ComfortStar®
Air Conditioning & Heating Products

R410A T1 Air handler
Top-discharge Split Type
Technical Manual 60Hz

Applicable Model:

Indoor unit

CSH90-3

CSH120-3

Comfortstar **reserves the right to discontinue, or change specification or designs at any time without notices and without incurring obligations.**

Content

Part. 1 General information

1. Model Names of Indoor Units

Model names of units with heat pump:

Type	Indoor unit		Cooling capacity	
	Model	Power supply	kW	Btu/h
Air handler	CSH90-3	220V~, 3Ph, 60Hz	26.0	88,700
	CSH120-3		35.0	119,400

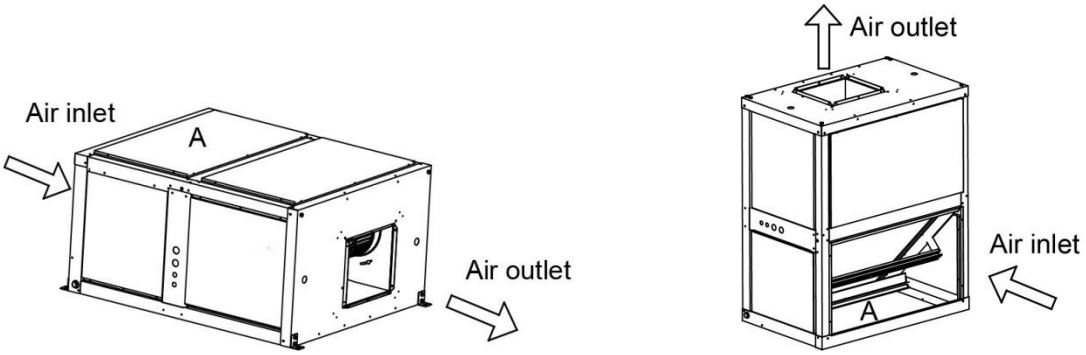
2. External Appearance

Part. 2 Performance

1. Features

✧ Flexible installation, horizontal installation as default, vertical installation is available.

As default, the airflow intake is from the rear of the unit. Then the unit can be installed as horizontal type. When move panel A to rear side, the airflow intake is changed to rear-top side . The unit could be installed as vertical type.



✧ Variable speed pulley.

- ✓ Change the speed of a rotating shaft member, so it will increase or decrease the revolutions per minute of that particular shaft to adjust CFM as required.
- ✓ The external static pressure can be adjusted up to 200Pa.

✧ 4 washable filters (grade G3) as standard, easy to maintenance.

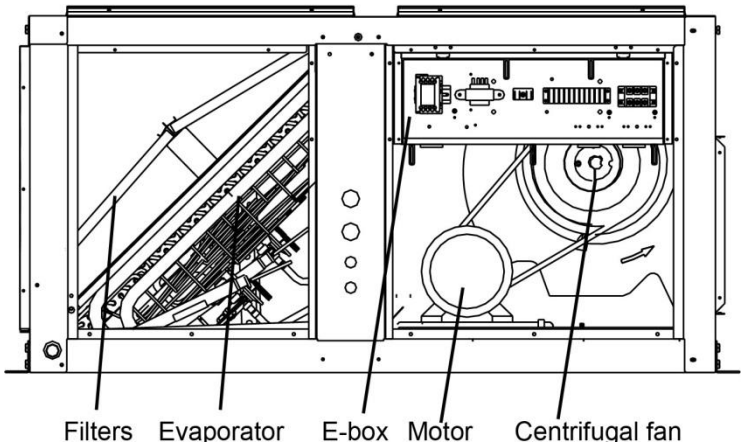
✧ 24V control signal between IDU and ODU, more safety.

✧ Air inlet and outlet flanges are standard and easy for duct connection.

✧ TXV (Thermal Expansion Valves) as standard, wired controller as optional.

✧ R410A refrigerant, environmentally friendly.

✧ Easy maintenance, Inlet & outlet pipe of evaporator, control box, fan and motor are in same side.



2. Specifications

Model			CSH90-3	CSH120-3
Power supply		\	230V~, 3Ph, 60Hz	230V~, 3Ph, 60Hz
Cooling (1)	Capacity	Btu/h	88,700	119,400
		W	26,000	35,000
	Input	W	9,000	12,100
	EER	W/W	2.89	2.89
Rated input (IDU)		W	1,600	1,800
Rated current (IDU)		A	6.6	7.8
Indoor air flow		CFM [L/s]	3,000 [1,417]	3,000 [1,417]
External static pressure		In.wg [Pa]	1.5(0.6-2.6)	1.5(0.6-2.6)
Indoor noise level		dB(A)	56	60
Refrigerant type		\	R410A	R410A
Refrigerant control		\	TXV	TXV
Fan	Type	\	Centrifugal fan	Centrifugal fan
	Diameter	In. [mm]	12-3/16 [Φ309]	12-3/16 [Φ309]
	Width	In. [mm]	12-1/8 [308]	12-1/8 [308]
motor	Motor model (×Quantity)	\	YE2-90L-4 (×1)	YE2-90L-4 (×1)
	Speed (Hi/med/lo)	r/min	1,680	1,680
Coil	Fin type	\	Hydrophilic aluminum fin	
	Tube type	\	Inner grooved copper pipe	
	Tube size	In. [mm]	1/4 [Φ7]	1/4 [Φ7]
	No. of rows	\	3	3
	Fin per Inch [mm]	\	17 [0.67]	17 [0.67]
	Tube pitch(a)×row pitch(b)	In. [mm]	13/16×1/2 [21×13.37]	
	Face area	sq. feet [m^2]	8.2 [0.758]	
	Number of circuits	\	10+10	10+10
Design pressure		Pa	4.4/2.6	4.4/2.6
Controller		\	KJR-25B (Wired controller) (Optional)	
Refrigerant pipe (Liquid/ Gas)		In. [mm]	3/8, 3/4 [Φ9.52, Φ19]	3/8, 3/4 [Φ9.52, Φ19]
Drain pipe size		\	3/4" NPT Female	3/4" NPT Female
Power wire (IDU)		\	3×2.5mm^2+1×1.0mm^2	3×2.5mm^2+1×1.0mm^2
Sign wire (IDU & ODU)		\	2×0.75mm^2+2×0.75mm^2	2×0.75mm^2+2×0.75mm^2
Dimension (W×H×D)		In. [mm]	44-7/8×28-3/8×57-1/8 [1,139×721×1,450]	
Packing (W×H×D)		In. [mm]	45-1/16×34-1/8×57-7/8 [1,145×867×1,470]	
Net/Gross weight		Lbs. [kg]	375/443 [170/201]	375/443 [170/201]

Notes:

1. The dates are based on the IDUs matched with ODUs MOVB-60CN1-X13.

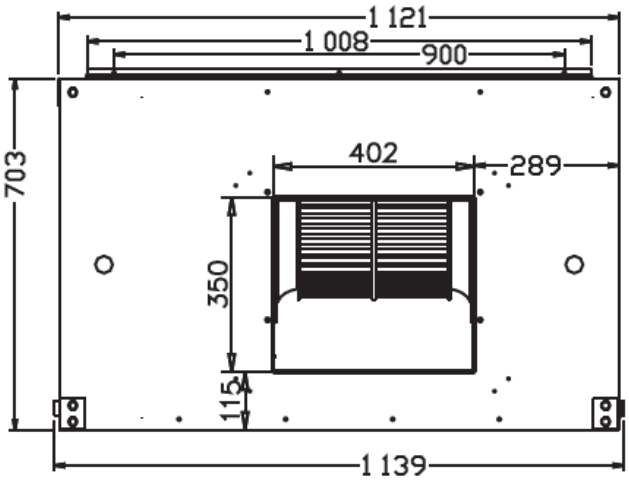
2. Nominal cooling capacities are based on the following conditions:

Indoor Temp.: 27°CDB, 19°CWB; Outdoor Temp.: 35°CDB, 24°CWB; Equivalent refrigerant pipe: 7.5m (horizontal).

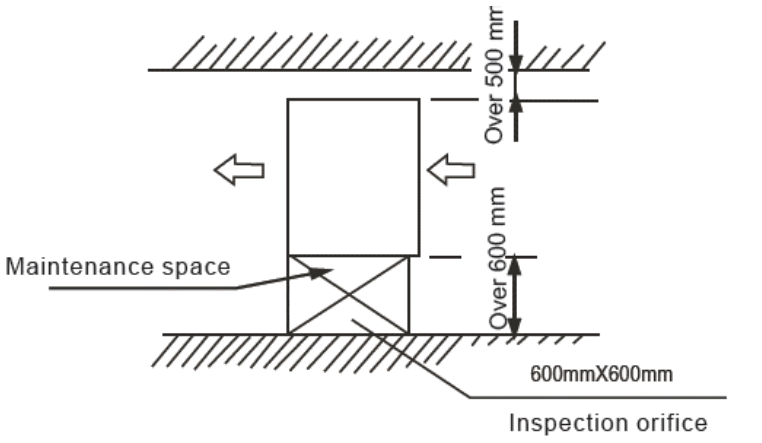
3. Specifications are subject to change without prior notice for product improvement.

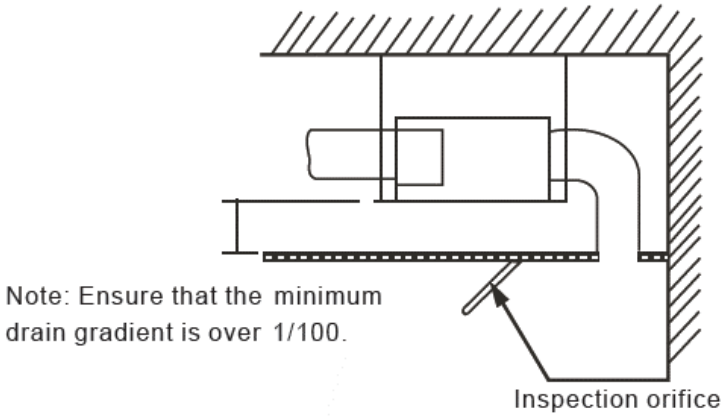
3. Dimensions

(Unit: in. [mm])

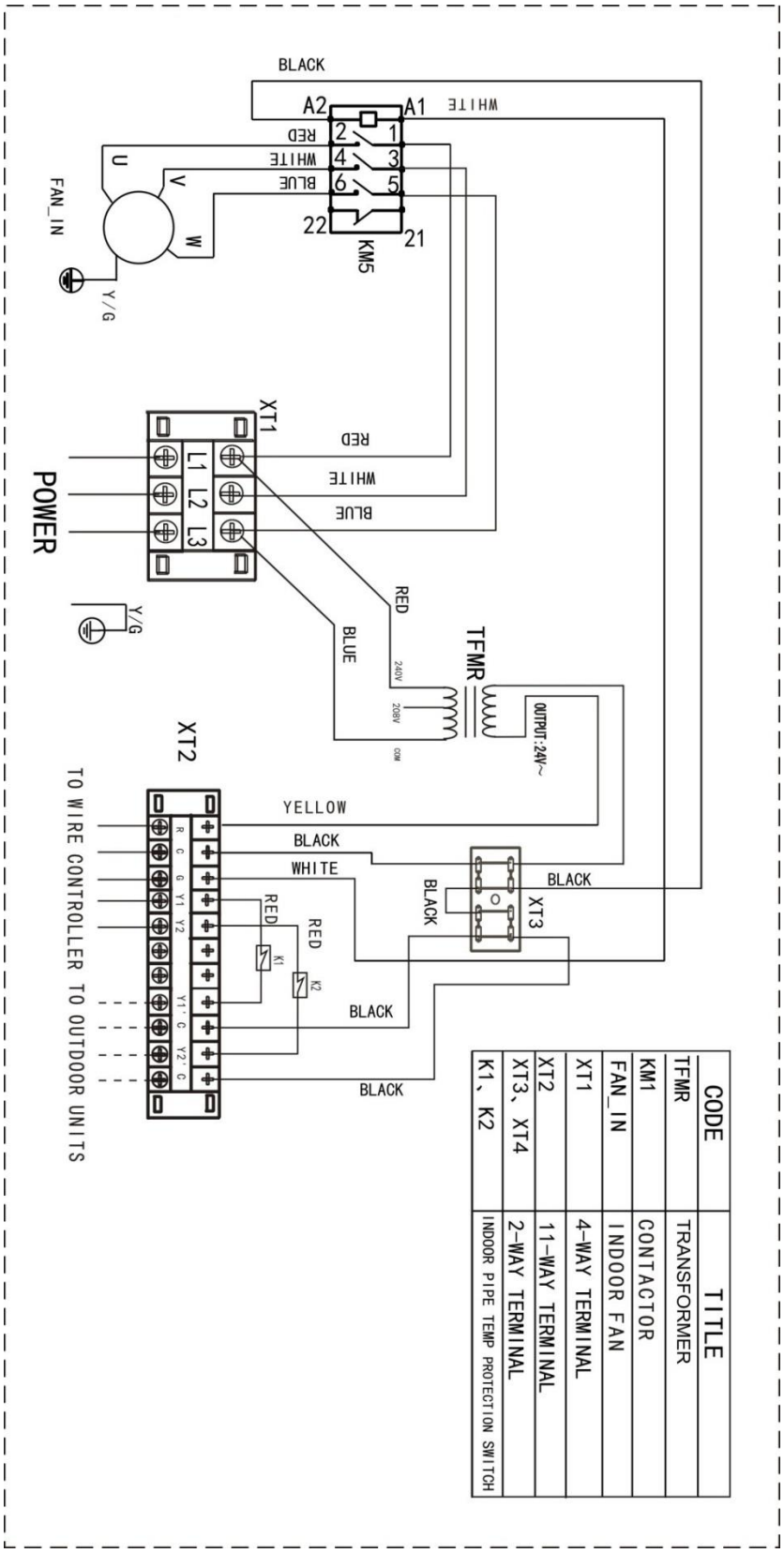


4. Service Space





5. Wiring Diagrams



6. Blower dates

Air Volume	Static Pressure External to Unit – Inches Water Gauge											
	0.6		0.8		1.0		1.2		1.4		1.6	
CFM	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
3,000												
3,200												
3,400												
3,600												
3,800												
4,000												
4,200												
4,400												
4,600												
4,800												
5,000											978	1.5
5,200											982	1.5
5,400									930	1.5	986	1.5
5,600									934	1.5	990	1.5
5,800							880	1.5	939	1.5	994	1.5
6,000					831	1.5	886	1.5	944	1.5	999	1.5
6,200					837	1.5	892	1.5	949	1.5		
6,400			779	1.50	844	1.5	898	1.5				
6,600	728	1.5	786	1.50	851	1.5	911	1.5				
6,800	737	1.5	800	1.50	858	1.5						
7,000	745	1.5	808	1.50								
7,200	760	1.5	816	1.50								

BHP: Brake Horsepower RPM: Blower Speed

Air Volume	Static Pressure External to Unit – Inches Water Gauge									
	1.8		2.0		2.2		2.4		2.6	
CFM	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
3,000					1233	1.5	1279	1.5		
3,200					1242	1.5	1288	1.5	1341	1.5
3,400			1175	1.5	1232	1.5	1297	1.5		
3,600			1149	1.5	1223	1.5	1287	1.5		
3,800			1132	1.5	1205	1.5	1277	1.5		
4,000			1124	1.5	1187	1.5	1258	1.5		
4,200			1109	1.5	1179	1.5	1240	1.5		
4,400			1102	1.5	1163	1.5				
4,600	1043	1.5	1096	1.5	1156	1.5				
4,800	1037	1.5	1098	1.5	1149	1.5				
5,000	1040	1.5	1093	1.5						
5,200	1036	1.5	1096	1.5						
5,400	1039	1.5								
5,600	1043	1.5								
5,800										
6,000										
6,200										
6,400										
6,600										
6,800										
7,000										
7,200										

BHP: Brake Horsepower RPM: Blower Speed

8. Capacity table

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Gross Cooling Capacity (kW)																			
Outdoor DB(°C)		29.40									35.00								
Indoor	WB(°C)	16.10			19.40			22.80			16.10			19.40			22.80		
CFM	DB(°C)	TC	SC	PI	TC	SC	PI	TC	SC	PI	TC	SC	PI	TC	SC	PI	TC	SC	PI
2,510	23.90	18.06	12.04	5.22	18.96	12.64	5.48	19.91	13.27	5.76	17.53	11.69	6.05	18.41	12.27	6.35	19.33	12.89	6.66
	26.70	18.78	14.45	5.43	19.72	15.17	5.70	20.70	15.93	5.99	18.23	14.02	6.29	19.14	14.73	6.60	20.10	15.46	6.93
	29.40	19.53	16.28	5.65	20.51	17.09	5.93	21.53	17.94	6.23	18.96	15.80	6.54	19.91	16.59	6.87	20.91	17.42	7.21
	32.20	20.31	18.47	5.87	21.33	19.39	6.17	22.39	20.36	6.48	19.72	17.93	6.80	20.71	18.82	7.14	21.74	19.77	7.50
2,700	23.90	21.12	14.08	6.11	22.18	14.79	6.41	23.29	15.53	6.74	20.51	13.67	7.07	21.53	14.36	7.43	22.61	15.07	7.80
	26.70	21.97	16.90	6.35	23.07	17.74	6.67	24.22	18.63	7.00	21.33	16.41	7.35	22.40	17.23	7.72	23.52	18.09	8.11
	29.40	22.85	19.04	6.61	23.99	19.99	6.94	25.19	20.99	7.28	22.18	18.49	7.65	23.29	19.41	8.03	24.46	20.38	8.43
	32.20	23.76	21.60	6.87	24.95	22.68	7.22	26.20	23.82	7.58	23.07	20.97	7.96	24.22	22.02	8.35	25.43	23.12	8.77
3,000	23.90	24.71	16.47	7.15	25.95	17.30	7.50	27.25	18.16	7.88	23.99	16.00	8.27	25.19	16.79	8.69	26.45	17.63	9.12
	26.70	25.70	19.77	7.43	26.99	20.76	7.80	28.34	21.80	8.19	24.95	19.19	8.60	26.20	20.15	9.03	27.51	21.16	9.49
	29.40	26.47	22.06	7.66	27.80	23.16	8.04	29.19	24.32	8.44	25.70	21.42	8.86	26.99	22.49	9.31	28.34	23.61	9.77
	32.20	27.27	24.79	7.89	28.63	26.03	8.28	30.06	27.33	8.69	26.47	24.07	9.13	27.80	25.27	9.58	29.19	26.53	10.06
3,480	23.90	28.08	18.72	8.12	29.49	19.66	8.53	30.96	20.64	8.95	27.27	18.18	9.40	28.63	19.09	9.87	30.06	20.04	10.37
	26.70	28.93	22.25	8.37	30.37	23.36	8.78	31.89	24.53	9.22	28.08	21.60	9.68	29.49	22.68	10.17	30.96	23.82	10.68
	29.40	29.79	24.83	8.62	31.28	26.07	9.05	32.85	27.37	9.50	28.93	24.11	9.97	30.37	25.31	10.47	31.89	26.58	11.00
	32.20	30.69	27.90	8.88	32.22	29.29	9.32	33.83	30.76	9.78	29.79	27.09	10.27	31.28	28.44	10.79	32.85	29.86	11.33

Notes:

DB= Dry Bulb temperature; WB= Wet Bulb Temperature

TC= Total Capacity (Unit: kW)

SC= Sensible Capacity (Unit: kW)

PI = Power Input (Unit: kW)

Gross Cooling Capacity (kW)																			
Outdoor DB(°C)		40.60									46.10								
Indoor	WB(°C)	16.10			19.40			22.80			16.10			19.40			22.80		
CFM	DB(°C)	TC	SC	PI	TC	SC	PI	TC	SC	PI	TC	SC	PI	TC	SC	PI	TC	SC	PI
2,510	23.90	16.75	11.17	7.23	17.59	11.72	7.59	18.46	12.31	7.97	16.26	10.84	8.36	17.07	11.38	8.78	17.93	11.95	9.22
	26.70	17.42	13.40	7.51	18.29	14.07	7.89	19.20	14.77	8.28	16.91	13.01	8.70	17.76	13.66	9.13	18.64	14.34	9.59
	29.40	18.11	15.10	7.81	19.02	15.85	8.21	19.97	16.64	8.62	17.59	14.66	9.05	18.47	15.39	9.50	19.39	16.16	9.97
	32.20	18.84	17.13	8.13	19.78	17.98	8.53	20.77	18.88	8.96	18.29	16.63	9.41	19.20	17.46	9.88	20.16	18.33	10.37
2,700	23.90	19.59	13.06	8.45	20.57	13.71	8.88	21.60	14.40	9.32	19.02	12.68	9.78	19.97	13.32	10.27	20.97	13.98	10.79
	26.70	20.38	15.67	8.79	21.39	16.46	9.23	22.46	17.28	9.69	19.78	15.22	10.18	20.77	15.98	10.69	21.81	16.78	11.22
	29.40	21.19	17.66	9.14	22.25	18.54	9.60	23.36	19.47	10.08	20.57	17.14	10.58	21.60	18.00	11.11	22.68	18.90	11.67
	32.20	22.04	20.04	9.51	23.14	21.04	9.98	24.30	22.09	10.48	21.40	19.45	11.01	22.47	20.42	11.56	23.59	21.45	12.13
3,000	23.90	22.92	15.28	9.89	24.07	16.04	10.38	25.27	16.85	10.90	22.25	14.84	11.45	23.37	15.58	12.02	24.53	16.36	12.62
	26.70	23.84	18.34	10.28	25.03	19.25	10.80	26.28	20.22	11.34	23.14	17.80	11.90	24.30	18.69	12.50	25.52	19.63	13.13
	29.40	24.55	20.46	10.59	25.78	21.48	11.12	27.07	22.56	11.68	23.84	19.86	12.26	25.03	20.86	12.88	26.28	21.90	13.52
	32.20	25.29	22.99	10.91	26.55	24.14	11.46	27.88	25.35	12.03	24.55	22.32	12.63	25.78	23.44	13.26	27.07	24.61	13.92
3,480	23.90	26.05	17.36	11.24	27.35	18.23	11.80	28.72	19.14	12.39	25.29	16.86	13.01	26.55	17.70	13.66	27.88	18.59	14.34
	26.70	26.83	20.64	11.57	28.17	21.67	12.15	29.58	22.75	12.76	26.05	20.04	13.40	27.35	21.04	14.07	28.72	22.09	14.77
	29.40	27.63	23.03	11.92	29.02	24.18	12.52	30.47	25.39	13.14	26.83	22.36	13.80	28.17	23.48	14.49	29.58	24.65	15.22
	32.20	28.46	25.88	12.28	29.89	27.17	12.89	31.38	28.53	13.54	27.63	25.12	14.21	29.02	26.38	14.93	30.47	27.70	15.67

Notes:

DB= Dry Bulb temperature; WB= Wet Bulb Temperature

TC= Total Capacity (Unit: kW)

SC= Sensible Capacity (Unit: kW)

PI = Power Input (Unit: kW)

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Gross Cooling Capacity (kW)																		
Outdoor DB(°C)		29.40									35.00							
Indoor	WB(°C)	16.10			19.40			22.80			16.10			19.40			22.80	
CFM	DB(°C)	TC	SC	PI	TC	SC	PI	TC	SC	PI	TC	SC	PI	TC	SC	PI	TC	SC	PI
3,230	23.90	24.33	16.22	7.04	25.55	17.03	7.39	26.82	17.88	7.76	23.62	15.75	8.14	24.80	16.53	8.55	26.04	17.36	8.98
	26.70	25.30	19.46	7.32	26.57	20.44	7.68	27.90	21.46	8.07	24.57	18.90	8.47	25.79	19.84	8.89	27.08	20.83	9.34
	29.40	26.31	21.93	7.61	27.63	23.02	7.99	29.01	24.18	8.39	25.55	21.29	8.81	26.83	22.35	9.25	28.17	23.47	9.71
	32.20	27.37	24.88	7.91	28.74	26.12	8.31	30.17	27.43	8.73	26.57	24.15	9.16	27.90	25.36	9.62	29.29	26.63	10.10
3,500	23.90	28.46	18.97	8.23	29.88	19.92	8.64	31.38	20.92	9.07	27.63	18.42	9.53	29.01	19.34	10.00	30.46	20.31	10.51
	26.70	29.60	22.77	8.56	31.08	23.91	8.99	32.63	25.10	9.44	28.74	22.11	9.91	30.17	23.21	10.41	31.68	24.37	10.93
	29.40	30.78	25.65	8.90	32.32	26.94	9.35	33.94	28.28	9.82	29.89	24.91	10.31	31.38	26.15	10.82	32.95	27.46	11.36
	32.20	32.02	29.10	9.26	33.62	30.56	9.72	35.30	32.09	10.21	31.08	28.26	10.72	32.64	29.67	11.25	34.27	31.15	11.82
4,000	23.90	33.30	22.20	9.63	34.96	23.31	10.11	36.71	24.47	10.62	32.33	21.55	11.15	33.94	22.63	11.70	35.64	23.76	12.29
	26.70	34.63	26.64	10.01	36.36	27.97	10.51	38.18	29.37	11.04	33.62	25.86	11.59	35.30	27.15	12.17	37.07	28.51	12.78
	29.40	35.67	29.72	10.31	37.45	31.21	10.83	39.32	32.77	11.37	34.63	28.86	11.94	36.36	30.30	12.54	38.18	31.81	13.16
	32.20	36.74	33.40	10.62	38.57	35.07	11.16	40.50	36.82	11.71	35.67	32.42	12.30	37.45	34.05	12.91	39.32	35.75	13.56
4,550	23.90	37.84	25.23	10.94	39.73	26.49	11.49	41.72	27.81	12.06	36.74	24.49	12.67	38.57	25.72	13.30	40.50	27.00	13.97
	26.70	38.97	29.98	11.27	40.92	31.48	11.83	42.97	33.05	12.43	37.84	29.11	13.05	39.73	30.56	13.70	41.72	32.09	14.39
	29.40	40.14	33.45	11.61	42.15	35.13	12.19	44.26	36.88	12.80	38.97	32.48	13.44	40.92	34.10	14.11	42.97	35.81	14.82
	32.20	41.35	37.59	11.96	43.41	39.47	12.56	45.59	41.44	13.18	40.14	36.49	13.84	42.15	38.32	14.53	44.26	40.23	15.26

Notes:

DB= Dry Bulb temperature; WB= Wet Bulb Temperature

TC= Total Capacity (Unit: kW)

SC= Sensible Capacity (Unit: kW)

PI = Power Input (Unit: kW)

Gross Cooling Capacity (kW)																		
Outdoor DB(°C)		40.60									46.10							
Indoor	WB(°C)	16.10			19.40			22.80			16.10			19.40			22.80	
CFM	DB(°C)	TC	SC	PI	TC	SC	PI	TC	SC	PI	TC	SC	PI	TC	SC	PI	TC	SC	PI
3,230	23.90	22.40	14.93	9.07	23.52	15.68	9.53	24.70	16.46	10.01	21.75	14.50	10.51	22.83	15.22	11.03	23.98	15.98	11.58
	26.70	23.30	17.92	9.44	24.46	18.82	9.91	25.68	19.76	10.41	22.62	17.40	10.93	23.75	18.27	11.47	24.93	19.18	12.05
	29.40	24.23	20.19	9.82	25.44	21.20	10.31	26.71	22.26	10.82	23.52	19.60	11.36	24.70	20.58	11.93	25.93	21.61	12.53
	32.20	25.20	22.91	10.21	26.46	24.05	10.72	27.78	25.25	11.25	24.46	22.24	11.82	25.69	23.35	12.41	26.97	24.52	13.03
3,500	23.90	26.20	17.47	10.62	27.51	18.34	11.15	28.89	19.26	11.70	25.44	16.96	12.29	26.71	17.81	12.90	28.05	18.70	13.55
	26.70	27.25	20.96	11.04	28.61	22.01	11.59	30.05	23.11	12.17	26.46	20.35	12.78	27.78	21.37	13.42	29.17	22.44	14.09
	29.40	28.34	23.62	11.48	29.76	24.80	12.06	31.25	26.04	12.66	27.52	22.93	13.29	28.89	24.08	13.96	30.34	25.28	14.66
	32.20	29.48	26.80	11.94	30.95	28.14	12.54	32.50	29.54	13.17	28.62	26.02	13.82	30.05	27.32	14.52	31.55	28.68	15.24
4,000	23.90	30.65	20.44	12.42	32.19	21.46	13.04	33.80	22.53	13.69	29.76	19.84	14.38	31.25	20.83	15.10	32.81	21.88	15.85
	26.70	31.88	24.52	12.92	33.48	25.75	13.56	35.15	27.04	14.24	30.95	23.81	14.95	32.50	25.00	15.70	34.13	26.25	16.49
	29.40	32.84	27.36	13.30	34.48	28.73	13.97	36.20	30.17	14.67	31.88	26.57	15.40	33.48	27.90	16.17	35.15	29.29	16.98
	32.20	33.82	30.75	13.70	35.51	32.29	14.39	37.29	33.90	15.11	32.84	29.85	15.86	34.48	31.34	16.66	36.20	32.91	17.49
4,550	23.90	34.84	23.22	14.11	36.58	24.39	14.82	38.41	25.61	15.56	33.82	22.55	16.34	35.51	23.68	17.16	37.29	24.86	18.01
	26.70	35.88	27.60	14.54	37.68	28.98	15.26	39.56	30.43	16.03	34.84	26.80	16.83	36.58	28.14	17.67	38.41	29.54	18.55
	29.40	36.96	30.80	14.97	38.81	32.34	15.72	40.75	33.96	16.51	35.88	29.90	17.33	37.68	31.40	18.20	39.56	32.97	19.11
	32.20	38.07	34.61	15.42	39.97	36.34	16.19	41.97	38.15	17.00	36.96	33.60	17.85	38.81	35.28	18.75	40.75	37.04	19.68

Notes:

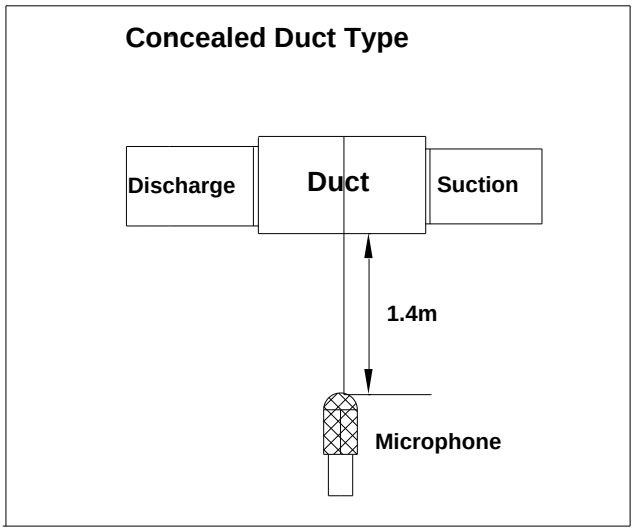
DB= Dry Bulb temperature; WB= Wet Bulb Temperature

TC= Total Capacity (Unit: kW)

SC= Sensible Capacity (Unit: kW)

PI = Power Input (Unit: kW)

9. Sound Levels



Model	Noise level
CSH90-3	56 dB(A)
CSH120-3	60 dB(A)

10. Electric characteristics

Model	Indoor unit				Power supply		IFM	
	Hz	Voltage	Min.	Max.	MCA	MFA	kW	FLA
CSH90-3	60	220V	198V	240V	6.29	7	1.5	5.99
CSH120-3	60	220V	198V	240V	6.29	7	1.5	5.99

Notes:

MCA: Min. Current Amps. (A)

MFA: Max. Fuse Amps. (A)

IFM: Indoor Fan Motor

kW: Fan Motor Rated Output (kW)

FLA: Full Load Amps. (A)

11. Accessories

Name	Qty.	Shape	Purpose
Installation and Operation Manual	1		
Refrigerant copper pipe	4		Connect to system
Y type refrigerant copper pipe	2		Connect to system
Drain outlet	1		Connect to water drainage pipe
Drain plug	1		
Sealing tape	1		Sealing drain
Plastic ring	5		Protect copper pipe and wire

Part. 3 Installation

1. Notes

CAUTION:

- ✧ The air conditioner must be installed by professional technicians.
- ✧ When installing the indoor unit and its accessory pipes, adhere to the technical manual as far as possible.
- ✧ Inspect and make sure the piping and cabling are correct before powering on the air conditioner.
- ✧ Decide the correct way of conveying the unit. Try to transport the unit with the original package.
- ✧ If the unit needs to be installed on a metal part of the building, electric insulation must be performed, and the installation must meet the relevant technical standards of electric devices.
- ✧ The unit must be installed 2.3m above floor.
- ✧ The unit shall not be installed in the laundry.
- ✧ Before obtaining access to terminals, all supply circuits must be disconnected.
- ✧ The unit must be positioned so that the plug is accessible.
- ✧ The enclosure of the unit shall be marked by word, or by symbols, with the direction of the fluid flow.
- ✧ If the power supply cord is damaged, it must be replaced by the manufacture or the service center or a similarly qualified person in order to avoid a hazard.
- ✧ An all-pole disconnection switch having a contact separation of at least 3mm in all poles should be connected in fixed wiring.
- ✧ Install the unit where enough space of installation and maintenance is available.
- ✧ Install the unit where the ceiling is horizontal and enough for bearing the weight of the indoor unit.
- ✧ Install the unit where the air inlet and outlet are not baffled and the least affected by external air.
- ✧ Install the unit where the supply air flow can be sent to all parts in the room.
- ✧ Install the unit where it is easy to lead out the connective pipe and the drain pipe.
- ✧ Install the unit where no heat is emitted from a heat source directly.

- ✧ Installing the equipment in any of the following places may lead to faults of the equipment (if that is inevitable, consult the supplier):
  - ✓ The site contains mineral oils such as cutting lubricant.
  - ✓ Seaside where the air contains much salt.
  - ✓ Hot spring area where corrosive gases exist, e.g., sulfide gas.
  - ✓ Factories where the supply voltage fluctuates seriously.
  - ✓ Inside a car or cabin.
  - ✓ Place like kitchen where oil permeates.
  - ✓ Place where strong electromagnetic waves exist.
  - ✓ Place where flammable gases or materials exist.
  - ✓ Place where acid or alkali gases evaporate, or other special environments.
- ✧ Install the unit where enough space of installation and maintenance is available.
- ✧ Install the unit where the air inlet and air outlet are free from obstacles and strong wind.
- ✧ Install the unit in a dry and well ventilated place.
- ✧ Install the unit where the bearing surface is level and can bear weight of the unit, and is suitable for installing the unit horizontally without increasing noise or vibration.
- ✧ Install the unit where the operation noise and the expelling of air do not affect neighbors.
- ✧ Install the unit where no flammable gas is leaked.6Install the unit where it is convenient for pipe connection and electric connection.

2. Installation of air handlers

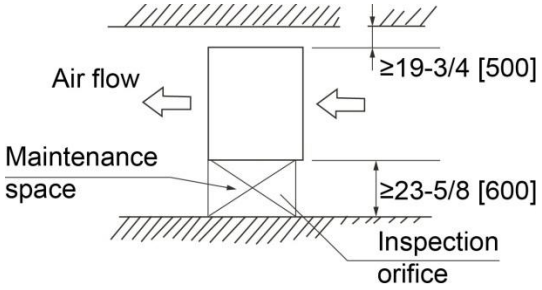
All the units are designed for either application and can be installed in either position as supplied from the factory. There are 2 drain pans which are not visible. The zinc coating steel drain pan is designed to trap condensate in either vertical or horizontal installations. All pans are insulated with insulation between the bottom of the pan and the unit and may be connected for either right or left hand drains. If unit is to be is installed over a finished ceiling and in an unconditioned space, it is recommended an auxiliary drain pan be placed under the entire unit.

All models are furnished with dual circuit manifolds for dual condensing unit application. The circuitry is so arranged to provide full face coil operation from the each unit. Fitting may be installed for either

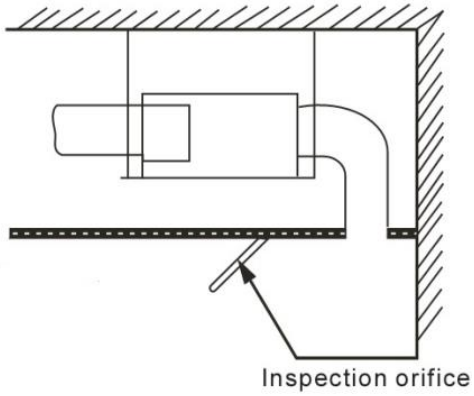
right or left hand tubing connections.

2.1 Installation of air handler

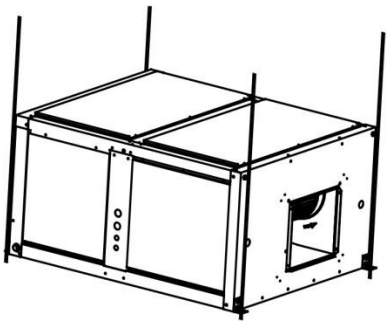
- ✧ As the following picture, when install the indoor unit, select the enough solid and level site with enough space for installation and maintance.
- ✧ The inspection orifice should be enough larger to repair and maintenance the unit.

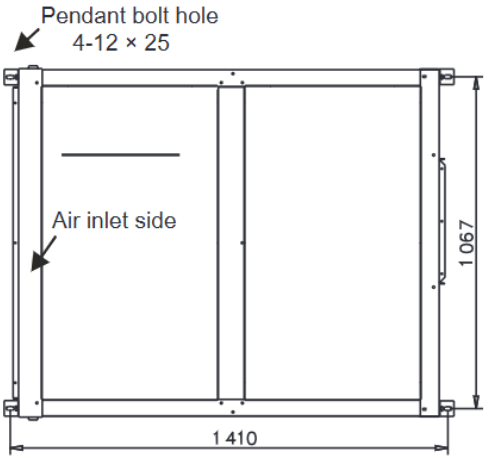


Top view (Unit: in. [mm])

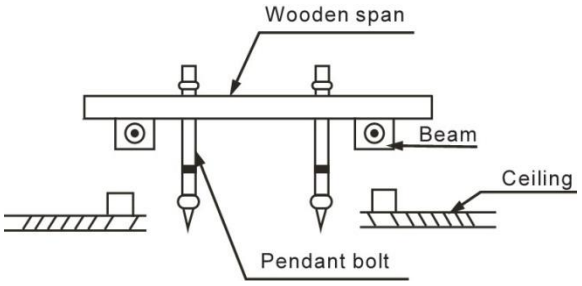


- ✧ Use Φ10 or bigger screws. The screw material is high-quality carbon steel whose surface is zinc plated or undergoes other anti-rust treatment, or stainless steel.
- ✧ Fix the pendant bolts firmly and reliably in light of the specifice situsation.
- ✧ The pendant bolt hole figure is as following picture. (Unit: in.[mm])

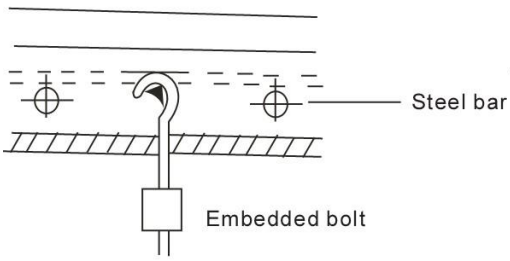




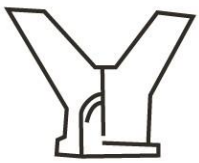
✧ When the pandant bolt is fixed in wooden structure, please put rectanglar sticks across the beams, and set pendant bolts.



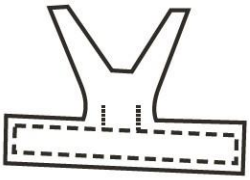
✧ When in the new concrete roughcast environment, please use embedded bolts, embedded pulling plugs and stick harness. On steel bar have some holes to hang pipe and embed screw bolts.



Pipe pendant embedded bolt

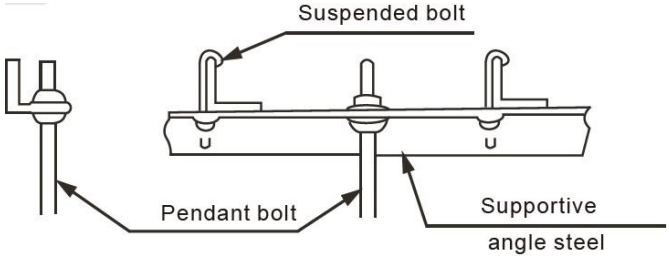


Blade plug-in unit



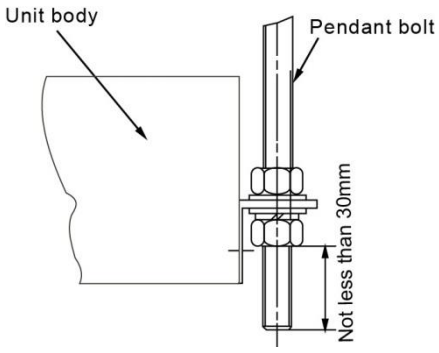
Slide plug-in unit

.When in steel beam and girder structure, set and use supportive angle steel.



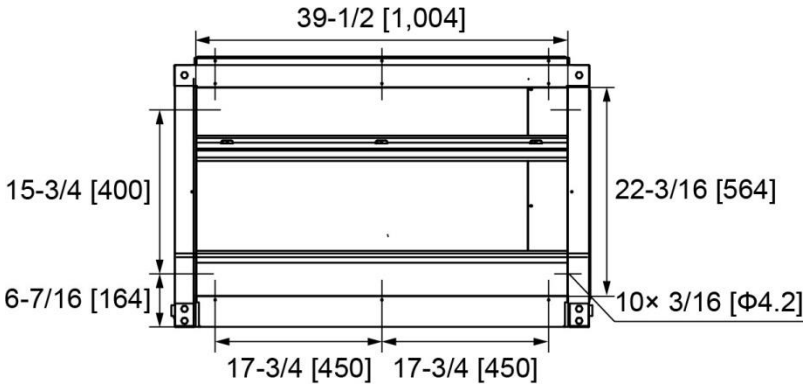
✧ After install the indoor units, use a hoisting device to hoist the indoor unit, and align it with

the installation screws to adjust the horizontality. Finally, Tighten the screws.

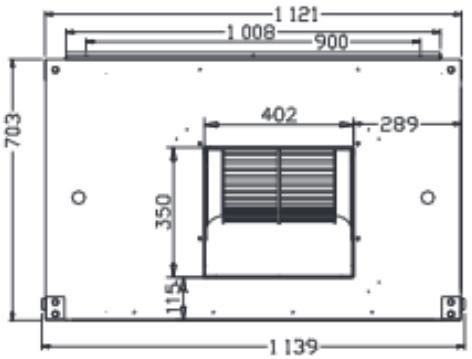


2.2 Designing and connecting the duct

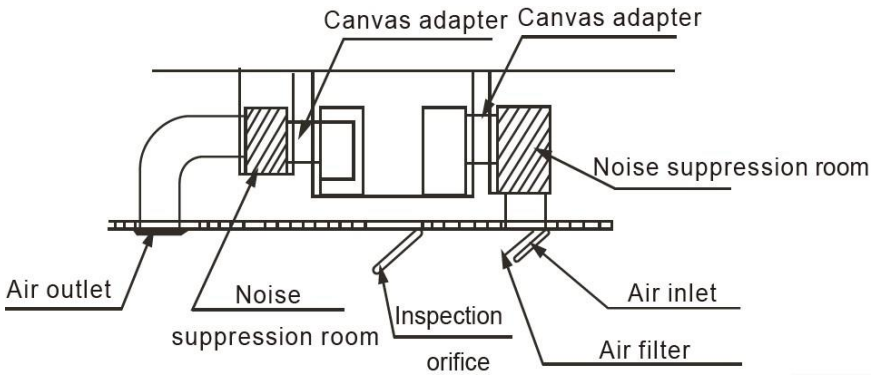
- ✧ The duct design must comply with national heating air conditioner pipeline design specifications.
- ✧ The duct accessories and materials must be produced by professional manufacturers.
- ✧ Int order to prevent air flow shoting, do not set the air inlet orifice near the air outlet orifice.
- ✧ Install a filter at an easy-to-maintain place such as intake pipe. If without the filter, the duct will gether on the air heat exchanger and lead to fault and water leak of the air conditioner.
- ✧ In order to suppress noise effectively, install noise suppression and sound insulation devices, especially in the noise-sensitive spaces such as meeting rooms.
- ✧ For connection of the flange plane, use non-flammable canvas adapter to prevent transmission of vibration. Use M6×20 screws (configured on site) for connection.
- ✧ View of air inlet side for horizontal installation (Unit: in.[mm])



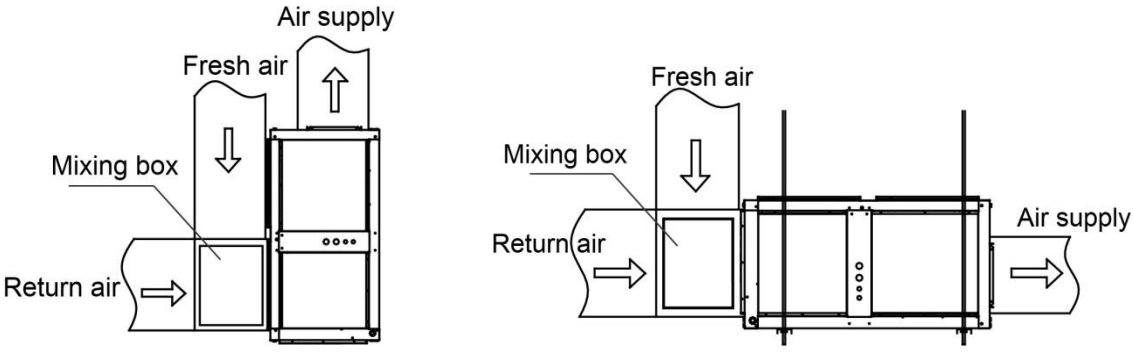
View of air inlet side for vertical installation (Unit: in. [mm])



✧ All pipelines must be connected closely and soundly without leak of air. The pipelines must be adiabatic and free from condensation. The key points of duct connection are as following picture.



✧ Field installed mixing box accessory



Notes: Mixing box is prepaired by user.

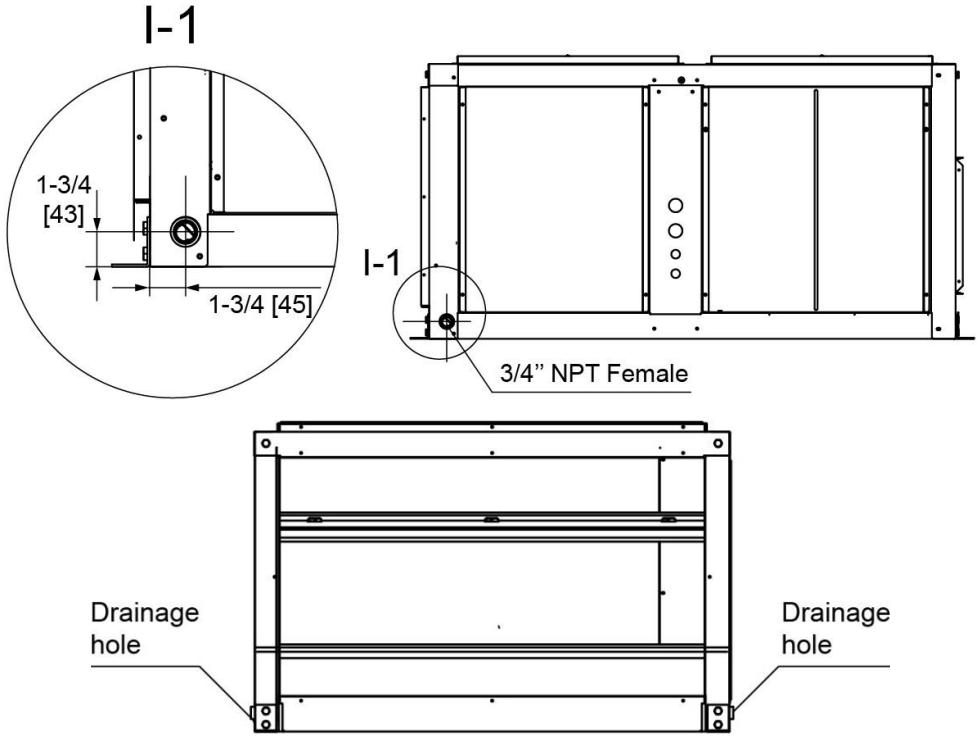
2.3 Install the drainage pipe

✧ In order to prevent faults caused by condensate of the refrigerant pipe and drain pipe, perform condensate prevention and heat insulation properly.

✧ Two drain coupling are provided on all models. Select either one for condensate outlet and plug the other.

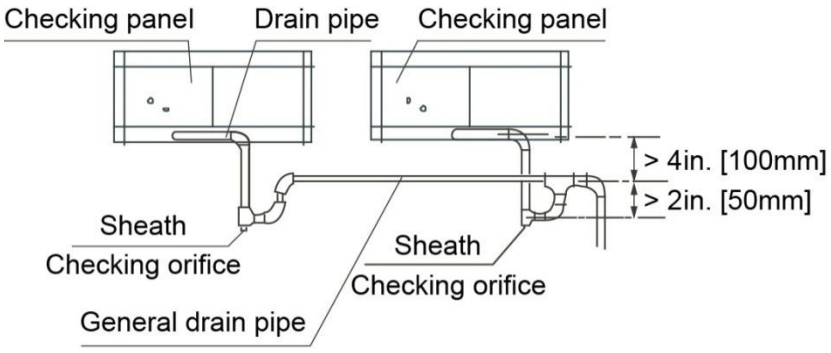
✧ Consult local codes or ordinances for specific requirement regarding condensate drain.

- ✧ Condensate drain is open to atmosphere and must be trapped. Trap must be at least 3 inches deep and made of flexible material or fabricated to prevent freeze-up.
- ✧ If air handler is installed in a non-conditioned space, it is recommended an auxiliary drain pan be fabricated and installed under entire unit.
- ✧ Do not reduce the drain line size from the connection size provided on the unit.
- ✧ Install a drain steam trap in the drainpipe to prevent water from overflowing. The drainpipe absorbs the odor. When the outside static pressure is high, especially the air inlet, it is difficult to drain the water.
- ✧ Drainage should be natural. When constructing, the outside pipe of outdoor unit should be inclined (1/50~1/100). The bending part of drainpipe should be fewer than 2. Furthermore, to reduce the depositing dust, avoid bending the pipe as possible as you can.
- ✧ Make sure there is no dust or rubbish falling into indoor unit drain elbow and drainpipe.
- ✧ After installation, remove the checking panel; pour some water in the drain elbow to see whether it drains smoothly and whether there is water leakage.
- ✧ The drainage hole location in the unit:



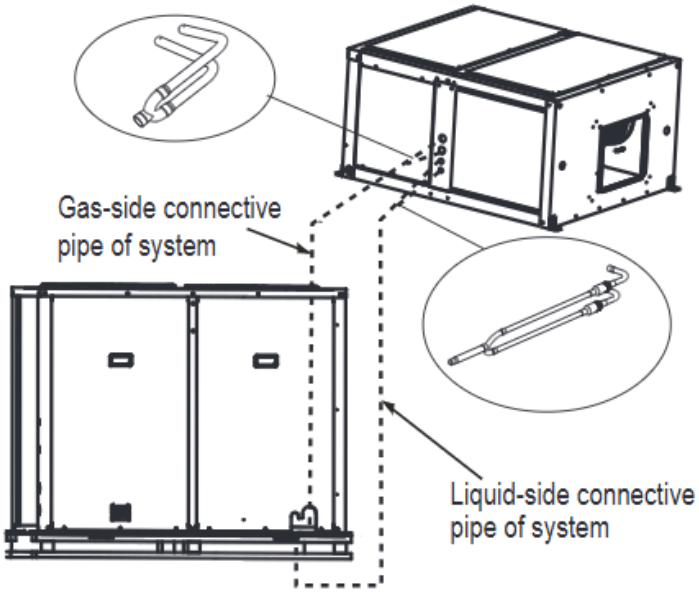
- ✧ Rubbish is easy to accumulate at drain stream trap. Make sure to install a plug or other things which is easy to clean.

- ✧ Unit must be slightly inclined toward drain.
- ✧ Use drain connection size or larger.
- ✧ Do not operate unit without trap.
- ✧ After confirming that drainage is smoothly and there is no leakage, wrap the drainpipe with insulation material, or there will be condensed water.



3. Connection of Refrigerant Pipe

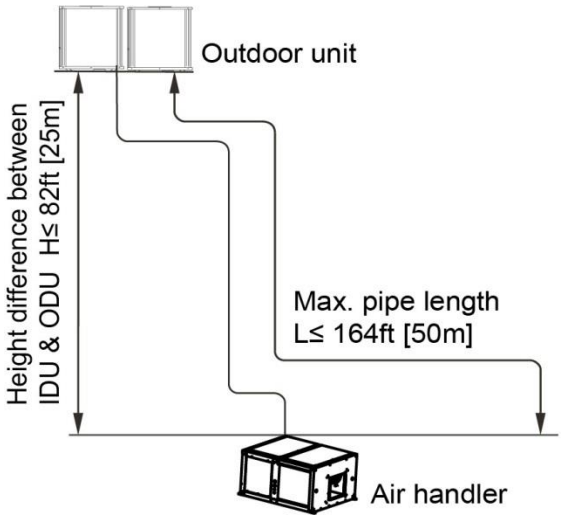
- ✧ Schematic diagram of connection between indoor unit and outdoor unit:



- ✧ Size of pipes:

Model	Gas side	Liquid side
	Size (in. [mm])	Size (in. [mm])
CSH90-3	1 [Φ25.0]	3/8 [Φ9.52]
CSH120-3	1-1/8 [Φ28.6]	1/2 [Φ12.7]

✧ Allowed length of refrigerant pipe and height difference



		Allowed value
Max. actual length of pipe (L)		164ft [50m]
Max. Height different between IDU & ODU.	ODU upper	82ft [25m]
	ODU lower	98ft [30m]

✧ All connections between indoor unit and outdoor unit are copper-to copper and should be brazed with a phosphorous-copper alloy material such as Silfos-5 or equivalent. **Do not** use soft solder. The outdoor units have reusable valves on both the liquid and vapor connections. The total system refrigerant charge is retained within the outdoor unit during shipping and installation. The reusable valves are provided to evacuate and charge per the instruction.

✧ Dry nitrogen should always be supplied through the tubing while it is being brazed, because the temperature required is high enough to cause oxidation of the copper unless an inert atmosphere is provided. The flow of dry nitrogen should continue until the joint has cooled. Always use a pressure regulator and safety valve to insure that only low pressure dry nitrogen is introduced into the tubing. Only a small flow is necessary to displace air and prevent oxidation.

✧ Install the connective pipe only after fixing the indoor unit and outdoor unit. Keep dry when installing the connective pipe. Do not let moist intrude into the pipeline system.

✧ Check the height difference between the indoor unit and outdoor unit, and check the length and number of bends of the refrigerant pipeline. Allowed length of refrigerant pipe and height difference:

Maximum height difference is 25m. If the height difference is greater than 5m, it is best to put the outdoor unit below the indoor unit.

- ✧ Measure the required length of the connective pipe.
- ✧ Connect the indoor unit first, and then connect the outdoor unit. The pipe bend should be handled carefully, without damaging the pipe.
- ✧ After the pipes between the indoor unit and the outdoor unit are connected, replenish compressed nitrogen to perform airtight test.
  - ✓ The airtight test is performed by using the compressed nitrogen, 2.94MPa (30kg/cm^{2}G). Leak test with a bubble type leak detector. Do not use the system refrigerant in the outdoor unit to purge or leak test.
  - ✓ Tighten the spool of the low pressure valve and high pressure valve before compressing the nitrogen.
  - ✓ Compress the nitrogen at the air vent of the gas valve.
  - ✓ The low pressure valve and high pressure valve are closed in the process of compressing the nitrogen.
  - ✓ **Do not** use oxygen, flammable gas or toxic gas in the airtight test.
- ✧ After vacuum and refrigerant leak precautions, the next step is to conduct heat insulation of refrigerant pipe.

4. Heat Insulation of Refrigerant Pipe

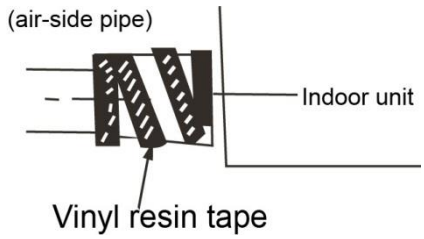
In order to prevent faults caused by condensate of the refrigerant pipe and drain pipe, perform condensate prevention and heat insulation properly. If it is forecast that high humidity and temperature environment (Condensate temperature is over 23°C) may exist in the ceiling, e.g., inside the ceiling with slab, ceiling which is in the same environment as the outdoor air. It is necessary to apply 10mm or thicker adiabatic wool (16~20kg/m^2) to the refrigerant pipe and the drain pipe in addition to applying the general heat insulation materials. Enough heat insulation materials should also be applied to the refrigerant joint and the pipe joint.

Note: the heat insulation of drain pipe refer to the installation of indoor unit.

- ✧ Please use heat-resistant materials as heat insulation material of the air-side pipe. (e.g., EPT)
- ✧ Cover heat insulation materials separately at the liquid side and the air side. Moreover, perform

heat insulation thoroughly for the air-side pipes of the indoor unit, and prevent water from dripping outside the unit.

- ✧ After applying the auxiliary heat insulation materials, use vinyl resin tape to seal refrigerant pipe and drainage pipe to prevent water leak.



5. Electric Connection

5.1 Caution

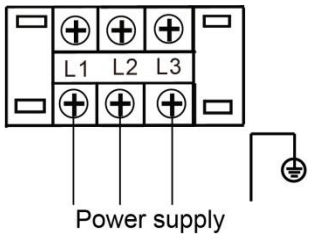
- ✧ Use special power supply for the air conditioner. Design power supplies specific to the indoor unit and outdoor unit. The supply voltage must comply with the nominal voltage.
- ✧ The external supply circuit of the air conditioner must have a ground wire, and the power supply ground wire of the indoor unit must be connected with the external ground wire firmly.
- ✧ The wiring must be performed by professional technicians according to the circuit diagram labels.
- ✧ Distribute the wires according to the relevant electric technical standards promulgated by the State, and set the Residual Current-operated Circuit Breaker (RCCB) properly.
- ✧ The power wire and the signal wire shall be laid out neatly and properly, without mutual interference or contacting the connection pipe or valve.
- ✧ No power cable is attached to this equipment. The user can select the power cable by reference to the stipulated power supply specifications. No joint of wires is allowed.
- ✧ Upon completion of wire connection, double check it and then connect the power supply.
- ✧ An all-pole disconnection device which has at least 3mm separation distance in all pole and a residual current device (RCD) with the rating of above 10mA shall be incorporated in the fixed wiring according to the national rule.
- ✧ The appliance shall be installed in accordance with national wiring regulations.

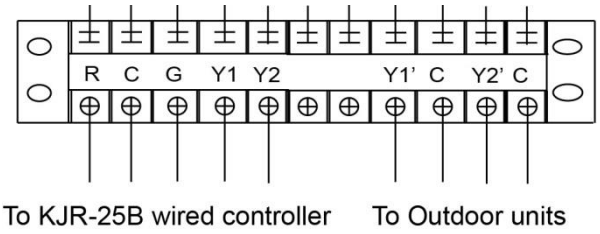
5.2 Specifications of power supply

Model	CSH90-3

	CSH120-3
Power	220V~, 3Ph, 60Hz
Switch capacity of the main power supply / Fuse	15A/10A
Indoor unit power cable	3×2.5mm^2 +1×1.0mm^2
Connective wire of indoor and outdoor unit	ODU 1: 2×0.75mm^2 ODU 2: 2×0.75mm^2
Wired controller connective wire (Optional)	5×0.75mm^2

5.3 Schematic diagram





6. Trial Run

- ✧ Check whether all valves are opened before trial run.
- ✧ Check the electric safety before trial run.
- ✧ Do not perform compulsory operation in any way, because it is very dangerous if the protection device is not active.
- ✧ Perform trial run only after all installations are finished.
- ✧ Confirm the following issues before trial operation:
  - ✓ Check whether the indoor unit and outdoor are installed properly.
  - ✓ Check whether the piping and wiring are correct.
  - ✓ Check whether the refrigerant pipeline system is inspected for leakage.
  - ✓ Check whether the drain is smooth.

- ✓ Check whether the heat insulation is perfect.
- ✓ Check whether the ground cables are connected correctly.
- ✓ Check whether the pipe length and the refrigerant amount are recorded.
- ✓ Check whether the power supply voltage is equal to the rated voltage of the air conditioner.
- ✓ Check whether any obstacles exist at the air inlet & outlet of the indoor or outdoor unit.
- ✓ Open the gas valve and the liquid valve.

✧ Use the remote controller or wired controller to let the air conditioner run in the cooling mode. Inspect the following items according to the operation manual. If any fault occurs, remove the fault first.

✧ Check the indoor unit:

- ✓ Whether any vibration or abnormal sound occurs during the operation.
- ✓ Whether the air, noise and condensate generated by the unit affect the neighbors.
- ✓ Whether any refrigerant is leaked.
- ✓ Check whether the connective copper pipes and drain pipes generate condensate due to loose wrapping.
- ✓ Open the air inlet grille of indoor unit to check whether any penetration or leak of water occurs, especially at the drain stopper.

✧ Check whether the connective copper pipes and the drain pipes generate condensate due to loose wrapping.

- ✓ Open the air inlet grille to check whether any penetration or leak of water occurs, especially at the drain stopper.
- ✓ Check whether any bibration or abnormal sound occurs during the operation.

✧ Inspection of fan and fan motor

- ✓ Check whether there is sundries in fan whorl, whether there is collision and friction between whorl and impeller when rotate impeller by hand and listen if there is abnormal noise on fan bearing.
- ✓ Check whether fan, fan motor and belt pulley is loose, check whether tightness of belt is up to the demand and whether belt pulley of fan and motor is on one plane according to following drawing. Check whether fan and fan motor rotate smoothly.
- ✓ Check whether the two belt pulleys are on the same plane, use the thumb vertically stand

on the middle of the belt, and check whether the tension of the belt meet the requirements.

✓ Electrify unit and start fan then check whether fan rotation direction is correct, stop unit and adjust phase sequence if fan rotation direction is adverse. Check motor running current by amperemeter and compare with motor nameplate parameter, change motor or belt pulley and adjust the fan valve opening if the measured value exceed nameplate parameter too much.

7. Trouble shooting

7.1 Phenomena not attributable to faults of air conditioner

✧ The system does not run.

- After pressing the **ON/OFF** button, the system does not run immediately.
- It does not run immediately because the safety device in the system is active to prevent overload.
- Three minutes later, the air conditioner compressor will run automatically.

✧ The indoor unit gives out white aerosol.

- This phenomenon may occur when the indoor relative humidity is too high and the unit runs in the cooling mode (in a place where there is much oil mist or dust).
- The indoor unit is installed in a place where there is much oil mist or dust. If the internal stain of the indoor unit is heavy, the temperature in the room will be distributed unevenly. In the case, the interior of the indoor unit must be cleaned. The cleaning units must be performed by professional maintainers.
- This phenomenon may also occur when the air conditioner shifts from defrosting operation to heating operation. That is because the moist generated by defrosting is expelled as steam.

✧ Noise of air conditioner

Squeak may occur when the air conditioner starts or stops running. That is the sound raised because the plastic assemblies inflate or deflate when the temperature changes.

✧ Dust is blown out of the indoor unit.

When the air conditioner resumes service after a long period out of service, the dust in the indoor unit will be blown out.

✧ The indoor unit gives out smell.

The indoor unit absorbs the smell of the room, furniture or smoking, and gives it out when running.

✧ Shift from cooling mode to air supply mode.

- In order to prevent frosting of the indoor heat exchanger, the air conditioner shifts to air supply mode automatically, and resumes to cooling mode in a short time.
- When the room temperature decreases to the set temperature, the air conditioner will shut down the compressor automatically, and shifts to the air supply status. After the room temperature rises, the compressor will restart. The action of the compressor in the heating mode is the contrary.

7.2 Faults of air conditioner and cause

✧ If any of the following exceptions occur, operation of the air conditioner will be immediately stopped. Turn off the power switch, and check it.

- The ***Run*** indicator blinks quickly (2 blinks per second.). After turning off the power switch and then turning it on again, that indicator still blinks quickly. The receiving function of the remote controller fails, or the start and shutdown operation is abnormal.
- The fuse blows out frequently, or the circuit breaker protection occurs frequently.
- Foreign substance or moist enters the air conditioner or other exceptions occur.

✧ If the air conditioner fails but does not meet the foregoing phenomena obviously, check the system in the following procedure:

Symptom	Possible causes	Way of handing
The system does not run.	Power supply fails.	Operate it after power supply resumes and connect the power supply properly.
	The power switch is not connected.	

Symptom	Possible causes	Way of handing
The air conditioner sends air out but cannot provide cool air at all.	The setting temperature is improper.	The setting temperature is lower than the room's during the cooling status or higher during the heating status.
	3-minutes protection of the compressor.	Waiting for 3 minutes.

Symptom	Possible causes	Way of handing
The cooling effect is poor.	The condenser or evaporator is too dirty.	Clean the heat-exchanger.
	The filter is blocked.	Clean the filter.
	The intake orifice or exhaust orifice of the indoor and outdoor unit is blocked.	Remove foreign mattes to keep well ventilated.
	The door or window is opened.	Close all the windows and doors.
	Directly exposed to sunlight.	Obstruct sunlight by curtains or jalousie.
	Too many heat sources.	Reduce heat sources.
	Too high outdoor environment temperature.	It is normal, and the cooling effect of the air conditioner is deteriorated.
	The refrigerant is leaked or the replenishment is deficient.	Detect leak, and fill the refrigerant of a correct quantity.

Symptom	Possible causes	Way of handing
The unit keeps starting up and shutting down frequently.	The refrigerant is excessive or deficient.	Detect leak, and fill the refrigerant of a correct quantity.
	Air or non-condensable gas exists in the refrigerant loop.	Make a vacuum again and fill the refrigerant.
	The compressor fails.	Repair or replace the compressor.
	The voltage is too high or too low.	Install a voltage regulator.
	The refrigerant loop is obstructed.	Locate the causes and replace the part.

8. Maintenance

8.1 Cautions

- ✧ Only the professionals can perform maintenance.
- ✧ Before performing operation for the electric connectors or cleansing the filter, turn off the

main power switch.

- ✧ Do not use water or air with a temperature higher than 50ºC to cleanse the filter or panel.
- ✧ Check and maintain the ventilating slot once every half years, wash and maintain with corresponding disinfection shall process once.
- ✧ Every two years are recommended. The filter can expel dust and other particles in the air. If it is blocked, the effect of the air conditioner will be degraded. Therefore, clean it every another two weeks if you use the air conditioner for a long period.
- ✧ If the air handler is installed in a place with heavy dust, clean the filter more often.
- ✧ If the stain is heavy and difficult to clean, replace the filter. The substitute filter is an optional assembly in the sale.
- ✧ Do not replace the power cable without permission. If the power cable is damaged, specialized power cable must be used as substitute. No repair the air conditioner without permission.
- ✧ Do not operate the unit without the evaporator fan access panel in place. Reinstall the access panel after performing any maintenance. Operating the unit without the access panel may result in severe person injury or death.

8.2 Operation required before leaving the air conditioner idle for a long period.

- ✧ Let the air conditioner run in the air supply mode for about half a day, and let its interior be fully dry.
- ✧ Switch off the power by the button in the wired controller, and then cut off the power supply.
- ✧ When the main power switch is turned on, a certain extent of electric power is consumed even if the air conditioner does not run. Turning off the main power switch can save energy.
- ✧ Remove the batteries out of the remote controller.
- ✧ After the air conditioner has been in service for several seasons, foreign substance accumulates inside the unit to an extent dependent on the working conditions. Therefore, shut down the air conditioner through the **ON/OFF** button of the wired controller, and then cut off the power supply.

8.3 Startup after a long period out of service.

- ✧ Check whether the air inlet or outlet of the indoor unit and outdoor unit is blocked. Remove foreign substance if any.

- ✧ Check whether the ground wire is connected properly.
- ✧ Check whether the condensate water is discharged normally.
- ✧ Check whether the insulation work of refrigerant circuit and ventilating duct is on sound status.
- ✧ Check whether the installing seat is corroded or rusted.

8.4 Maintenance and upkeep of indoor unit.

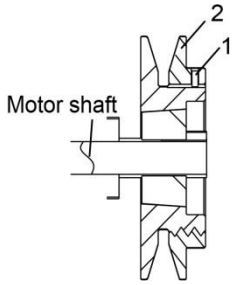
Some regular maintenance should be carried on, includes: clean dust filter, clean casing, wash condenser and replace a new belt, as well as do some test for the equipment.

- ✧ Motor mounting.

  One of the most critical aspects of an air handler installation is the mounting of the motor, motor sheave, fan pulley and the belts, and the adjustment of these items.

- ✧ Motor sheave and fan pulley mounting and adjustment.

  The adjustable pitch sheave which is mounted on the motor shaft controls the fan speed. To adjust the fan speed refers to figure at right, proceed as follow's adjustment of these items.



Step 1: Loosen the four set screw (Part 1)

Step 2: Rotate the adjustable sheave (Part 2) to desired position.

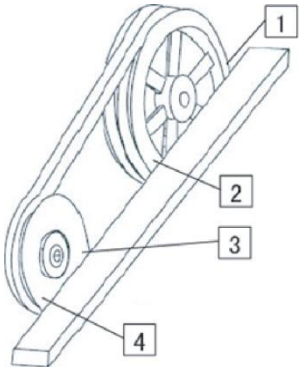
Step 3: Lock the adjustable sheave in place by tightening the set screw (Part 1).

Notes: The adjustable sheave is not to be used to adjust belt tension. Before making fan adjustments, be sure the main electrical disconnect switch is in the 'OFF' position to prevent possible injury due to accidental operation of the motor.

- ✧ Fan belt alignment and adjustment.

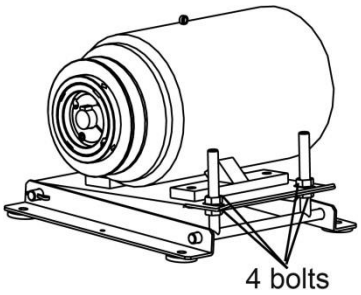
  Place belt on the groove of the fan pulley and motor sheave to obtain the approximate alignment and belt tension.

  Remove the belt and align the fan pulley and motor sheave using a straight edge, refer to the following picture.



When the pulley and sheave are properly aligned, re-install belt. Do not force or pry the belt onto the pulley and sheave. With the belt in place, adjust so that all the slack is on one side of the drive. The belt should have from 3/4'' to 1' of slack at 3lbs. pressure. Adjust the belt to this tension, first, loosen the four screws as following picture, then raise or lower the swing base via the adjusting rods and nuts.

Refer to following picture, loosen 4 bolts, and move the electric motor to adjust belt tension. The 4 bolts are used for factory precision adjustment only, which shall not be adjusted except professional maintenance stall.

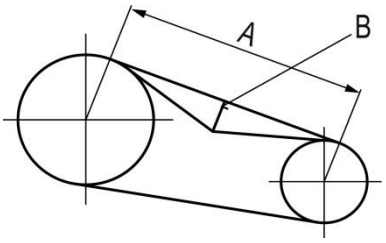


✧ Belt tension is measured by belt tension indicator.

Calculate the deflection, deflection=A/64. A=315mm.

Measure the belt deflection force, the force should be between the values shown in the following table.

The belt which is too tight or too loose may generate noise and be harmful to the unit.



A: Center distance.

B: Belt tension indicator applied to middle distance 16mm defection per 1 meter.

Belt section	For required to deflection		
	Small pulley Dia. (in. [mm])	Newton (N)	Kilogram-force (kgf)
SPA	4-5/16~5-1/4 [109~133]	25~35	2.5~3.6

✧ Maintenance of fan: One week after the air handler is running, the elastic belt should be re-adjust, and should be inspected once every three months in accordance with the requirements of inspection.

✧ Maintenance of belt and pulley: When the unit is running, check tension of the belt in a regular time. Do the inspection job according to requirements of inspection.

Tension adjustment of the belt:

If the belt tension is proper, it will help to avoid fan vibration, reduce noise and belt abrasion. The belt tension should be checked and do adjustment according to the following procedures if necessary:

Step 1: Loosen the 4 fixed bolts of motor. Tighten or loosen the bolts to move the motor.

Step 2: Act in the middle of the belt perpendicularly with a finger. Adjust belt tension until there is deflection distance. If possible, it is better to use a tension frequency test device, in order to get a more precise tension.

Step 3: Tighten the fixed bolt of motor again.

Pulley revises:

Fan pulley and motor pulley should on the same plane, or it will consume much more energy and curtail service life of belt. Every time after belt adjustment, check if positions of the 2 pulleys are correct, refer to the following picture. Put a ruler on the same side of 2 pulleys to check if positions of 2 pulleys are correct. Check if point 1, point 2, point 3 and point 4 are in the same place. If not, loosen fixed screws of fan pulleys and along the fan axle to slide fan pulleys. Loosen motor to adjust the angle on the fan slide way. Adjust to make straightness less than 2mm or equal to 2mm.

Notes:

- Straightness requirements and tension requirements should be satisfied at the same time after adjusting belt and pulleys.
- When the service time has reached to 24 hours for the newly used belt, it is

necessary to check belt tension and adjust it properly. Improper adjustment or no adjustment may result in belt lifespan reduction. Even more it will cause belt fracture.

- Belt is consumable. It is normal when after 6-month usage, the belt is abraded and lose efficacy. It is needed to change a new one at this time. If multi-belts rotate, the group of belts should be changed simultaneously.

✧ Replace the air filters.

✓ Loosen filter access panel's hole and remove it.

✓ Pull out the filter along the supporting slot.

✧ Clean the air filter.

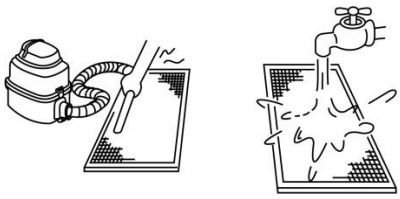
Vacuum cleaner or fresh water may be used to clean the air filter. If the dust accumulated too much, please use soft brush and mild detergent to clean and dry out in cool place).

✓ The air-in side should face up when using vacuum cleaner.

✓ The air-in side should face down when using water.

✓ Do not dry out the air filter under direct sunshine or heat.

✓ Re-install the air filter.



✧ Maintenance performed by serviceman.

To keep unit operation safely and efficiently, the manufacturer recommends that a qualified serviceman check the entire system at least once each year and any other time when it is needed. The serviceman should examine following items:

✓ Filters;

✓ Motors and drive system components;

✓ Economizer gaskets (for possible replacement);

✓ Safety controls (for mechanical cleaning)

✓ Electrical components and wiring (for possible replacement and connection tightness);

✓ Condensate drain (for cleaning);

- ✓ Unit duct connections (to check that they are physically sound and sealed to the unit casing);
- ✓ Unit mounting support (for structural integrity);
- ✓ The unit (for obvious unit deterioration).