	15 Max. 950g	10	10	–	–	15	Not suitable for extended line lengths under any circumstances				
OSA 45	RM 5518	13	6	15	1.1	n/a	20	10	10	–	–	25	Not suitable for extended line lengths under any circumstances				
		16	6	25	1.1	n/a	Max. 1500g										
OSA 73	ZR28K3	16	10	30	2.2	2.2	40	12 / 18	12	16	10	40	1.8	40	30	10	30
										19	10	40	1.8	40	30	10	30
OSA 85	ZR36K3	16	10	15	2.45	2.45	40	12 / 18	12								
		19	10	30	2.45	2.45	40	12 / 18	12	19	10	40	2.05	40	30	10	30
OSA 100/101	ZR42K3	19	10	30	2.8	2.8	40	12 / 18	12	19	10	40	2.4	40	30	10	Already fitted
OSA 126	ZR47KC	19	13	15	3.3	3.3	60	12 / 15	12								
		22	13	30	3.3	3.3	60	12 / 18	12	22	13	40	2.7	60	30	13	" "
OSA 127	ZR 48/49 KC	19	13	15	3.3	3.3	60	12 / 15	12								
		22	13	30	3.3	3.3	60	12 / 18	12	22	13	40	2.7	60	30	13	" "
OSA 146 B (twin)[8]	ZR28KC (x2)	16 (x2)	10 (x2)	30	2.2 (per sys.)	2.2 (per sys.)	40	12 / 18	12	16	10	40	1.8	40	30	10	30
										19	10	40	1.8	40	30	10	30
OSA 147	ZR61KCP	22	13	30	4.0	4.0	60	12 / 18	12	22	13	50	3.2	60	30	13	Already fitted
OSA 148	ZR61KCTF	22	13	30	4.0	4.0	60	12 / 18	12	22	13	50	3.2	60	30	13	" "
OSA 150	ZR61KC	22	13	30	3.8	3.8	60	12 / 18	12	22	13	50	3.2	60	30	13	" "
OSA 180/181	ZR72KC	22	13	30	4.7	5.54	60	12 / 18	12	22	13	50	4.1	60	30	13	" "
		28	13	30	4.7	5.54	60	12 / 18	12	28	13	50	4.1	60	30	13	" "
OSA 220/221	ZR81KC	28	13	30	5.76	7.14	60	12 / 18	12	28	13	50	5.16	60	30	13	" "
OSA 264/266	ZR108KC	28	13	30	7.5	8.9	60	12 / 18	12	28	13	50	6.9	60	30	13	" "

1 Pre-charged units include the Base Charge for the unit set plus charge sufficient for a 10 m line length as shown above and in Installation Instructions. Add the stipulated amount of refrigerant per m for line lengths above 10 m. Refrigerant charge varies depending on the type of compressor lubricant in use (refer page 5).

2 Refrigerant charging to be by weight (not by pressure or sight glass). Sight glasses are not recommended because of flash gas in liquid line.

3 Superheat must be checked at the service valve on cooling cycle during commissioning (3°C to 5°C at specified conditions; refer page 5).

4 Oil traps must be fitted to vertical suction risers at 5 m intervals (where outdoor unit is above indoor unit). Refer page 1 for recommended trap design.

5 R.C. = Reverse Cycle system; C.O. = Cooling Only system.

6 Oil should be added on extended line lengths (refer table above). For compressors with a sight glass fitted, add oil to maintain the level in the sightglass after 15 minutes running time.

7 Where crankcase heaters are fitted, 24 hour power supply is essential **otherwise warranty is void.**

8 Twin compressor, twin circuit system.

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Table 2 SPLIT SYSTEM PIPING REQUIREMENTS

(for Units Supplied with Holding Charge Only)

Model	Compressor Ref.	STANDARD UNIT LIMITATIONS			REFRIGERANT CHARGING					MAXIMUM VERTICAL SEPARATION		ADDITIONAL REQUIREMENTS FOR EXTENDED LINE LENGTHS				
					Base Charge [1] kg (R22)											
		Suction Line mm OD	Liquid Line mm OD	Maximum Line Length m	Using Mineral Oil	Using POE Oil	Additional Charge for Pipe Length[1] g/m (R22)	Add Oil Beyond m	Additional Oil [6] ml/m	Outdoor Unit above Indoor Unit m	Indoor Unit above Outdoor Unit m	Suction Line mm OD	Liquid Line mm OD	Maximum Line Length m	Compressor Crankcase Heaters Required Beyond m	Suction Accumulator with 24 hr Heaters Required Beyond m
OSA 250	ZR108	28	16	50	6.2	7.5	105	30	25	18	12	28	16	70	Already fitted	50
												35	16	70	" "	50
OSA260 A (tandem)	ZRT108	28	16	30	6.4	7.5	105	-	-	18	12	28	16	50 [5]	" "	–
												35	16	50 [5]	" "	–
OSA290 A (tandem)	ZRT122	28	16	30	6.35	8.0	105	-	-	18	12	28	16	50 [5]	" "	–
												35	16	50 [5]	" "	–
OSA 300	ZR125	28	16	50	6.35	8.0	105	30	25	18	12	28	16	70	" "	50
												35	16	70	" "	50
OSA 390	ZR16M3	35	16	50	8.0	8.0	105	30	30	18	12	35	16	70	" "	50
OSA 410 A (tandem)	ZRT162	35	16	30	8.0	8.0	105	-	-	18	12	35	16	50 [5]	" "	–
												41	16	50 [5]	" "	–
OSA 480	ZR19	35	19	50	10.1	10.7	150	35	30	18	12	35	19	70	" "	50
OSA 500 B (twin)	ZR108 (x2)	28 (x2)	16 (x2)	50	6.2 (per system)	7.5 (per system)	105	30	30	18	12	28	16	70	" "	50
												35	16	70	" "	50
OSA 600 B (twin)	ZR125 (x2)	28 (x2)	16 (x2)	50	6.35 (per system)	8.0 (per system)	105	30	30	18	12	28	16	70	" "	50
												35	16	70	" "	50
OSA 780 B (twin)	ZR16M3 (x2)	35 (x2)	16 (x2)	50	8.1 (per system)	9.5 (per system)	105	30	30	18	12	35	16	70	" "	50
												41	16	70	" "	50
OSA 920 B (twin)	SM185 (x2)	35 (x2)	19 (x2)	50	10.5 (per system)	n/a	150	30	35	18	12	35	19	70	" "	50
												41	19	70	" "	50

1 Units above are supplied with a 1 kg Holding Charge of refrigerant. Add sufficient charge to complete the Base Charge, then add the stipulated amount of refrigerant per m for your **total** pipe length. Refrigerant charge varies depending on the type of compressor lubricant in use (refer page 5).

2 Refrigerant charging to be by weight (not by pressure or sight glass). Sight glasses are not recommended because of flash gas in liquid line.

3 Superheat must be checked at the service valve on cooling cycle during commissioning (3°C to 5°C at specified conditions; refer page 4).

4 Oil traps must be fitted to vertical suction risers at 5 m intervals (where outdoor unit is above indoor unit). Refer page 1 for recommended trap design.

5 Line length not to exceed 50 m under any circumstances for tandem systems.

6 Oil should be added on extended line lengths (refer table above). For compressors with a sight glass fitted, add oil to maintain the level in the sightglass after 15 minutes running time.

7 'Tandem' denotes a twin compressor, single circuit system.
'Twin' denotes a twin compressor, twin circuit system.