TOSHIBA Leading Innovation

Product Bulletin

New 6 Series DI-Big Re-use of Existing Pipework

TOSHIBA are pleased to confirm the data detailed below to enable the re-use of existing refrigerant pipework for the Digital Inverter 6 series DI Big outdoor units.

1. Introduction

- This bulletin is designed to help the designer to understand the restrictions and implications when re-using the existing pipework, particularly when the pipework is the wrong size.

2. Applicable Models

- RAV-SM2246AT8-E
- RAV-SM2806AT8-E

3. Standard Piping Conditions

- Below are the standard design conditions when using the correct pipe sizes. Please refer to section 4 when using the non-standard pipe sizes

	Single			
Outdoor Unit	Allowable Pipe Length (m)		Height Difference (m)	
	Total Length L		Indoor – Outdoor H	
	Minimum	Maximum	Indoor Unit : Above	Outdoor Unit : Above
RAV-SM2246AT8-E	5	100	30	30
RAV-SM2806AT8-E	5	100	30	30

For further information please contact our customer support team on 0870 843 0333, your local representative, your supplier of TOSHIBA products or email any enquiries to: - general.enquiries@toshiba-ac.com

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Simultaneous Twin, Triple

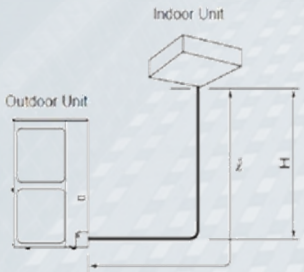
Outdoor Unit	Allowable Pipe Length (m)			Height Difference (m)		
	Total Length L1 + L2 L1 + L3 L1 + L4 Maximum	Branch Pipe L2 L3 L4 Maximum	Branch Pipe L3 – L2 L4 – L2 L4 – L2 Maximum	Indoor – Outdoor H		Indoor – Indoor (Δh)
				Indoor Unit : Above	Outdoor Unit : Above	
RAV-SM2246AT8-E	100	20	10	30	30	0.5
RAV-SM2806AT8-E	100	20	10	30	30	0.5

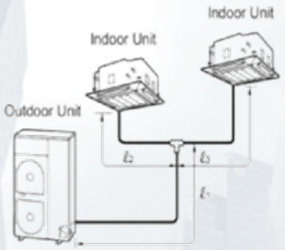
Outdoor Unit	Pipe Diameter				Number Of Bends
	Main Pipe		Branch Piping		
	Gas Side	Liquid Side	Gas Side	Liquid Side	
RAV-SM2246AT8-E	1 1/8	1/2	5/8	3/8	10 or less
RAV-SM2806AT8-E	1 1/8	1/2	5/8	3/8	10 or less

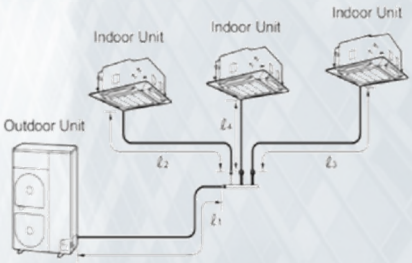
Simultaneous Double Twin

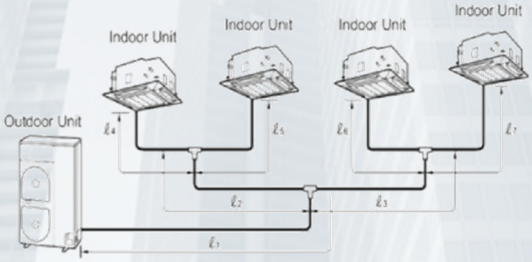
Outdoor Unit	Allowable Pipe Length (m)				Height Difference (m)		
	Total Length L1 + L2 + L4 L1 + L2 + L5 L1 + L3 + L6 L1 + L3 + L7 Maximum	Branch Pipe L4 L5 L6 L7 Maximum	Branch Pipe L4 + L2 L5 + L2 L6 + L3 L7 + L3 Maximum	Branch Pipe (L4+L2)-(L5+L2) (L4+L2)-(L6+L2) (L4+L2)-(L7+L2) (L5+L2)-(L6+L3) (L5+L2)-(L7+L3) (L6+L3)-(L7+L3) Maximum	Indoor Unit : As Above	Outdoor Unit : As Above	Indoor – Indoor (Δh)
RAV-SM2246AT8-E	100	15	20	6	30	30	0.5
RAV-SM2806AT8-E	100	15	20	6	30	30	0.5

Outdoor Unit	Pipe Diameter				Number Of Bends
	Main Pipe		Branch Piping		
	Gas Side	Liquid Side	Gas Side	Liquid Side	
RAV-SM2246AT8-E	1 1/8	1/2	L2,L3 : 5/8 L4,L5,L6,L7 : 1/2	L2,L3 : 3/8 L4,L5,L6,L7 : 1/4	10 or less
RAV-SM2806AT8-E	1 1/8	1/2	5/8	3/8	10 or less









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Single		
Diameter of Connecting Pipe (Liquid Side)	Additional Refrigerant (g/m)	Additional Refrigerant Amount (g) =
L	a	
1/2	90	a x (L – 30)

Simultaneous Twin						
Diameter of Connecting Pipe (Liquid Side)			Additional Refrigerant (g/m)			Additional Refrigerant Amount (g) =
L1	L2	L3	a	B	-	
1/2	3/8	3/8	90	45	-	a x (L – 28) + B x (L2 + L3 -4)

Simultaneous Triple					
Diameter of Connecting Pipe (Liquid Side)		Additional Refrigerant (g/m)			Additional Refrigerant Amount (g) =
L1	L2 to L4	a	B	-	
1/2	3/8	90	45	-	a x (L – 28) + B x (L2 + L3 + L4 - 6)

Simultaneous Double Twin							
Outdoor Unit	Diameter of Connecting Pipe (Liquid Side)			Additional Refrigerant (g/m)			Additional Refrigerant Amount (g) =
	L1	L2 to L4	L4 to L7	a	B	Y	
RAV-SM2246AT8-E	1/2	3/8	1/4	90	45	20	a x (L1 – 28) + B x (L2 + L3 – 4) + Y x (L4 + L5 + L6 +L7)
RAV-SM2806AT8-E	1/2	3/8	3/4	90	45	45	

4. Standard Piping Conditions

- This section is used to determine what non-standard pipework is acceptable and it also includes and capacity loss and additional restrictions on pipe lengths that must be considered

Liquid	3/8 (1-Size Smaller)					
Gas	7/8 (1-Size Smaller)		1 1/8 (Standard)		1 3/8 (1-Size Larger)	
Pipe Length	Max	Pre-Charged	Max	Pre-Charged	Max	Pre-Charged
RAV-SM2246AT8-E	100m*	30m*	100m	30m	45m	30m
RAV-SM2806AT8-E	100m*	30m*	100m	30m	45m	30m
Liquid	1/2 (Standard)					
Gas	7/8 (1-Size Smaller)		1 1/8 (Standard)		1 3/8 (1-Size Larger)	
Pipe Length	Max	Pre-Charged	Max	Pre-Charged	Max	Pre-Charged
RAV-SM2246AT8-E	100m*	30m*	100m	30m	45m	30m
RAV-SM2806AT8-E	100m*	30m*	100m	30m	45m	30m
Liquid	5/8 (1-Size Larger)					
Gas	7/8 (1-Size Smaller)		1 1/8 (Standard)		1 3/8 (1-Size Larger)	
Pipe Length	Max	Pre-Charged	Max	Pre-Charged	Max	Pre-Charged
RAV-SM2246AT8-E	70m*	20m*	70m	20m	45m	20m
RAV-SM2806AT8-E	70m*	20m*	70m	20m	45m	20m

*Cooling capacity is lower due to the diameter of the gas pipe being smaller than the standard size

- The capacity correction factor for the highlighted sections in the previous tables can be found using the following tables

Cooling Capacity Correction											
Unit	Gas Pipe	5 to 10m	10 to 20m	20 to 30m	30 to 40m	40 to 50m	50 to 60m	60 to 70m	70 to 80m	80 to 90m	90 to 00m
RAV-SM2246AT8-E	7/8	92 to 91%	91 to 89%	89 to 87%	87 to 86%	86 to 84%	84 to 81%	81 to 79%	79 to 77%	77 to 75%	77 to 75%
RAV-SM2806AT8-E											

- The capacity correction factor for the highlighted sections in the previous tables can be found using the following tables

Single		
Diameter of Connecting Pipe (Liquid Side)	Additional Refrigerant (g/m)	Additional Refrigerant Amount (g) =
L	a	
3/8	45	a x (L – 30)
5/8	120	a x (L – 20)

Simultaneous Twin						
Diameter of Connecting Pipe (Liquid Side)			Additional Refrigerant (g/m)			Additional Refrigerant Amount (g) =
L1	L2	L3	a	B	-	
3/8	3/8	3/8	45	45	-	a x (L1 - 28) + B x (L2 + L3 – 4)
5/8	3/8	3/8	120	45	-	a x (L1 – 18) + B x (L2 + L3 – 4)

Simultaneous Triple					
Diameter of Connecting Pipe (Liquid Side)		Additional Refrigerant (g/m)			Additional Refrigerant Amount (g) =
L1	L2 to L4	a	B	-	
3/8	3/8	45	45	-	a x (L1 – 28) + B x (L2 + L3 + L4 – 6)
5/8	3/8	120	45	-	a x (L1 – 18) + B x (L2 + L3 + L4 – 6)

Simultaneous Double Twin							
Outdoor Unit	Diameter of Connecting Pipe (Liquid Side)			Additional Refrigerant (g/m)			Additional Refrigerant Amount (g) =
	L1	L2 to L3	L4 to L7	a	B	Y	
RAV-SM2246AT8-E	3/8	3/8	1/4	45	45	20	a x (L1 – 28) + B x (L2 + L3 – 4) + Y x (L4 + L5 + L6 +L7)
	5/8	3/8	1/4	120	45	20	a x (L1 – 18) + B x (L2 + L3 – 4) + Y x (L4 + L5 + L6 +L7)
RAV-SM2806AT8-E	3/8	3/8	3/8	45	45	45	a x (L1 – 28) + B x (L2 + L3 – 4) + Y x (L4 + L5 + L6 +L7)
	5/8	3/8	3/8	120	45	45	a x (L1 – 18) + B x (L2 + L3 – 4) + Y x (L4 + L5 + L6 +L7)