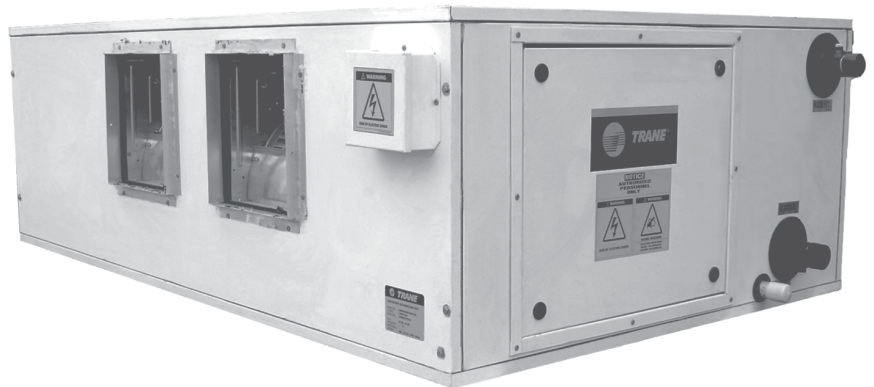




Installation Operation Maintenance

Low Height Air handler (LWHA)

- BELT DRIVE, 013-133
- DIRECT DRIVE, 013-053



**Model
LWHA**

**BC-SVX002-E4
(May 2014)**

General Information

Foreword

These instructions do not attempt to cover all variations in systems, nor to provide for every possible contingency to be met in connection with installation. Should further information be desired or should particular problems arise which are not sufficiently covered for the purchaser's purpose, the matter should be referred to the manufacturer.

Warranty

Warranty is based on the general terms and conditions of The Trane Company. The warranty is void if the equipment is repaired or modified without the written approval of the manufacturer, if the operating limits are exceeded or if the control system or the electrical wiring is modified. Damage due to misuse, lack of maintenance or failure to comply with the manufacturer's instructions or recommendations are not covered by the warranty obligation.

Reception

On arrival, inspect the unit before signing the delivery note. Specify any damage on the delivery note, and send a registered letter of protest to the last carrier of the goods within 72 hours of delivery. Notify the local Trane Sales Office at the same time.

The unit should be totally inspected within 15 days of delivery. If any concealed damage is discovered, stop unpacking the shipment.

Notify the carrier immediately by phone or any registered mail. Notify the local Trane Sales Office. Conceal damage must be reported within 15 days of delivery. Check the unit nameplate to confirm that the proper unit was shipped. Available power supply must be compatible with electrical characteristics specified on component nameplates.

Installation

This manual covers the installation, operation and maintenance of the Trane Chilled Water Blower coil Air Handlers. LWHA is completely designed to incorporate a single slab coil assembly, improved application flexibility, servicing and maintenance accessibility and an improved accessory line.

LWHAs are specially designed to meet tight ceiling space requirement.

Note:

"Warnings" and "Cautions" appear at appropriate places in this manual. Your personal safety and the proper operation of this machine require that you follow them carefully. The manufacturer assumes no liability for installations or servicing performed by unqualified personnel.

Handling

The unit will be supplied with a shipping based and protective packaging over the unit casing. The packaging should be kept on the unit during handling or storage on site.

If it is necessary to remove the packaging for inspection prior to completion of on site handling, retain packaging parts and reapply them by tapping in position to prevent damage to the casing. The unit as supplied has a shipping base which is suitable for handling by a fork lift truck.

Contents

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LWHA Model Nomenclature

L W H A 0 1 3 E A 2 A A A A A 1 A 1 2 0 0 4 X L 2 X 0 0 0 F
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Digit 1,2,3,4 **LW** Low Height Ahu

Digit 3 **H** Airflow Configuration
H = Horizontal Discharge

Digit 4 **A** Development Sequence, A = First

Digit 5,6,7 **0 1 3** Unit Models
013 023 043 063 113
023 033 053 083 133

Digit 8 **E** Minor Design Sequence

Digit 9 **A** Fan Motor kW. Refer Table →

	BELT DRIVE			Direct Drive
	Low Static	Std. Static	High Static	
LWHA 013	A=0.18	B=0.37	C=0.75	K=0.35
LWHA 020	A=0.18	B=0.37	C=0.75	L=0.55
LWHA 023	B=0.37	C=0.75	D=1.1	L=0.55
LWHA 033	B=0.37	C=0.75	D=1.1	M=0.6
LWHA 043	C=0.75	D=1.1	E=1.5	N=0.75
LWHA 053	D=1.1	E=1.5	F=2.2	Q=1.55
LWHA 063	E=1.5	F=2.2	G=3	
LWHA 083	E=1.5	F=2.2	G=3	
LWHA 113	F=2.2	G=3.0	H=4.0	
LWHA 133	G=3.0	H=4.0	I=5.5	

Digit 10 **2** Electrical rating / Utilization Range : Volt/Phase/Hz.
1 = 200V / 3Ph / 50Hz
2 = 380 - 415V / 3Ph / 50Hz
3 = 230V / 3Ph / 60Hz
4 = 380V / 3Ph / 60Hz
5 = 220-240 / 1Ph / 50Hz (For Direct Drive)
S = Special

Digit 11 **A** Motor shaft diameter, (for belt driven only)

Code	A	B	C	D	E	F	X
Dia	11	14	19	24	28	38	None For
KW	0.18	0.37	0.75	1.1/1.5	2.2/3/4	5.5/7.5	Direct Drive

Digit 12 **A** Motor pulley size

A=63	B=67	C=71	D=75	E=80	F=85	G=90
H=95	I=100	J=106	K=112	L=118	M=125	N=132
O=140	P=150	Q=160	R=170	S=180	T=190	X=None

Digit 13 **A** Fan Model

Model	Belt Driven	Direct Driven
LWHA 013	A=8/8 Single	E=KDD 9/7T 350W 4P-1 3SK
LWHA 020	A=8/8 Single	L=KDD 9/7T 550W 4P-1.3SK
LWHA 023	B=9/7 Single	F=KDD 9/9T 550W 4P-1 3SK
LWHA 033	B=9/7 Single	G=KD2 9/7T 600W 4P-1 3SF
LWHA 043	C=9/7 Twin	H=KD2 9/7T 750W 4P-1 3SF
LWHA 053	D=10/8 Twin	I=KD2 9/9 1550W 4P-1 3SF
LWHA 063	D=10/8 Twin	NA
LWHA 083	J=12/9 Twin	NA
LWHA 113	K=15/11 Twin	NA
LWHA 133	K=15/11 Twin	NA

Digit 14 **B** Fan shaft diameter, (for belt driven only,)

Code	Fan Model	Model
B = 25	8-8 Single, 9/7 Single, 9/7 Twin	LWHA 013-063
C = 30	12/9 Twin, 15/11 Twin	LWHA 083-133
X = None	None (For Direct Drive Fan)	

LWHA Model Nomenclature

L W H A 0 1 3 E A 2 A A A A A 1 A 1 2 0 0 4 X L 2 X 0 0 0 F
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Digit 15

A

Fan pulley size

A=63	B=67	C=71	D=75	E=80	F=85	G=90
H=95	I=100	J=106	K=112	L=118	M=125	N=132
O=140	P=150	Q=160	R=170	S=180	T=90	X=None

Digit 16

1

Number of Grooves

1 = 1 Groove 2 = 2 Grooves 3 = 3 Grooves X = None

Digit 17

A

Belt type

A = SPA B = SPB C = SPC Z = SPZ X = None

Digit 18,19
20,21

1 2 0 0

Belt length

xxxx

Digit 22

4

Cooling Coil Row

4 = 4 Rows 6 = 6 Rows

Digit 23

X

Heating Coil Row

X = None 1 = 1 Row

Digit 24

L

Coil Connection

L = LEFT R = RIGHT

Digit 25

2

Filter, Washable Type

2 = 2" Washable (STD) X = No Filter Media S = Special

Digit 26

X

Electric Heater

X = No Electric Heater Y = UL Listed Electric Heater

Digit 27

0

0 = Future Use

Digit 28

0

0 = Future Use

Digit 29

0

0 = Future Use

Digit 30

F

Service Indicator, F = Models Extension (Introduce LWHA 020/083/113/133, to replace BDHB)

General Specification - LWHA-013 thru 133-EF

Model			LWHA 013	LWHA 020	LWHA 023
Nominal Airflow at 2.54m/s(500ft/min) Coil Face Velocity,		CFM	1076	1250	1750
		CMH	1829	2124	2973
		Max CMH	2103	2442	3419
		Min CMH	732	850	1189
Unit Dimensions					
Unit Width x Height x Length,		mm	992 x 428 x 1087	1118 x 428 x 1087	1118 x 528 x 1087
Basic Weight,		kg	100		120
Coil CAP. Data					
Chilled Water Coil 4 Row/144 Fin per Foot	Cooling Capacity	MBH (KW)	28.3 (8.28)	37.1 (10.88)	52 (15.23)
	Water Flow Rate	GPM (L/S)	5.71 (0.36)	7.45 (0.47)	10.3 (0.65)
	Water Pressure Drop	ft.wg (kPa)	0.97 (2.9)	1.71 (5.1)	1.74 (5.2)
Chilled Water Coil 6 Row/144 Fin per Foot	Cooling Capacity	MBH (KW)	43.8 (12.84)	53.4 (15.64)	74.7 (21.90)
	Water Flow Rate	GPM (L/S)	8.72 (0.55)	10.62 (0.67)	14.9 (0.94)
	Water Pressure Drop	ft.wg (kPa)	3.01 (9.0)	4.69 (14.0)	4.76 (14.2)
Hot Water Coil 1 Row/144 Fin per Foot	Heating Capacity	MBH (KW)	24 (7.04)	28.8 (8.43)	40.3 (11.80)
	Water Flow Rate	GPM (L/S)	2.69 (0.17)	3.17 (0.20)	4.44 (0.28)
	Water Pressure Drop	ft.wg (kPa)	0.44 (1.3)	0.64 (1.9)	0.67 (2)
Fan Data (Belt Driven)					
Fan Type					
Fan Size			FC 8/8 S	FC 8/8 S	FC 9/7 S
Discharge Opening, H x W	BELT Drive	mm	228 x 259 x 1no	228 x 259 x 1no	262 x 232 x 1no
Max RPM			1750	1750	1750
Available ESP					
Motor Data (Belt Driven)					
Motor Type					3 Phase, 50/60Hz, 4 Poles,
Motor Size - Low/ Std/ High Static		kW	0.18/ 0.37/ 0.75	0.18/ 0.37/ 0.75	0.37/ 0.75/ 1.1
Electrical Rating / Utilization Range					
FLA @ 415 Vac, 3Phase, 50Hz			0.59/ 1.03/ 1.78	0.59/ 1.03/ 1.78	1.03/ 1.78/ 2.56
LRA @ 415 Vac, 3Phase, 50Hz			2.4/ 5.2/ 11	2.4/ 5.2/ 11	5.2/ 11/ 16
Cooling Coil Data					
Coil - Width, (Vertical Dim.)		inch	10	10	14
Coil - Length, (Horizontal Dim.)		Inch	31	36	36
Coil Face Area,		FT² (M²)	2.15 (0.20)	2.5 (0.23)	3.5 (0.33)
Coil Rows			4 or 6 Rows	4 or 6 Rows	4 or 6 Rows
Fin Material					
Tube Material / Size, OD		Inch			
Header Material / Size (Standard)		Inch			
Header Material / Size (Optional)		Inch			
HW Coil Data					
Coil - Width / Length / Face Area/ Fin & Tube Material		mm (inch)			
Coil Rows					
Header Material / Size (Standard)		Inch			
Header Material / Size (Optional)		Inch			
Condensate Drain Connection Size					
Filter Data					
Filter Type - Standard					
Filter Size x qty			24"W X 12"H X 2" - 1pc	16"W X 12"H X 2" - 2pcs	20"W X 16"h X 2" - 2pcs
			-		-
DIRECT DRIVE OPTION:					
Fan Data (Direct Driven)					
Fan Type					Centrifugal Forward-
Fan Size			KDD-9/7T, 350 Watt	KDD-9/7T, 550 Watt	KDD-9/9T, 550 Watt
Discharge Opening, H X W	Direct Drive		270 x 240 x 1no	270 x 240 x 1no	270 x 306 x 1no
Motor Data (Direct Driven)					
Motor Type					3 speed/ 4Pole - 220-
Motor/Fan Speed , Low / Med / High			1200/ 1275/ 1350	1150/ 1250/ 1300	1150/ 1250/ 1300
Motor Size		Watt	350	550	550
FLA (Full Load Current) - Low/ Med / High		Amp	2.2/ 3.0/ 4.3	4.0/ 4.7/ 5.4	4.2/ 5.3/ 6.3
ESP (incl. 2" Filter & 4+1 Row Coil) at Nominal Airflow.	High	Pa			
	Medium	Pa			
	Low	Pa			

Note: 1. Cooling coil performance are rated at 26.7C (80F) EDB / 19.4C (67F)EWB and 6.67C(44F) EWT/ 12.22C(54F) LWT at Nominal airflowrate.



General Specification - LWHA-013 thru 133-EF

LWHA 033	LWHA 043	LWHA 053	LWHA 063	LWHA 083	LWHA 113	LWHA 133				
2042	2625	3188	3837	4740	6510	7726				
3469	4460	5416	6519	8053	11061	13126				
3989	5129	6228	7497	9260	12720	15095				
1388	1784	2166	2607	3221	4424	5250				
1271 x 528 x 1087	1578 x 528 x 1087	1578 x 593 x 1207	1858 x 593 x 1207	1858 x 720 x 1255	2126 x 822 x 1255	2476 x 822 x 1255				
130	170	200	230							
66 (19.33)	92.5 (27.11)	112.3 (32.92)	140.8 (41.25)	173.9 (50.96)	232.6 (68.18)	285.7 (83.74)				
13.16 (0.83)	18.39 (1.16)	22.35 (1.41)	28.06 (1.77)	34.71 (2.19)	46.44 (2.93)	57.06 (3.60)				
2.95 (8.8)	6.4 (19.1)	6.5 (19.4)	11.05 (33.0)	11.32 (33.8)	6.97 (20.8)	11.25 (33.6)				
90.4 (26.49)	121 (35.46)	147 (43.07)	180.9 (53.02)	223.5 (65.49)	302.5 (88.65)	366.5 (107.40)				
18.07 (1.14)	24.09 (1.52)	29.32 (1.85)	36.14 (2.28)	44.54 (2.81)	60.39 (3.81)	73.07 (4.61)				
7.37 (22.0)	14.77 (44.1)	14.94 (44.6)	24.75 (73.9)	25.18 (75.2)	15.14 (45.2)	24.08 (71.9)				
48.2 (14.14)	64.2 (18.82)	74.3 (21.77)	91.3 (26.75)	113.9 (33.37)	164.7 (48.26)	199.4 (58.44)				
5.39 (0.34)	7.13 (0.45)	8.24 (0.52)	10.14 (0.64)	12.68 (0.80)	18.39 (1.16)	22.19 (1.40)				
1 (3)	1.94 (5.8)	2.01 (6)	3.25 (9.7)	3.32 (9.9)	2.24 (6.7)	3.48 (10.4)				
Centrifugal Forward-Curved Fan										
FC 9/7 S	FC 9/7 S2	FC 10/8 S2	FC 10/8 S2	FC 12/9 S2	FC 15/11 S2	FC 15/11 S2				
262 x 232 x 1no	262 x 232 x 2nos	289 x 265 x 2nos	289 x 265 x 2nos	341 x 309 x 2nos	404 x 373 x 2nos	404 x 373 x 2nos				
1750	1750	1750	1750	2000	2000	2000				
5- - 300 Pa (0.2 - 1.2" wg)										
TEFC, Class F Insulation, IEC Standard Induction Motor										
0.37/ 0.75/ 1.1	0.75/ 1.1/ 1.5	1.1/ 1.5/ 2.2	1.5/ 2.2/ 3.0	1.5/ 2.2/ 3.0	2.2/ 3.0/ 4.0	3.0/ 4.0/ 5.5				
380 - 420 Vac, 3Phase, 50Hz										
1.03/ 1.78/ 2.56	1.78/ 2.56/ 3.26	2.56/ 3.26/ 4.67	3.26/ 4.67/ 6.21							
5.2/ 11/ 16	11/ 16/ 21	16/ 21/ 35	21/ 35/ 51							
14	14	17	17	21	25	25				
42	54	54	65	65	75	89				
4.08 (0.38)	5.25 (0.49)	6.38 (0.59)	7.67 (0.71)	9.48 (0.88)	13.02 (1.21)	15.45 (1.44)				
4 or 6 Rows	4 or 6 Rows	4 or 6 Rows	4 or 6 Rows	4 or 6 Rows	4 or 6 Rows	4 or 6 Rows				
Aluminum										
COPPER - 3/8" OD					COPPER 1/2"OD					
MILD STEEL PIPE / 1-1/2" BSPT (Ext. Thd.)										
Cu Tube / 1-5/8" ODM										
SAME AS CHW Coil										
3/8" Coil , 1 Row x 1/2 Row Feed										
MILD STEEL PIPE / 1-1/2" BSPT (Ext. Thd.)										
Cu Tube / 1- 5/8" ODM										
1" BSPT (Ext Thd.)										
2" Washable , Pleated / Equivalent to Filter Class G3 / Initial Resistance = 35Pa , Final Resistance = 200Pa										
20"W X 16"h X 2" - 2pcs	20"W X 16"h X 2" - 3pcs	20"W X 20"H X 2" - 3pcs	20"W X 20"H X 2" - 3pcs	20"W X 20"H X 2" - 1pc	16"W X 25"H X 2" -1pc	16"W X 25"H X 2" -1pc				
-	-		-	24"W X 20"H X 2" - 2pcs	20"W X 25"H X 2" -3pcs	25"W X 25"H X 2" -3pcs				
Curved, (FC) Fan										
KD2-9/7T, 600 Watt	KD2-9/7, 750 Watt	KD2- 9/9, 1550 Watt	NOT AVAILABLE							
270 x 240 x 2nos	270 x 240 x 2nos	270 x 306 x 2nos								
240VAc , 1 Phase, 50Hz,										
1250/ 1300/ 1350	1250/ 1300/ 1350	1300/ 1355/ 1400								
600	750	1550								
3.8/ 4.4/ 5.2	4.4/ 5.4/ 5.8	4.7/ 6.5/ 9.0								

2. Heating performance are rated at 15C (59F) EDB and 60C(140F) EWT/ 50C(122F) LWT at Nominal airflowrate.

Unit Installation


Unit Location Recommendations

When selecting and preparing of the unit operating location, consider the following:

1. LWHA shall be installed for horizontal application only.
2. Available power supply must agree with electrical data on unit nameplate.
3. Consider the weight of the unit .
4. Allow sufficient space for the recommended clearances. Refer to Figure 1.
5. Installer must provide suspension rods (threaded) for ceiling mounted unit.
6. All unit must be installed level.
7. Coil piping and condensate drain requirements must be considered. Allow room for proper ductwork and electrical connections. Support all piping and ductwork independently of unit to prevent excess noise and vibration.

Lifting / Rigging Recommendations

Before preparing the unit for lifting, estimate the approximate center of gravity for lifting safety. Because of placement of internal components, the unit weight may be unevenly distributed, with more weight in the coil area. Before hoisting unit into position, be sure that a proper rigging method is used, with straps or slings and spreader bars for protection and safety during lifting. Always test-lift the unit to determine exact unit balance and stability before hoisting it to the installation location.


**WARNING**

DO NOT LIFT THE UNIT WITHOUT TEST-LIFTING FOR BALANCE AND RIGGING. DO NOT LIFT THE UNIT ABOVE PERSONNEL. FAILURE TO OBSERVE THESE WARNINGS MAY RESULT IN PERSONAL INJURY, DEATH OR EQUIPMENT DAMAGE.

MOUNTING

Unit Suspension - Typical

Use suspension mouting kit to isolate the unit from structure. This is usually accomplished through the use of spring or rubber type vibration isolators. The units are designed to be suspended from ceiling on threaded rod size 3/8" or 1/2"(M12), furnished by the installing contractor. Four external mounting lugs are provided at bottom of the unit. The false ceiling opening must be large enough for future maintenance.

**WARNING**

CHECK THAT THE SUPPORTING STRUCTURE IS STRONG ENOUGH TO SUPPORT UNIT WEIGHT.

To install unit complete the following:

1. Determine the unit mounting hole dimensions. Prepare the hanger rod isolator assemblies (provided by installing contractor) and install them in the selected area. Threaded rods are recommended for leveling the unit.
2. Hoist the unit to the suspension rods and attaché with washers and lock nut. Refer to figure 2, for specific mounting details.
3. Level the unit for proper coil drainage and condensate removal from drain

pan. Refer to drain trap sketch in the piping section.

4. Connect the ductwork to the unit.

Auxiliary Drain Pan

A field fabricated auxiliary drain pan may be installed under the unit, and when condensate overflow may cause damage. This drain pan will eliminate any excess condensation that may be due to extreme humidity or an obstructed drain in the primary drain pan. Drain lines from this pan must be installed, but should not be connected to the primary drain line from the unit. Isolate the auxiliary drain pan from both the air handler and the structure.

Air Filters

LWHAs are shipped with 2" Washable filters installed in the unit as standard. For filter dimension and quantity, refer to General Specification. Filter loading method is sliding type and accessible from both sides.

Duct Connections

The Inlet and Discharge air duct connections to the unit should be made with a flexible material minimizing noise and vibration. Typically, about 3 inches(75mm) is needed for this connection to rigid ductwork.

Duct turns and transitions must be made carefully to minimize air friction losses. Avoid sharp turns and use splitters or turning vanes when elbows are necessary. Discharge (supply) ductwork should run in a straight line, unchanged in size or direction, for at least a distance of 1-1/2 fan diameters (see General Specification, for fan diameter).

The return duct should be sized to the same dimensions as the return inlet the return inlet of the unit.

All ductwork should be properly insulated to prevet condensation and heat loss.

Unit Installation

Coil Connections

The water coils for LWHA units are of a 1-Row(Heating), 4-Row or 6-Row(Cooling) design with high efficiency Wavy 3BS aluminum fins and Copper tubes.

LWHA 013-083 : 3/8" OD Cu Tube
LWHA 113&133 : 1/2" OD Cu Tube.

Proper installation and piping is necessary to insure satisfactory coil operation and prevent operational damage. Water Inlet and Outlet connections protrude through the coil section side panel. Follow the industry standard practices when piping the coil.

Note the following:

1. Support all piping independently of the coils.
2. Provide swing joints or flexible fittings in all connections that are adjacent heating coils in order to absorb thermal expansion and contraction strains.
3. When attaching piping to the coil header, make the connection only tight enough to prevent leaks, the maximum recommended torque is 200ft-lbs.
4. Teflon tape or teflon piping compound should not be used because of its high lubricity, Teflon makes it easier to tighten the pipe to the header joint past the point where an effective seal is created, thus damage to the coil could result.
5. "White Zinc" compound / pipe sealer on all threaded connection is recommended, instead.

Note: DRAIN AND VENT CONNECTIONS ARE PROVIDED AS STANDARD ON COIL HEADERS. IF EXTENDED DRAINS AND VENTS ARE REQUIRED, THEY MUST BE FIELD PROVIDED.

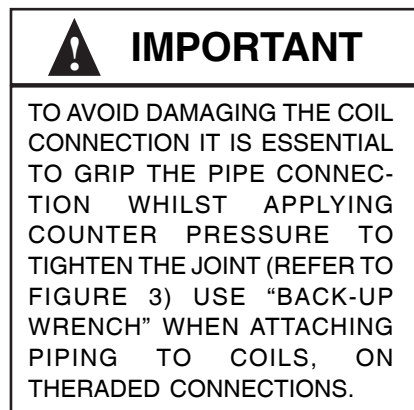
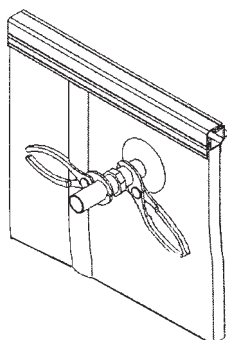
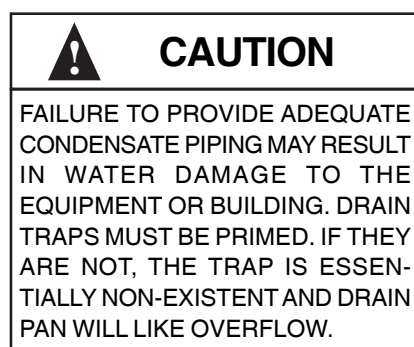


Figure 3
Typical Piping for Water Coil



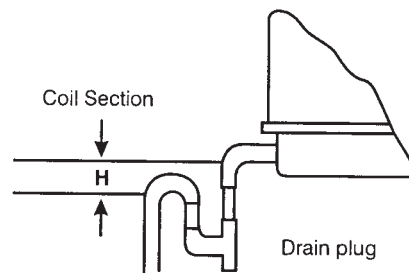
Condensate Drain Connections



The threaded condensate drain connection is provided on the coil section drain pan. Pitch the line downward toward an open drain and install a plugged Tee to facilitate cleaning. Condensate lines should not be connected to a closed drain. This is to avoid the possibility of drawing sewer gasses into the unit. Make sure the drain pan connection opening is unobstructed. Trap the drain line as

shown in Figure 4. Drain Connection size is 1" BSPT for all units.

Figure 4 - Condensate Drain Evacuation U-Trap

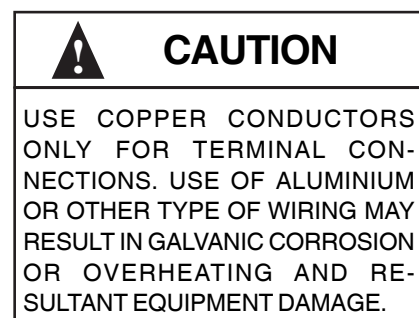
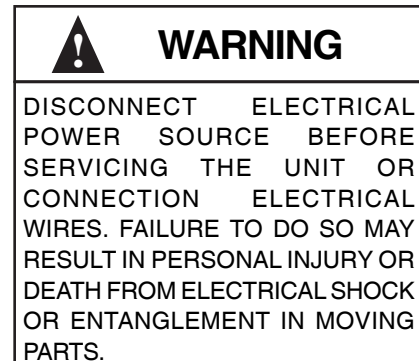


'H, This dimension must be 15 mm at least plus total static pressure.

Electrical Connection

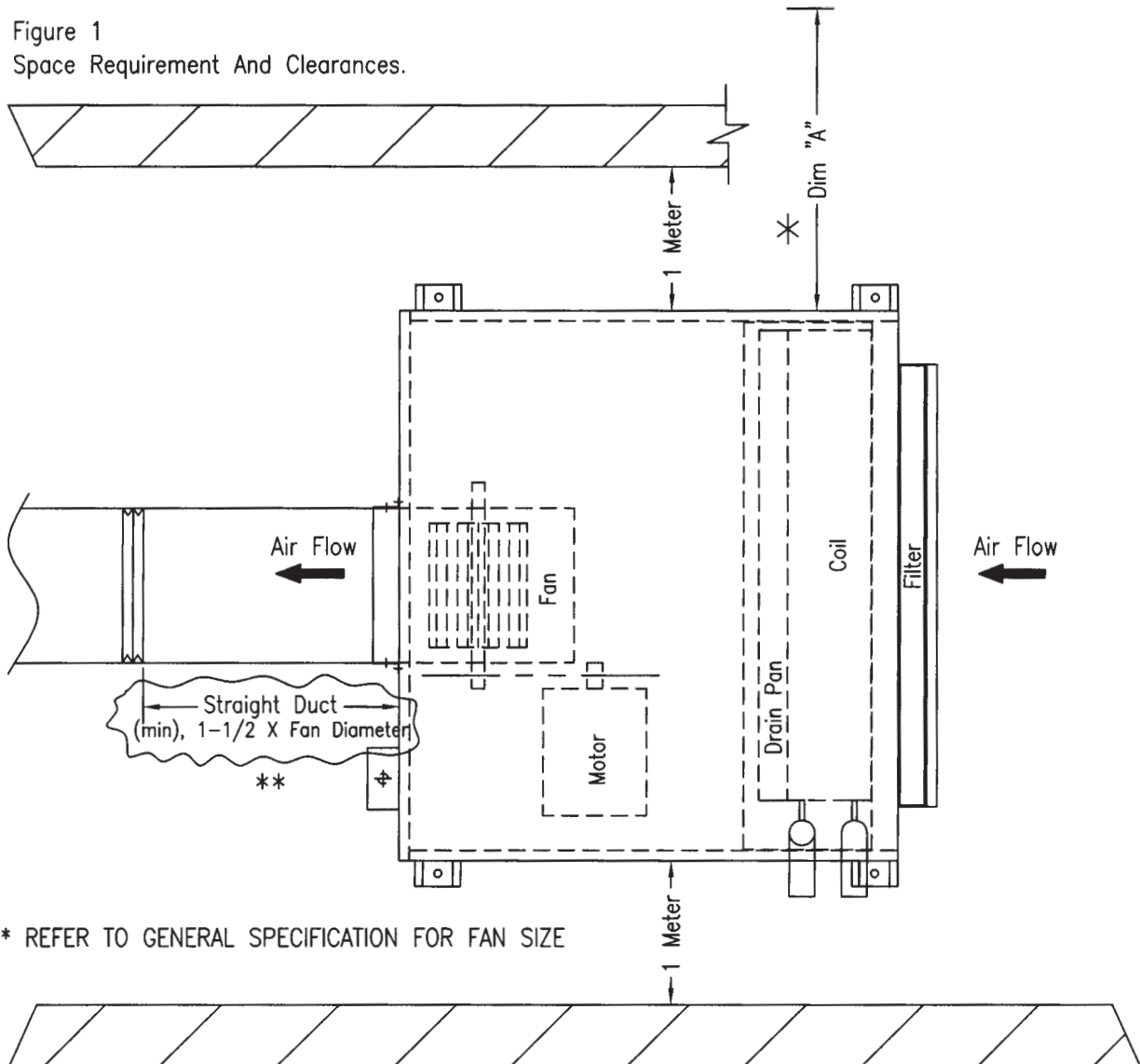
All electrical line sizing, protection and grounding must comply with all National Electric and local electrical codes.

The contractor must also furnish an on/off switching system, thermostat (if controlled temperature is desired) and fuse disconnect switch in compliance with national/local electrical codes, if not supplied by Trane. Refer to General Specification, for electrical characteristics of motors.



Unit Installation

Figure 1
Space Requirement And Clearances.



Dimension

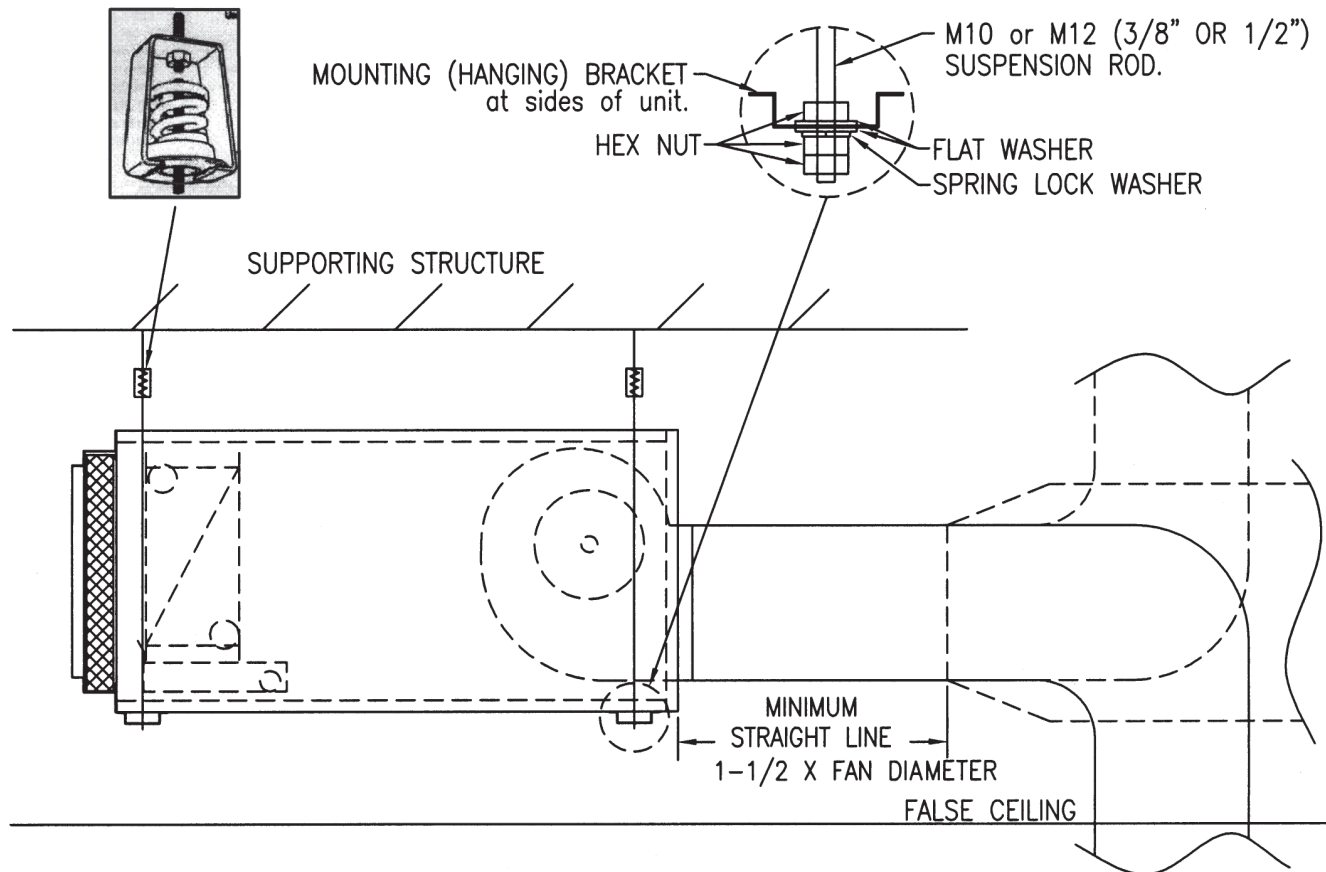
Unit Size	*	**
	Min Clearance, Dim "A"	Straight Duct
LWHA 013	40" (1020 mm)	305 mm
LWHA 020	45" (1150 mm)	305 mm
LWHA 023	45" (1150 mm)	343 mm
LWHA 033	51" (1300 mm)	343 mm
LHWA 043	63" (1605 mm)	343 mm
LHWA 053	63" (1605 mm)	381 mm
LWHA 063	74" (1884 mm)	381 mm
LWHA 083	74" (1884 mm)	457 mm
LWHA 113	84" (2133 mm)	571 mm
LWHA 133	98" (2489 mm)	571 mm
For drain pan & coil removal		

* CLEARANCE, Dim "A" IS NOT REQUIRED,
IF THE COIL & DRAIN PAN ARE ACCESSIBLE
FROM AIR ENTERING (FILTER) SIDE.

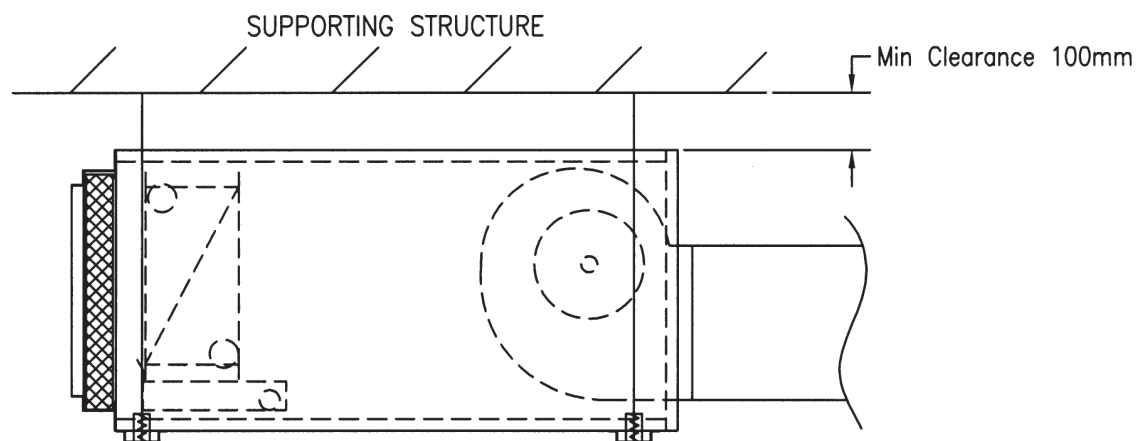
REMOVE THE NON-DRIVE SIDE PANEL &
FILTER FRAME, TO SLIDE OUT & REMOVE
THE COIL.

Unit Installation

Figure 2
TYPICAL INSTALATION METHOD , METHOD 1 , FOR LWHA

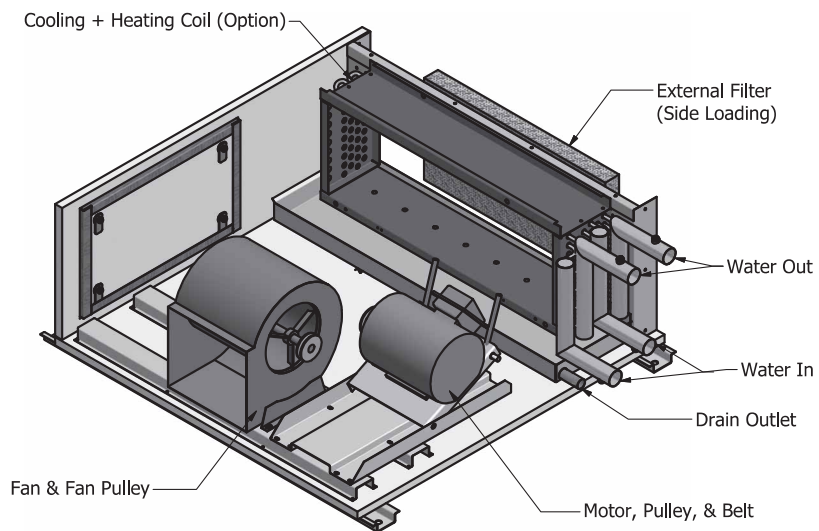


TYPICAL INSTALATION METHOD , METHOD 2 , FOR LWHA

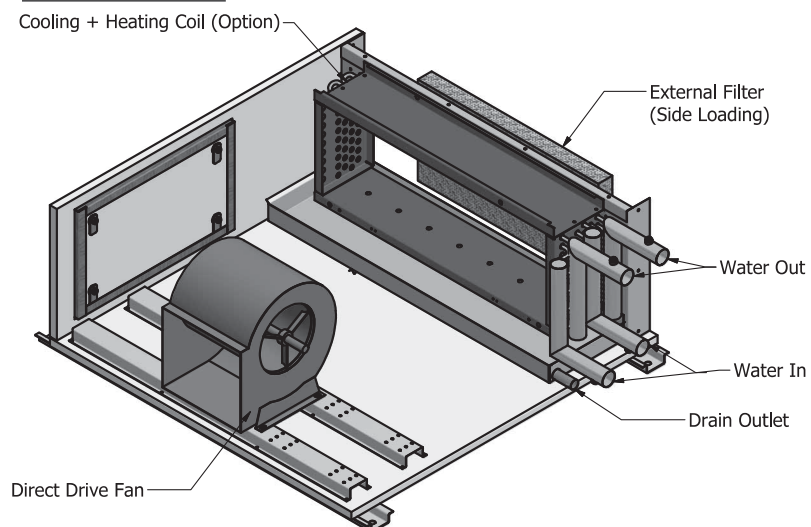


Low Height Air Handling Unit Double Wall - Direct Driven/ Belt Driven

LWHA 013 ~ 133
BELT DRIVE TYPE



LWHA 013 ~ 053
DIRECT DRIVE TYPE

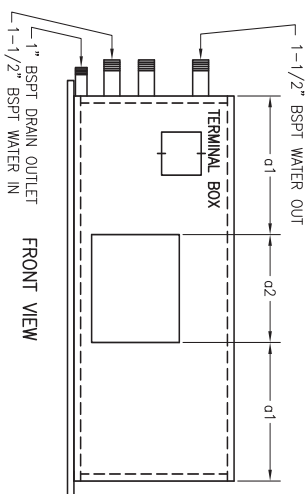
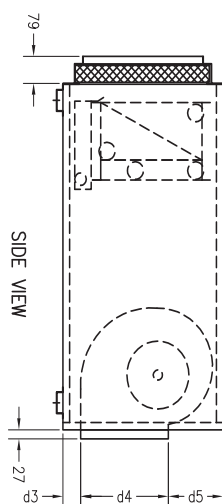
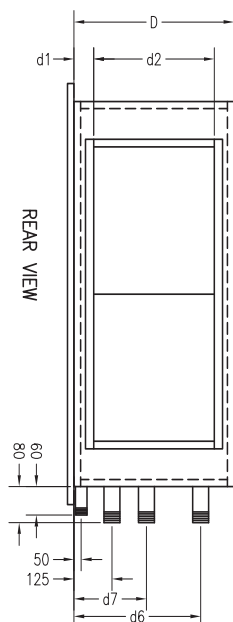


Dimension Data

Low Height Air Handling Unit

Double Wall - Direct Driven

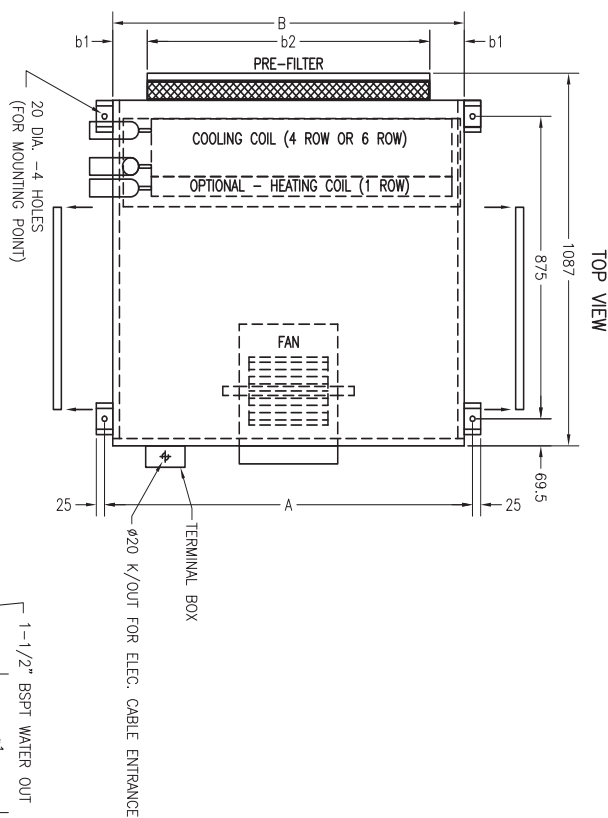
LWHA 013/020/023 - LH Coil



COIL :- 4 ROW / 6 ROW / 4+1 ROW / 6+1 ROW

MODEL	A	B	D	a1	a2	b1	b2
013	1043	992	428	376	240	166	660
020	1170	1118	428	439	240	166	786
023	1170	1118	528	406	306	59	1000

MODEL	d1	d2	d3	d4	d5	d6	Filter Size	Qty.
013	86.5	255	65	270	93	346	24"W X 12"H	1
020	86.5	255	65	270	93	346	16"W X 12"H	2
023	86.5	355	60	270	198	449	20"W X 16"H	2

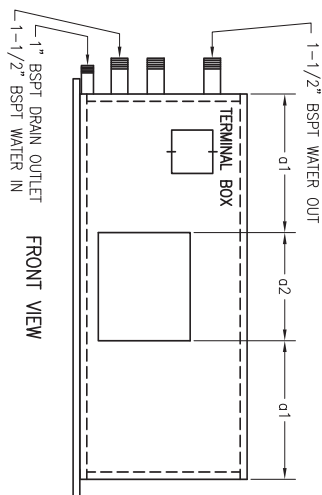
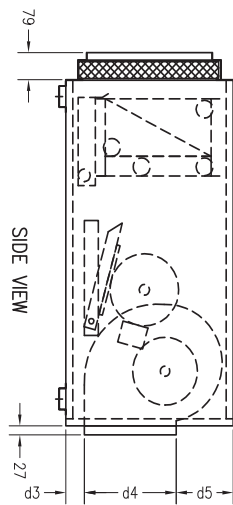
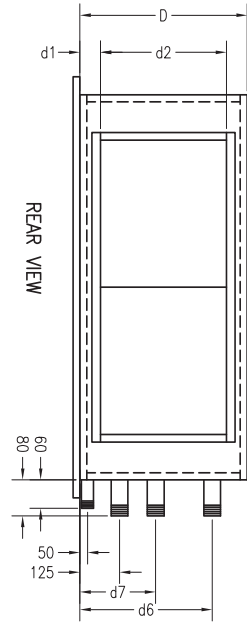


Dimension Data

Low Height Air Handling Unit

Double Wall - Belt Driven

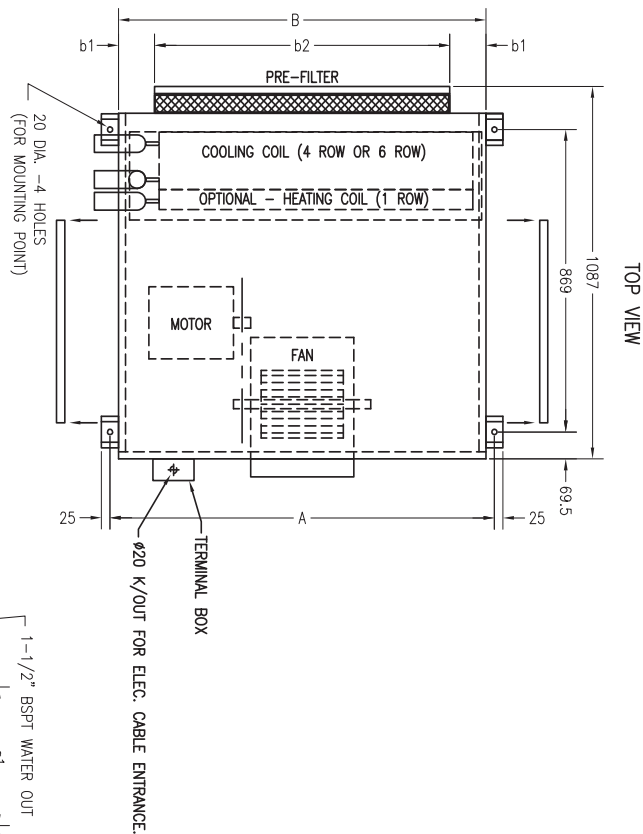
LWHA 013/020/023/033 - LH Coil



COIL :- 4 ROW / 6 ROW / 4+1 ROW / 6+1 ROW

MODEL	A	B	D	a1	a2	b1	b2
013	1043	992	428	363.5	265	166	660
020	1170	1118	428	426.5	265	166	786
023	1170	1118	528	439	240	59	1000
033	1321	1271	528	515.5	240	135.5	1000

MODEL	d1	d2	d3	d4	d5	d6	d7	Filter Size	Qty.
013	86.5	255	65	233	130	346	219	24"W X 12"H	1
020	83.5	261	65	233	130	346	219	16"W X 12"H	2
023	86.5	355	90	270	168	449	245	20"W X 16"H	2
033	86.5	355	90	270	168	449	245	20"W X 16"H	2

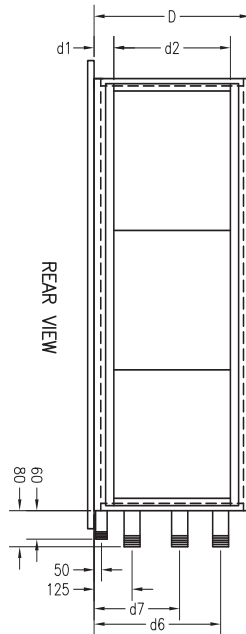


Dimension Data

Low Height Air Handling Unit

Double Wall - Direct Driven

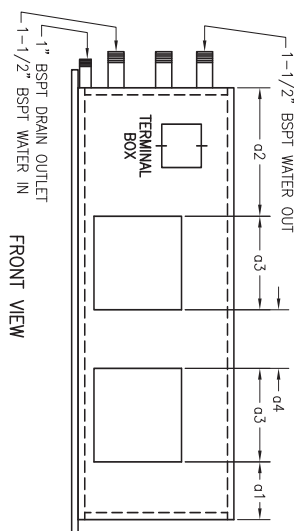
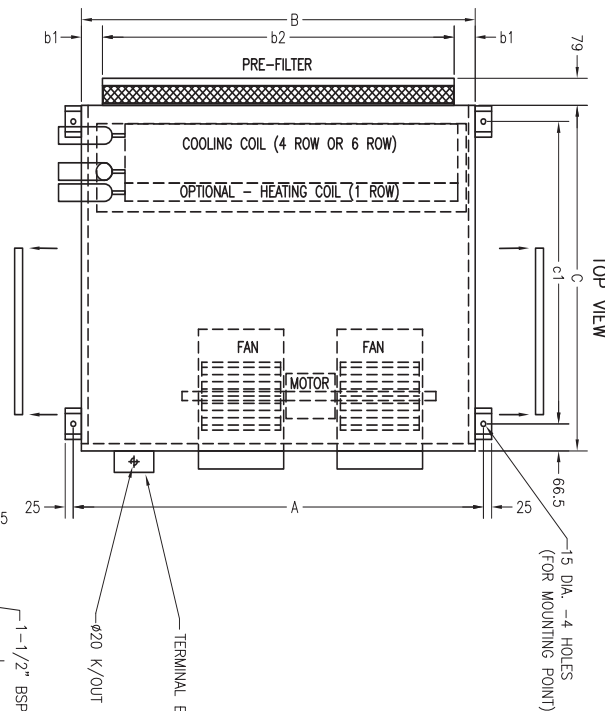
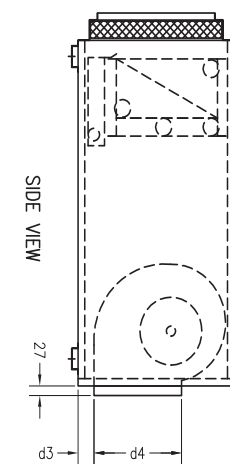
LWHA 033/043/053 - LH Coil



COIL :- 4 ROW / 6 ROW / 4+1 ROW / 6+1 ROW

MODEL	A	B	C	D	a1	a2	a3	a4	b1	b2	c1
033	1321	1271	1008	528	283	283	240	225	135.5	1000	875
043	1628	1578	1008	593	437	437	240	225	39	1500	875
053	1628	1578	1128	593	311	311	306	344	39	1500	995

MODEL	d1	d2	d3	d4	d5	d6	d7	Filter Size	Qty.
033	86.5	355	48	270	210	447	245	20"W X 16"H	2
043	119	355	48	270	275	447	245	20"W X 20"H	3
053	119	355	64	270	259	517	284	20"W X 20"H	3

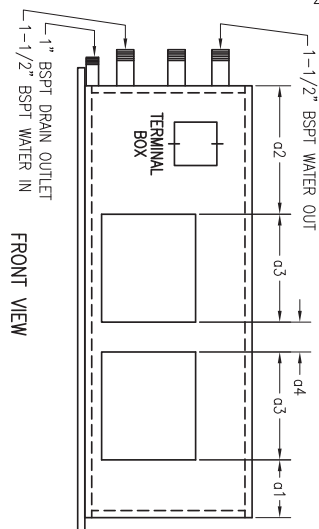
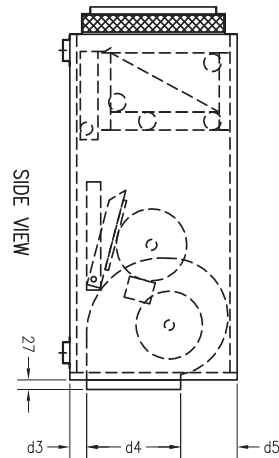
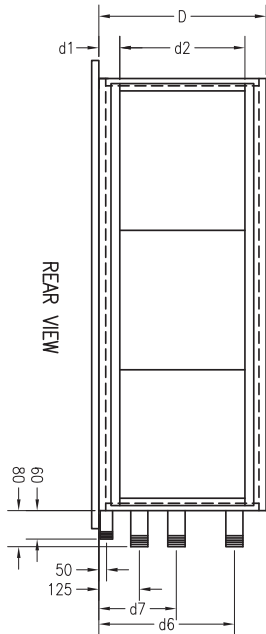


Dimension Data

Low Height Air Handling Unit

Double Wall - Belt Driven

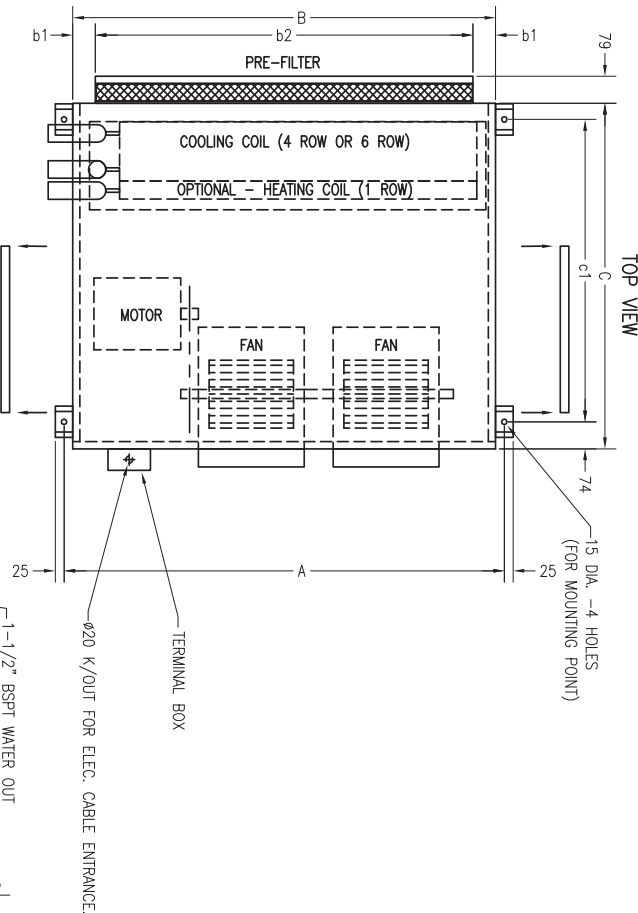
LWHA 043/053/063/083/113/133 - LH Coil



COIL :- 4 ROW / 6 ROW / 4+1 ROW / 6+1 ROW

MODEL	A	B	C	D	a1	a2	a3	a4	b1	b2	c1
043	1628	1578	1008	528	462	462	238	178	39	1500	860
053	1628	1578	1128	593	314	514	273	204	39	1500	980
063	1908	1858	1128	593	554	554	273	204	179	1500	980
083	1908	1858	1176	720	500	500	308	242	86	1686	1028
113	2176	2126	1176	822	536	536	383	288	123	1880	1028
133	2528	2476	1176	822	711	711	383	288	109	2258	1028

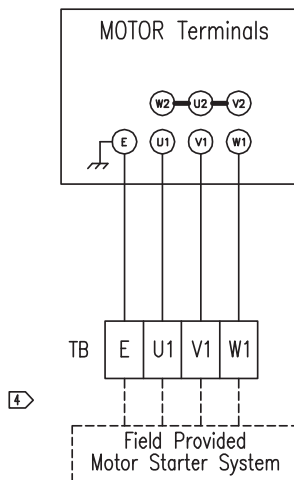
MODEL	d1	d2	d3	d4	d5	d6	d7	Filter Size	Qty.
043	86.5	355	90	270	168	449	145	20"W x 16"H	3
053	69.5	454	90	298	205	519	165	20"W x 20"H	3
063	69.5	454	90	298	205	519	165	20"W x 20"H	3
083	125	162	90	344	286	624	165	20"W x 20"H	1
								24"W x 20"H	2
113	117	588	320	416	86	726	145	16"W x 25"H	1
								20"W x 25"H	3
133	117	588	320	416	86	726	145	16"W x 25"H	1
								25"W x 25"H	3



LWHA Schematic Wiring Diagram (Without Starter)

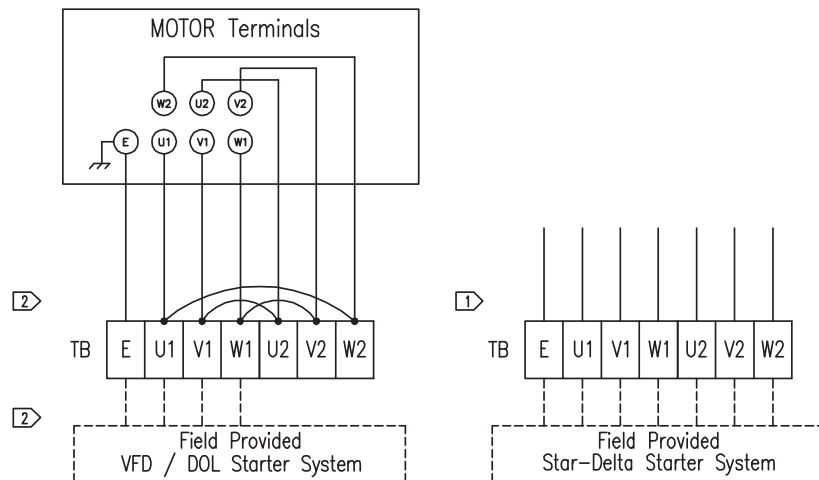
WIRING FOR MOTOR

2.2 kW and Below

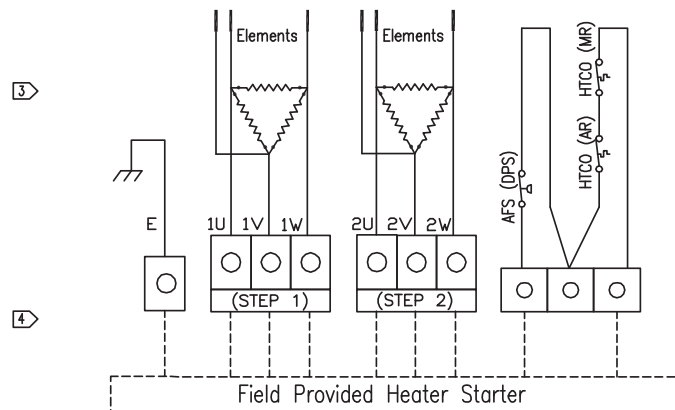


WIRING FOR MOTOR

3.0 kW and Above



HEATER WIRING 3-Phase (OPTION)



NOTES:

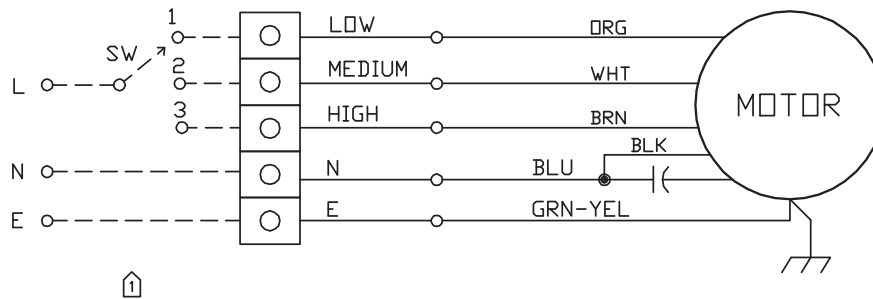
- ① REMOVE JUMPER FOR STAR-DELTA STARTER CONNECTION. ALWAYS REFER TO MOTOR NAMEPLATE TO ENSURE CORRECT CONNECTION.
- ② PLEASE ENSURE FIELD CONNECTION IS FOLLOWING TO THIS WIRING INSTRUCTION, FAILURE TO DO SO WILL CAUSE DAMAGE TO THE MOTOR.
FACTORY DEFAULT CONNECTION.
- ③ NUMBER OF STEP DEPENDS ON SELECTION.
- ④ PLEASE REFER NAMEPLATE FOR CORRECT POWER INPUT.

LEGEND	
L	LIVE TERMINAL
N	NEUTRAL TERMINAL
E	EARTH/GROUND TERMINAL
AFS	AIR FLOW SWITCH
U,V,W	3 PHASE LIVE TERMINALS
HTCO (AR/MR)	HIGH TEMP CUT-OUT SWITCH (AUTO RESET/MANUAL RESET)
□ / TB	TERMINAL BLOCK
— — —	WIRING/PARTS BY FACTORY
— — —	WIRING/PARTS BY OTHERS

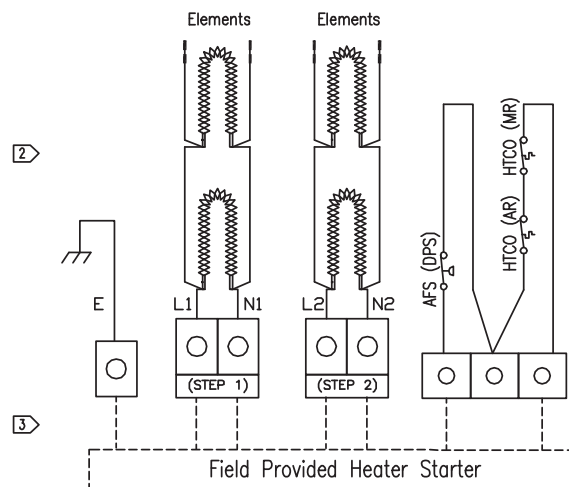
LWHA Wiring Diagram (Direct Drive Fan)

MOTOR WIRING - DIRECT DRIVE FAN

240VAC, 50Hz, 1-Phase






HEATER WIRING 1-Phase (OPTION)



NOTES:

- ① FIELD INSTALLED STARTER/SPEED SWITCH.
- ② NUMBER OF STEP DEPENDS ON SELECTION.
- ③ PLEASE REFER NAMEPLATE FOR CORRECT POWER INPUT.

LEGEND	
L	LIVE TERMINAL
N	NEUTRAL TERMINAL
E	EARTH/GROUND TERMINAL
AFS	AIR FLOW SWITCH
HTCO(AR/MR)	HIGH TEMP CUT-OUT SWITCH (AUTO RESET/MANUAL RESET)
	TERMINAL BLOCK
	WIRING/PARTS BY FACTORY
	WIRING/PARTS BY OTHERS

Operation / Start-Up

Pre-Start-Up Inspection

Perform the following checks and inspections before operating the unit.

Inspection Checklist

- ☐ a) Unit is mounted securely to the ceiling support rods (mounting units).
- ☐ b) Ductwork connections are complete, valve and piping have thoroughly insulated.
- ☐ c) Coil connections are complete and tight.
- ☐ d) Condensate drain pan connections are complete and tight.
- ☐ e) Electrical connections completed. Wiring is correct and in accordance with the wiring diagram. Ground connection completed.
- ☐ f) Check and retighten, if necessary all the motor, fan pulley, fan bearings and wheel.
- ☐ g) Rotate fan by hand, to ensure that it runs freely and that there is no interference.
- ☐ h) Check and retighten, if necessary, drive and bearing bolts, motor clamp plate bolts and isolator bolt.
- ☐ i) Check to ensure that pulley is correctly aligned and that shaft is parallel.
- ☐ j) Check belt tension as per instruction given in the maintenance section.

Start-Up procedures

After completing all items under "Pre-Start-Up", the unit may be started and the following checks and adjustments performed:

- ☐ a) Bump start the motor to check the direction of rotation. If the rotation need to be changed, stop the motor completely and change the direction of rotation by changing the line connection.
- ☐ b) After connecting the load, the motor should start quickly and run smoothly. If it does not, the power supply should be switched off at once and all connections, as well as the power supply, should be re-checked before re-starting.
- ☐ c) In the event of excessive vibration or unusual noises, the motor should be disconnected from the load and checked for poor alignment, loose mounting bolts, etc.
- ☐ d) When the motor has been operated under load for a short period of time, check that the operating current with the nameplate current.
- ☐ e) Measure the motor voltage and amps on all phases to insure proper operation. Compare these reading with the motor nameplate

Maintenance



WARNING

WHEN INSTALLING OR SERVICING THIS EQUIPMENT, ALWAYS EXERCISE BASIC SAFETY PRECAUTIONS TO AVOID THE POSSIBILITY OF ELECTRIC SHOCK THAT COULD RESULT IN SEVERE PERSONAL INJURY OR DEATH.

Monthly Inspection

1. Check condition of air filters and replace them if necessary.
2. Check the drain pan to be sure that it is clean and free to carry the flow of condensate through the drain line.
3. Check the coil surface for cleanliness. Clean if necessary.

Yearly Inspection

1. Replace filters.
2. Check coil surface, clean by vacuuming or flushing with cold water. Do not use steam or hot water.
3. Carry out check (g) through (j) as detailed in inspection checklist in the Operation Section.
4. Inspect the condition of the fan belt and replace if necessary.
The belts fitted to units cannot achieve design performance without the correct tensioning.
5. Check condition of external vibration isolators, replace if there is any sign of wear, loosening or material deterioration.
6. Check fan bearings for noisy operation and excessive lubricant leakage. Replace if necessary.
7. Inspect the condensate drain pan and condensate piping to make sure they are clear and will carry away all water.
8. Inspect the control panel wiring to make sure connections are tight and insulation is intact.
9. Check system for water leaks.

Change / Clean Filters

Change or clean air filters at least twice a year. Filters will require more frequent care under high load conditions or dirty air. A clogged air filter reduces airflow, cooling capacity and increases energy usage.

To clean washable filters, remove the filter media and wash it in water to remove dust, dirt and lint; allow to dry thoroughly before re-installing in the units. Do not rub or wring.

Washable filters can also be cleaned by blowing with compressed air in opposite direction of filter airflow.

Fan Belt Tension

Note: Fan belt tension should be checked at least twice during the first day of operation, since there is a rapid decrease in tension until belts are run in.

Proper belt tensioning is required to ensure maximum bearing and drive component life and is based on fan brake horsepower requirement.

Belt Tension Measurement

Check the belt tension as follows:

Measure the span length mm of the drive. With a belt tensioner at the center of the span, apply a force K (perpendicular to the span) large enough to deflect the belt 15mm per 1 meter of span. Refer to figure 5.

$$\text{DEFLECTION} = \text{SPAN mm} \times 15/1000\text{mm}$$

The deflection force for the belt should be within the minimum and maximum force shown in the Table 1. When the tension drops to the minimum value,

readjust to the maximum value.

To measure belt tension, use a belt tensioner as shown in Figure 6. Determine actual deflection by depressing one belt with the belt tensioner and measuring the deflection relative to the other belts or to belt line. Adjust the belt tension to the correct force (Newton) and tighten all setscrews to the proper torques.

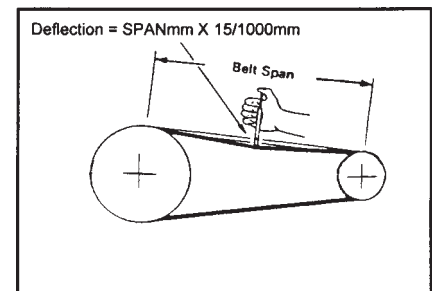


Figure 5

Belt Tension Measurement

Fan /Motor Bearing



IMPORTANT

THE MOTOR & FAN FURNISHED WITH SHIELDED BEARINGS. THE BEARINGS ARE PRE-LUBRICATED FOR LIFE AND MAINTENANCE FREE. REPLACE THE BEARING IF DAMAGED/NOISY.

Maintenance

Table1

Smaller Pulley Diameter	Force Unit	SPZ	SPA	SPB	SPC
56 - 80 mm	kg	1.5	2		
81 - 112 mm	kg	2	2.5	3	
113 - 160 mm	kg	2.5	3	3.5	5
161 - 224 mm	kg	2.5	3.5	5	7
225 - 355 mm	kg		4.5	6	9
356 - 630 mm	kg			6	11

Force Unit Tolerance +/- 0.5kg

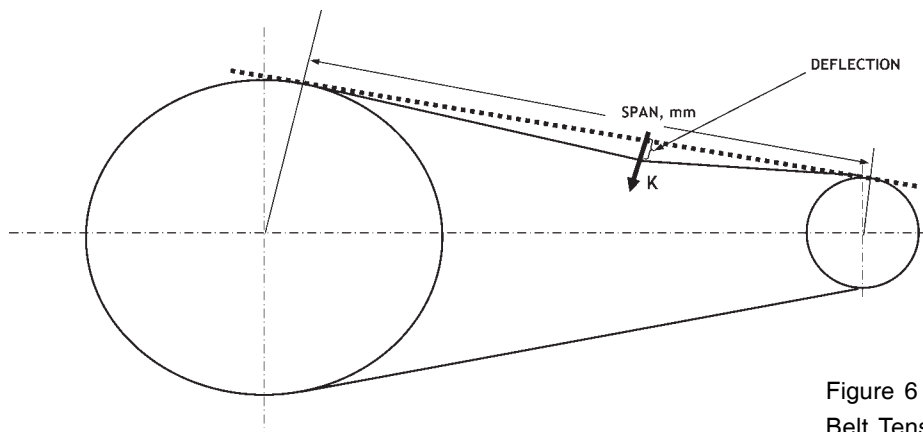
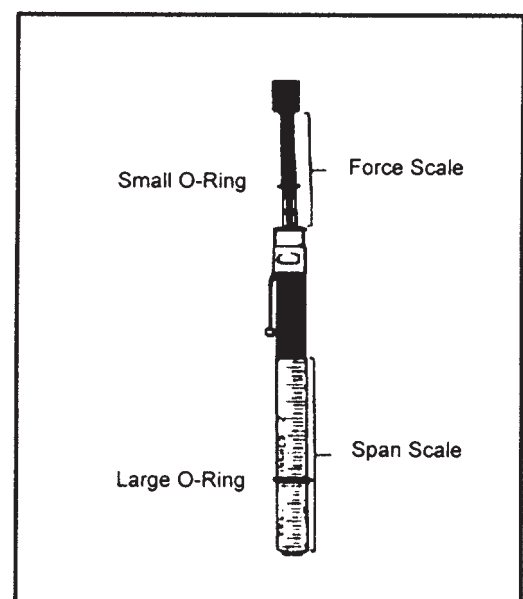



Figure 6
Belt Tension Measurement



Maintenance

Fan Belt Maintenance

Clean fan belts and pulleys with a dry cloth. Oil and grease must be kept off belts. The use of a belt dressing is not recommended. When replacing belts, use a matched set. Do not force belts onto pulleys, but adjust motor position to allow mounting and then re-tighten.



CAUTION

DO NOT OVER-TENSION THE BELTS. EXCESSIVE TENSION WILL REDUCE FAN AND MOTOR BEARING LIFE, ACCELERATE BELT WEAR AND POSSIBLY CAUSE SHAFT FAILURE. CLEAN THE SHEAVES AND BELT WITH A DRY CLOTH. OIL AND GREASE SHOULD BE KEPT AWAY FROM THE BELT BECAUSE THEY CAN CAUSE DETERIORATION AND SLIPPAGE. THE USE OF BELT DRESSING IS NOT RECOMMENDED

Sheave (Pulley) Alignment

To prevent interference of the fan frame with the belt, make sure that the belt edge closest to the motor has the proper clearance from the fan frame, as shown in Figure 7.

Align the fan and motor sheaves by using a straightedge as shown in Figure 8. The straightedge must be long enough to span the distance between the outside edges of the sheaves.

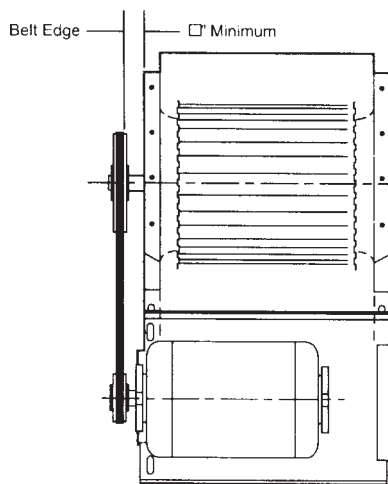
When the sheaves are aligned, the straightedge will touch both sheaves at points A through D.

Maintenance Contract Training

It is strongly recommended that you sign a maintenance contract with your local Service Agency. This contract provides regular maintenance of your installation by a specialist in our equipment.

Regular maintenance ensures that any malfunction is detected and corrected in good time and minimizes the possibility that serious damage will occur. Finally, regular maintenance ensures the maximum operating life of your equipment. We would remind you that failure to respect these installation and maintenance instructions might result in immediate cancellation of the warranty.

**Figure 7
Clearance**

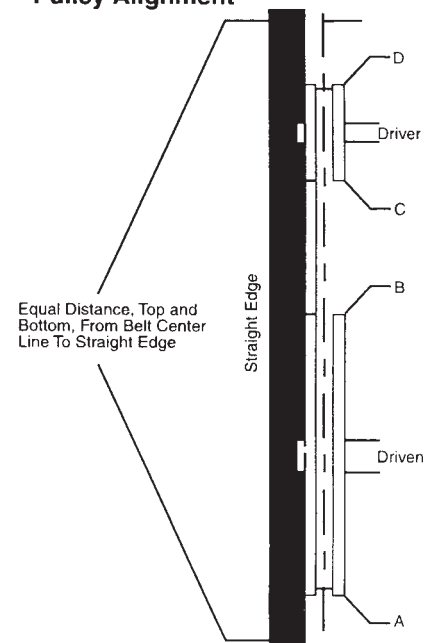


The equipment described in this manual is the result of many years of research and continuous development.

To assist you in obtaining the best use of it, and maintaining it in perfect operating condition over a long period of time, the constructor have at your disposal a refrigeration and air conditioning service school. The principal aim of this is to give operators and maintenance technicians a better knowledge of the equipment they are using, or that is under their charge.

Emphasis is particularly given to the importance of periodic checks on the unit operating parameters as well as on preventative maintenance, which reduces the cost of owning the unit by avoiding serious and costly breakdown.

**Figure 8
Pulley Alignment**



Trouble Analysis

Use the tables in this section to assist in identifying the cause of causes of a malfunction in LWHA operation. The column header **RECOMMENDED ACTION** will suggest repair procedures.

Note: These Tables are intended as a diagnostic aid only. For detailed repair procedures, contact your local Trane Service Company.



IMPORTANT

DISCONNECT ELECTRICAL POWER SOURCE AND ALLOW ALL ROTATING EQUIPMENT TO STOP COMPLETELY BEFORE INSPECTING OR SERVICING THE UNIT. FAILURE TO DO SO MAY RESULT IN PERSONAL INJURY OR DEATH FROM ELECTRICAL SHOCK OR MOVING PARTS.



WARNING

DISCONNECT ELECTRICAL POWER PRIOR TO ACCESS INTO A FAN DUCTWORK. EVEN WHEN LOCKED OUT ELECTRICALLY, FANS MAY CAUSE INJURY OR DAMAGE IF THE IMPELLER IS SUBJECT TO "WINDMILLING". THE IMPELLER SHOULD BE SECURED TO PHYSICALLY RESTRICT ROTATIONAL MOVEMENT. FAILURE TO SECURE IMPELLER CAN CAUSE SEVERE PERSONAL INJURY OR DEATH.

LWHA Series Trouble Analysis

<u>Symptom</u>	<u>Probable cause</u>	<u>Recommended Action</u>
Bearing is excessively hot	Over tensioned belts.	Adjust tension.
	No lubricant / lubrication dry-out	Replace bearing.
Motor fail to start	Misaligned bearing.	Correct alignment. Check shaft level.
	Blown fuse or open circuit breaker.	Replace fuse or reset circuit breaker.
	Overload trip.	Check and reset overload.
	Improper wiring or connections.	Check wiring with diagram supplied on unit.
Motor stalls	Improper power supply.	Compare actual supply power with motor nameplate recommendations. Contact power company for adjustments.
	Mechanical failure.	Check that motor and driver rotate freely.
	Open phase.	Check line for an open phase.
	Overloaded motor.	Reduce load or replace with larger motor.
Excessive vibration	Low line voltage.	Check across AC line. Correct voltage if possible
	Over tensioned belts	Adjust belts tension.
Motor runs and then dies down	Misaligned drive	Align drive.
	Partial loss of line voltage.	Check for loose connections. Determine adequacy of main power supply.
Motor does not come up to speed.	Stator shorts when motor warms up.	Replace stator / motor.
	Low voltage at motor terminals.	Check across AC line and correct voltage loss if possible.
Motor overheats	Line wiring to motor too small.	Replace with larger sized wiring.
	Overloaded motor.	Reduce load or replace with a larger motor.
	Motor fan is clogged with dirt preventing proper ventilation.	Remove fan cover, clean fan and replace cover.
Excessive motor noise.	Motor mounting bolts loose.	Tighten motor mounting bolts.
	Worn motor bearings.	Replace bearing.
	Fan rubbing on fan cover.	Remove interference in motor fan housing.

LWHA Series Trouble Analysis

<u>Symptom</u>	<u>Probable cause</u>	<u>Recommended Action</u>
Rapid motor bearing wear	Excessive overhung load due to overtensioned drive. Excessive overhung load due to a small diameter motor sheave.	Check belt tension and overhung load. Replace sheave with larger one.
Loose fan belt	Motor is poorly positioned. Worn or damaged belt. Worn sheaves.	Adjust belt tension. Replace belt or belt set. Check sheave alignment. Replace sheaves.
Short belt Life	Worn sheaves. Misaligned belt. Grease or oil on belts. Belt slipping. Belts rubbing.	Replace sheaves. Realign drive Check for leaky bearings. Clean belts and sheaves. Adjust tension. Remove obstruction or realign drive for clearance.
Bearing Noise	Poor alignment. Inadequate lubrication.	Loosen bearing set screws and re-align. Replace bearing.
Low coil capacity (Chilled Water)	Incorrect airflow. Incorrect gpm. Incorrect water temperature.	Check fan-operating conditions. Check water pumps, valves and lines for obstructions. Provide proper water temperature.
Under CFM or low air flow	Belt loose Duct leakages Duct obstruction or too small causing high static Dirty filter or coil	Adjust belt tension or clean belt if it is greasy. Check duct joining or turning. Increase fan rpm to overcome high static but fan and motor working limitations must be considered. Change filter and clean coil.
Over cfm or high air flow	Low static due to oversize duct or duct work too short	Replace pulley to reduce fan rpm to meet requirement.
Water leaking	Drain pipe choked Improper or no U-trap Water carry over due to high velocity	Clear drain pipe. Ensure U-trap installed properly. Replace pulley to reduce fan rpm.



Trane
www.trane.com

For more information, contact your local district office

Literature Order Number BC-SVX002-E4 (June 2014)

File Number

Supersedes BC-SVX002-E4 (September 2011)

Stocking Location Malaysia

Trane has a policy of continuous product and product data improvement and reserves the right to charge design and specifications without notice. Only qualified technicians should perform the installation and servicing of equipment referred to in this publication.