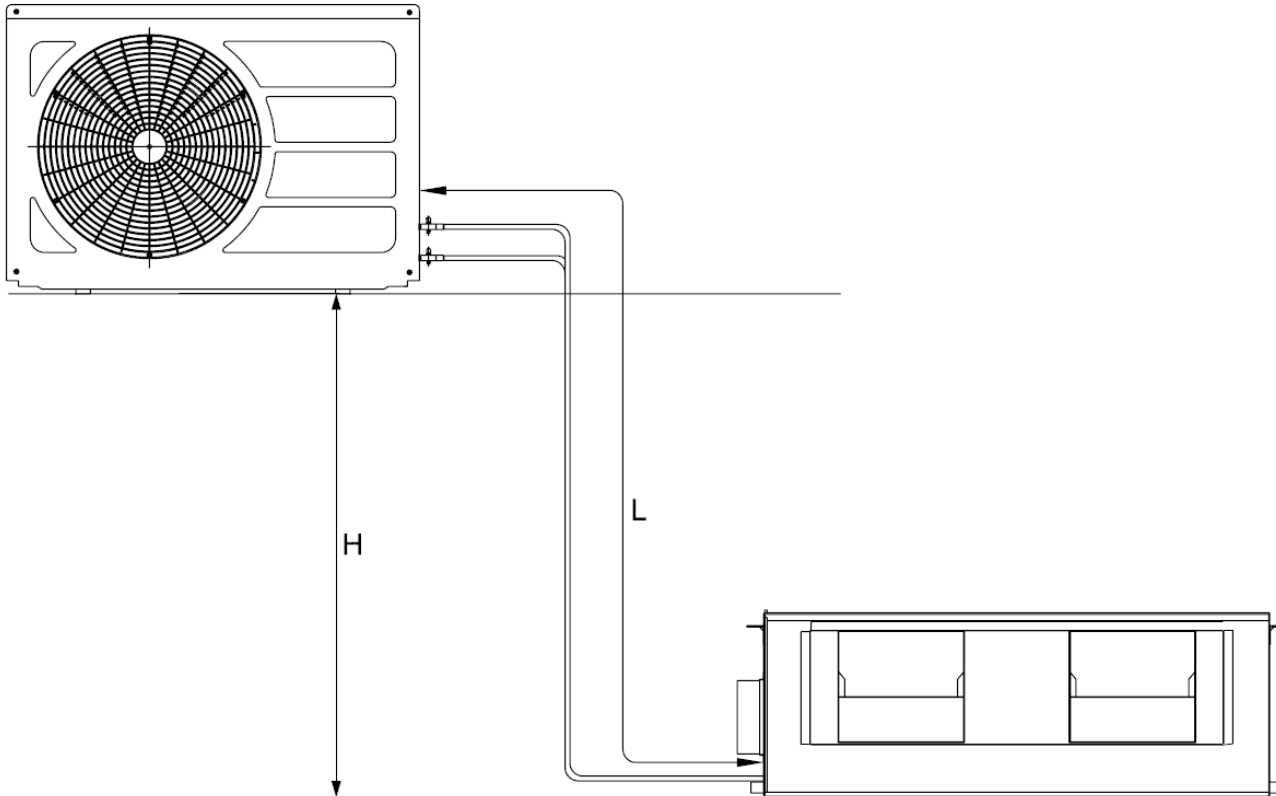
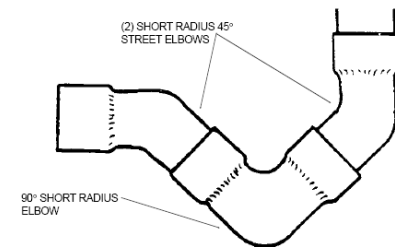
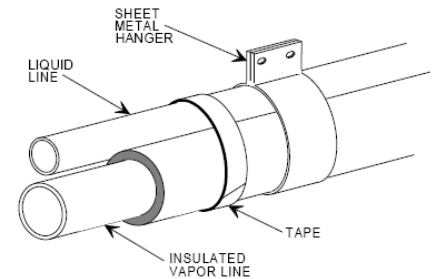


Refrigerant Pipe Design



General Guidelines

- Support all refrigerant lines at minimum intervals (4 feet) with suitable hangers and brackets.
- Insulate suction line.
- Install the lines with few bends as possible.
- Use long radius elbows wherever possible.
- Never solder liquid line and vapor line together.
- Exposed liquid line to direct sun must be insulated
- Install Oil Traps in suction line.
- Slope horizontal suction lines on cooling only systems approximately 1 inch every 20 feet toward the outdoor unit to facilitate proper oil return. Since the flow of refrigerant is bi-directional on heat pumps, horizontal vapor lines should be level.
- During brazing operations, flow Nitrogen through the system to prevent contamination.



Total Equivalent Line Length & Pressure Drop

The total equivalent length of the interconnecting tubing equals to sum of:

1. All Horizontal lengths
2. All Vertical lengths
3. All Elbows Equivalent lengths

Refrigerant Pressure drop Equals to:

Pressure drop due to friction

Minus

Static pressure **GAIN** due to the weight of refrigerant (Outdoor unit above Indoor Unit)

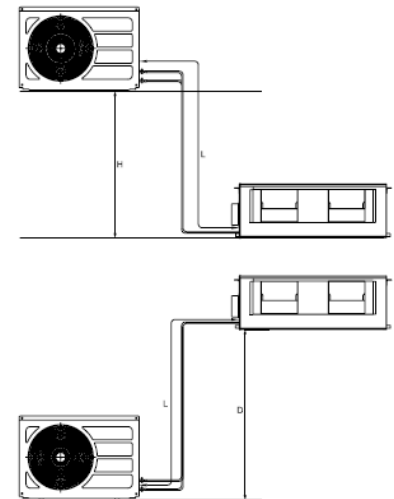
Plus

Static pressure **DROP** due to the weight of refrigerant (Indoor unit above Outdoor Unit)

TABLE 1 - EQUIVALENT LENGTHS OF ELBOWS

LINE SIZE INCHES (O.D.)	90° SHORT RADIUS ELBOW (FT.)*	90° LONG RADIUS ELBOW (FT.)
1/4	0.7	0.6
5/16	0.8	0.7
3/8	0.9	0.8
1/2	1.2	1.0
5/8	1.5	1.3
3/4	1.6	1.4
7/8	1.8	1.6
1-1/8	2.4	2.0

* Two 45° radius ells equals one 90° radius ell.



Line Sizing Considerations

SUCTION LINE

- 1000 fpm minimum Velocity.
- 3000 fpm maximum Velocity.

Low velocity leads to:

- Low oil return to compressor.
- Large pipe size.

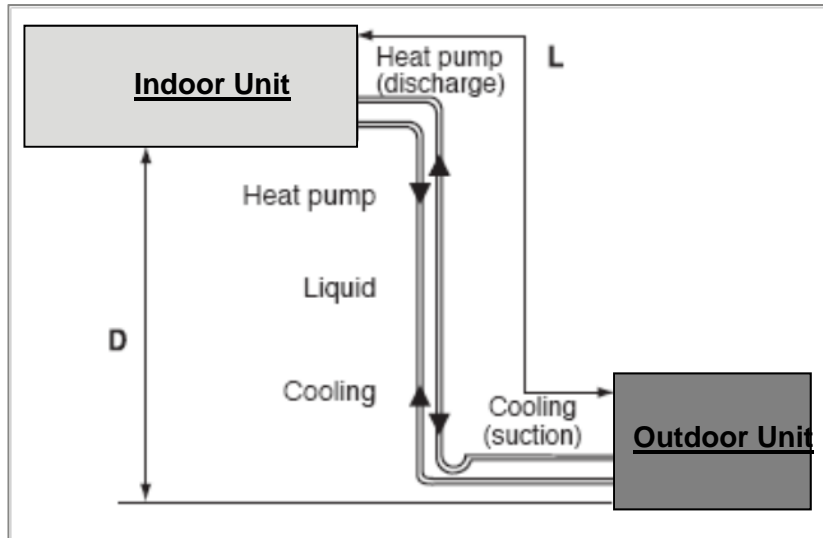
High velocity leads to:

- Refrigerant Noise
- Vibrating lines, especially at elbows
- High pressure drop.

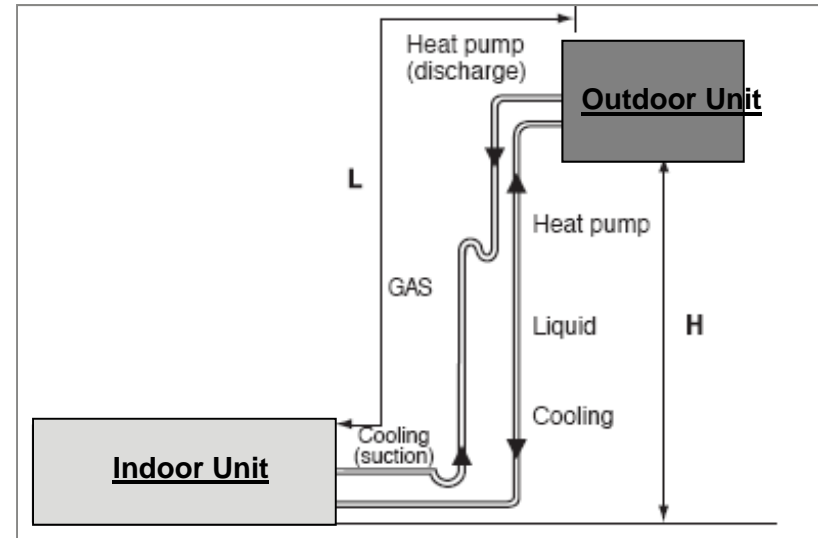
LIQUID LINE

- 100 fpm minimum Velocity.
- 400 fpm maximum Velocity.

Oil Traps



Indoor Unit above the Outdoor Unit



Outdoor Unit above the Indoor Unit

U trap to be installed on the suction side of the pipe work.

Pipe Sizing

Taurus Split Units Pipe Sizing and Capacity Deration Software Version 12.01

INPUT DATA ⁽¹⁾		
Type		
Units Configuration		
Outdoor Unit Model		
Vertical Pipe	Meter(s)	
Horizontal Pipe	Meter(s)	
Quantity of 90 Degree Elbow	No(s)	
Quantity of 45 Degree Elbow	No(s)	

INPUT DATA

INPUT DATA ⁽¹⁾		
Type		
Units Configuration		50Hz R22 Taurus Residential Split Units 60Hz R22 Taurus Residential Split Units 50Hz R407C Taurus Residential Split Units 50Hz R22 Taurus Commercial Split Units
Outdoor Unit Model		
Vertical Pipe	Meter(s)	
Horizontal Pipe	Meter(s)	
Quantity of 90 Degree Elbow	No(s)	
Quantity of 45 Degree Elbow	No(s)	

(1) Please input the data in the following sequence : Type then, Units Configuration then, Outdoor Unit Model then, Vertical Pipe then Horizontal Pipe then, Quantity of 90 Degree Elbow then, Quantity of 45 Degree Elbow.

Indoor Unit and Outdoor Unit Location

INPUT DATA ⁽¹⁾		
Type	50Hz R22 Taurus Residential Split Units	
Units Configuration		
Outdoor Unit Model	Indoor unit above Outdoor unit Outdoor unit above indoor unit	
Vertical Pipe	Meter(s)	
Horizontal Pipe	Meter(s)	
Quantity of 90 Degree Elbow	No(s)	
Quantity of 45 Degree Elbow	No(s)	

(1) Please input the data in the following sequence : Type then, Units Configuration then, Outdoor Unit Model then, Vertical Pipe then Horizontal Pipe then, Quantity of 90 Degree Elbow then, Quantity of 45 Degree Elbow Elbow.

Selecting Outdoor Unit Model

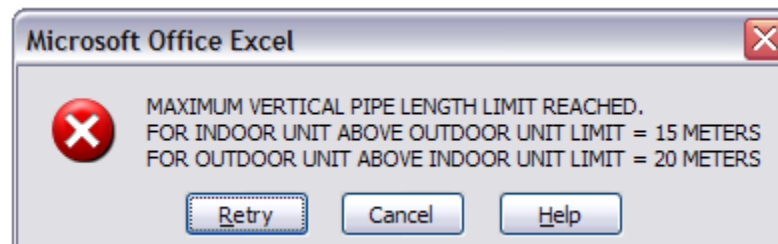
INPUT DATA ⁽¹⁾		
Type		50Hz R22 Taurus Residential Split Units
Units Configuration		Indoor unit above Outdoor unit
Outdoor Unit Model		
Vertical Pipe	Meter(s)	YE 1SD 12 YE 1TD 18 YE 1SD 18 YE 1TD 24 YE 1SD 24 YE 1TD 30 YE 1SD 30 YE 1TD 36
Horizontal Pipe	Meter(s)	
Quantity of 90 Degree Elbow	No(s)	
Quantity of 45 Degree Elbow	No(s)	

(1) Please input the data in the following sequence : Type then, Units Configuration then, Outdoor Unit Model then, Vertical Pipe then Horizontal Pipe then, Quantity of 90 Degree Elbow then, Quantity of 45 Degree Elbow.

Piping Lengths and Elbows

INPUT DATA ⁽¹⁾		
Type	50Hz R22 Taurus Residential Split Units	
Units Configuration	Indoor unit above Outdoor unit	
Outdoor Unit Model	YE1SD30	
Vertical Pipe	Meter(s)	4.00
Horizontal Pipe	Meter(s)	6.00
Quantity of 90 Degree Elbow	No(s)	2.00
Quantity of 45 Degree Elbow	No(s)	3.00

(1) Please input the data in the following sequence : Type then, Units Configuration then, Outdoor Unit Model then, Vertical Pipe then Horizontal Pipe then, Quantity of 90 Degree Elbow then, Quantity of 45 Degree Elbow.



Output Data (Low Rise Building)

OUTPUT DATA		
Equivalent Elbow	Meter(s)	2.67
Total Equivalent Length of Pipe	Meter(s)	12.67
Suction Tube Diameter	Inche(s)	5/8
Liquid Tube Diameter	Inche(s)	3/8
Quantity of Suction (U) Trap	No(s)	0.80
Refrigerant charge per Circuit to be added (gm) *	Gram(s)	309.81
Capacity Deration	%	0.04

Notes:

- 1 U trap to added for every 5 meter of vertical length
- *2 The extra refrigerant charge displayed is for reference only. For the final charge confirmation, the installer must take into consideration parameters like Subcooling, Superheating, Operating pressures and accordingly reconsider the refrigerant charge to be added.
- 3 Compressor type: Rotary/Recip/Scroll

Input Data (High Rise Building)

INPUT DATA ⁽¹⁾		
Type	50Hz R22 Taurus Residential Split Units	
Units Configuration	Indoor unit above Outdoor unit	
Outdoor Unit Model	YE1SD30	
Vertical Pipe	Meter(s)	4.00
Horizontal Pipe	Meter(s)	15.00
Quantity of 90 Degree Elbow	No(s)	2.00
Quantity of 45 Degree Elbow	No(s)	3.00

(1) Please input the data in the following sequence : Type then, Units Configuration then, Outdoor Unit Model then, Vertical Pipe then Horizontal Pipe then, Quantity of 90 Degree Elbow then, Quantity of 45 Degree Elbow.

Output Data (Reciprocating & Scroll Compressors)

OUTPUT DATA		
Equivalent Elbow	Meter(s)	2.67
Total Equivalent Length of Pipe	Meter(s)	21.67
Suction Tube Diameter	Inche(s)	3/4
Liquid Tube Diameter	Inche(s)	3/8
Quantity of Suction (U) Trap	No(s)	0.80
Refrigerant charge per Circuit to be added (gm) *	Gram(s)	875.21
Capacity Deration	%	0.07

Notes:

- 1 U trap to added for every 5 meter of vertical length
- *2 The extra refrigerant charge displayed is for reference only. For the final charge confirmation, the installer must take into consideration parameters like Subcooling, Superheating, Operating pressures and accordingly reconsider the refrigerant charge to be added.
- 3 **Compressor type:Reciprocating/Scroll, Rotary not allowed**

Suction Line Accumulator

INPUT DATA ⁽¹⁾		
Type	50Hz R22 Taurus Residential Split Units	
Units Configuration	Indoor unit above Outdoor unit	
Outdoor Unit Model	YE1SD30	
Vertical Pipe	Meter(s)	4.00
Horizontal Pipe	Meter(s)	25.00
Quantity of 90 Degree Elbow	No(s)	2.00
Quantity of 45 Degree Elbow	No(s)	3.00

(1) Please input the data in the following sequence : Type then, Units Configuration then, Outdoor Unit Model then, Vertical Pipe then Horizontal Pipe then, Quantity of 90 Degree Elbow then, Quantity of 45 Degree Elbow.

Suction Line Accumulator

OUTPUT DATA		
Equivalent Elbow	Meter(s)	2.67
Total Equivalent Length of Pipe	Meter(s)	31.67
Suction Tube Diameter	Inche(s)	3/4
Liquid Tube Diameter	Inche(s)	3/8
Quantity of Suction (U) Trap	No(s)	0.80
Refrigerant charge per Circuit to be added (gm) *	Gram(s)	1492.99
Capacity Deration	%	0.10

Notes:

- 1 U trap to added for every 5 meter of vertical length
- *2 The extra refrigerant charge displayed is for reference only. For the final charge confirmation, the installer must take into consideration parameters like Subcooling, Superheating, Operating pressures and accordingly reconsider the refrigerant charge to be added.
- 3 Compressor type:Reciprocating/Scroll, Rotary not allowed
- 6 Accumulator is to be added in suction line