

## HAB Horizontal Air Handler Belt Drive Installation, Operation, and Maintenance Manual

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### General

This document provides installation, operation, and maintenance information for the Titus Horizontal Air Handler Belt Drive (HAB) models.

Additional information may be found at the Titus website, its address is [www.titus-hvac.com](http://www.titus-hvac.com).

### Introduction

The following information is to be used by the installer as a guide. Since each installation is unique unto itself, only general topics are covered. Installation may not occur in the same order as topics are presented.

This guide does NOT supersede or circumvent any applicable national, state, or local codes.

The installation is to be performed only by individuals whose experience meets or exceeds the requirements of the work involved.

The installer MUST read the entire contents of this guide and develop a thorough understanding before beginning installation.

Due to a continuing program of product research, Titus reserves the right to discontinue or change without notice, any or all specifications or designs without incurring obligations.

### Safety

The installation and/or servicing of comfort conditioning equipment can be hazardous due to system pressures and electrical devices.

**Caution: Only trained and qualified personnel should perform service and/or installation.**

**Observe all precautions and warnings in product data or attached to the unit.**

Follow all safety codes. Wear eye protection and gloves. Have a fire extinguisher readily available.

**Caution: Disconnect all power supplies before accessing equipment.**

**Disconnecting more than one power supply may be required to de-energize some equipment.**

### DANGER

**ELECTRIC SHOCK CAN CAUSE DEATH.**

### Inspection

Thoroughly inspect all packages upon receipt. Ensure carton(s) have not been dropped, crushed or punctured. Inspect all contents for damage. If damage is found, immediately file a claim with the delivering carrier.

### Product Description

This section provides model number nomenclature, various unit dimensions, and coil specification.

### Model Number Specification

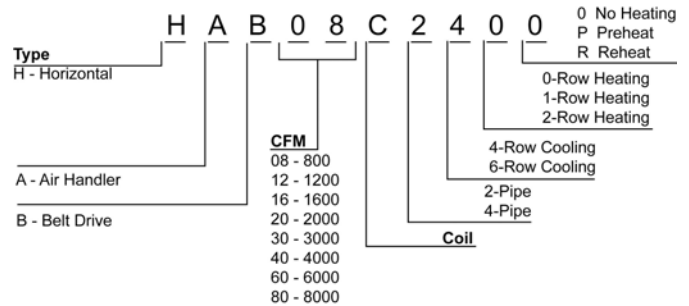
Figure 1 defines model number nomenclature specifics.

## Unit Cabinet Dimensions

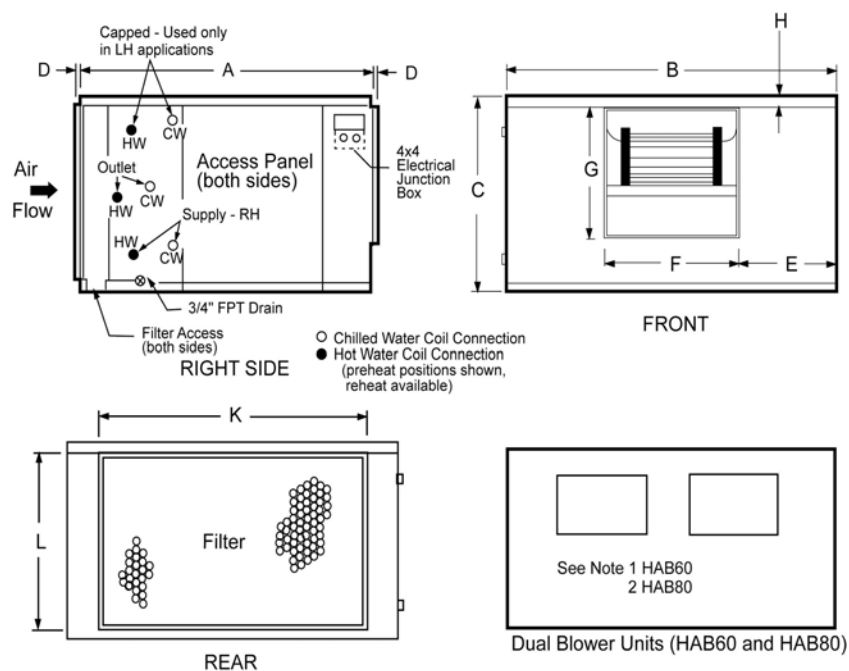
Figure 2 shows dimensional callouts for all sides of an HAB unit. Table 1 provides the cabinet dimensions for each HAB model along with the blower-opening outlet.

## Coil Specifications

Table 2 provides HAB model specifics for the chilled and hot water coil outside diameter and shipping weight based on the number of coils (weight for 4-row chilled water coil includes weight for entire unit).



**Figure 1. Air Handler Model Number Nomenclature**



**Figure 2. HAB Dimensional Views**

**Table 1. Cabinet Dimensions (in inches)**

Model	Unit						Blower Opening Outlet		Return Duct Connection	
	A	B	C	D	E	H	F	G	K	L
HAB08	37.00	27.00	18.00	1	9.13	1.00	8.75	10.00	18.00	16.00
HAB12	37.00	36.50	18.00	1	12.09	1.00	12.31	10.88	27.50	16.00
HAB16	42.00	38.00	22.00	1	14.25	1.00	9.50	14.00	29.00	20.00
HAB20	42.00	45.00	22.00	1	16.00	1.00	13.00	14.00	36.00	20.00
HAB30	52.50	54.00	27.00	1	20.38	1.00	13.25	16.75	45.00	25.00
HAB40	52.50	57.00	34.00	1	21.88	8.50	13.25	16.75	48.00	32.00
HAB60	57.50	67.13	42.00	1	Note 1	7.00	(2) 16.07	(2) 15.88	57.75	40.25
HAB80	57.50	72.00	47.0	1	Note 2	11.88	(2) 16.07	(2) 15.88	66.00	45.00

**Note 1:** Blower opening 7 inches down from top of unit. Looking at discharge 14-3/8 inches left side and 8-3/8 inches right side.

**Note 2:** Blower opening 11-7/8 inches down from top of unit. Looking at discharge 14-3/16 inches left, 11-3/8 inches center and 3-15/16 inches right side.

**Table 2. HAB Installation Data**

Model	4-Row Unit		6-Row Unit		2-Row Coil		1-Row Coil (Note)
	Connection Size OD SWT	Ship Weight (lbs)	Connection Size OD SWT	Ship Weight (lbs)	Connection Size OD SWT	Ship Weight (lbs)	Connection Size OD SWT
HAB08	3/4"	145	3/4"	156	5/8"	13	5/8"
HAB12	3/4"	171	7/8"	190	7/8"	18	5/8"
HAB16	7/8"	200	1-1/8"	222	7/8"	25	7/8"
HAB20	1-1/8"	244	1-1/8"	263	1-1/8"	30	7/8"
HAB30	1-1/8"	457	1-3/8"	475	1-1/8"	41	N/A
HAB40	1-3/8"	512	1-5/8"	547	1-1/8"	53	N/A
HAB60	1-3/8"	700	1-5/8"	787	1-3/8"	86	N/A
HAB80	(2) 1-5/8"	775	(2) 1-5/8"	855	(2) 1-1/8"	106	N/A

**Note:** Shipping weight of a one-row coil is same as two-row coils.

## Standard Installation

Basic installation procedure covers verifying and/or installing the following items.

- Ductwork.
- Duct insulation and vapor proofing.
- Unit placement.
- Sound attenuation.
- Condensate drain.
- Water piping.
- Motors and drives.
- Electrical connections.

**Note:** If mixing boxes form part of the unit, install the mixing boxes prior to installing unit. See *Mixing Box Installation* topic within this document.

## Ductwork

Use accepted industry practices and design guidelines of the *ASHRAE Fundamentals Handbook*. Ductwork must comply with all building codes and the National Fire Protection Association's pamphlet 90A and 90B.

Carefully inspect any previously installed ductwork to determine suitability.

**Note:** Ductwork should be of a size meeting requirements of the installation. Ductwork should transition gradually from a smaller size blower outlet to required duct run size to avoid excessive loss of air velocity.

## DANGER

**BEFORE INSTALLING UNIT, DETERMINE WHETHER THE UNIT WEIGHT CAN BE SUPPORTED SAFELY.**

**POSSIBLE INJURY AND DAMAGE MAY RESULT DUE TO JOIST/TRUSS OVERLOADING.**

When return air duct connection is smaller than return inlet opening, construct the transition piece so the vertical and horizontal dimensions of transition do not increase more than one inch for every seven inches of length.

Allow a minimum of three feet of straight ductwork following an equipment outlet.

Suspend unit or support unit from floor. Models HAB08 through 20 have 3/8-inch weld nuts provided in each corner of the top for suspending the unit with threaded rod. See Figure 3. Models HAB30 through 80 have 7/8-inch knockouts in each corner of top and bottom panels for suspension rods to pass through, located 3-1/2 inches in from corners on centerline. It is recommended that angle iron or unistrut be used under the unit for support (these support pieces should extend approximately one inch beyond each end of the unit, see Figure 4).

Ensure the suspension rods are located so the rods do not block access panels or interfere with electrical, mechanical or drain functions of the unit.

Install unit with 1/8-inch pitch toward condensate drain opening.

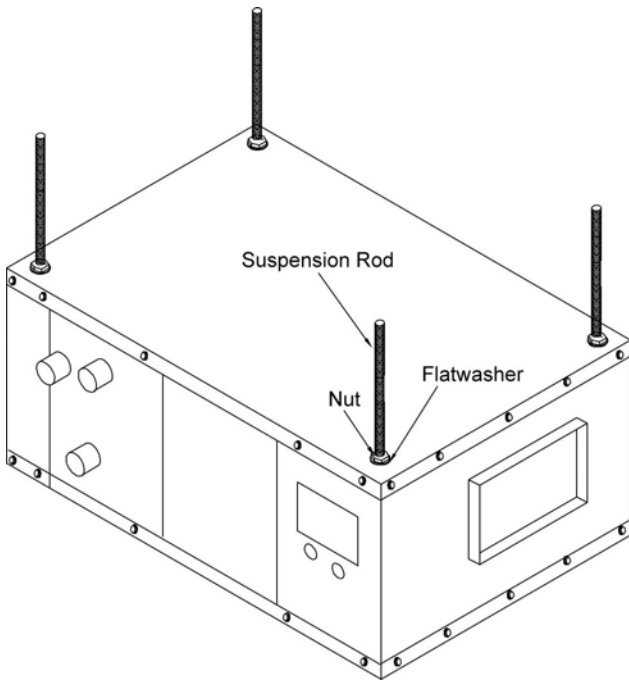


Figure 3. HAB08 through 20 Suspension

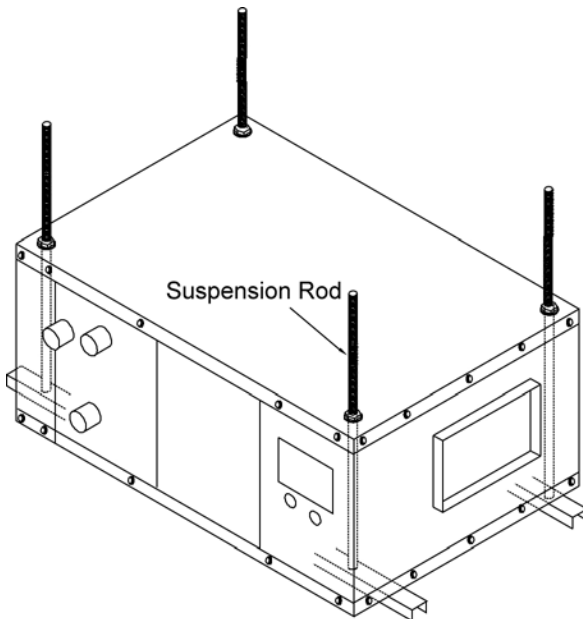


Figure 4. HAB30 through 80 Suspension

**Duct Insulation and Vapor Proofing**

Previously installed heating supply ductwork may already have adequate insulation against excessive heat loss. This insulation may be satisfactory for protection against heat gain from summer cooling. Depending upon application, additional insulation may be required.

Externally insulated ductwork must have adequate vapor seal for summer operation, especially where duct is exposed to high humidity conditions.

**Condensate Drain**

Condensate drain must consist of a minimum of 3/4-inch copper tubing, 3/4-inch galvanized pipe, or 3/4-inch PVC pipe. Figure 5 shows condensate drain setup. The drain trap must be properly configured to ensure the removal of all condensate runoff. Ensure drain pitches downward at a slope of one inch every 10 feet.

**Note 1:** Incorrect trapping can hold water in pan, causing overflow.

**Note 2:** Consult local codes for additional precautions before installing condensate pan.

**Caution:** If unit location is above an occupied space or where damage may result from condensate overflow, install a watertight pan of corrosion-resistant metal beneath unit to catch overflow. If this condition exists, a separate 3/4-inch condensate drain must be provided for this added pan. See Figure 6.

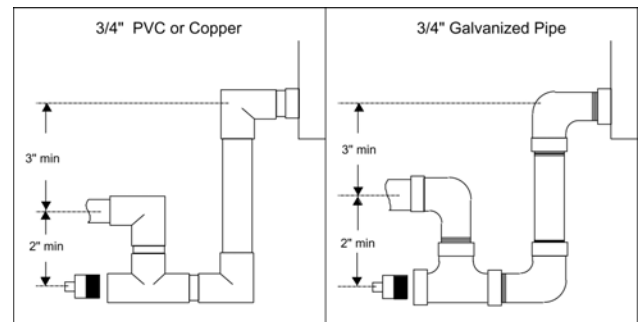


Figure 5. Condensate Drain

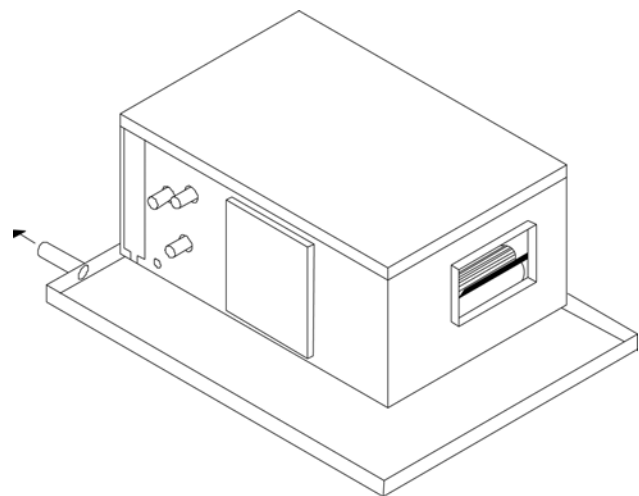


Figure 6. Occupied Space Condensate Pan (Field Supplied) Installation

## Water Piping

All piping must be supported, independent of coils. Swing joints or flexible fittings must be provided to absorb expansion and contraction strains. Rigid piping reduces the effectiveness of vibration isolators. The water supply should always be connected so the entering water is on the leaving airside of the coil. See Figure 7. Coils must be adequately vented in order to prevent air binding.

**Note:** Freeze-ups due to low air temperatures are not covered under the warranty agreement.

## Sound Attenuation

Flexible duct connections should be used between the unit and both the supply and return ducts.

Both suspended and base-mounted units require unit vibration isolation.

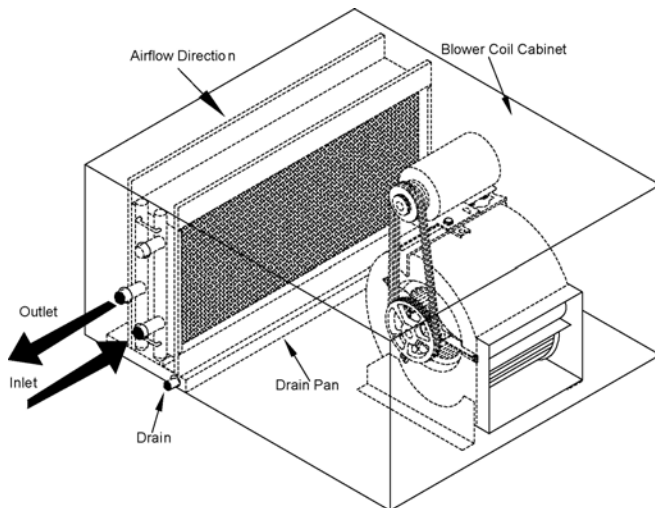
## Motors and Drives

Units are normally shipped with motor and drive installed. However, when mounting a motor on the adjustable base in the field, use extreme care to ensure proper alignment and belt tension.

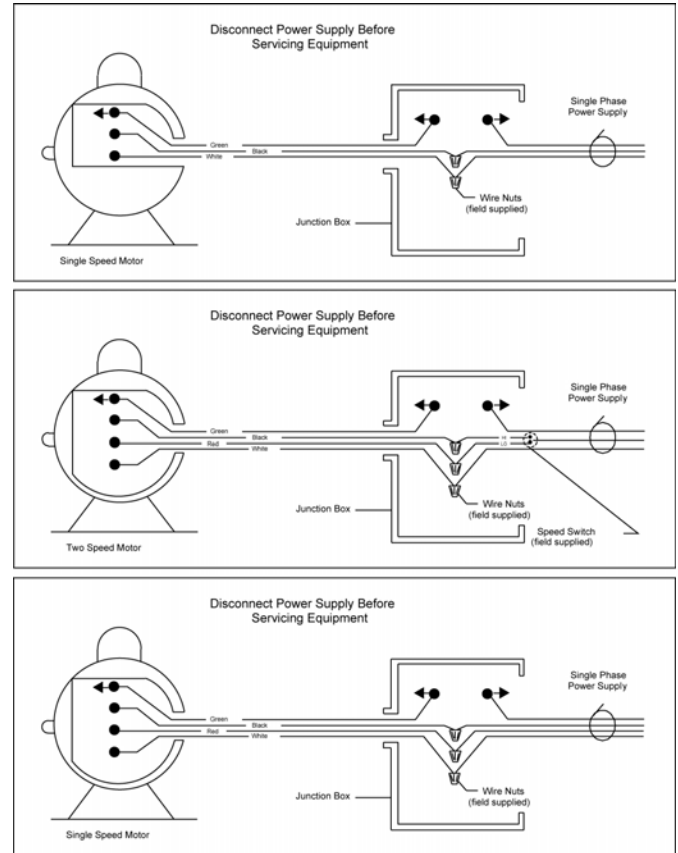
## Electrical Connections

Each unit has a mounted control box and, typically, the motor is to be wired to this box. Only ODP, single- and three-phase motors on 800 to 2000 CFM units are factory-wired to junction box. All other motors require field wiring to junction box located on side of the unit cabinet.

**Note:** Unit must be permanently grounded in accordance with NEC and local codes and ordinances. See the typical wiring diagrams shown in Figure 8.



**Figure 7. Blower Coil Connections**



**Figure 8. Wiring Diagrams**

## Installation of Options

In addition to the standard equipment, the following optional equipment may require consideration during installation.

- Grille plenum.
- Mixing box.
- Electric heat.
- Face and bypass damper filter section.

## Grille Plenum

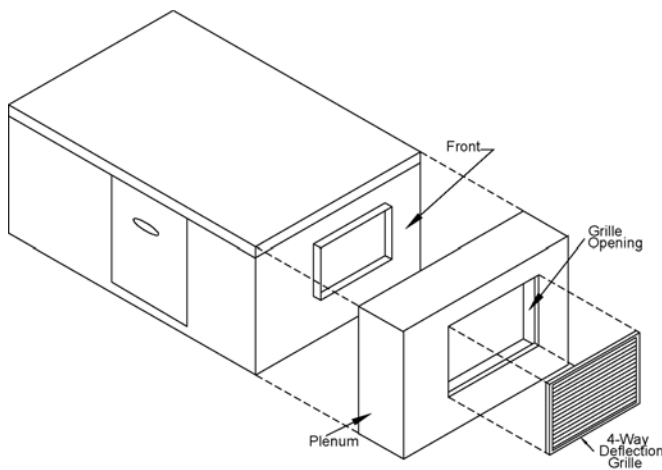
Figure 11 shows the setup of an HAB model and grille plenum. The grille plenum is available in two sizes. Grille plenums sized for the HAB08 through 20 models have one opening, while the plenum sizes for the HAB30 through 80 models have two openings.

## Preparation

- Remove shipping screws (red-headed screws).
- Remove smaller screws from the cabinet front that align with the pre-punched ¼-inch holes of the grille plenum. The screws aligning with the large ½-inch holes are to remain in place.

## Installation

1. Remove grille from plenum, retain screws for reattaching grille later.
2. Position plenum with unit front.
3. Align the 1/2-inch holes in the plenum with the unit's protruding screw heads.
4. Align the smaller 1/4-inch holes in plenum and unit together.
5. Reach through the grille opening to the unit and insert the screws.
6. Tighten all screws to secure plenum.
7. Reinsert grille in plenum opening and secure with screws retained previously.
8. Adjust grille louvers manually.



**Figure 11. Grille Plenum Installation**

## Mixing Box Installation

### Preparation

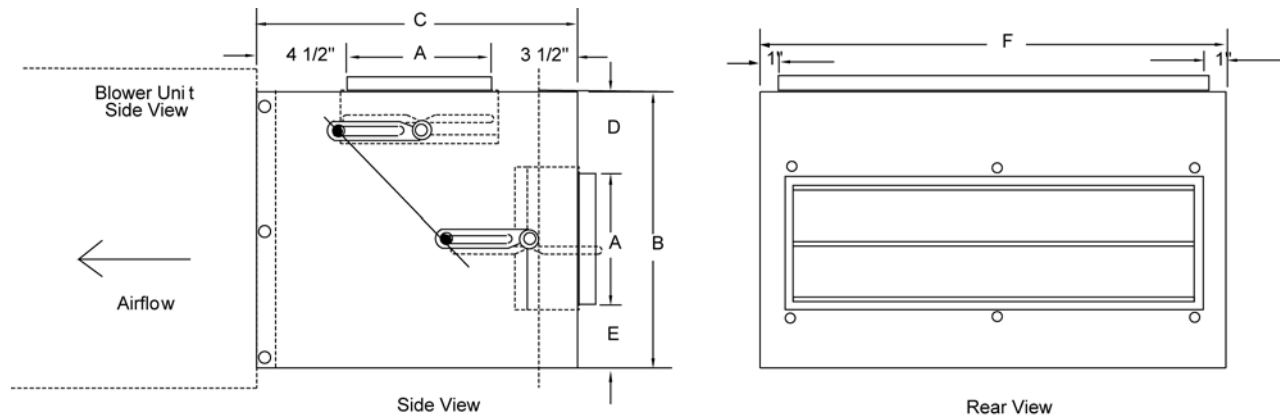
Inspect desired installation location and determine if space provides sufficient work and safety clearances. If space allows, make all sheet metal connections and attachments prior to moving complete assembly to duct connection site. Figure 12 and Table 3 provide unit, mixing box, and damper dimensional information.

1. One side of mixing box has two plastic plugs. These plugs may be removed and replaced to the opposite end to seal the unused 7/8-inch holes at the opposite cabinet end where the 5/16-inch linkage rods do not extend outward.
2. Choose side of cabinet most accessible for servicing to mount damper motor. Remove bolt for each damper shaft and extend shaft until second hole in shaft aligns with hole in damper blade. Insert bolt.
3. Connect two shafts with the two crank arms and the 5/16-inch linkage rod (furnished with mixing box).  
**Note:** *Blades and crank arms are to operate in parallel.*
4. Mount damper motor on the selected side of mixing box cabinet by drilling necessary holes and securing with screws or nuts and bolts.

### Installation

1. Attach mixing box to unit return-air duct flange. Vertical duct flange connections at unit rear are pre-punched to match pre-punched holes in mixing box. Mixing box may be mounted for top-rear or bottom-rear connection.
2. After bolting vertical flange, drill holes in horizontal duct flanges. Secure flanges with screws or nuts and bolts.
3. Use field-supplied hardware to connect motor shaft to one of the damper shafts.
4. Connect duct to the 1-inch duct flange provided on mixing box for return and fresh air makeup as required.

**Note:** *Steps 1, 2, and 3 may follow steps 1 and 2 in Preparation.*



**Figure 12. Mixing Box Dimensions**

**Table 3. Mixing Box Dimensions**

Model	Mixing Box Dimensions						Damper	Ship Wgt. (lbs)	CFM	SP
	A	B	C	D	E	F				
HAB08	8	16	16	6	2	18	(2) 16 x 8	44	800	0.07
HAB12	8	16	16	6	2	27.5	(2) 26 x 8	49	1200	0.08
HAB16	8	20	16	8	4	29	(2) 28 x 8	53	1600	0.1
HAB20	8	20	16	8	4	36	(2) 34 x 8	63	2000	0.07
HAB30	10	25	18	8	7	45	(2) 44 x 10	101	3000	0.06
HAB40	12	32	20	10	10	48	(2) 46 x 12	120	4000	0.03
HAB60	14	40.25	22	12	14.25	58	(2) 56 x 14	197	6000	0.05
HAB80	14	45	22	15	16	66	(2) 56 x 14	205	8000	0.04

**Note:** All dimensions in inches.

## Electric Heat

### Preparation

1. Ensure duct materials are compatible for 250° F operation. Refer to NFPA pamphlet 90A and 90B for more information.
2. Ensure ample room exists in the ductwork. Electric heater must have at least 24 inches of straight duct clearance before an elbow. If 24 inches are unavailable, devices such as turning vanes or baffles may be required.

**Note:** Electric heaters are incompatible with discharge equipment.

### Installation

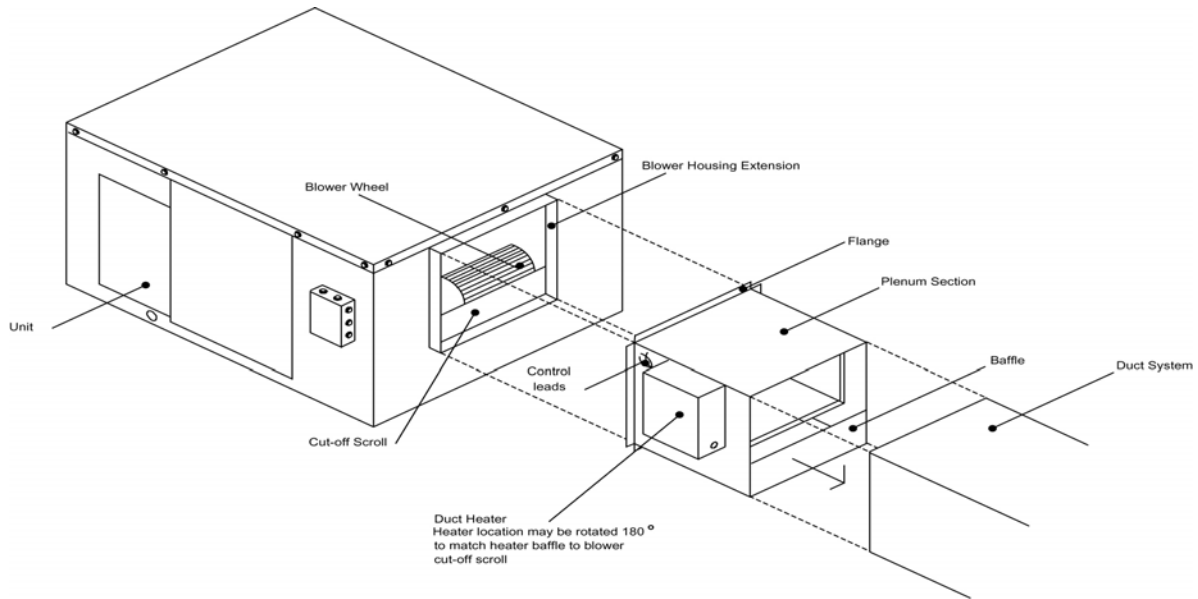
1. Position heater element section over the blower wheel of the HAB unit.
 

**Note:** Heater baffle must be aligned with the blower cut-off scroll. Heater should be rotated 180 degrees if necessary to align. This ensures proper blower discharge of air over the heater elements.
2. Attach electric heat plenum to unit using #6 or larger sheet metal screws.
 

**Note:** Ensure plenum is securely attached to HAB unit only and not to blower housing extension.
3. Add insulation, if necessary, to outside of heater plenum section.
 

**Note:** Do not insulate duct heater.

The following figure shows unit and heater components.



**Figure 13. Electric Heat Installation**

### **Face and Bypass Damper Add-on Filter Section**

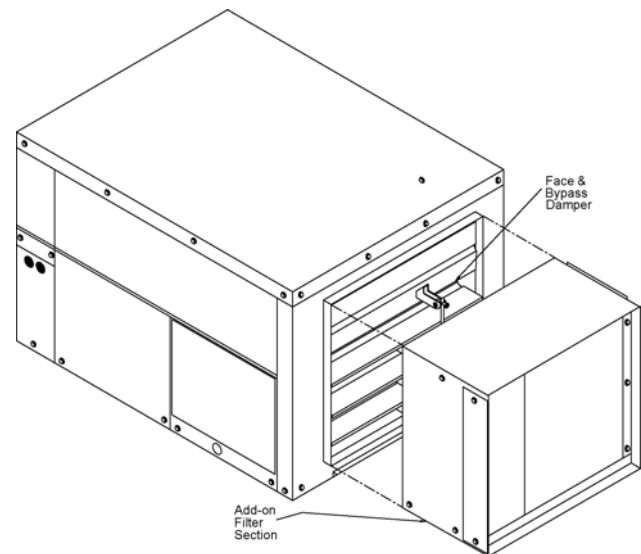
HAB units equipped with face and bypass dampers may have the add-on filter section specified as an option. Add-on filter sections ship separately and are field installed. Figure 14 shows the add-on filter section placement. Use the following steps as guidelines for filter section installation.

1. Slip add-on filter section over the face and bypass damper front.
2. Secure filter section to damper using field-supplied short sheet-metal screws inserted into factory-punched holes.
3. Verify screws do not hinder damper operation.

### **Startup**

Check the following items before startup.

- Ensure all shipping bolts/screws are removed and all other bolts and screws are tight.
- Never assume the voltage and phase on the unit nameplate is the same as the motor wired.
- Check alignment of the sheaves and ensure the setscrews are tight.
- Check for proper rotation of the blower pulley.
- Check motor phase and rotation.
  - Exchanging two of the three leads at the unit junction box.
  - Exchanging leads inside the motor junction box can reverse the rotation of single-phase motors. Refer to the motor nameplate.



**Figure 14. HAB Model with Bypass Damper and Add-on Filter Section**

- Not all installations require a starter (some motors utilize a contactor).
- Ensure all filters are installed. Perform filter check with all doors and panels in place.
- Check amperage draw of the motor. The amperage draw should not exceed the nameplate amps shown on the motor serial plate.



## Operation and Maintenance

Read and heed warning and danger notices before operation and maintenance

### DANGER

**DISCONNECT ELECTRICAL POWER TO ALL CIRCUITS BEFORE SERVICING UNIT. FAILURE TO DO SO MAY RESULT IN PERSONAL INJURY FROM ELECTRICAL SHOCK OR MOVING PARTS.**

### Return Air Filters

Inspect return air filters on a regular basis (at least monthly). Clean or replace filter(s). Filter can be accessed from either side of unit.

**Caution: Always operate unit with a filter and/or filter access door closed to avoid blower motor damage.**

### Coil

The coil is easily cleaned when dry. To check or clean, remove unit access panel, filter access door and filter(s). Use accepted industry methods for cleaning. Remove all foreign matter from pan and condensate drain line. Check for rust and holes.

### Belt and Pulley

The following list highlights items to consider for belt and pulley maintenance and adjustment.

- Proper pulley alignment and belt tension must be maintained at all times.
- Reduce speed by adjusting pulley faces so the faces are further apart.
- Increase speed by moving the faces closer together.
- Check pulley setscrews and bolts.

### Motor

Proper lubrication is essential to long motor life. Use electric motor oil or SAE20 non-detergent oil. Tighten motor mount bracket and base bolts.

**Note:** Avoid over oiling the motor. If a motor is over-oiled, the oil may run down the motor shaft and splatter.

### Blower

Periodically check bearing for wear. Replace as required.

Check wheel for dirt accumulation and clean as required.

## Abbreviations

The following table lists the abbreviations used within this document.

Abbrev.	Term
ANSI	American National Standard Institute
ASHRAE	American Society of Heating Refrigeration Air-Conditioning Engineers
ASTM	American Society for Testing and Materials
CFM	cubic feet per minute
CW	cold water
ETL	Environmental Testing Laboratory
fpi	fins per inch
fpm	feet per minute
FPT	female pipe thread
HW	hot water
IAQ	Indoor Air Quality
OD	outside diameter
ODP	open-drip proof
PSI	pounds per square inch
rpm	revolutions per minute
SP	static pressure
SWT	sweat
UL	Underwriters Laboratory



# Air Handler Terms and Conditions Warranty

The following terms and conditions apply to and govern the sale of the air handling equipment and parts manufactured by Titus.

**EXCLUSIVE TERMS OF SALE** – Titus quotes and sells its goods on the expressed condition that the buyer assents to the terms and conditions set forth herein, regardless of any inconsistent or additional terms that may be embodied in any purchase order. Titus' sale of its goods is expressly conditional on the buyer's acceptance and receipt of the goods shall constitute the buyer's assent to such terms and conditions.

**ACCEPTANCE** – All orders are subject to Credit and Sales Department approval and acceptance. Titus reserves the right, among other remedies, to terminate or suspend further delivery against an order in the event the buyer fails to pay any portion of the order when it becomes due. Should buyer's financial condition become unsatisfactory to Titus, cash payment or satisfactory security may be required by Titus for further deliveries or for goods already delivered.

**CANCELLATION** – Buyer shall not cancel the order without prior written consent of Titus. In the event buyer cancels the order with the prior written consent of Titus after the buyer's offer to purchase is received and acknowledged in writing, Titus shall be entitled to receive from the buyer Titus' cost plus 15% administrative overhead and liquidated damages in the amount of 10%. Furthermore, for goods released for production but prevented by buyer from shipping upon completion or by the acknowledged shipping date, whichever is later, Titus may, at its option, in addition to all other remedies, invoice buyer to be payable within 30 days and store the goods at buyer's sole expense.

**DELIVERIES** – Any stated shipping date of the goods is Titus' best estimate based upon the volume of orders for the goods Titus has received or expects to receive at the time it receives buyer's order. **TITUS MAKES NO GUARANTEE OF SHIPMENT BY THE ESTIMATED DATE AND SHALL HAVE NO LIABILITY OR OTHER OBLIGATION, INCLUDING, BUT NOT LIMITED TO INCIDENTAL OR CONSEQUENTIAL DAMAGES THE BUYER OR ANY THIRD PARTY MAY INCURE, FOR ITS FAILURE TO SHIP BY SUCH DATE, REGARDLESS OF CAUSE.**

**SHIPMENTS** – Titus shall not be bound to deliver any goods for which buyer has not given shipping instructions. **ALL PRODUCTS ARE SOLD F.O.B. SELLER'S PLANT. TITLE TO GOODS PASSES TO THE BUYER UPON DELIVERY BY TITUS TO THE FREIGHT LINE.** All goods are shipped at buyer's risk. Buyer should examine shipments carefully for loss or damage and should have same noted by transportation agent on the freight bill upon accepting delivery. In the event of concealed damage, buyer has 10 days from receipt of the goods in which to call the freight line for an inspection.

In either case, the equipment cannot be returned to Titus until after a freight inspection has been completed. In absence of shipping instructions, Titus shall use its own discretion in choice of carrier.

**TAXES** – Sales, use, consumption, storage or other taxes, if applicable, shall be paid by the buyer.

**RETURN GOODS** – New and unused goods returned for credit will not be accepted unless a Return Goods Authorization number has been issued by Titus. Goods must be securely packed to reach Titus without damage and properly identified with the Return Goods Authorization number. **RGA numbers are valid for only 30 days after issuance.** A minimum 20% fee will be charged on all stock products cleared for return that can be returned to stock after inspection. Build-to-order products manufactured and shipped cannot be returned and a 100% cancellation fee applies to any order that has been released for production but has not shipped. All goods must be returned freight prepaid by the buyer.

**ALL PRODUCTS LIMITED WARRANTY** – Titus warrants that its goods will be free from defects in material and workmanship under normal use and maintenance for a period of one year from the date of original installation or 18 months from the date of shipment whichever comes first. A new or rebuilt part to replace any defective part will be provided without charge, PROVIDED the defective part is returned to Titus. The replacement part assumes the unused portion of the warranty.

**THIS WARRANTY DOES NOT INCLUDE LABOR** or other costs incurred for identifying, repairing, removing, installing, shipping, servicing, or handling of either defective parts or replacement parts.

**TITUS WILL NOT BE RESPONSIBLE FOR:**

1. Normal maintenance.
2. Damage or repairs required as a consequence of faulty installation or application by others.
3. Failure to start due to voltage conditions, blown fuses, open circuit breakers, or other damages due to the inadequacy or interruption of electrical service.
4. Damage or repairs required as a consequence of any misapplication, abuse, improper servicing, unauthorized alteration, or improper operation.
5. Damage as a result of floods, winds, fires, lightning, accidents, corrosive atmosphere, or other conditions beyond the control of Titus.
6. Parts not supplied or designated by Titus.
7. Titus products installed outside the United States and Canada.

**FOR SERVICE OR REPAIR FOLLOW THESE STEPS IN ORDER:**

FIRST: Contact the installing contractor.

SECOND: Contact the distributor or nearest authorized Titus representative.

THIRD: Contact

TITUS  
990 Security Row  
Richardson, TX 75080  
972.699.1030

**THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

**BUYER'S EXCLUSIVE REMEDY** – The buyer's acceptance of the goods shall confirm the buyer's review and acceptance of Titus' All Products Limited Warranty, notwithstanding any other written or oral warranty of the goods that may be given to the buyer. **THE BUYER'S EXCLUSIVE REMEDY AGAINST TITUS SHALL BE LIMITED TO TITUS' ALL PRODUCT LIMITED WARRANTY. NO OTHER REMEDY, INCLUDING, BUT NOT LIMITED TO, RECOVERY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR LOST PROFITS, LOST SALES, INJURY TO PERSON OR PROPERTY, OR ANY OTHER INCIDENTAL OR CONSEQUENTIAL LOSS, SHALL BE AVAILABLE TO THE BUYER.**

**FIELD MODIFICATIONS** – Should the installing contractor believe that the goods do not meet the requirements of the original submittal or do not operate according to the submittal, the buyer should immediately contact the selling distributor or authorized Titus representative as outlined in the All Products Limited Warranty section. Upon Titus' acceptance of responsibility to make modifications to the goods, Titus will, at its sole discretion, either direct the contractor to make the modifications, send its own field service technicians to make the modifications, or engage another contractor to make the modifications. If Titus directs the installing contractor to make the modifications, Titus will issue a Field Repair Order (FRO) specifying the work to be done and the price to be paid. **DO NOT BEGIN ANY MODIFICATIONS WITHOUT AN FRO NUMBER.** Titus will not be responsible for any costs incurred in modifying the goods, unless it has approved the modifications in advance.

**EXCUSE OF PERFORMANCE** – Titus shall not be liable for its failure to perform due to causes beyond its reasonable control, including but not limited to strikes, fire, war, acts of God, whether such events occur at or about Titus' plant or at the plant of its suppliers.

**CREDIT AND TERMS OF PAYMENT** – Unless otherwise specified, terms of payment are net cash, thirty (30) days after shipment. Interest at the legal rate applicable to judgments will be charged on past due accounts commencing after the last day of the first calendar month following the date of invoice. Seller may suspend credit and refuse shipment whenever seller in its sole discretion believes buyer's credit is unsatisfactory unless buyer then makes arrangements for payment which are satisfactory to seller.

**MISCELLANEOUS – THESE TERMS AND CONDITIONS FOR THE SALE OF THE GOODS SHALL BE CONSTRUED ACCORDING TO THE LAWS OF THE STATE OF TEXAS. ALL SUMS DUE TITUS FOR THE SALE OF ITS GOODS ARE PAYABLE, AND ALL MATTERS ARISING PURSUANT TO SUCH SALE ARE PERFORMABLE, IN DALLAS COUNTY, TEXAS.** The terms and conditions state herein constitute the full understanding between Titus and the buyer, and no terms, conditions, understanding or agreement purporting to modify or vary these terms shall be binding unless hereafter made in writing and signed by Titus and the buyer.

**Titus has a policy of continuous product improvement, and reserves the right to change design and specification without notice. Titus has no system design or application responsibility to buyer or any third party.**