Installation
Operation
Maintenance

ODYSSEY

Light Commercial
Split System 5-20 Tons
TTH Model 50 Hz / 60 Hz

Air Handling Models

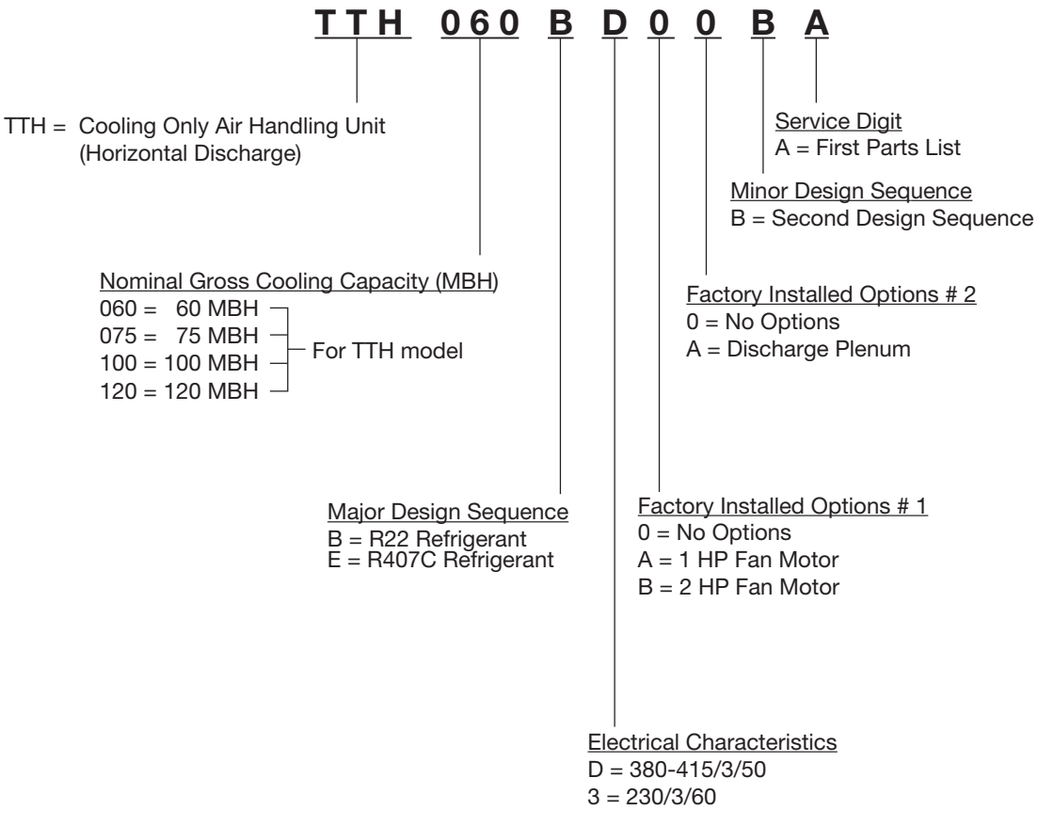
R22 Series
TTH 060 BD / TTH 060 B3
TTH 075 BD / TTH 075 B3
TTH 100 BD / TTH 100 B3
TTH 120 BD / TTH 120 B3

R407C Series
TTH 060 ED / TTH 060 E3
TTH 075 ED / TTH 075 E3
TTH 100 ED / TTH 100 E3
TTH 120 ED / TTH 120 E3

Feb 2013 **TTH-IOM01-EN**

Model Nomenclature

Air Handling Unit
Model Nomenclature



Contents

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.

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. Take photos of the damage material if possible. Notify the carrier immediately by phone and registered mail. Notify the local Trane Sales Office. Concealed 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.

General Information
This manual covers the Installation, Operation, and Maintenance of the TTH060B, TTH075B, TTH100B, and TTH120B single circuit air handlers. These new air handler models are completely redesigned to incorporate a single slab coil assembly, improved application flexibility, servicing and maintenance accessibility, and an improved accessory line. They are horizontal type with special drain pan (for TTH model).

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 base 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. If it is necessary to sling the unit, use spreader bars under the shipping base.

Ensure that ropes do not cause abrasion to the surface of the unit.

Warning
Open and lock unit disconnect to prevent injury or death from electric shock or contact with moving parts before attempting any installation or maintenance.

Inspection
Inspect material carefully for any shipping damage. If damaged, it must be reported to, and claims made against the transportation company. Replace damaged parts with authorized parts only. 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.

Unit Installation

Warning
Open and lock unit disconnect to prevent injury or death from electric shock or contact with moving parts before attempting any installation or maintenance.

The general location of the air handler is normally selected by the architect, contractor, and/or buyer. For proper installation, the following items must be considered.

1. Available power supply must agree with electrical data on component nameplate.
2. Air handler shipped wired for 380 Volt applications.
3. If external accessories are installed on the unit, additional clearance must be provided.
4. All duct work should be properly insulated to prevent condensation and heat loss.

Note
It is recommended that the outline drawings be studied and dimensions properly noted and checked against selected installation site.

Important
If adding external accessories to the unit, additional clearance must be considered for the overall space needed.

Lifting Recommendations
Before preparing the unit for lifting, the center of gravity should be determined for lifting safety. Because of the placement of internal components, the unit weight may be unevenly distributed. Approximate to total unit weight and corner weight are given in Table 1.

Warning
On site Lifting Equipment must be capable of lifting the weight of the unit with an adequate safety factor. The use of under-capacity lifting devices may result in personal injury ordeath and cause damage to the unit.

Table 1 - Unit weight and corner weight (Lbs)

Model	Net weight (Lbs) Maximum	Corner weight (Lbs)			
		#1	#2	#3	#4
TTH060	192	45	44	52	51
TTH075	201	47	45	55	54
TTH100	298	69	67	82	80
TTH120	309	71	70	85	83

The unit can be moved using a forklift of suitable capacity. For lifting the unit into an elevated mounting position, run lifting straps or slings under the unit and attach securely to the lifting device. Use spreader bars to protect the unit casing from damage. Test lift the unit to determine proper balance and stability.

Caution
Use spreader bars to prevent straps from damaging the unit, install the bars between lifting straps, both underneath the unit and above the unit. This will prevent the straps from crushing the unit cabinet or damaging the unit finish.

Installation Considerations
For proper installation and operation, check each of the following before mounting the units.

(a) Space Requirement and Clearances
Allow adequate space for the unit and free air or service clearance. See Figure 1a and 1b.

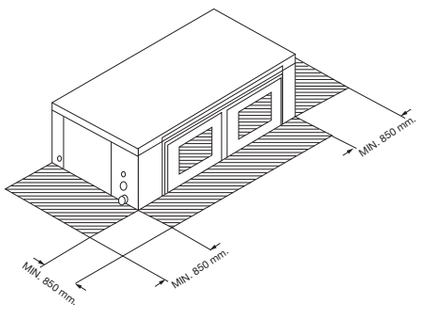


Figure 1a

For servicing and routine maintenance, provide access to the unit through removable panels in the ceiling see Figure 1b.

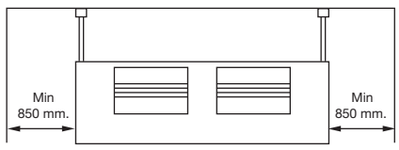


Figure 1b

(b) Location, Mounting and Positioning
Before installing any unit make sure proper preparation has been made at each unit locating for piping and electrical connections.

The unit should be installed in horizontal applications only. Suspend the unit using the factory-provided threaded mounting holes on bottom of the unit. This is usually accomplished through the use of spring or rubber isolators. Which are to be furnished by the installer see Figure 2.

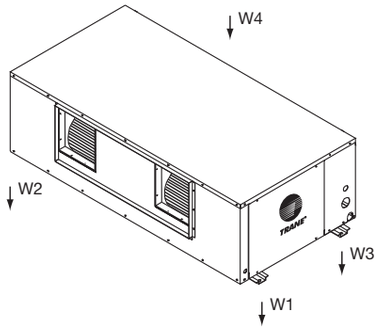


Figure 2
Position of corner weight
TTH model

Unit Installation

Check that the supporting structure is strong enough to support unit weights.

Align the mounting holes with structural support and secure suspension rods, to the structure, to the air handler cabinet. If the mounting holes locations do not permit proper alignment with existing structure, it may be necessary to field fabricate cross members on existing structure beams.

All units must be mounted level to assure proper drainage and operation.

(c)Coil Piping Connections
All refrigerant piping connection are made outside the unit.

Caution

- Protect adjacent surfaces from heat damage, when brazing around the air handler.
- These air handlers are shipped with a holding charge of N_2 until refrigerant lines are ready to be connected.

All refrigerant suction line piping should be insulated.

Important

Ensure that the refrigerant lines passing through the cabinet are not resting on sharp sheet metal edges.

Installation, brazing, leak testing, and evacuation of refrigeration lines are covered in the installation instructions packaged with the outdoor unit. Read the instructions before beginning installation of refrigerant lines.

(d) Condensate Drain Connections
These air handlers come standard with a drain pan. Drain connections are provided on both sides of the air handlers.

For a typical drain trap assembly, see Figure 3 and 4.

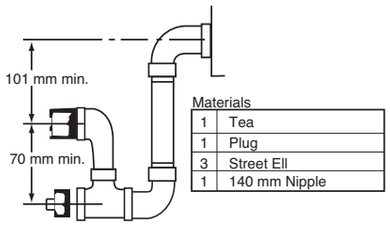


Figure 3
1 inch (25.4 mm) Galvanized Pipe and Fittings.

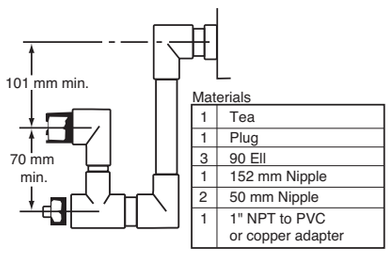


Figure 4
1 inch (25.4 mm) PVC or Copper Tubing and Fittings.

(e) Filters
These air handlers are shipped with 1" washable filters installed in the unit. To replace filters from either side and slide old filters and replace with new ones.

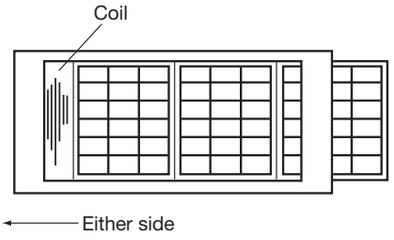


Figure 5

(f) Duct Connections
The supply and return ducts should be connected to the unit with flame retardant duct connectors to reduce vibration transmission. The return duct should be sized to the same dimensions as the return inlet of the unit.

(g) Electrical Connections

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.

1. All electrical lines, sizing, protection and grounding must be in accordance with the National Electric Code and local codes.
2. If conduit is used, isolate whenever vibration transmission may cause a noise problem within the building structure.
3. Ensure all connections are tight and no wires exposed.
4. All accessories must be installed and wired according to the instructions packaged with that accessory.

Installation Checklist

Complete this checklist once the unit is installed to verify that all recommended procedures have been accomplished before the system is started. Operational checks cannot be performed until the system interconnection is complete.

- Verify that the unit electrical power is disconnected.
- Inspect all field wiring connections. All connections should be clean and tight.
- Inspect unit ground connection(s). Ground must comply with all applicable codes.
- Inspect unit suspension arrangement (if used). Unit position must be secure. Remove any tools or debris found in or near the unit.
- Inspect duct outlets. Outlets must be open and unrestricted.
- Inspect unit drain lines. Pipe connections must be tight and drain line unrestricted.
- Inspect fan assembly to insure all moving parts move freely.
- Inspect unit for proper filters, securely installed. All cabinet panels must be secured.
- Instruct owner/operator on proper system operating and maintenance procedure.

General Data

General Data - Air Handler Units

INDOOR UNIT MODEL		TTH060BD/ED	TTH075BD/ED	TTH100BD/ED	TTH120BD/ED
POWER CONS-V/Ph/Hz		380-415/3/50	380-415/3/50	380-415/3/50	380-415/3/50
INDOOR COIL-TYPE		SLIT TYPE	SLIT TYPE	SLIT TYPE	SLIT TYPE
Row/FPI		3/15	3/15	3/15	3/15
Face Area	sq ft (m^2)	4.22 (0.39)	5.06 (0.47)	6.67 (0.62)	8.19 (0.76)
Tube Size OD	in (mm)	5/16 (7.94)	5/16 (7.94)	5/16 (7.94)	5/16 (7.94)
Refrigerant Control		CAP.TUBE	EXPANSION VALVE	EXPANSION VALVE	EXPANSION VALVE
Drain Conn. Size	inch	STEEL PIPE 1" MPT	STEEL PIPE 1" MPT	STEEL PIPE 1" MPT	STEEL PIPE 1" MPT
No. of Refrigerant Circuit		1	1	1	1
INDOOR FAN-TYPE		Centrifugal Type, Belt-Adjustable Drive			
Dia. x Width	inch	10x10	10x10	10x8	10x10
No. Used		1	1	2	2
Nominal Airflow	CFM	2,000	2,500	3,400	4,000
No. Motors-HP		1-3/4	1-1	1-2	1-2
Motors Speed	RPM	1,405	1,400	1,405	1,405
Volt/Ph/Hz.		380-415/3/50	380-415/3/50	380-415/3/50	380-415/3/50
F.L.Amps-L.R.Amps.		1.61-8.40	1.99 - 11.0	3.66 - 21.0	3.66 - 21.0
FILTER-TYPE		Aluminium/Washable Filter			
(No.)-Size x Thk.	mm	(2)-520x440x25	(2)-600x440x25	(3)-520x440x25	(3)-542x520x25
Refrigerant		Factory Holding Charge			
Ref. Line Connection		Braze	Braze	Braze	Braze
Suction Line Size (each)	inch	1 1/8	1 1/8	1 3/8	1 3/8
Liquid line Size (each)	inch	3/8	1/2	1/2	1/2
DIMENSION (HxWxD)					
Crated (Shipping)	mm	673 x 1,410 x 970	673 x 1,410 x 970	673 x 1,778 x 970	772 x 1,778 x 970
Uncrated (Net)	mm	520 x 1,312 x 841	520 x 1,312 x 841	520 x 1,680 x 841	620 x 1,680 x 841
WEIGHT					
Net Weight	kg	86.7	91.3	135.4	140.4

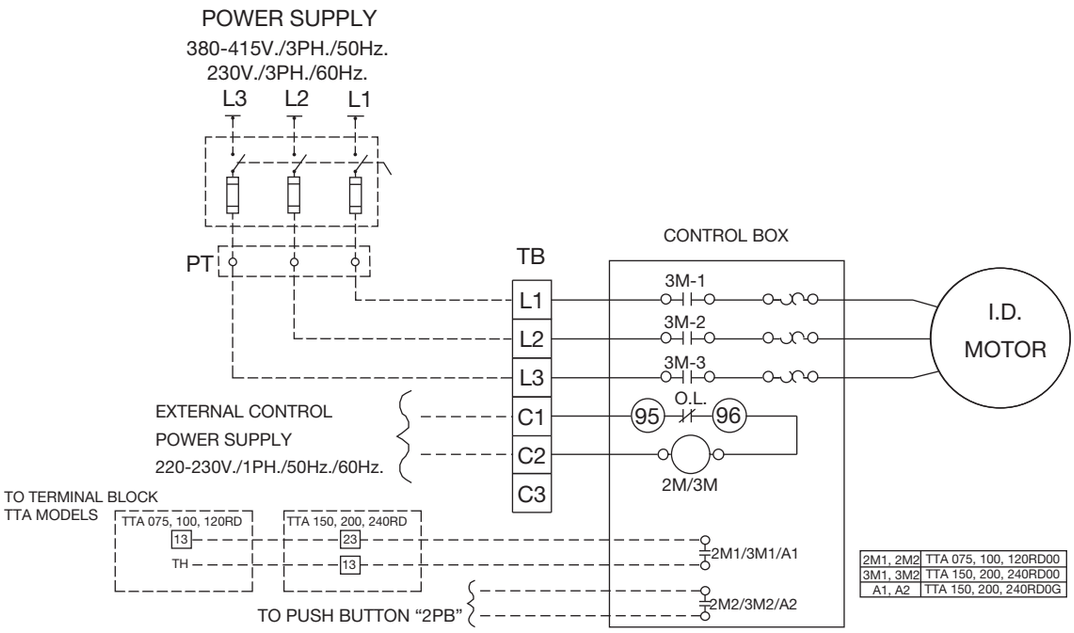
General Data

General Data - Air Handler Units

INDOOR UNIT MODEL		TTH060B3/E3	TTH075B3/E3	TTH100B3/E3	TTH120B3/E3
POWER CONS-V/Ph/Hz		230/3/60	230/3/60	230/3/60	230/3/60
INDOOR COIL-TYPE		SLIT TYPE	SLIT TYPE	SLIT TYPE	SLIT TYPE
Row/FPI		3/15	3/15	3/15	3/15
Face Area	sq ft (m^2)	4.22 (0.39)	5.06 (0.47)	6.67 (0.62)	8.19 (0.76)
Tube Size OD	in (mm)	5/16 (7.94)	5/16 (7.94)	5/16 (7.94)	5/16 (7.94)
Refrigerant Control		CAP.TUBE	EXPANSION VALVE	EXPANSION VALVE	EXPANSION VALVE
Drain Conn. Size	inch	STEEL PIPE 1" MPT	STEEL PIPE 1" MPT	STEEL PIPE 1" MPT	STEEL PIPE 1" MPT
No. of Refrigerant Circuit		1	1	1	1
INDOOR FAN-TYPE		Centrifugal Type, Belt-Adjustable Drive			
Dia. x Width	inch	10x10	10x10	10x8	10x10
No. Used		1	1	2	2
Nominal Airflow	CFM	2,000	2,500	3,400	4,000
No. Motors-HP		1-3/4	1-1	1-2	1-2
Motors Speed	RPM	1,405	1,400	1,405	1,405
Volt/Ph/Hz.		230/3/60	230/3/60	230/3/60	230/3/60
F.L.Amps-L.R.Amps.		1.61-8.40	1.99 - 11.0	3.66 - 21.0	3.66 - 21.0
FILTER-TYPE		Aluminium/Washable Filter			
(No.)-Size x Thk.	mm	(2)-520x440x25	(2)-600x440x25	(3)-520x440x25	(3)-542x520x25
Refrigerant		Factory Holding Charge			
Ref. Line Connection		Braze	Braze	Braze	Braze
Suction Line Size (each)	inch	1 1/8	1 1/8	1 3/8	1 3/8
Liquid line Size (each)	inch	3/8	1/2	1/2	1/2
DIMENSION (HxWxD)					
Crated (Shipping)	mm	673 x 1,410 x 970	673 x 1,410 x 970	673 x 1,778 x 970	772 x 1,778 x 970
Uncrated (Net)	mm	520 x 1,312 x 841	520 x 1,312 x 841	520 x 1,680 x 841	620 x 1,680 x 841
WEIGHT					
Net Weight	kg	86.7	91.3	135.4	140.4

Electrical Wiring

TTH060–120 / TWE120–240 (EXPORT)

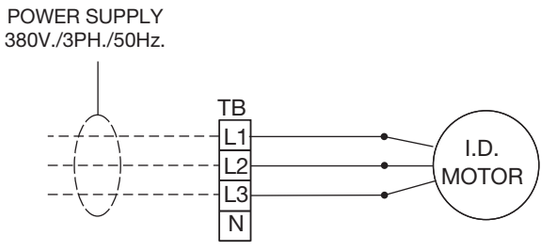


LEGEND	
DEVICE DESIGNATION	DESCRIPTION
1M	CONTACTOR BLOWER MOTOR.
TB	TERMINAL BLOCK
2M1, 2M2, 3M1	AUXILIARY N.O. CONTACT
3M2, A1, A2	AUXILIARY N.O. CONTACT
TH	THERMOSTAT
2PB	SWITCH PUSH BUTTON
——	FACTORY WIRING & DEVICE BY MFR.
– – – – –	FIELD WIRING
ID. MOTOR	INDUCTION MOTOR
PT	POWER TERMINAL
-⊏⊐-	FUSE

NOTES

1. ALL FIELD WIRING TO BE IN ACCORDANCE WITH NATIONAL ELECTRIC CODE (N.E.C.) CANADIAN ELECTRIC CODE AND/OR LOCAL STATE AND CITY CODES, PROVIDE DISCONNECTS FOR ALL POWER SUPPLIES.
2. DRAWING PRACTICES AND SYMBOLS ARE IN ACCORDANCE WITH AIR CONDITIONING & REFRIGERATION INSTITUTE (ARI) GRAPHIC ELECTRICAL STANDARDS.
3. COMPONENT TERMINAL MARKINGS ARE INDICATED BY ENCIRCLED NUMBERS AND/OR LETTERS.
4. NUMBERS ON VERTICAL & HORIZONTAL LINE ARE CIRCUIT IDENTIFICATION.
5. THIS UNIT TO BE USED WITH EVAPORATORS OPERATING WITH IN A TEMPERATURE RANGE OF 32° F TO 53.5° F.

TTH060–120 / TWE120–240 (DOMESTIC)

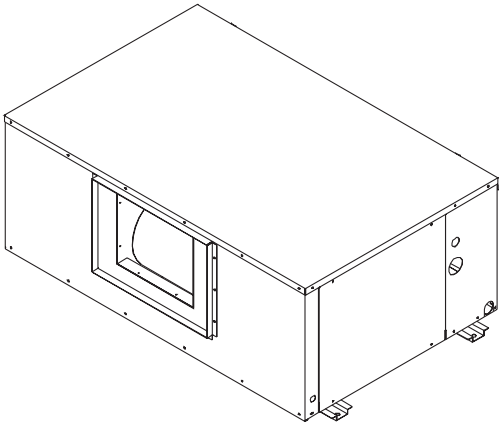


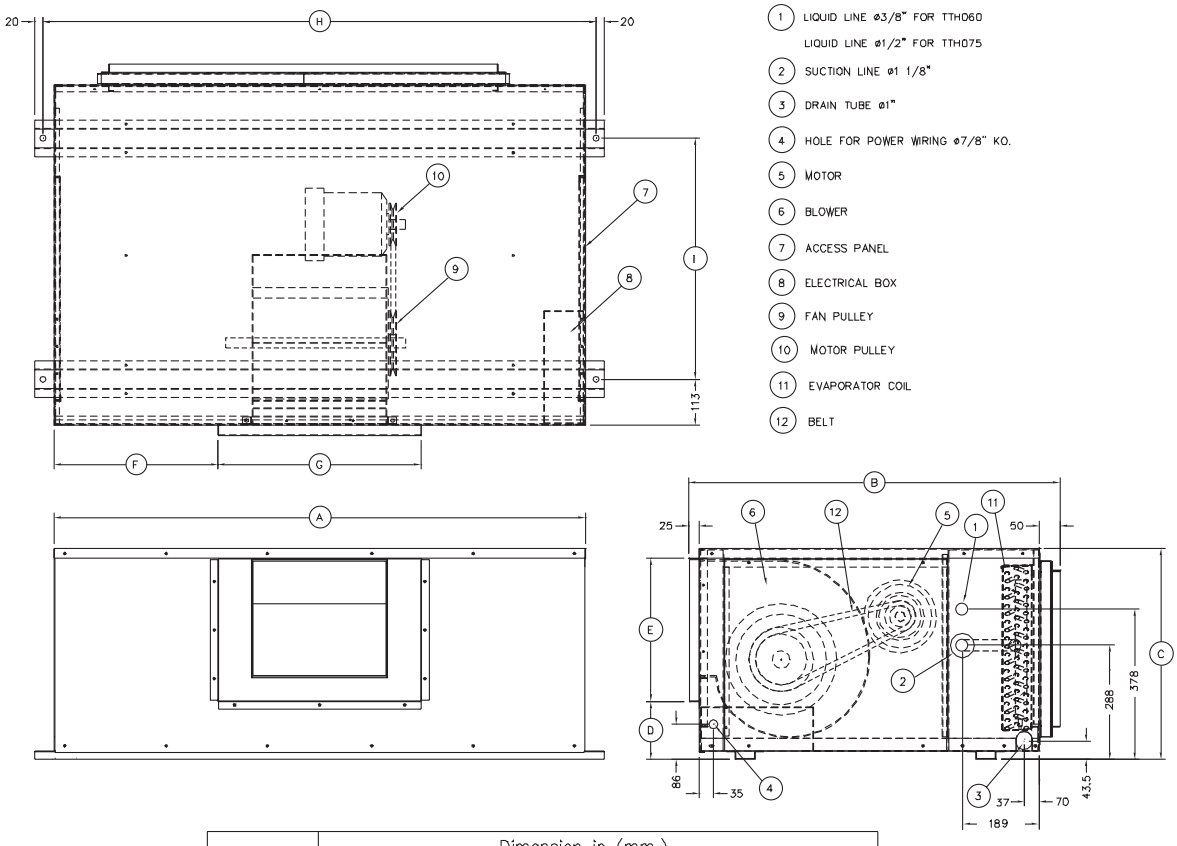
LEGEND	
DEVICE DESIGNATION	DESCRIPTION
TB	TERMINAL BLOCK
————	FACTORY WIRING & DEVICE BY MFR.
– – – – –	FIELD WIRING
ID. MOTOR	INDUCTION MOTOR 380V. 3PH. 50Hz.

Caution: Disconnect the power supply before opening the control box or servicing.

Dimensional Data

TTH 060-075 BD/ED
TTH 060-075 B3/E3



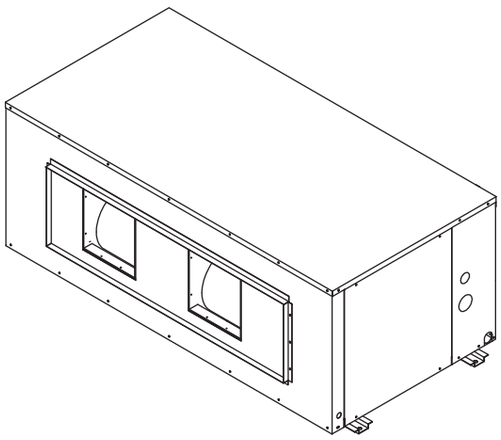


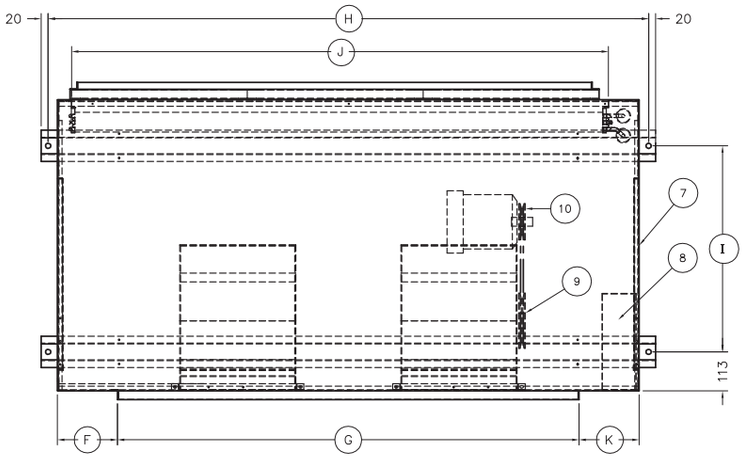
1. LIQUID LINE ø3/8" FOR TTH060
   LIQUID LINE ø1/2" FOR TTH075
2. SUCTION LINE ø1 1/8"
3. DRAIN TUBE ø1"
4. HOLE FOR POWER WIRING ø7/8" KO.
5. MOTOR
6. BLOWER
7. ACCESS PANEL
8. ELECTRICAL BOX
9. FAN PULLEY
10. MOTOR PULLEY
11. EVAPORATOR COIL
12. BELT

Model	Dimension in (mm.)								
	A	B	C	D	E	F	G	H	I
TTH060	1312	916	520	143	352	405	502	1366	595
TTH075	1312	916	520	143	352	405	502	1366	595

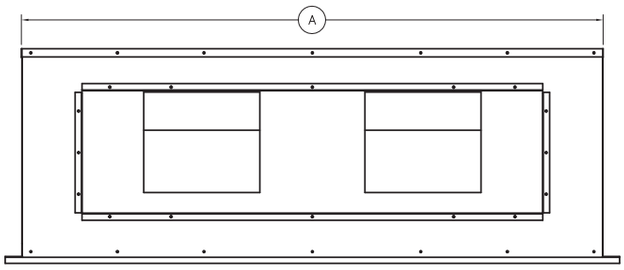
Dimensional Data

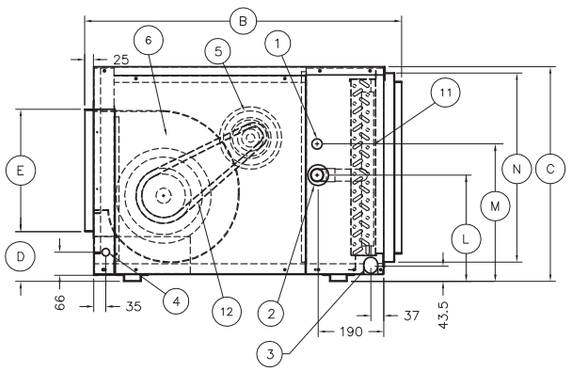
TTH 100-120 BD/ED
TTH 100-120 B3/E3





1. LIQUID LINE ø1/2" FOR TTH100/120
2. SUCTION LINE ø1 3/8"
3. DRAIN TUBE ø1"
4. HOLE FOR POWER WIRING ø7/8" KO.
5. MOTOR
6. BLOWER
7. ACCESS PANEL
8. ELECTRICAL BOX
9. FAN PULLEY
10. MOTOR PULLEY
11. EVAPORATOR COIL
12. BELT

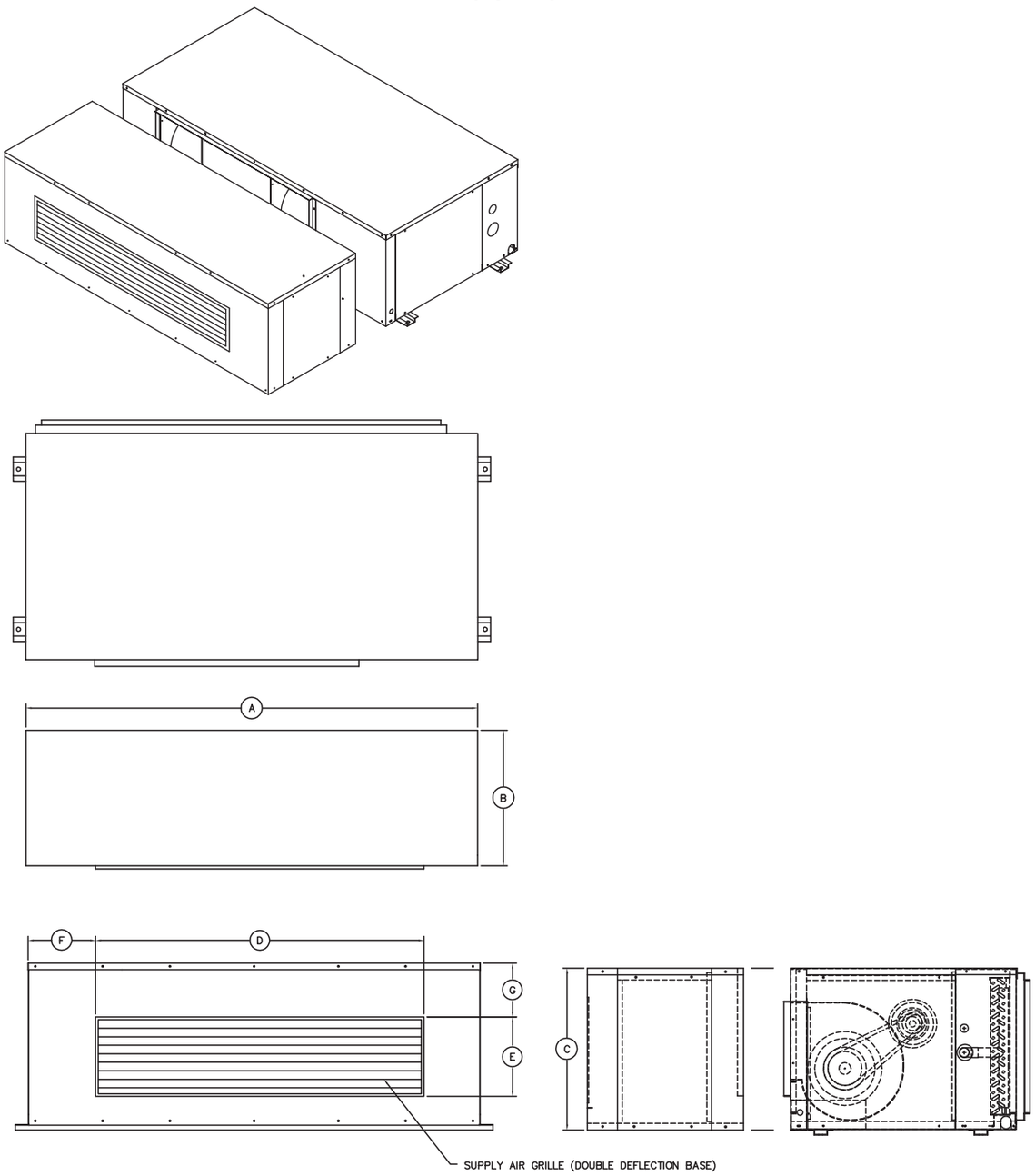




Model No.	Dimensions (mm)													
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
TTH100	1680	916	521	144	353	294	946	1734	595	1550	440	288	378	435
TTH120	1680	916	620	144	353	173	1332	1734	595	1522	173	307	397	545

Dimensional Data

TTH 060-120
With Plenum (Option)



Model No.	Dimension (mm.)						
	A	B	C	D	E	F	G
TTH060	1312	499	503	762	305	275	100.5
TTH075	1312	499	503	965	305	173.5	100.5
TTH100	1680	499	503	1270	305	205	100
TTH120	1680	499	600	1330	350	172	152.5

Operation and Start-up

Preparation
Perform the following checks and inspections before operating the unit:

Inspection Checklist
- Unit is mounted securely to the ceiling support rods (mounting units).
- Ductwork connections are complete.
- Coil connections are complete and tight.
- Condensate drain pan connections are complete and tight.
- Electrical connections are completed. Wiring is correct and in accordance with the wiring diagram.
- Ground connection is completed.
- Check and re-tighten if necessary set screws on the drive, fan pulley, fan bearings and wheel.
- Rotate fan by hand, to ensure that it runs freely and that there is no interference.
- Check that fan is centrally located in the housing, axially and radially.
- Check and re-tighten, if necessary, drive and bearing bolts, motor clamp plate bolts and isolator bolts.
- Check to ensure that pulley are correctly aligned and that shafts are parallel.
- Check belt tension as per instruction given in the maintenance section.

Start-Up Procedures
After completing all times under “Pre-Start-Up”, the unit may be started and the following checks and adjustments performed.

a. Measure the motor voltage and amps on all phases to insure proper operation. Compare these readings with the motor nameplate.
b. Disconnect load and start motor to check the direction of rotation. If the rotation need to be changed, stop the motor completely and change the direction of rotation.
c. 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, be re-checked before re-starting.
d. In the event of excessive vibrations or unusual noises, the motor should be disconnected from the load and checked for poor alignment, loose mounting bolts, etc.
e. When the motor has been operated under load for a short period of time, check that the operating current totally with the nameplate current.

Maintenance

Warning
Disconnect electrical power source and secure in disconnected position before servicing the unit. Failure to do so may result in personal injury or death from electrical shock.

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 checks as detailed in inspection checklist in the Operation Section.
4. Inspect the condition of the evaporator fan belt and replace if necessary. The belts fitted to TTH units cannot achieve design performance without the correct tensioning.
5. Check condition of 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 intacted.

Change/Clean Filters
Change or clean air filters at least twice a year. Filters will be required more frequent care under high load condition or dirty air. A clogged air filters reduces airflow, cooling capacity and increases energy usage.

To clean permanent 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.

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

Belt Maintenance
Clean fan belts and pullies 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 pullies, but adjust motor position to allow mounting and then re-tighten.

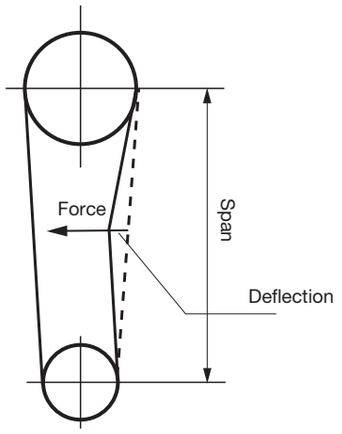


Figure 6
Belt Tension Measurement

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 then adjust the belt tension to the correct pounds force and tighten all setscrews to the proper torques.

Trouble Shooting

System Faults	Power Supply	High Voltage Wiring	Low Voltage Wiring	Control Transformer	Thermostat	Low Voltage Fuse	Curcuit Breaker	Relay (Fan)	Capacitor (Fan)	Thermal Cutout	Low Indoor Airflow	High Indoor Airflow	Refrig. Undercharge	Refrig. Overcharge	Excessive Evap. Load	Check Valve (Leaking)	Restriction LD Coil	Restriction (TXV or CAP)
Refrigerant Circuit																		
Head Pressure Too High												P						
Head Pressure Too Low											P			P				
Suction Pressure Too High											P		P	P	P			
Suction Pressure Too Low										P		P				P	P	
Indoor Coil Frosting									P		P				P	P		
Liquid Floodback (TXV)														P				
Liquid Floodback (Cap. Tube)															P			
Electrical																		
I.D. Motor Won't Start	P	P	P	P	P	P	P	P	P									

P Primary Causes - S Secondary Causes

Trouble Shooting

Safety recommendations
To avoid accidents and damage, the following recommendations should be observed during maintenance and service visits:

1. The maximum allowable pressures for system leak testing on low and high pressure side are given in the chapter “Installation”. Always provide a pressure regulator.
2. Disconnect the main supply before any servicing on the unit.
3. Service work on the refrigeration system and the electrical system should be carried out only by qualified and experienced personnel.

Maintenance Contract
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 may result in immediate cancellation of the warranty.

Training
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 has 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 preventive maintenance, which reduces the cost of owning the unit by avoiding serious and costly breakdown.

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