USER MANUAL FOR DUCTED SPLIT UNIT

Thanks for selecting LARK DUCTED SPLIT SYSTEM. Your choice is an ideal investment that may bring you a more sweet and comfortable life.

Please read this manual carefully before installation.

Contents

Chapter One: Product Overview

Ⅰ. Major features

- 11 sizes available ranging from 19.5 kW to 103.7 kW cooling capacity.
- Cooling only and heat pump version.
- Wide application as hotel, apartment, villa, factory, shopping center, office building, school, etc.
- Panels and frame are made from metal steel protected with polyester powder painting to ensure total resistance to atmospheric agents.
- High efficiency scroll compressor for the whole range, with built-in thermal overload cut-out and crankcase heater, mounted on rubber vibration dampers.
- Compact indoor design, long air supply distance.
- Outdoor units are equipped with low noise axial fans.
- Split installation, connected by means of flare/welding coupling.
- Easy operation line controller:
  - Cooling/Heating/Fan/Auto
  - Error indication
  - Timing On/Off
- Multi safety protection
  - High/low pressure protection
  - Overheat protection
  - Current overload protection
  - Phase sequence relay
  - Time delay and antifreeze switch

OPTIONAL
- Additional electric heater on indoor unit
- Additional heating coil on indoor unit
- T3(Tropical climate)

Ⅱ. Nomenclature:

L AA H C S 20 W/N
❶ ❷ ❸ ❹ ❺ ❻ ❼

❶ L: Lark air product

❷ Unit type
AA: Air to Air
AW: Air to Water
WA: Water to Air
WW: Water to Water

❸ C: Cooling only
H: Heat pump

❹ Refrigerant type
--: R22
A: R410a
B: R134a
C: R407c

❺ Type of unit
P: Packaged type
S: Split type (Ducted split)

❻ Model

❼ Unit name
W: Outdoor unit
N: Indoor unit
W/N: The whole unit

Chapter Two: Technical Data

Ⅰ. TECHNICAL DATA

Mod.				20	25	32	36	42	48
Nominal cooling capacity*			kW	19.5	24.8	31.2	35.6	41.3	47.4
Nominal heating capacity**			kW	22.6	28.9	35.8	40.8	46.9	54.4
Connection									
Method			/	Flare	Flare	Flare	Welding	Welding	Welding
Liquid pipe diameter			¢mm	9.52x2	12.7x2	12.7x2	12.7x2	15.88/12.7	15.88/12.7
Gas pipe diameter			¢mm	15.88x2	19.05x2	19.05x2	19.05x2	28/19.05	28/19.05
Condensate pipe			DN	DN25	DN25	DN25	DN25	DN25	DN25
Power supply			/	380V/3N/50Hz					
OUTDOOR UNIT	**Compressor**								
	Qty/refrigerant circuit		Nr.	2/2	2/2	2/2	2/2	2/2	2/2
	Cooling power input*		kW	7.2	9.3	11.8	12.8	15.1	17.9
	Heating power input**		kW	7.13	9.21	11.68	12.67	14.95	17.72
	Cooling current		A	12.87	16.62	21.09	22.88	26.99	32.00
	Heating current		A	12.74	16.46	20.88	22.65	26.72	31.68
	Comp. starting current		A	2×46.2	2×65.8	2×65.8	155	105+65.8	127+65.8
	Energy adjustment		%	50-100	50-100	50-100	0-100	40-60-100	33-66-100
	Axial fans								
	Quantity		Nr.	1	1	1	1	2	2
	Airflow		m^3/h	9400	9400	12500	14200	18800	18800
	Sound pressure level***		dB(A)	67	67	68	70	71	71
	Dimension	**W**	mm	1020	1020	1180	1180	1640	1640
		H	mm	830	830	960	960	880	880
		D	mm	1030	1030	1130	1130	1130	1130
	Net weight		kg	170	180	220	230	260	280
INDOOR UNIT	**Centrifugal fans**								
	Quantity		Nr.	2	2	2	2	2	2
	Airflow		m^3/h	3500	4500	5650	6450	7400	8550
	ESP		Pa	120	100	150	130	180	200
	Sound pressure level***		dB(A)	64	64	66	66	68	68
	Dimension	**W**	mm	1660	1660	1660	1790	1840	2065
		H	mm	480	480	580	580	580	680
		D	mm	915	915	915	915	1045	1160
	Net weight		kg	90	100	150	160	180	200
Additional electric heater******			kW	2×3	2×4	2×5	2×6	2×6	2×8
Additional heating coil******			kW	22.2	28.4	35.1	40.0	46.0	53.3

Performance values refer to the following conditions:

* Cooling capacity is measured under the condition: indoor temperature DB 27°C/ WB 19°C, ambient temperature DB 35°C / WB 24°C.

** Heating capacity is measured under the condition: indoor temperature DB 20°C / WB 15°C, ambient temperature DB 7℃ / WB 6°C.

*** Sound pressure measured at a distance of 1 m and a height of 1.5 m above the ground in a dear field.

**** Optional as request.

- The standard conditions of capacity for heating coil: Nominal air flow, inlet water temperature 60℃, outlet water temperature 50℃, inlet air DB 20℃.
- If with the heating coil, the ESP will be 60～80Pa lower.
- If the ambient temperature is lower than 0℃ for heating use, the electric heater is required.

Mod.				52	62	72	88	104
Nominal cooling capacity*			kW	51.3	63.3	71.3	87.9	103.7
Nominal heating capacity**			kW	58.9	72.6	81.9	100.0	115.8
Connection								
Method			/	Welding	Welding	Welding	Welding	Welding
Liquid pipe diameter			¢mm	15.88/12.7	15.88×2	15.88×2	15.88×2	19.05×2
Gas pipe diameter			¢mm	28/19.05	28×2	28×2	28×2	35×2
Condensate pipe			DN	DN25	DN25	DN25	DN25	DN25
Power supply			/	380V/3N/50Hz				
OUTDOOR UNIT	**Compressor**							
	Qty/refrigerant circuit		Nr.	2/2	2/2	2/2	2/2	2/2
	Cooling power input*		kW	18.4	23.1	26.6	28.1	39.3
	Heating power input**		kW	18.22	22.87	26.33	27.82	38.91
	Cooling current		A	32.89	41.29	47.55	50.23	70.25
	Heating current		A	32.56	40.88	47.08	49.7	69.55
	Comp. starting current		A	155+65.8	2×127	2×155	2×135	2×175
	Energy adjustment		%	30-70-100	50-100	50-100	50-100	50-100
	Axial fans							
	Quantity		Nr.	2	2	2	2	2
	Airflow		m^3/h	21500	26500	29880	36500	43500
	Sound pressure level***		dB(A)	71	71	71	71	71
	Dimension	**W**	mm	1840	1840	2120	2155	2165
		H	mm	970	970	970	1300	1300
		D	mm	1130	1130	1130	2030	2105
	Net weight		kg	330	340	460	780	800
INDOOR UNIT	**Centrifugal fans**							
	Quantity		Nr.	2	2	2	2	2
	Airflow		m^3/h	9250	11450	12900	14800	17100
	ESP		Pa	200	300	300	280	500
	Sound pressure level***		dB(A)	68	68	69	69	70
	Dimension	**W**	mm	2165	1870	1870	2100	2100
		H	mm	608	980	1080	1180	1180
		D	mm	1160	1230	1230	1270	1270
	Net weight		kg	220	230	300	320	400
Additional electric heater******			kW	2×8	2×10	2×10	2×12	2×14
Additional heating coil******			kW	57.8	71.2	80.3	98.0	113.5

Performance values refer to the following conditions:

* Cooling capacity is measured under the condition: indoor temperature DB 27°C/ WB 19°C, ambient temperature DB 35°C / WB 24°C.

** Heating capacity is measured under the condition: indoor temperature DB 20°C / WB 15°C, ambient temperature DB 7℃ / WB 6°C.

*** Sound pressure measured at a distance of 1 m and a height of 1.5 m above the ground in a dear field.

**** Optional as request.

- The standard conditions of capacity for heating coil: Nominal air flow, inlet water temperature 60℃, outlet water temperature 50℃, inlet air DB 20℃.
- If with the heating coil, the ESP will be 60～80Pa lower.
- If the ambient temperature is lower than 0℃ for heating use, the electric heater is required.

Ⅱ. SELECTION TABLE FOR DIFFERENT CONDITIONS IN COOLING:

1).Model20

Indoor inlet air DB temp.	Indoor inlet air WB temp.	Ambient temperature							
		30		35		40		45	
		Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input
℃	℃	kW	kW	kW	kW	kW	kW	kW	kW
21	15	15.15	6.23	14.53	6.77	13.84	7.37	13.15	8.03
23	16	17.21	6.41	16.53	6.95	15.77	7.57	14.93	8.24
25	17	19.05	6.55	18.23	7.10	17.42	7.72	16.50	8.40
27	19	20.32	6.65	19.50	7.20	18.60	7.82	17.59	8.50
29	21	21.58	6.75	20.77	7.31	19.77	7.93	18.77	8.60

2).Model25

Indoor inlet air DB temp.	Indoor inlet air WB temp.	Ambient temperature							
		30		35		40		45	
		Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input
℃	℃	kW	kW	kW	kW	kW	kW	kW	kW
21	15	19.27	8.05	18.48	8.75	17.61	9.52	16.73	10.37
23	16	21.89	8.28	21.03	8.98	20.06	9.78	18.98	10.64
25	17	24.23	8.47	23.19	9.17	22.15	9.97	20.99	10.85
27	19	25.84	8.58	24.80	9.30	23.65	10.10	22.38	10.98
29	21	27.45	8.72	26.41	9.44	25.15	10.24	23.88	11.11

3).Model32

Indoor inlet air DB temp.	Indoor inlet air WB temp.	Ambient temperature							
		30		35		40		45	
		Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input
℃	℃	kW	kW	kW	kW	kW	kW	kW	kW
21	15	24.24	10.21	23.26	11.10	22.15	12.08	21.04	13.16
23	16	27.54	10.50	26.45	11.39	25.23	12.41	23.88	13.50
25	17	30.48	10.74	29.17	11.63	27.87	12.65	26.41	13.77
27	19	32.50	10.89	31.20	11.80	29.75	12.81	28.15	13.93
29	21	34.53	11.06	33.23	11.98	31.64	13.00	30.04	14.10

4).Model36

Indoor inlet air DB temp.	Indoor inlet air WB temp.	Ambient temperature							
		30		35		40		45	
		Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input
℃	℃	kW	kW	kW	kW	kW	kW	kW	kW
21	15	27.66	11.08	26.53	12.04	25.27	13.11	24.01	14.28
23	16	31.43	11.39	30.18	12.36	28.79	13.46	27.25	14.64
25	17	34.77	11.65	33.29	12.62	31.80	13.72	30.13	14.93
27	19	37.09	11.82	35.60	12.80	33.95	13.90	32.12	15.11
29	21	39.40	12.00	37.91	13.00	36.10	14.10	34.27	15.29

5).Model42

Indoor inlet air DB temp.	Indoor inlet air WB temp.	Ambient temperature							
		30		35		40		45	
		Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input
℃	℃	kW	kW	kW	kW	kW	kW	kW	kW
21	15	32.09	13.07	30.78	14.21	29.32	15.46	27.85	16.84
23	16	36.46	13.44	35.02	14.58	33.40	15.88	31.61	17.27
25	17	40.34	13.74	38.62	14.89	36.89	16.18	34.95	17.62
27	19	43.03	13.94	41.30	15.10	39.39	16.40	37.26	17.83
29	21	45.71	14.15	43.98	15.33	41.88	16.63	39.76	18.04

6).Model48

Indoor inlet air DB temp.	Indoor inlet air WB temp.	Ambient temperature							
		30		35		40		45	
		Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input
℃	℃	kW	kW	kW	kW	kW	kW	kW	kW
21	15	36.83	15.49	35.33	16.84	33.65	18.33	31.97	19.97
23	16	41.84	15.93	40.19	17.29	38.34	18.82	36.28	20.48
25	17	46.30	16.29	44.32	17.65	42.34	19.19	40.12	20.88
27	19	49.38	16.52	47.40	17.90	45.20	19.44	42.77	21.14
29	21	52.46	16.78	50.48	18.18	48.07	19.71	45.63	21.39

7).Model52

Indoor inlet air DB temp.	Indoor inlet air WB temp.	Ambient temperature							
		30		35		40		45	
		Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input
℃	℃	kW	kW	kW	kW	kW	kW	kW	kW
21	15	39.86	15.92	38.24	17.31	36.42	18.84	34.60	20.52
23	16	45.28	16.37	43.50	17.77	41.49	19.35	39.27	21.05
25	17	50.11	16.75	47.97	18.14	45.82	19.72	43.42	21.47
27	19	53.45	16.98	51.30	18.40	48.92	19.98	46.29	21.73
29	21	56.78	17.24	54.63	18.68	52.02	20.26	49.39	21.99

8).Model62

Indoor inlet air DB temp.	Indoor inlet air WB temp.	Ambient temperature							
		30		35		40		45	
		Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input
℃	℃	kW	kW	kW	kW	kW	kW	kW	kW
21	15	49.18	19.99	47.18	21.74	44.94	23.65	42.69	25.77
23	16	55.88	20.56	53.67	22.31	51.20	24.29	48.45	26.42
25	17	61.83	21.03	59.19	22.77	56.54	24.76	53.57	26.95
27	19	65.95	21.32	63.3	23.1	60.37	25.08	57.11	27.28
29	21	70.06	21.65	67.41	23.46	64.19	25.44	60.94	27.60

9).Molde72

Indoor inlet air DB temp.	Indoor inlet air WB temp.	Ambient temperature							
		30		35		40		45	
		Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input
℃	℃	kW	kW	kW	kW	kW	kW	kW	kW
21	15	55.40	23.02	53.14	25.03	50.62	27.23	48.09	29.67
23	16	62.94	23.67	60.45	25.69	57.67	27.97	54.57	30.43
25	17	69.65	24.21	66.67	26.22	63.68	28.51	60.35	31.03
27	19	74.28	24.55	71.30	26.60	67.99	28.88	64.33	31.41
29	21	78.92	24.93	75.93	27.01	72.30	29.29	68.64	31.78

10).Model88

Indoor inlet air DB temp.	Indoor inlet air WB temp.	Ambient temperature							
		30		35		40		45	
		Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input
℃	℃	kW	kW	kW	kW	kW	kW	kW	kW
21	15	68.29	24.31	65.50	26.42	62.39	28.76	59.28	31.34
23	16	77.58	25.02	74.51	27.12	71.09	29.54	67.30	32.16
25	17	85.87	25.56	82.18	27.71	78.52	30.13	74.38	32.78
27	19	91.60	25.95	87.90	28.10	83.84	30.52	79.29	33.17
29	21	97.28	26.34	93.62	28.53	89.12	30.95	84.61	33.56

11).Model104

Indoor inlet air DB temp.	Indoor inlet air WB temp.	Ambient temperature							
		30		35		40		45	
		Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input
℃	℃	kW	kW	kW	kW	kW	kW	kW	kW
21	15	80.57	34.01	77.27	36.95	73.60	40.23	69.93	43.83
23	16	91.52	34.99	87.91	37.94	83.86	41.32	79.40	44.98
25	17	101.31	35.75	96.95	38.75	92.64	42.14	87.75	45.85
27	19	108.06	36.30	103.70	39.30	98.91	42.68	93.54	46.40
29	21	114.76	36.84	110.45	39.90	105.14	43.28	99.82	46.94

Ⅲ. SELECTION TABLE FOR DIFFERENT CONDITIONS IN HEATING:

1). Model20, Indoor air flow 3500m^3/h

Indoor inlet air DB temp. (℃)										
			-3/-4		2/1		7/6		12/10.5	
	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input
	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
18	16.78	5.35	17.47	5.50	20.03	5.89	22.90	6.36	25.56	6.82
20	16.78	5.58	17.56	5.66	20.03	6.12	22.80	6.59	25.46	7.05
22	16.78	5.81	17.56	5.89	20.03	6.36	22.69	6.82	25.26	7.36
24	16.88	6.05	17.56	6.12	20.03	6.59	22.60	7.13	25.17	7.60

2). Model25, Indoor air flow 4500m^3/h

Indoor inlet air DB temp. (℃)	Outdoor inlet air DB/WB temp. ℃									
	-5/-5.5		-3/-4		2/1		7/6		12/10.5	
	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input
	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
18	21.45	6.91	22.34	7.11	25.61	7.61	29.28	8.21	32.69	8.81
20	21.45	7.21	22.46	7.31	25.61	7.91	29.15	8.51	32.56	9.11
22	21.45	7.51	22.46	7.61	25.61	8.21	29.02	8.81	32.31	9.51
24	21.59	7.81	22.46	7.91	25.61	8.51	28.90	9.21	32.19	9.81

3). Model32, Indoor air flow 5650m^3/h

Indoor inlet air DB temp. (℃)	Outdoor inlet air DB/WB temp. ℃									
	-5/-5.5		-3/-4		2/1		7/6		12/10.5	
	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input
	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
18	26.58	8.76	27.67	9.01	31.73	9.65	36.28	10.41	40.49	11.17
20	26.58	9.14	27.82	9.27	31.73	10.03	36.11	10.79	40.33	11.55
22	26.58	9.52	27.82	9.65	31.73	10.41	35.95	11.17	40.02	12.06
24	26.74	9.90	27.82	10.03	31.73	10.79	35.80	11.68	39.87	12.44

4). Model36, Indoor air flow 6450m^3/h

Indoor inlet air DB temp. (℃)	Outdoor inlet air DB/WB temp. ℃									
	-5/-5.5		-3/-4		2/1		7/6		12/10.5	
	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input
	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
18	30.29	9.50	31.54	9.78	36.16	10.47	41.34	11.29	46.15	12.12
20	30.29	9.92	31.71	10.05	36.16	10.88	41.16	11.71	45.96	12.53
22	30.29	10.33	31.71	10.47	36.16	11.29	40.97	12.12	45.61	13.08
24	30.47	10.74	31.71	10.88	36.16	11.71	40.80	12.67	45.44	13.50

5). Model42, Indoor air flow 7400m^3/h

Indoor inlet air DB temp. (℃)	Outdoor inlet air DB/WB temp. ℃									
	-5/-5.5		-3/-4		2/1		7/6		12/10.5	
	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input
	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
18	34.81	11.21	36.26	11.54	41.57	12.35	47.52	13.33	53.05	14.30
20	34.81	11.70	36.45	11.86	41.57	12.84	47.31	13.81	52.84	14.79
22	34.81	12.19	36.45	12.35	41.57	13.33	47.09	14.30	52.43	15.44
24	35.03	12.68	36.45	12.84	41.57	13.81	46.90	14.95	52.23	15.93

6). Model48, Indoor air flow 8550m^3/h

Indoor inlet air DB temp. (℃)	Outdoor inlet air DB/WB temp. ℃									
	-5/-5.5		-3/-4		2/1		7/6		12/10.5	
	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input
	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
18	40.38	13.29	42.05	13.68	48.21	14.64	55.12	15.79	61.53	16.95
20	40.38	13.87	42.28	14.06	48.21	15.22	54.87	16.37	61.28	17.53
22	40.38	14.45	42.28	14.64	48.21	15.79	54.62	16.95	60.81	18.30
24	40.63	15.02	42.28	15.22	48.21	16.37	54.40	17.72	60.59	18.88

7). Model52, Indoor air flow 9250m^3/h

Indoor inlet air DB temp. (℃)	Outdoor inlet air DB/WB temp. ℃									
	-5/-5.5		-3/-4		2/1		7/6		12/10.5	
	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input
	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
18	43.72	13.67	45.53	14.06	52.20	15.05	59.68	16.24	66.62	17.43
20	43.72	14.26	45.78	14.46	52.20	15.65	59.41	16.83	66.35	18.02
22	43.72	14.85	45.78	15.05	52.20	16.24	59.14	17.43	65.84	18.81
24	43.99	15.45	45.78	15.65	52.20	16.83	58.90	18.22	65.60	19.41

8). Model62, Indoor air flow 11450m^3/h

Indoor inlet air DB temp. (℃)	Outdoor inlet air DB/WB temp. ℃									
	-5/-5.5		-3/-4		2/1		7/6		12/10.5	
	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input
	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
18	53.89	17.15	56.12	17.65	64.34	18.89	73.57	20.38	82.12	21.88
20	53.89	17.90	56.42	18.15	64.34	19.64	73.23	21.13	81.79	22.62
22	53.89	18.64	56.42	18.89	64.34	20.38	72.90	21.88	81.15	23.62
24	54.23	19.39	56.42	19.64	64.34	21.13	72.60	22.87	80.86	24.36

9). Model72, Indoor air flow 12900m^3/h

Indoor inlet air DB temp. (℃)	Outdoor inlet air DB/WB temp. ℃									
	-5/-5.5		-3/-4		2/1		7/6		12/10.5	
	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input
	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
18	60.80	19.75	63.31	20.32	72.59	21.75	82.99	23.47	92.64	25.19
20	60.80	20.61	63.65	20.89	72.59	22.61	82.61	24.33	92.26	26.04
22	60.80	21.46	63.65	21.75	72.59	23.47	82.24	25.19	91.55	27.19
24	61.17	22.32	63.65	22.61	72.59	24.33	81.90	26.33	91.21	28.05

10). Model88, Indoor air flow 14800m^3/h

Indoor inlet air DB temp. (℃)	Outdoor inlet air DB/WB temp. ℃									
	-5/-5.5		-3/-4		2/1		7/6		12/10.5	
	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input
	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
18	74.25	20.87	77.30	21.46	88.63	22.98	101.33	24.82	113.10	26.61
20	74.25	21.77	77.70	22.08	88.63	23.88	100.00	27.82	112.65	27.51
22	74.25	22.67	77.70	22.98	88.63	24.82	91.00	28.10	111.77	28.72
24	74.69	23.61	77.70	23.88	88.63	25.71	94.00	27.26	111.37	29.65

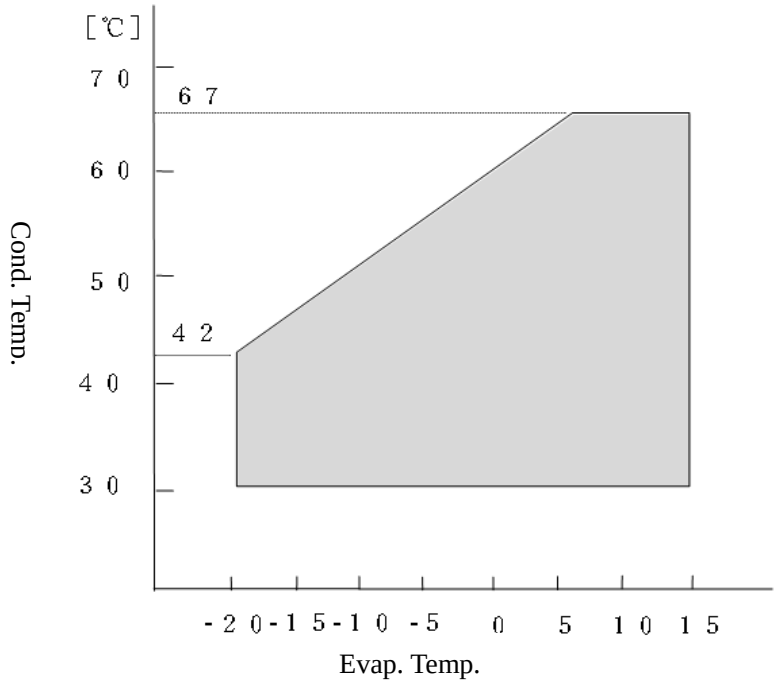
11). Model104, Indoor air flow 17100m^3/h

Indoor inlet air DB temp. (℃)	Outdoor inlet air DB/WB temp. ℃									
	-5/-5.5		-3/-4		2/1		7/6		12/10.5	
	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input	Total capacity	Power input
	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
18	85.98	29.20	89.51	30.01	102.63	32.14	117.34	34.71	130.97	37.22
20	85.98	30.45	89.98	30.89	102.63	33.40	115.80	38.91	130.45	38.47
22	85.98	31.71	89.98	32.14	102.63	34.71	105.38	39.30	129.43	40.17
24	86.49	33.02	89.98	33.40	102.63	35.96	108.85	38.13	128.97	41.47

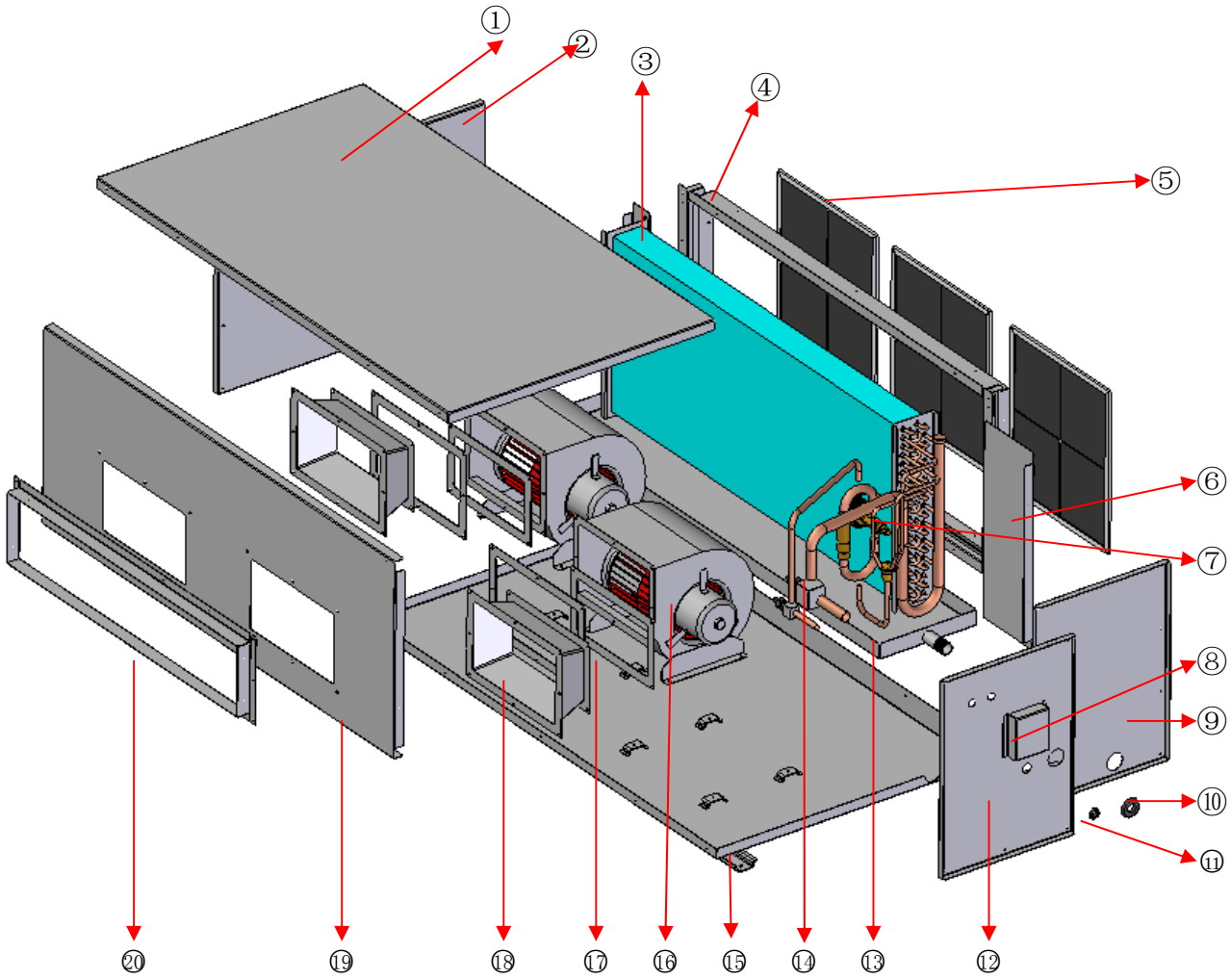
Ⅳ. HOT WATER HEATING COIL PERFORMANCE TABLE

Model	Inlet/outlet temp.（℃）							
	90/70		80/60		60/50		45/40	
	Heating capacity	Water flow	Heating capacity	Water flow	Heating capacity	Water flow	Heating capacity	Water flow
	kW	m3/h	kW	m3/h	kW	m3/h	kW	m3/h
20	38.406	1.6426	31.302	1.3179	22.2	1.91	14.43	2.4639
25	49.132	2.0984	40.044	1.6836	28.4	2.44	18.46	3.1476
32	60.723	2.5972	49.491	2.0838	35.10	3.02	22.815	3.8958
36	69.2	2.9584	56.4	2.3736	40.00	3.44	26	4.4376
42	79.58	3.4056	64.86	2.7324	46.00	3.96	29.9	5.1084
48	92.209	3.9474	75.153	3.1671	53.30	4.59	34.645	5.9211
52	99.994	4.2742	81.498	3.4293	57.80	4.97	37.57	6.4113
62	123.176	5.2632	100.392	4.2228	71.20	6.12	46.28	7.8948
72	138.919	5.934	113.223	4.761	80.30	6.90	52.195	8.901
88	169.50	7.290	138.20	5.940	98.0	8.43	63.7	10.95
104	196.4	8.44	160	6.88	113.5	9.76	73.8	12.68

Ⅴ. UNIT WORKING CONDITIONS RANGE

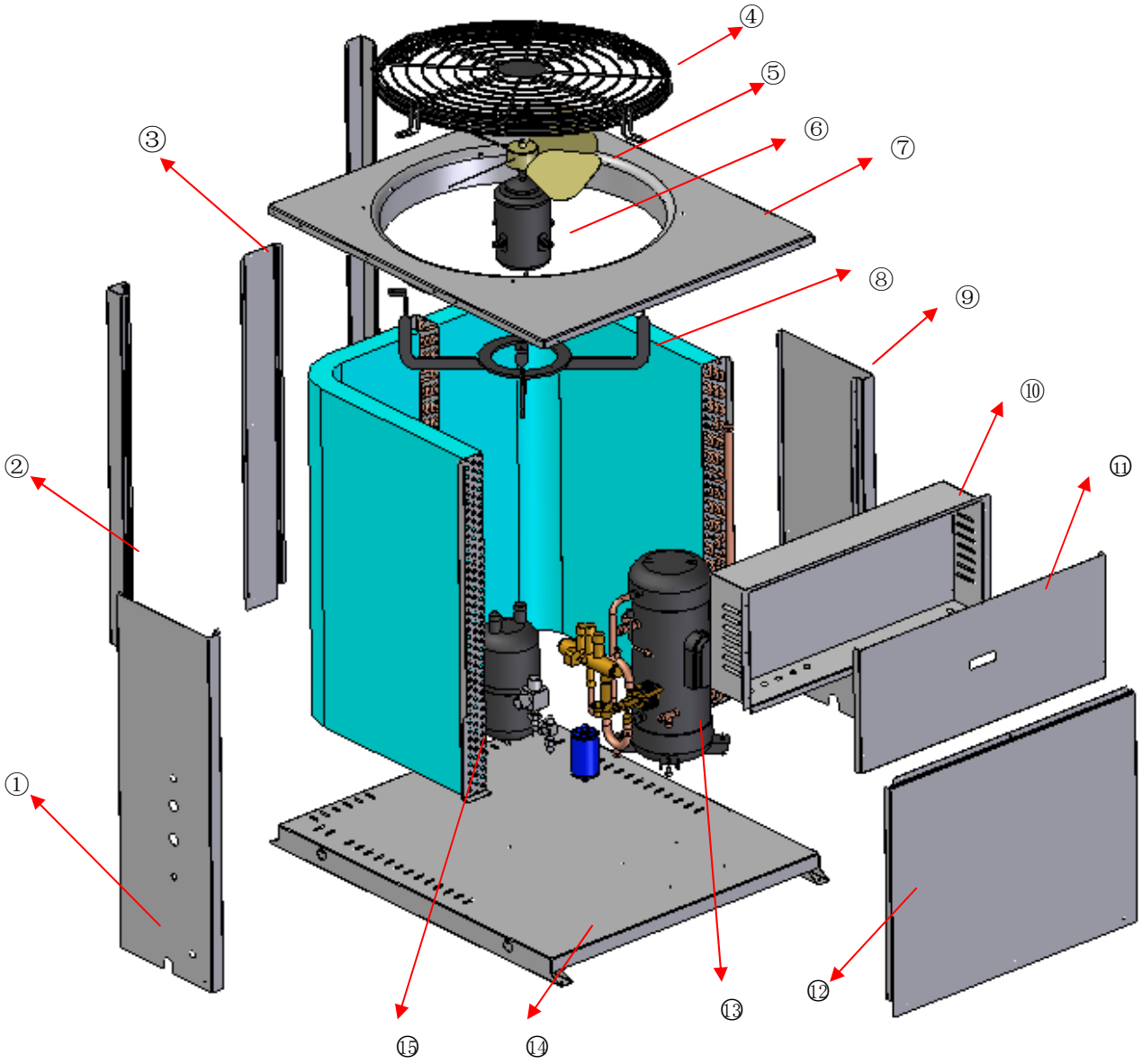


1). Indoor unit explosive view (Sample as Model36N)



No.	Name	No.	Name
1	Top cover	11	Rubber ring φ35
2	Left side panel	12	Right side panel 1
3	Evaporator assembly	13	Drain tray
4	Back frame assembly	14	Piping assembly
5	Filter assembly	15	Bottom board
6	Right panel of evaporator	16	Centrifugal fan
7	Throttle assembly	17	Fan cover
8	Electrical box	18	Flexible joint
9	Right side panel 2	19	Front panel
10	Rubber ring φ50	20	Front panel flange

2). Outdoor unit explosive view (Sample as Model36W)



No.	Name	No.	Name
1	Left side panel	9	Right side panel
2	Support frame	10	Electrical box
3	Connecting board	11	Electrical box cover
4	Fan guard	12	Access door
5	Fan blade	13	System parts
6	Fan motor	14	Base
7	Fan deck	15	Condenser assembly
8	Motor bracket		

Chapter Four: Installation

Note: Installation is to be done by the technical persons.

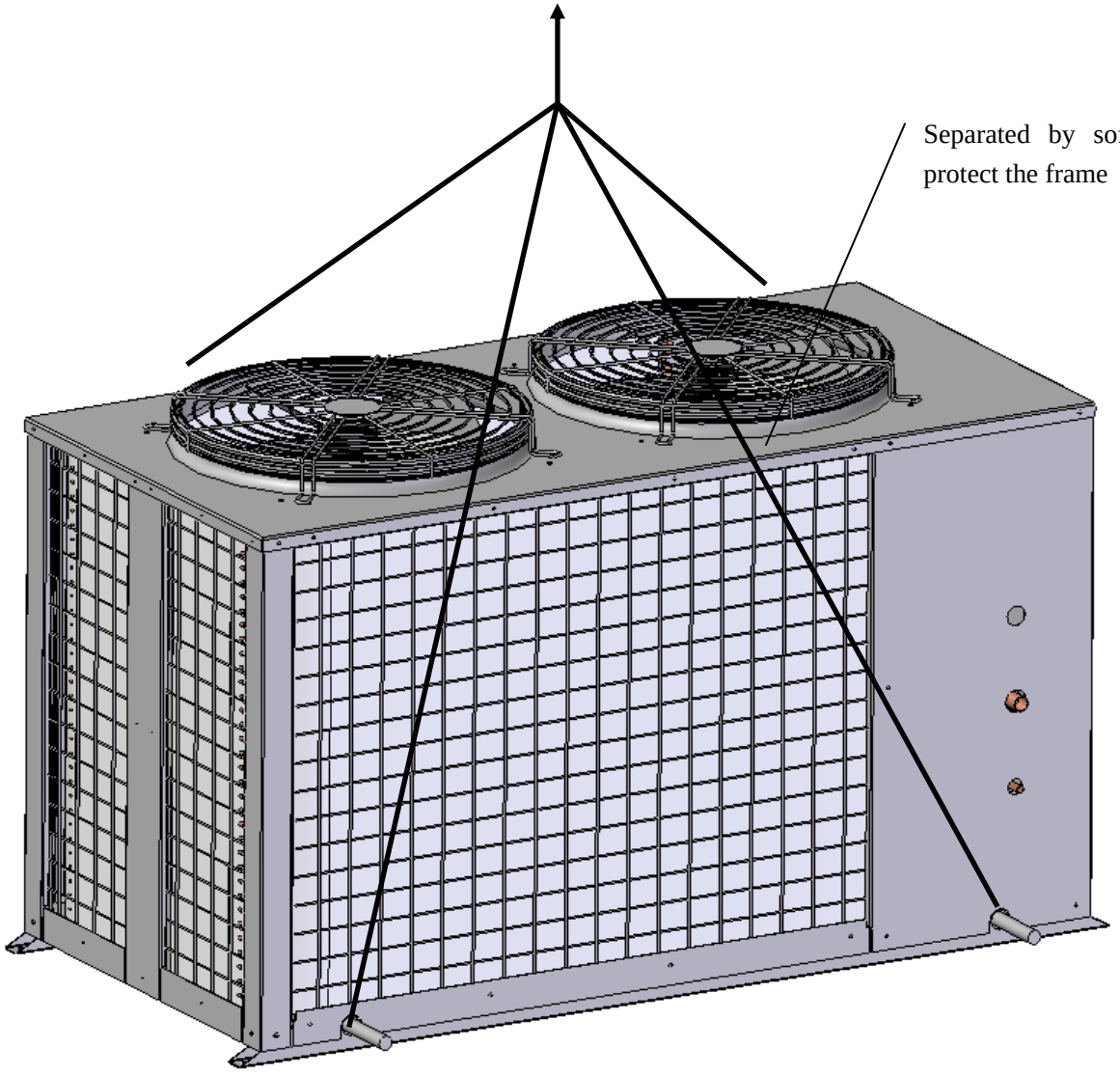
1. Hoisting and transportation

(1) Check and accept

Check carefully when receiving the goods and see that if there is any damage in the transport and count the component and parts according to the menu.

(2) Transportation and hoisting

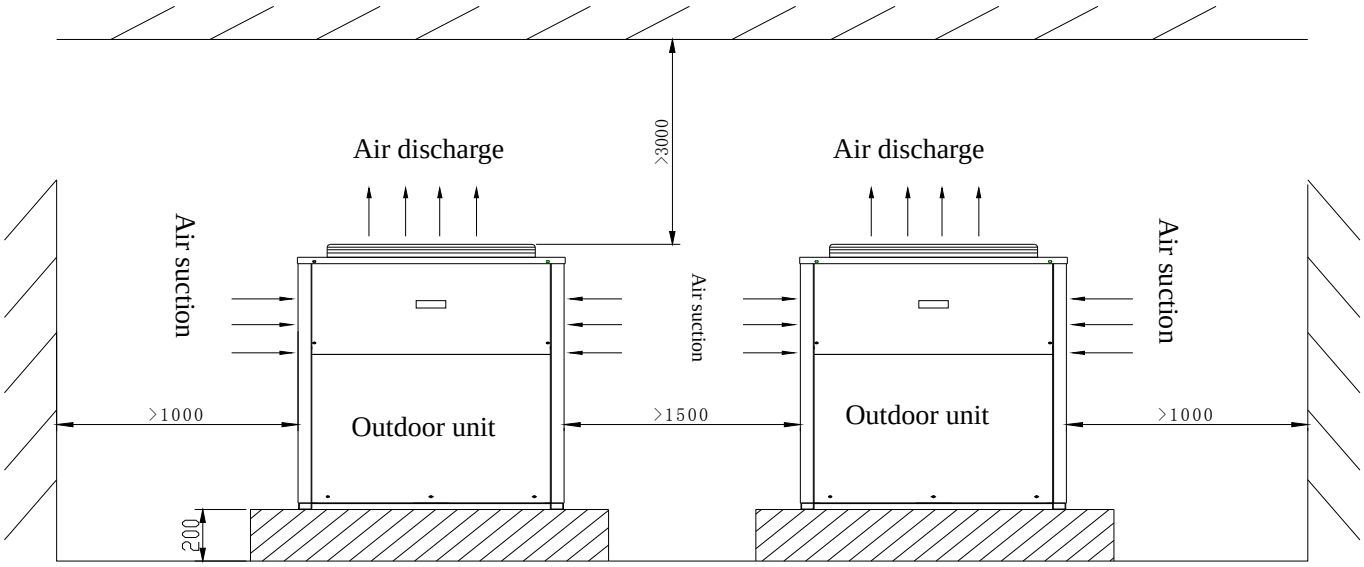
Hoist the units to the appointed place with thick rope. Damping measures should be taken during transportation. The units should keep level with the tilt angle less than 30°. The rope may not touch the fans and screen.

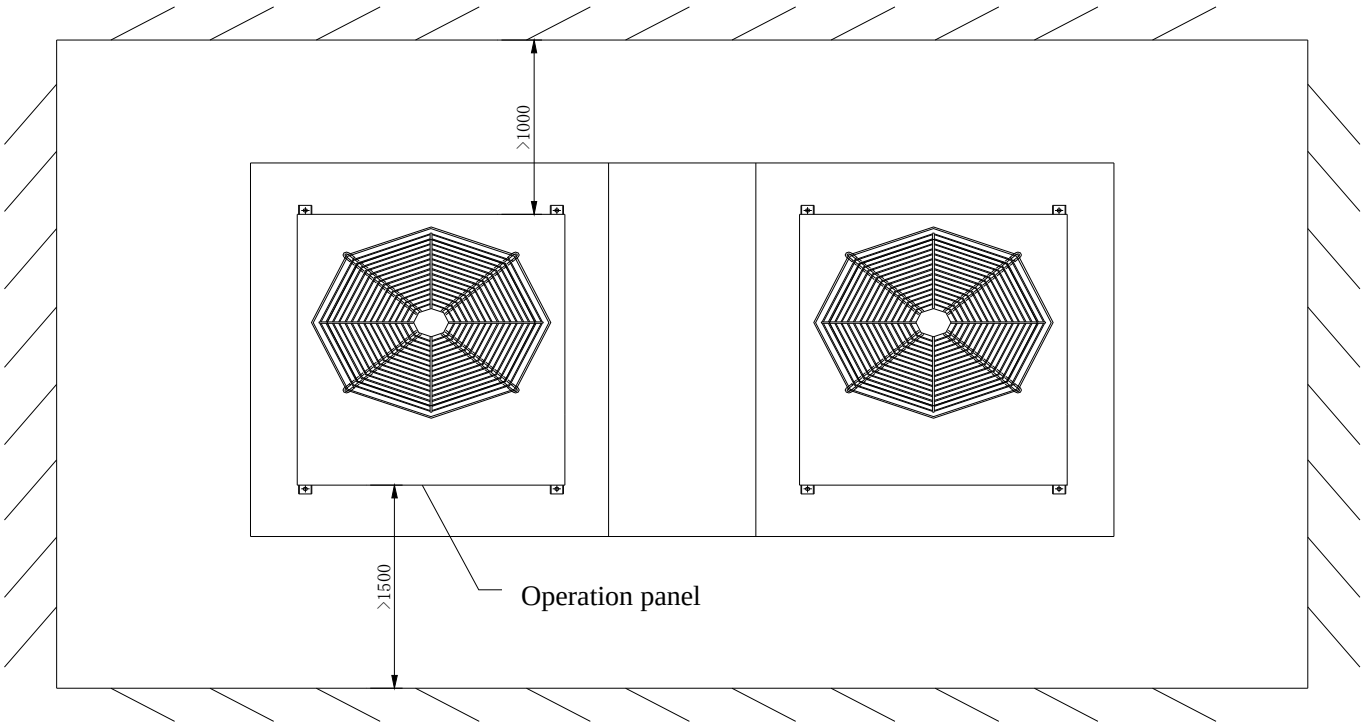


2. Installation of the unit

(1). Outdoor unit installation

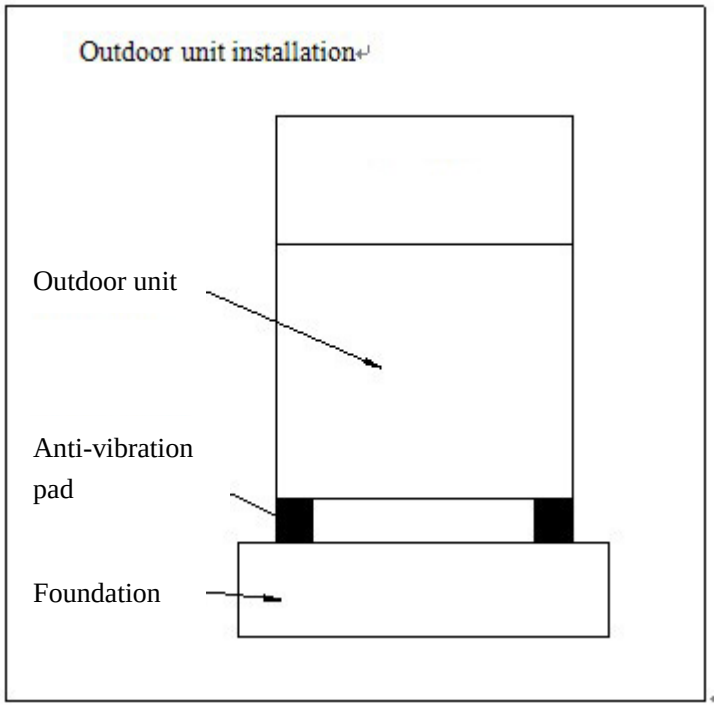
- Try to install the outdoor unit in the place where less people work and live, considering the noise.
- Please consider the condensate water and defrosting water to drain easily.
- The outdoor unit should be installed outside and keep proper distance from the neighbor wall for smooth air passing and easy repair. Keep the unit firm, level and a less than 5 Degree angle





- Please consider the weight load of the base, especially on the roof installation.
- The unit should be installed 200-300mm above the ground level of installation.

The unit can be fastened to the base by upset bolt. The base can be made by cement with a machine seat. An angle bar can also be applied as a support with a quakeproof rubber pad and be placed on the ground or roof, or be hanged on the wall or be placed on the support.

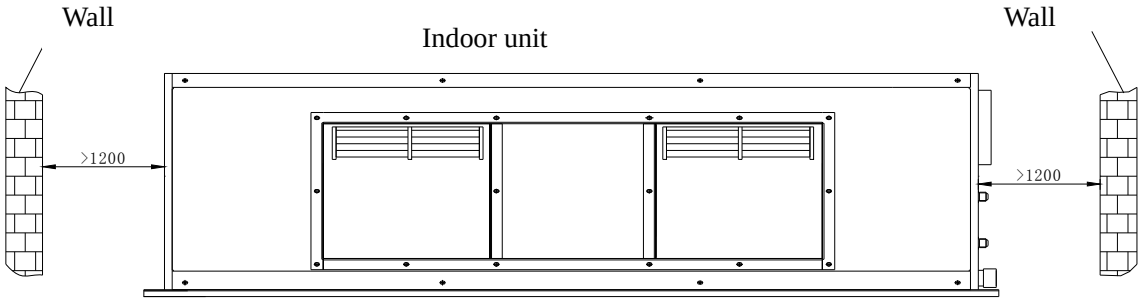


Caution:

1. Try to avoid the air discharge direction facing the yearly strong wind.
2. The position of the installation should be enough high. Place a decouple plate on the unit's base to reduce the shake passing.
3. Avoid installation at the places full of dirty things, falling leaves and insects, which may stop the heat-changer.
4. Try to cover a sun-shading umbrella on the units top.
5. Clean the heat-changer regularly for good efficiency.

(2) Indoor unit installation

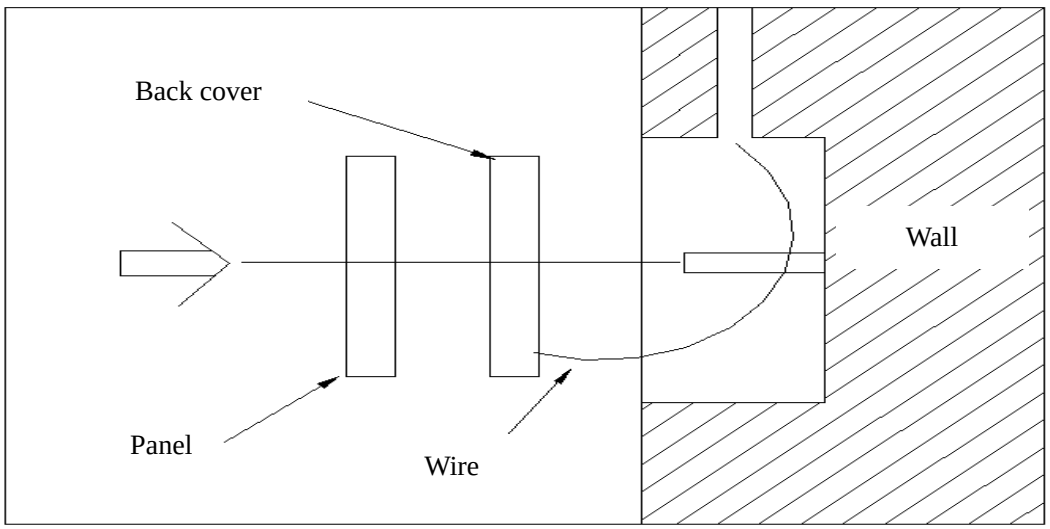
- There should be with some distance between the drain tray and ceiling to make the drain smoothly.
- Please consider the filter replacement and the service.



- Please consider the weight load of the frame of the building.
- Try to minimum the distance between the indoor unit and outdoor unit.
- Consider the convenience of the electric supply.

(3) Control panel installation

- Install it where it is easy to control.
- Install it where the AC is often to use and big space.
- Install it where good air circulation.



(4) Ambient conditions limitation

Ambient temperature:

Minimum		Maximum	
Cooling	Heating	Cooling	Heating
+15℃	-10℃	+43℃	+20℃

(5) The restriction of the cooling piping

① For heat pump unit.

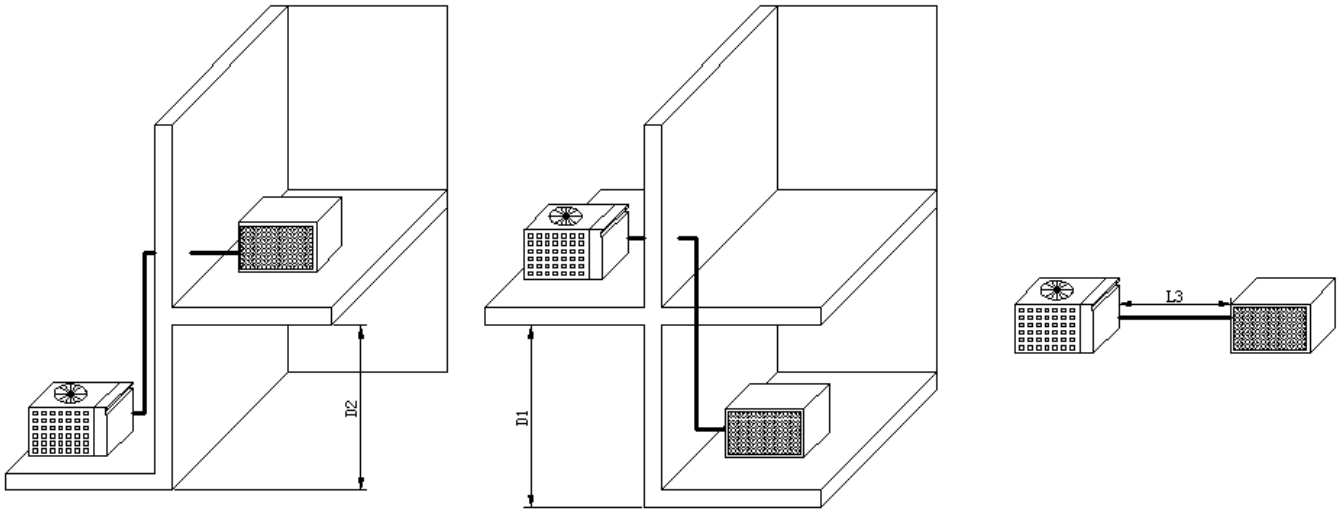
Model	Maximum Length L3 (m)	Maximum Fall D1 (m)	Maximum Fall D2 (m)
20	30	10	10
25	30	10	10
32	30	10	10
36	30	12	12
42	30	10	10
48	30	12	10
52	30	12	10
62	30	12	12
72	30	12	12
88	30	12	12
104	30	12	12

② For cooling only unit.

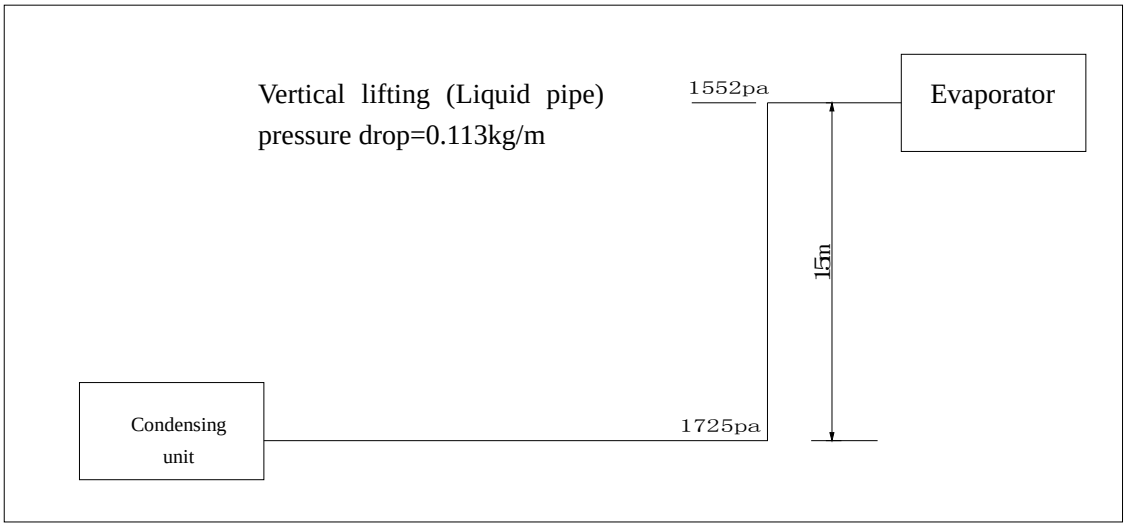
Model	Maximum Length L3 (m)	Maximum Fall D1 (m)	Maximum Fall D2 (m)
20	30	10	16
25	30	10	16
32	30	10	18
36	30	12	18
42	30	10	18
48	30	10	18
52	30	10	20
62	30	12	20
72	30	12	20
88	30	12	20
104	30	12	20

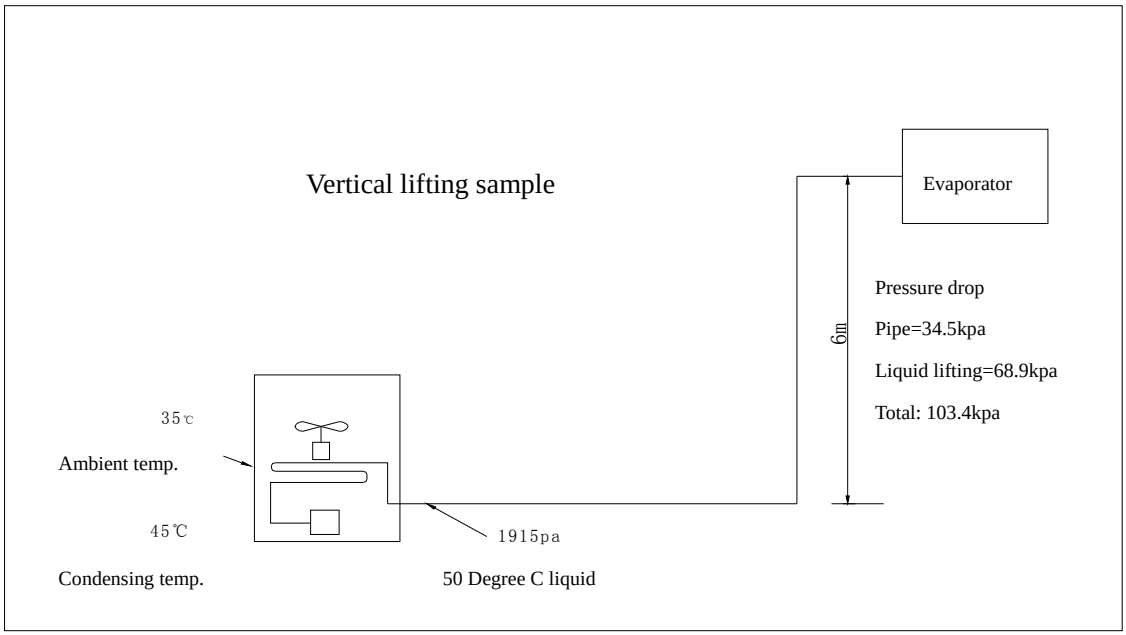
D1=Outdoor unit is above of the indoor unit. D2= Indoor unit is above of the outdoor unit.

Please see below drawing fro D1 and D2:



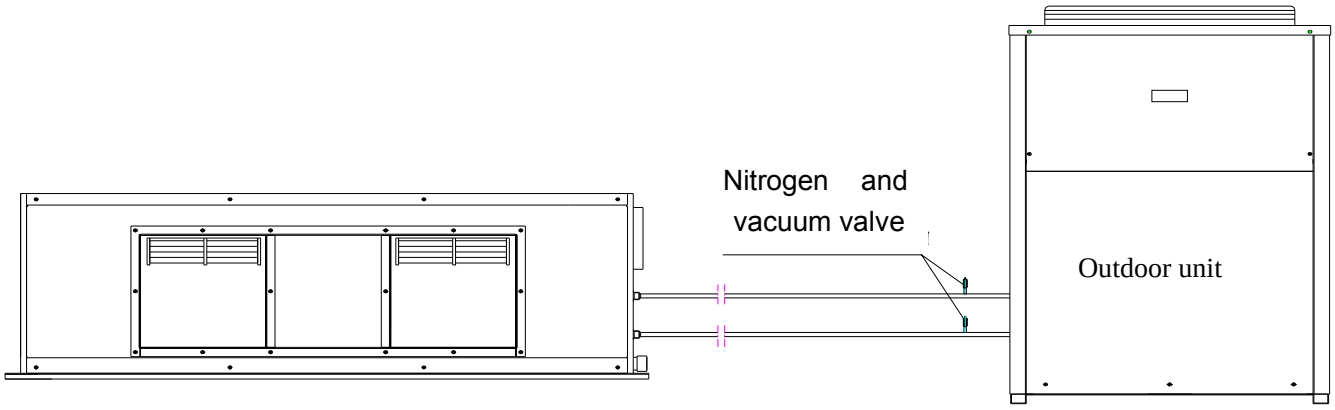
③ The height difference D1 and D2 is caused by the sub-cool, pressure drop and oil return etc.





3. Installation of the Refrigerant system

① Piping Diagram



Caution:

- The mouth of pipe should be well connected with the main engine and keep the braze pipe dry and without any garbage or impurities, or else serious fallout would be caused.

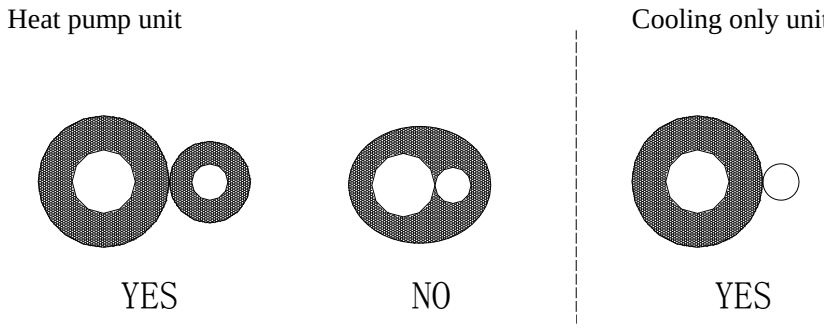
Model	20 W/N	25W/N	32W/N	36W/N	42W/N
Liquid pipe size	φ9.52X0.75/TP2	φ12.7X1.0/TP2	φ12.7X1.0/TP2	φ15.88X1.0/TP2	φ12.7X1.0/TP2 φ15.88X1.0/TP2
Gas pipe size	φ15.88X1.0/TP2	φ19X1.0/TP2	φ19X1.0/TP2	φ28X1.5/TP2	φ19X1.0/TP2 φ28X1.5/TP2

Model	48W/N	52W/N	62W/N	72W/N	88W/N	104W/N
Liquid pipe size	φ12.7X1.0/TP2 φ15.88X1.0/TP2	φ12.7X1.0/TP2 φ15.88X1.0/TP2	φ15.88X1.0/TP2	φ15.88X1.0/TP2	φ15.88X1.0/TP2	φ19X1.0/TP2
Gas pipe size	φ19X1.0/TP2 φ28X1.5/TP2	φ19X1.0/TP2 φ28X1.5/TP2	φ28X1.5/TP2	φ28X1.5/TP2	φ28X1.5/TP2	φ35X1.5/TP2
Copper tube standard: GB/T 17791-1999						

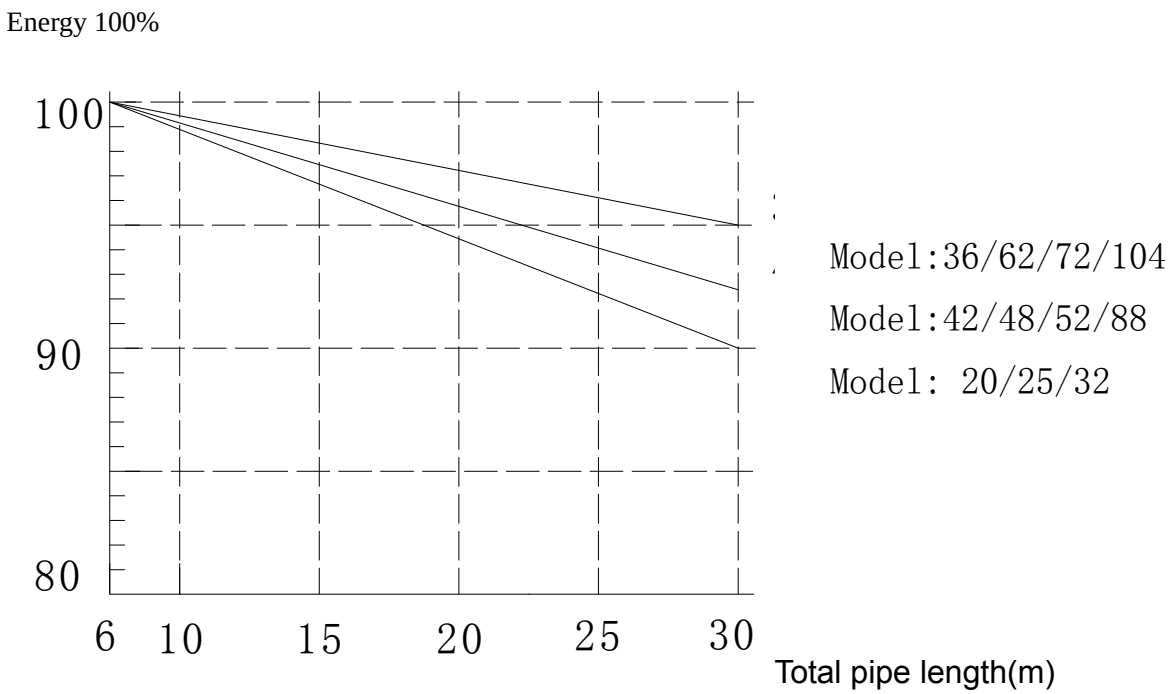
- Apply nitrogen protection when welding; in case of refrigerant escape, 2.4Mpa nitrogen should be charged in for leak detection after welding.
- After leak detection of Refrigerant pipes, nitrogen must be exhausted from the system and create vacuumed condition before starting the units.
- No folding in the process of pipe connecting to guarantee refrigerant circulation.
- Keep good heat protection of the piping for cooling effects and energy saving.
- Fully open the shutoff valve with proper force between the indoor and outdoor unit, and mind not damaging the braze pipe.

②. Pipe insulation of the Refrigerant system

- Adopt the fireproof rubber insulation pipe, the liquid pipe wall should not less than 10mm, and the gas pipe wall should not be less that 133mm (15mm is recommended).
- Please note the performance like fireproof, waterproof, insulation and aging etc if you use other materials.
- Wrap up the pipe connection by adhesive tape.

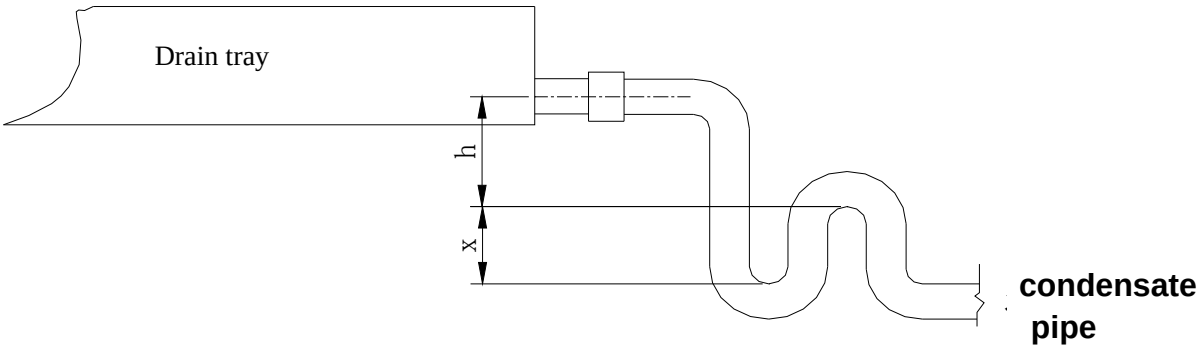


③. The correction coefficient with different length indoor pipe.



The above drawing is estimated and not accurate, by reasonable selection of the refrigerant pipe size and length, then make the best flow rate and minimum energy loss. Maximum length 30m, and maximum vertical height 12m.

④. The installation of the condensate pipe.

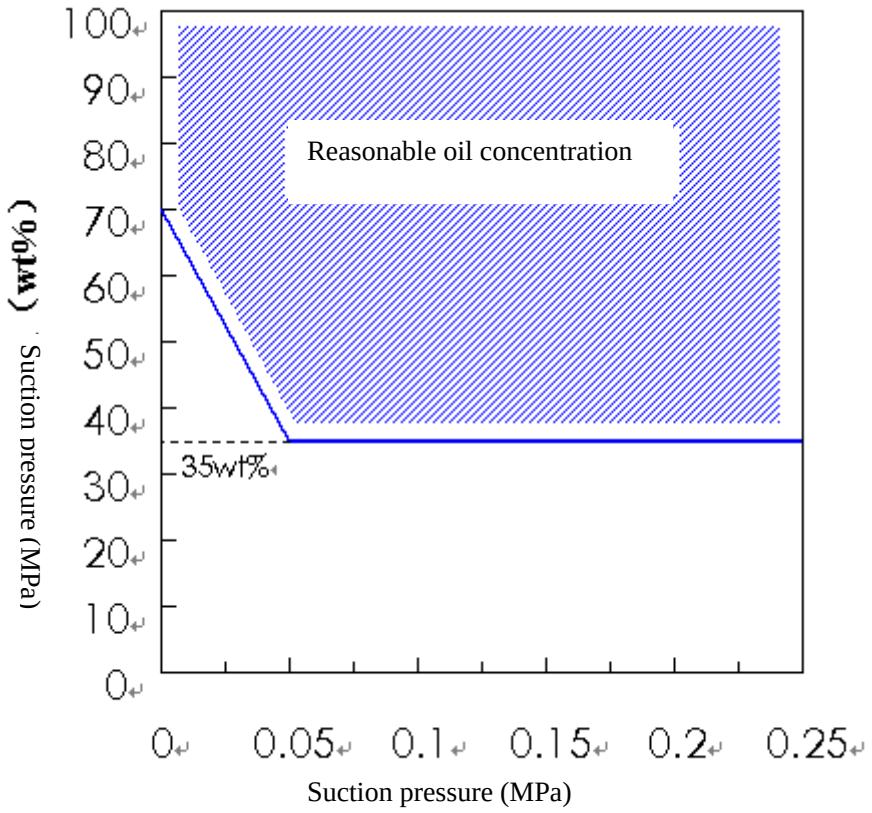


h=x≥P/10+20(mm),P is the exclusive pressure in the water pipe, unit: Pa.
The minimum value of h is 50mm.

The water temperature in the condensate pipe is lower, then it needs to be insulated. Meanwhile, in order to make sure the drain smoothly, then drain pipe should be gradient a little.

⑤. The installation for the oil return.

Please refer to below mentioned oil concentration range for the compressor working

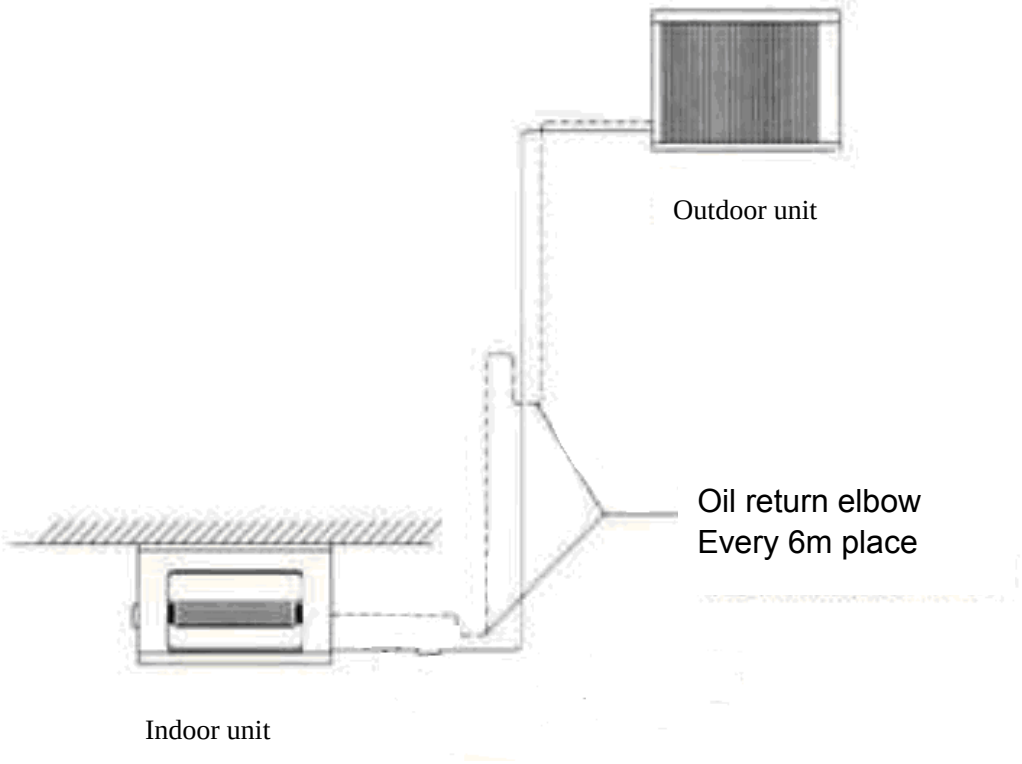


The pipe connection design principle:

1. Minimize connection pipe, less than 6m is recommended.
2. Minimize the height between the indoor and outdoor unit.
3. Minimize the number of the elbow on the pipe line.
4. If the length of the connection pipe between the indoor and outdoor unit is more than 30m, it is necessary to check the lubricant quantity. If necessary, please add more lubricant inside. Please see the lubricant model on the compressor nameplate.
5. The standard pipe length is 6m, and please also add the refrigerant if you need more pipe.
6. If the vertical height of the indoor and outdoor unit is more than 8m, it is necessary to add a oil return elbow on every 6m suction pipe distance .

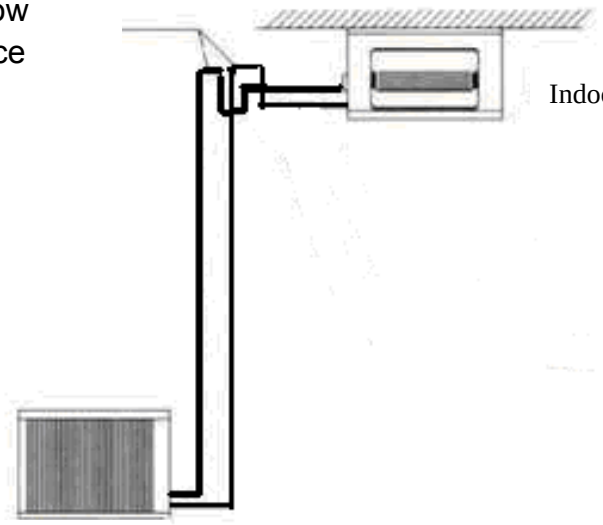
Please see below if the outdoor unit and indoor are not in same level.

A. The outdoor is above the indoor unit.



B, The indoor is above the outdoor unit. Near the indoor liquid and gas pipe.

Oil return elbow
Every 6m place



The refrigerant charging during commissioning:

Refrigerant Pipe	Specification	Charge (g/m)
Liquid pipe	φ12.7X1.0/TP2	120
	φ15.88X1.0/TP2	168
	φ19X1.0/TP2	250
Gas pipe	φ22X1.0/TP2	7.5
	φ28X1.5/TP2	13
	φ35X1.5/TP2	20

The unit is already charged as the 6m connection pipe, so if the connection pipe is less than 6m, then no need to charge it. If it is more than, then please refer to above and charge it accordingly.

4 Installation of the ducted system

The ducted system affects the operation of the whole unit. Pay special attention to the method of piping and installation, or else great inconvenience would be caused.

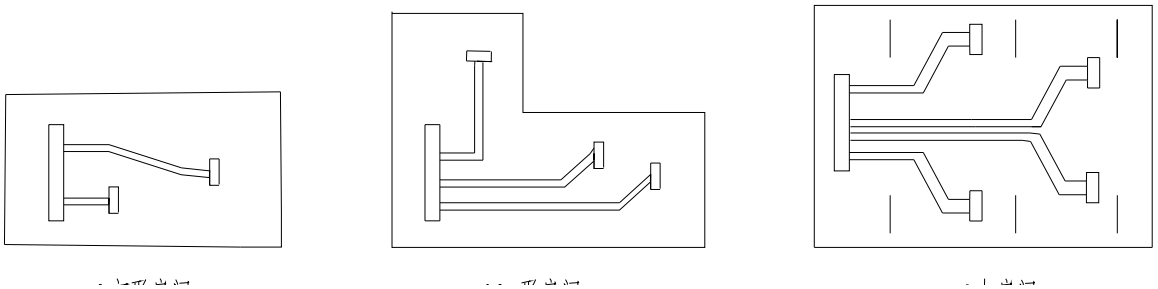
(1) Cautions of piping and installation:

1. The removable connection on the duct can not be put inside the wall or floorslab.
2. All the horizontal or vertical duct must use necessary hanging bracket, and its structure is subject to the contractor according to the field situation and make sure of its reliability and fastness.
3. 200~300mmflexible joint needs to be installed on both side of the duct which pass through the settlement joint, as well as the fan inlet and outlet. The flexible joint needs

to be fastened, and reducing duct is forbidden.

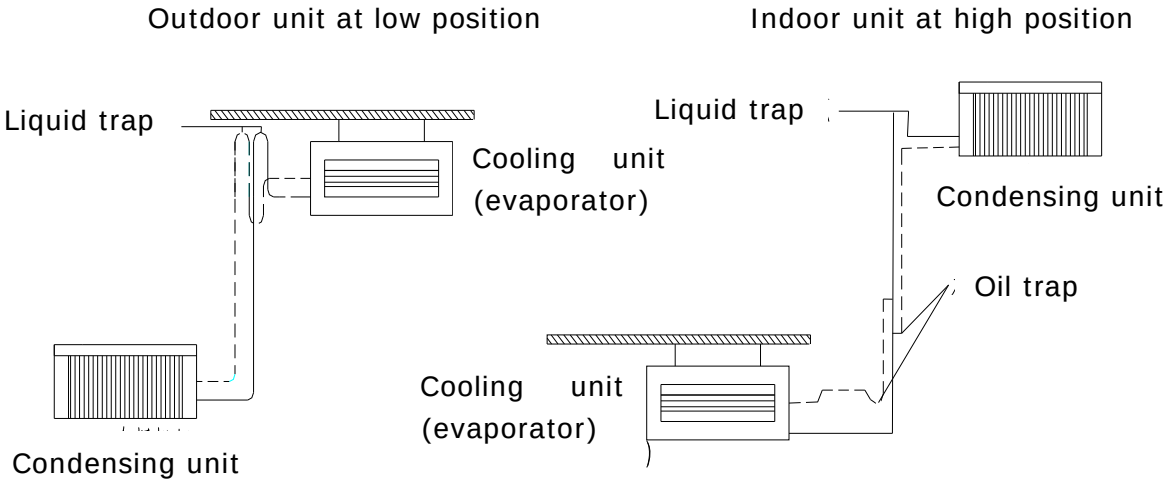
4. Duct hanging bracket should be installed outside of the insulation, and put some sole timber between the bracket and duct. Meanwhile, we should avoid to install a hanging bracket on flange, gauge hole, regulating valve etc.
5. When installing the fire damper and smoke damper, please firstly check its quality, activity, and reliability, and then install it if everything is fine.
6. When installing the regulating valve and butterfly Valve etc, make the operation handle on proper location for easy operation.
7. The installation location of the fire damper must conform to the design, and the air direction must conform to the arrow head on the valve body, opposite is forbidden.
8. The fire damper should have the hanging bracket separately.

(2) Piping for the differently shaped rooms

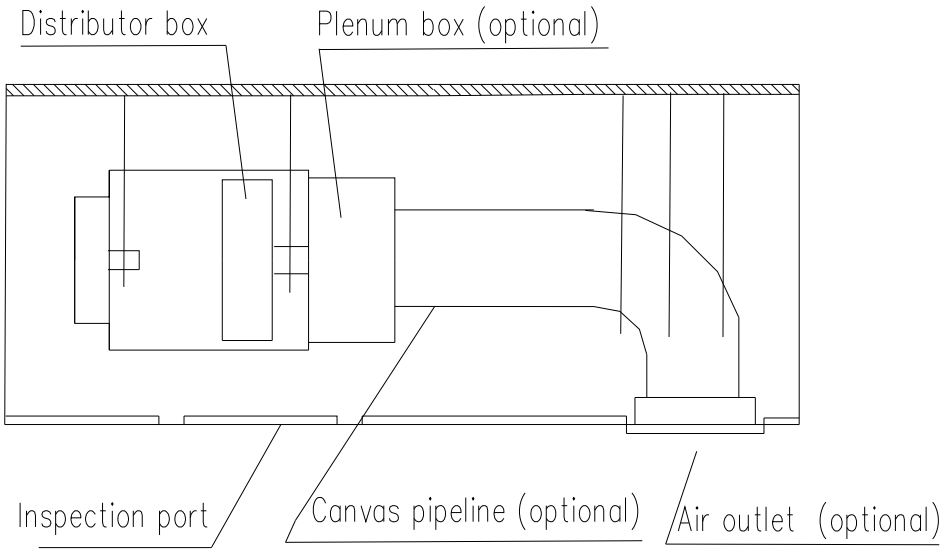


a) Square shape rooms　　b) L-shape rooms　　c) Large rooms

（2）The connecting method of indoor unit and outdoor unit



（4）Diagram for indoor unit installation



5. Installation of the electric system

Caution:

Wiring of the control system must strictly follow the National Electric Standard. The following is the details:

a) Power wire must be lead with suitable sectional surface area, chosen regarding to the input current of different types of units. It also requires equipping the fuses and circuit breaker with appropriate ampere ratio on the power supply return circuit. Power supply electric cable can't be connected by two separate electric cables. It's better to use the as the power wires of outdoor units, which can bear ultraviolet ray, also connect it with the general power of the power distributor box. Also it should be equipped with leak electricity switch and air switch, to deal with the overload situation. The outer covering of the unit should be earthed properly.

Model	Minimum power supply cable section	Voltage
20	$3\times6mm^2+1\times4mm^2+1\times2.5mm^2$	3×380V 50Hz
25	$3\times6mm^2+1\times4mm^2+1\times2.5mm^2$	
32	$3\times6mm^2+1\times4mm^2+1\times2.5mm^2$	
36	$3\times6mm^2+1\times4mm^2+1\times2.5mm^2$	
42	$4\times10mm^2+1\times4mm^2$	
48	$4\times10mm^2+1\times4mm^2$	
52	$4\times10mm^2+1\times4mm^2$	
62	$4\times16mm^2+1\times4mm^2$	
72	$4\times16mm^2+1\times4mm^2$	
88	$5\times25mm^2$	
104	$5\times25mm^2$	

b) To prevent water invading, there should be a wire circle before pulling the electric cable into the outdoor units. The wires inserted must be packed with insulation rubber so that it can’t be touched with any other electric appliance and mental accessories. Before connecting with the units, cold pressure terminal should be fixed on the electric cable.

c) Indoor must employ use for electric purpose only PVC and PVC connecting wire square box and be covered with a tap (can't use recycling material connecting wire box). Connection pipes such as elbows is not to be used in the vacant pipes which should be bended out with suitable elbow springs. The radius of the vacant pipe elbow is four times longer than the diameter of the pipe. No folding after the bending of the vacant pipe.

d) RVVP screened wires must be used as communication wires and be kept away from power wires. Parallel connection and series connection can be applied to the connection between the indoor units, outdoor units and the communication wire of the end temperature control box. But the connection between communication wire and wiring terminal must be connected as the figure shows.

e) End temperature control box is operation control box, also indoor temperature sampling box, so it must be installed in the area where it's convenient for operation and suitable for sampling environmental temperature. It also need to drill a hole on the wall where the end temperature control box is installed and use normal wall socket switch. Please refer to the figure.

Chapter Five: Operation and Testing Instruction

1. Operation and testing

(1) The first checking before the start

a) Check the power wire and the communication wire connection and ensure there is fine ground-protect.

b) Check if the heat retention of the duct system is good.

(2) The whole unit working testing

When finishing the whole checking of the system, it's time to have a whole testing with electricity.

a) Preheat the compressor for 6-7 hours before operation.

b) Switch on the power. Observe the controller for single system. If it displays the Fault code E10. Observe three-phase power monitor. If the red indicating lamp lights, there is something wrong with the three-phase power. Adjust the three –phase then start the unit. Shut the power and check if there i s any abnormal sound.

c) Check if the heating/cooling conversion of each unit is normal. Adjust the air supply valve of each room and ensure certain air in the each room. Set the working mode and see if it meets your requirement.

d) Observe the temperature change and see if it meets your requirement. The trial operation time usually lasts for 3 days.

Chapter Six: Operation Control Process

Please refer to the control manual separately

Chapter Seven: Repair and maintenance

1. Electric preparation.

(1) The unit should have special power with a fluctuation range of –12%----+10%. It needs an auto air switch with rated current that is 1.5 times as that of the units. Don't use knife-switch.

(2) The unit should be properly earthed.

(3) Don't operate the component switch frequently. There should be less than four times in one hour. The electric control box should avoid damp.

(4) Observe if the wiring of the three phase connection is rightly through the power protector.

(5) If any system failure occurs, please don't press the AC contactor to start the system without finding out the reasons.

(6) The necessary parameters before the installation have been sets by the Company and locked with a password. Generally, the customers are not allowed to change the parameters at discretion. If necessary, please contact the agents or the technicians of the Company.

2. The unit first start.

(1) The unit should be pre-heated for 6-7 hours before the first start each season. Single cooling units should release the water if they rest. Don't cut off the power when the hot pump units stop heating in winter.

(2) Keep well heat-exchanging environment. Clean the dust regularly.

(3) Don't close the valve of the units, or else the unit is damaged.

(4) Clean the fins of the condenser regularly.

Chapter Eight: Troubleshooting

Common breakdowns	Reason	Troubleshooting method
No signal on the panel	The power is not on	Power on
	The loss of phase or opposite phase in the three phase	Switch on the power, adjusting the phase
	The main controller's fuse breaks	Change the fuse
	The inside controller's fuse breaks there is a signal in the unit controller	Change the fuse
	The controller is damaged.	Change it
The direct light is shining	The communication lines are wrong connected	Correct them well.
	The communication lines are loose	connect them well.
	The controller is dead.	change it
The compressor doesn't work.	Something is wrong with the power	connect it well
	the design value of the temp controller is too high or too low	design it again
	the connect wires are loose.	Find out the reason and repair them
	Relay and fuse are bad	Repair or change
	the compressor has breakdown	Change a new one
Buttons don't work well	The controller stop.	Switch off the power and switch on again.
	The controller is damaged.	change it
Frequent opening of the compressor	Cold-producing medium is more or less to make high and low voltage switches is not normal	Testing and repairing, fill or reduce a part of the cold-producing medium
	Water cycling is not good	Cleaning the water filter or release all gas
	The return difference design value of the temperature controller is too low	Reset again
The plate displaying ON, but the component doesn't start or just stop	The filer is jam and cause a small flow	Cleaning the filter
	The system resistance is too big and the pump lift is less	Cleaning the pump, add the lift
	Air stopping cause less flow or no flow	Release all air
	The water temperature sensor is not well contracted	Repeat wiring firmly
	The water pump doesn't work.	Check the water pump and the wiring
	The flow switch is wrong adjusted or the guiding line is broken	Readjust or connect the wire

Too much noise from the component	Liquid cold-producing medium comes into the compressor	see if the expansion valve is bad or if the temperature sensor is loosen
	The inside parts are damaged	Change the compressor
Low efficiency of the unit heating	There is less cold-producing medium	Add enough cold-producing medium
	The water system can't keep temperature well	Improve the pipes' temperature keeping.
	The freezer can't release the heat well.	clean the freezer
	The water flow is less	clean the water filter
	The refrigeration system is bad	Check and change the dry filter
Frequent opening action of the high pressure protect of the compressor	The heat loss of the solidification device is not good	Clean the solidification device
	The cold-producing medium is too much	Let out unnecessary refrigerant
	The high voltage switch is wrong	Change it
	The unit's air is not good	Improve cooling condition
The water pumps don't work or send out noise	The power is wrong	Repair it
	The pump's electric machine is damaged	Change it
	There is air in the unit's water system	Let out all air
	The relay is wrong	Change it
The compressors are working while the unit doesn't freeze	The cold-producing medium give away	Check and repair, then fill
	The heat exchanger freeze	Find out the reason, then change it
	The compressor is wrong	Change it
The heating (freezing) rate go down	The water quality is too bad	Change the cycling water
	The unit's exhaust don't unimpeded	Get rid of obstacle
	The cold-producing medium give away	Check and repair, then fill
	There is dirt in the heat exchanger	Clean it
The freezing fan stop working	The relay is wrong	Change it
	The fan electric machine is damaged	Change it
	The fan is tight but the screw is loose and make the fan sliding on the electric machine axle	Fasten the screw