



Installation and Maintenance Manual

CLCH-IM-16A

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T-Series Climate Changer[®] Central Station Air Handlers



Draw-Thru and Blow-Thru Unit Sizes 3, 6, 8, 10, 12, 14, 17, 21, 25, 30, 35, 40, 50, 66, 80, and 100

Part No. X39640516-01

Since the Trane Company has a policy of continuous product improvement, it reserves the right to change specifications and designs without notice. The installation and servicing equipment referred to in this booklet should be done by qualified experienced technicians.

Notice

WORLD ENVIRONMENTAL SCIENTISTS HAVE CONCLUDED, BASED ON THE BEST CURRENTLY AVAILABLE EVIDENCE, THAT OZONE IN OUR UPPER ATMOSPHERE IS BEING REDUCED DUE TO THE RELEASE OF CFC FULLY HALOGENATED COMPOUNDS.

THE TRANE COMPANY URGES THAT ALL HVAC SERVICERS WORKING ON TRANE EQUIPMENT, OR ANY MANUFACTURER'S PRODUCTS, MAKE EVERY EFFORT TO ELIMINATE, IF POSSIBLE, OR VIGOROUSLY REDUCE THE EMISSION OF CFC, HCFC, AND HFC REFRIGERANTS TO THE ATMOSPHERE RESULTING FROM INSTALLATION, OPERATION, ROUTINE MAINTENANCE, OR MAJOR SERVICE ON THIS EQUIPMENT. ALWAYS ACT IN A RESPONSIBLE MANNER TO CONSERVE REFRIGERANTS FOR CONTINUED USE EVEN WHEN ACCEPTABLE ALTERNATIVES ARE AVAILABLE.

REFRIGERANT USED IN ANY TYPE OF AIR-CONDITIONING OR REFRIGERATING EQUIPMENT SHOULD BE RECOVERED FOR REUSE, RECOVERED AND /OR RECYCLED FOR REUSE, REPROCESSED (RECLAIMED), OR PROPERLY DESTROYED, WHENEVER IT IS REMOVED FROM EQUIPMENT. NEVER RELEASE TO THE ATMOSPHERE!

Warning and Cautions

Notice that WARNING and CAUTION appear at appropriate intervals throughout this manual.

WARNING

WARNING indicates a potentially hazardous situation that could result in personal injury or death.

CAUTION

CAUTIONs are designed to alert you to conditions that could result in minor personal injury or equipment damage.

Literature Change History

CLCH-IM-16 (November 1997)

Initial Manual covering T-Series Climate Changer, sizes 3, 6, 8, 10, 12, 14, 17, 21, 25, 30, 35,40, 50, 66, 80, and 100.

CLCH-IM-16A (March 1999)

Revised manual to include new details on shipping, assembly, and installation.

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General Information

Unit Description

Trane T-Series Climate Changers[®] are Central Station Air Handlers designed for a variety of air handling applications. The basic unit consists of a fan, heating and/or cooling coils, filters, and dampers. See the sales catalog (CLCH-DS-9) for a list of available options and components.

The fan is internally isolated. Fans available are double-width, double-inlet Centrifugal types with forward curved, backward inclined, or airfoil blade type design; single-width, single-inlet Plug Fans or Vane-Axial Q Fans[®]. Fans are available in low, medium, and high pressure classes with or without inlet guide vanes.

To insure fan stability, the unit ships with four (4) lock-down devices that prevent the fan from shifting during shipment and installation. These spacers must be removed prior to fan operation to assure proper vibration isolation.

The units are available with factory-mounted controls for stand-alone operation or operation with a complete building automation system. This includes factory-mounted starters, DDC controllers, and end devices.

Trane T-Series Climate Changers ship as complete assemblies or sectional subassemblies. Some assembly is required when the units ship as subassemblies.

Operating Environment

The T-Series Climate Changer (TSC) is an outdoor air handler. When considering the placement of the TSC it is important to consider the operating environment. The acceptable ambient temperature range for unit operation is -40° to +140°F (-40°C to 60°C).

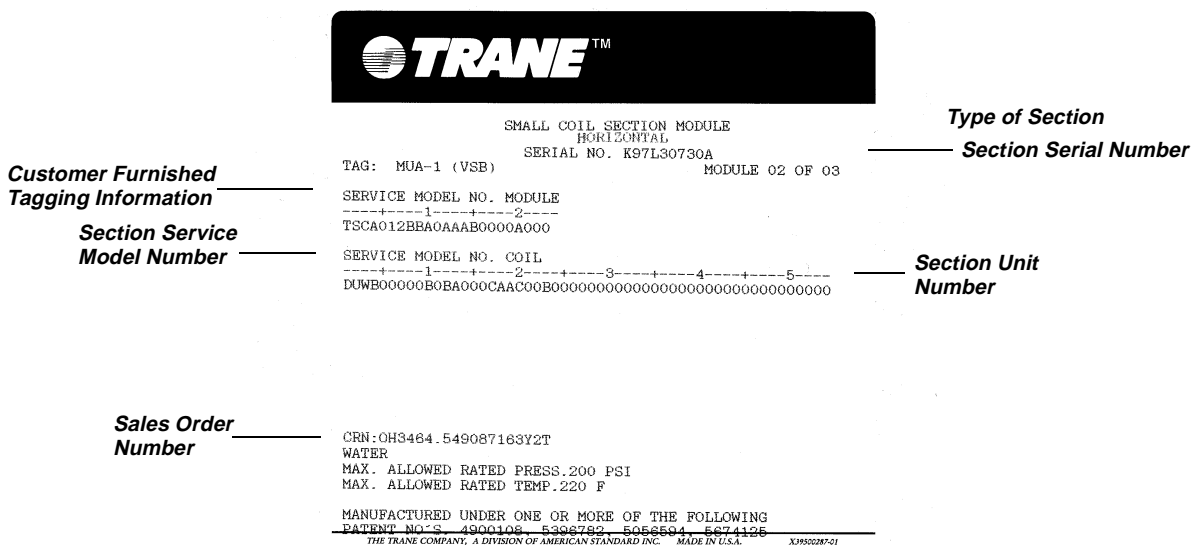
For heating applications a special motor may be required to withstand the higher temperatures. Motors with Class “B” insulation are acceptable for ambient temperatures **up to 104°F** while motors with class “F” insulation can withstand ambient temperatures **to +140° F** (60°C).

NOTE: IT IS RECOMMENDED THAT THE CUSTOMER PROVIDE ADEQUATE FREEZE PROTECTION FOR THE COILS.
UNITS WITH UL APPROVAL HAVE A MAXIMUM AMBIENT TEMPERATURE REQUIREMENT OF 104°F.

Unit Nameplates

Each unit section is provided with a section nameplate (label). See Figure 1. This nameplate includes type of section, section serial number, customer tagging information, section position and service model number.

Figure 1
Unit Nameplate



Each section of a T-Series Climate Changer is identified with a multi-character model number and serial number. The model number precisely identifies a particular section. Refer to model number and serial number when ordering parts or requesting service.

If the unit ships as individual sections or section subassemblies refer to the nameplate for customer tagging information and section position to insure proper placement of the sections during assembly.

Controls

Wiring Sizes and Connections

Entrances are provided for field installation of high and low voltage wiring through a pipe/nipple connection in the base of the unit. The low and high voltage connections are on opposite sides of the unit on sizes 3 - 50 and on the same side for sizes 66 - 100.

CAUTION

The high and low voltage wire raceways for the T-series units are intended for factory wiring ONLY. Do not use these raceways for field uses. Failure to follow these instructions can result in damage to the unit.

Wiring to the unit must be provided by the installer and must comply with all national and local electrical codes. The motor nameplate includes a wiring diagram. If there are any questions concerning the wiring of the motor be sure to take the motor manufacturer's name, model number, and serial number and contact your local Trane representative for assistance.

Factory Mounted Controls

NOTE: FOR MORE IN-DEPTH UNDERSTANDING OF THE PROGRAMMABLE CONTROL MODULE (PCM) REFERENCE INSTALLATION GUIDE EMTX-IN-11A, APPLICATION GUIDE EMTX-AG-1, OPERATORS' GUIDE EMTX-OG-4, INSTALLATION, OPERATION AND PROGRAMMING GUIDE CLCH-IOP-1, AND INSTALLATION, OPERATION AND MAINTENANCE MISC-IOM-5.

The T-Series Climate Changer is available with a wide array of factory mounted controls. They include the Programmable Control Module (PCM), motor starters, and Variable Frequency Drives (VFD).

NOTE: THIS SECTION WILL PROVIDE A BRIEF OVERVIEW OF THE OPTIONAL FACTORY MOUNTED CONTROLS. FOR MORE IN-DEPTH UNDERSTANDING OF THE PROGRAMMABLE CONTROL MODULE (PCM), REFERENCE INSTALLATION GUIDE EMTX-IN-11A, APPLICATION GUIDE EMTX-AG-1, OPERATORS' GUIDE EMTX-OG-4, INSTALLATION OPERATION AND PROGRAMMING GUIDE CLCH-IOP-1 AND INSTALLATION OPERATION AND MAINTENANCE MISC-IOM-5.

Most control components are mounted inside the units. Depending on system configuration, these controls may include damper actuators, dirty filter switches, averaging temperature sensors, low limit switches, point temperature switches, and inlet guide vane actuators. Variable frequency drives, starters, PCMs, control transformers, static pressure transducers, DC power supplies, customer interface relays, etc. will be in enclosures mounted on the inside of the unit.

Small items that cannot be factory-mounted will ship inside the control enclosures. These controls may include space temperature sensors, outside air temperature sensors, and humidity sensors.

All control valves will ship directly to the "ship to address" from the vendor, unless another address was given on the order.

All constant volume or variable air volume control systems are provided with 120 to 24 VAC control transformers. Unless ordered with a factory-mounted/wired starter or variable frequency drive, the customer must provide 120 VAC control power, 50/60 hz, typically 3 amps for unit sizes 3 - 50, and 5 amps for unit sizes 66 -100. A dedicated 15 amp circuit is recommended.

A T-Series Climate Changer unit and/or field-installed accessories that must be stored for a period of time prior to being installed MUST be protected from the elements. The PCM and all other electrical/electronic components should be stored in conditions of -20 - 120°F and 5 - 95% relative humidity non-condensing. Electrical components ARE NOT moisture-tolerant

The warranty will not cover damage to the unit or controls due to negligence during storage. A controlled indoor environment is recommended for proper storage. For further storage considerations, refer to "Storage Considerations" in the next section.

Receiving

The T-Series Climate Changer can ship as individual sections, section subassemblies, or a complete air handler. Sizes 3 - 100 have an integral base rail.

Upon receipt of the unit(s) and prior to unloading, inspect the unit for damage and verify that the shipment is complete. **Delivery cannot be refused.**

Inspection

1 Visually inspect components for any damage that may have occurred during shipment.

NOTE: THE TRANE COMPANY IS NOT RESPONSIBLE FOR SHIPPING DAMAGE.

- 2 Check all access doors to confirm that the latches and hinges are not damaged.
- 3 Check all coil connections to confirm they are straight and undamaged.
- 4 Inspect the coils for damage to the fin surface or coil connections.
- 5 Check all devices attached to the unit exterior and confirm that they are not damaged.
- 6 Manually rotate the fan wheel to ensure free movement of the shaft, bearings, and drive. Inspect the fan housing for any foreign objects.
- 7 Inspect the interior of each section for any internal damage as soon as possible after delivery. Concealed damage must be reported within 15 days of receipt.
- 8 If the unit was ordered with Factory Mounted Controls, locate all sensors. These components will be shipped inside the control enclosure.
- 9 If the unit shipped in subassemblies, locate assembly hardware. The necessary assembly hardware will be packaged inside the fan section or the mixing section.

Resolving Shipping Damage

The T-Series Climate Changer ships FOB. If damage has occurred to the unit sections during shipment, the following instructions should be completed:

- 1 Make specific notation describing the damage on the freight bill.
- 2 Report all claims of shipping damage to the delivering carrier immediately.

- 3 Keep damaged material in the same location as it was received. It is the receiver's responsibility to provide reasonable evidence that the concealed damage was not incurred after delivery.
- 4 Notify the Trane sales representative of the damage and arrange for repair. Do not attempt to repair the unit without consulting the sales representative. **TRANE IS NOT RESPONSIBLE FOR SHIPPING DAMAGE.**

Storage Considerations

General

The Trane T-Series Climate Changer air handler is an outdoor unit and requires no special protection for storage before installation. Keep the equipment in the original shipping container for protection and ease of handling. **The warranty will not cover damages to the unit due to negligence during storage.**

For longer periods of storage, allow enough clearance around the unit to perform periodic inspection and maintenance of the equipment. In addition, loosen belt tension on drive belts.

Long Term Storage

Every two weeks, rotate the fan and motor shaft thirty revolutions by hand. Check for free rotation.

Every six months, check fan shaft bearings and grease lines. Add grease using a manual grease gun following the lubrication recommendations in the Periodic Maintenance section.

Check the motor lubrication; remove and clean grease plugs and check for the presence of moisture in the grease. If moisture is present, remove the motor and send it to an authorized repair shop for bearing inspection/replacement. If no moisture is present, refer to the motor manufacturer's lubrication recommendation for proper lubrication.

Rigging and Handling

The unit will be shipped (as specified by sales order) as 1) a complete assembly, 2) in sub-assemblies (collection of sections), or 3) as individual sections. Follow appropriate lift warnings as shown on the label affixed to the unit.

⚠ WARNING

Never bolt (assemble) sections or sub-assemblies together before rigging. Always rig subassemblies or sections as received from the factory.

⚠ CAUTION

Do NOT lift from the top of the unit. Lift only from lift lugs located at the bottom of the unit. Use all lift lugs provided. Failure to do so can damage the unit.

Determine Unit Weights

Weights in this manual are approximate. Always test-lift the unit section to check for proper balance and rigging before hoisting to the desired location.

When preparing to lift sections, estimate the equipment's approximate weight and center of gravity. Refer to the tables listed below and placed on the following pages. Due to placement of internal components, the weight of the unit may be unevenly distributed, with more weight being present in the fan and coil areas)

Table 1
T-Series Section Weights (lb) - Unit Sizes 3 - 50

Trane Unit Size	3	6	8	10	12	14	17	21	25	30	35	40	50
Filter / Mixing	225	232	270	367	393	443	490	526	624	687	933	1025	1148
Economizer	314	377	419	582	637	677	740	827	902	1118	1291	1544	1785
Exhaust	88	105	115	134	145	154	167	187	201	219	265	283	399
Air Blender	191	242	279	355	380	399	431	477	562	614	822	888	1080
Flat Filter	71	84	91	109	122	130	140	157	164	177	235	249	365
Angled Filter	154	199	232	242	261	290	312	338	355	389	545	590	684
Bag Filter	189	248	281	285	323	372	426	511	579	632	698	752	852
Cartridge Filter	143	181	213	218	235	266	284	317	334	368	494	538	621
Sm. Blank / Inspection	47	56	61	71	76	80	85	95	100	108	130	139	221
Med Blank / Access	62	75	80	95	101	105	113	125	132	143	169	181	269
M-L Blank / Access	N/A	N/A	N/A	161	171	179	192	212	221	241	334	364	429
Large Blank / Access	105	137	164	218	232	243	261	289	361	393	541	584	662
Small Coil													
Weight includes 2 row UW	117	151	170	210	238	255	285	323	353	390	448	487	757
Med. Coil													
Weight includes 8 row UW	182	250	294	363	431	476	539	641	722	824	897	1017	1444
M-L Coil													
Weight includes 10 row W	N/A	N/A	N/A	649	788	842	967	1142	1298	1483	1759	1982	2550
Large Coil													
Weight includes 10 row W	323	439	568	720	864	923	1054	1234	1465	1664	1986	2222	2804
Moisture Eliminator	59	80	93	147	167	182	202	231	254	289	347	385	554
Internal Face/Bypass	98	129	144	185	200	230	252	281	306	343	425	480	645
Face Damper	98	129	144	185	200	230	252	281	306	343	425	480	645

Table 1
T-Series Section Weights (lb) - Unit Sizes 3 - 50

Trane Unit Size	3	6	8	10	12	14	17	21	25	30	35	40	50
Front Horiz Disch Fan													
Weight includes Type A fan	300	444	500	508	599	652	762	905	1022	1277	2010	2168	2560
Bottom Vert Disch Fan													
Weight includes Type A fan	347	500	561	580	676	731	847	1000	1122	1385	2139	2307	2780
Diffuser	74	91	98	114	122	130	143	163	173	192	293	322	445
Discharge Plenum	92	118	135	195	204	209	224	252	318	337	472	511	571

Table 2
T-Series Section Weights (lb) - Unit Sizes 66 - 100

Trane Unit Size	66	80	100
Filter / Mixing	1367	1511	1817
Economizer	2147	2382	2984
Exhaust	464	506	572
Air Blender	1257	1386	1640
Flat Filter	432	477	546
Angled Filter	797	839	964
Bag Filter	1046	1163	1414
Cartridge Filter	761	798	911
Sm. Blank / Inspection	252	262	288
Med Blank / Access	307	319	350
M-L Blank / Access	472	491	538
Large Blank / Access	775	870	1056
Small Coil			
Weight includes 2 row UW	933	1040	1237

Table 2
T-Series Section Weights (lb) - Unit Sizes 66 - 100

Trane Unit Size	66	80	100
Med. Coil			
Weight includes 8 row UW	1850	2143	2608
M-L Coil			
Weight includes 10 row W	3372	3884	4738
Large Coil			
Weight includes 10 row W	N/A	N/A	N/A
Moisture Eliminator	710	786	928
Internal Face/Bypass	753	852	1002
Face Damper	753	852	1002
Front Horiz Disch Fan			
Weight includes Type A fan	3621	4391	5141
Bottom Vert Disch Fan			
Weight includes Type A fan	3621	4391	5141
Diffuser	913	1029	1257
Discharge Plenum	651	769	928

Table 3
Inlet Guide Vane Weights (lb)

Fan Type/ Unit Size	3	6	8	10	12	14	17	21	25	30	35	40	50	66	80	100
FC Fan	N/A	38	38	43	46	55	57	65	70	70	105	128	155	155	N/A	N/A
BI Fan	N/A	N/A	N/A	58	63	69	76	89	66	66	N/A	N/A	N/A	N/A	N/A	N/A
AF Fan	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	36	43	54	64	93	111
Plug Fan	N/A	N/A	N/A	N/A	N/A	N/A	N/A	25	29	29	40	64	74	100	122	118

Table 4
Approximate Motor Weights (lb)

Motor Type/ Horsepower	1/6	1/4	1/3	1/2	3/4	1	1-1/2
General Purpose ODP	16	21	24	26	28	32	35
General Purpose TEFC	N/A	N/A	N/A	N/A	N/A	50	54
Energy Efficient ODP	N/A	N/A	N/A	N/A	N/A	35	41
Energy Efficient TEFC	N/A	N/A	N/A	N/A	N/A	36	46
VAV-ODP	N/A	N/A	N/A	N/A	N/A	38	42

Motor Type/ Horsepower	2	3	5	7-1/2	10	15	20	25	30	40	50	60	75	100
General Purpose ODP	38	70	88	126	151	230	265	329	359	370	508	685	722	970
General Purpose TEFC NA	60	90	111	163	193	253	300	365	409	610	681	872	968	1255
Energy Efficient ODP	41	67	79	107	119	215	260	286	334	372	406	591	765	989
Energy Efficient TEFC	45	75	96	140	160	233	289	332	384	471	536	764	820	1302
VAV-ODP	42	87	91	132	147	230	220	331	352	450	509	796	825	1000

Table 5
Approximate Dry Cooling Coil Weights Type UU, UF, and UW, Fin Series 168 (Weights in lb)

Rows	Unit Size															
	3	6	8	10	12	14	17	21	25	30	35	40	50	66	80	100
2	41	58	69	88	110	122	138	175	197	222	247	274	358	458	548	666
4	63	94	114	146	181	203	232	289	329	376	425	475	621	804	956	1175
6	79	121	148	188	236	266	306	381	437	503	573	645	831	1083	1292	1604
8	94	147	182	231	290	329	380	473	545	631	721	814	1042	1362	1628	2032

Table 6
Unit Size 3, Approximate Dry Coil Weights, Fin Series 168 (Weights in lb)

Rows	Coil Type											
	W	K	P2	P4	P8	D	DD	WD	WA	WC	TT	NS
1	44								44	39		57
2	65	77	41	44					66		38	

Table 6
Unit Size 3, Approximate Dry Coil Weights, Fin Series 168 (Weights in lb)

Coil Type												
Rows	W	K	P2	P4	P8	D	DD	WD	WA	WC	TT	NS
4	90	127	66	68	83	107	99					
6	116	176	95	102		148	157)	123				
8	141)	231		122	131	189	183	148				
10	166	274				231	241	173				
12	191	324				272	266	198				

Table 7
Unit Size 6, Approximate Dry Coil Weights, Fin Series 168 (Weights in lb)

Coil Type												
Rows	W	K	P2	P4	P8	D	DD	WD	WA	WC	TT	NS
1	53								53	48		73
2	81	93	56	59					81		54	
4	119	155	95	96	111	135	127					
6	157	217	136	142		189	198	164				
8	194)	285		175	185	243	236	201				
10	232	341				297	307	238				
12	270	403				351	345	275				

Table 8
Unit Size 8, Approximate Dry Coil Weights, Fin Series 168 (Weights in lb)

Coil Type												
Rows	W	K	P2	P4	P8	D	DD	WD	WA	WC	TT	NS
1	71								71	66		97
2	108	124	75	77					109		72	
4	164	210	130	131	146	183	175					
6	217	296	187	194		259	273	227				
8	271	382		244	253	334	327	280				
10	326	469				409	425	334				
12	380	555				484	480	387				

Table 9
Unit Size 10, Approximate Dry Coil Weights, Fin Series 168 (Weights in lb)

Coil Type												
Rows	W	K	P2	P4	P8	D	DD	WD	WA	WC	TT	NS
1	80								80	75		114
2	127	144	94	97					128		91	
4	197	245	164	166	181	218	209					
6	266	346	237	244		308	322	275				
8	336	447		308	318	398	392	344				
10	405	548				489	505	412				
12	475	650				579	575	481				

Table 10
Unit Size 12, Approximate Dry Coil Weights, Fin Series 168 (Weights in lb)

Coil Type												
Rows	W	K	P2	P4	P8	D	DD	WD	WA	WC	TT	NS
1	103								103	103		142
2	165	185	119	122					166		116	
4	257	316	211	213	228	284	274					
6	349	448	306	313		402	421	361				
8	441	579		400	410	521	513	452				
10	533	710				638	661	542				
12	625	842				756	75	633				

Table 11 Unit Size 14, Approximate Dry Coil Weights, Fin Series 168 (Weights in lb)

Coil Type												
Rows	W	K	P2	P4	P8	D	DD	WD	WA	WC	TT	NS
1	107								107	107		149
2	173	192	126	129					173		123	
4	271	330	225	226	241	297	287					
6	369	467	326	333		42	441	381				
8	467	605		426	435	547	539	477				
10	565	742				671	693	574				
12	663	880				796						

Table 12
Unit Size 17, Approximate Dry Coil Weights, Fin Series 168 (Weights in lb)

Coil Type												
Rows	W	K	P2	P4	P8	D	DD	WD	WA	WC	TT	NS
1	123								123	122		172
2	199	221	N/A	N/A					199		145	
4	316	381	N/A	N/A	N/A	345	333					
6	434	542	N/A	N/A		491	513	445				
8	551	703		N/A	N/A	637	630	561				
10	667	864				782	810	677				
12	786	1025				928	928	792				

Table 13
Unit Size 21, Approximate Dry Coil Weights, Fin Series 168 (Weights in lb)

Coil Type												
Rows	W	K	P2	P4	P8	D	DD	WD	WA	WC	TT	NS
1	148								149	139		214
2	241	264	191	197					241		184	
4	379	451	330	333	364	411	396					
6	517	637	475	489		581	600	528				
8	655	835		617	636	752	738	664				
10	793	1009				922	943	800				
12	931	1195				1092	1081	936				

Table 14
Unit Size 25, Approximate Dry Coil Weights, Fin Series 168 (Weights in lb)

Coil Type												
Rows	W	K	P2	P4	P8	D	DD	WD	WA	WC	TT	NS
1	170								171	161		247
2	277	305	219	225					278		213	
4	440	524	384	386	417	478	461					
6	604	743	553	567		678	701	617				
8	767	969		721	739	878	864	778				
10	930	1181				1078	1105	939				

Table 14
Unit Size 25, Approximate Dry Coil Weights, Fin Series 168 (Weights in lb)

Coil Type												
Rows	W	K	P2	P4	P8	D	DD	WD	WA	WC	TT	NS
12	1093	1401				1278	1268	1100				

Table 15
Unit Size 30, Approximate Dry Coil Weights, Fin Series 168 (Weights in lb)

Coil Type												
Rows	W	K	P2	P4	P8	D	DD	WD	WA	WC	TT	NS
1	190								191	180		278
2	312	340	254	260					313		249	
4	505	588	448	450	481	542	526					
6	697	837	647	661		771	794	709				
8	889	1091		842	862	1001	897	899				
10	1082	1333				1230	1257	1088				
12	1275	1582				1459	1450	1278				

Table 16
Unit Size 35, Approximate Dry Coil Weights, Fin Series 168 (Weights in lb)

Coil Type												
Rows	W	K	P2	P4	P8	D	DD	WD	WA	WC	TT	NS
1	275		N/A	N/A	N/A				212	224		333
2	379	413							340		298	
4	616	717				660	642					
6	853	1022				943	974	879				
8	1091	1333				1224	1211	1116				
10	1328	1631				1505	1544	1353				
12	1565	1936				1788	1781	1590				

Table 17
Unit Size 40, Approximate Dry Coil Weights, Fin Series 168 (Weights in lb)

Coil Type												
Rows	W	K	P2	P4	P8	D	DD	WD	WA	WC	NS	
1	306		N/A	N/A	N/A				231	247	368	
2	425	458							381			

Table 17
Unit Size 40, Approximate Dry Coil Weights, Fin Series 168 (Weights in lb)

Coil Type											
Rows	W	K	P2	P4	P8	D	DD	WD	WA	WC	NS
4	699	800				743	724				
6	973	1142				1062	1093	998			
8	1247	1489				1381	1368	1273			
10	1521	1825				1700	1738	1546			
12	1795	2166				2018	2011	1820			

Table 18
Unit Size 50, Approximate Dry Coil Weights, Fin Series 168 (Weights in lb)

Coil Type											
Rows	W	K	P2	P4	P8	D	DD	WD	WA	WC	NS
1	386		N/A	N/A	N/A				294	322	477
2	551	592							491		
4	920	1044				975	953				
6	1289	1496				1399	1440	1323			
8	1658	1949				1823	1810	1692			
10	2028	2400				2248	2297	2061			
12	2397	2853				2672	2666	2431			

Table 19
Unit Size 66, Approximate Dry Coil Weights, Fin Series 168 (Weights in lb)

Coil Type												
Rows	W	K	P2	P4	P8	D	DD	WD	WA	WC	N	NS
1	521		N/A	N/A	N/A				387	441	660	648
2	738	789										
4	1242	1383				1302	1275		660			
6	1740	1980				1866	1908	1776				
8	2241	2577				2430	2409	2277				
10	2742	3171				2994	3042	2778				
12	3243	3768				3555	3543	3279				

Table 20
Unit Size 80, Approximate Dry Coil Weights, Fin Series 168 (Weights in lb)

Coil Type											
Rows	W	K	P2	P4	P8	D	DD	WD	WA	WC	NS
1	611		N/A	N/A	N/A				453	494	753

Table 20
Unit Size 80, Approximate Dry Coil Weights, Fin Series 168 (Weights in lb)

Rows	Coil Type										
	W	K	P2	P4	P8	D	DD	WD	WA	WC	NS
2	873	932							778		
4	1471	1643				1547	1516				
6	2068	2355				2219	2275	2114			
8	2664	3066				2893	2872	2710			
10	3262	3777				3565	3632	3307			
12	3859	4490				4268	4228	3904			

Table 21
Unit Size 100, Approximate Dry Coil Weights, Fin Series 168 (Weights in lb)

Rows	Coil Type										
	W	K	P2	P4	P8	D	DD	WD	WA	WC	NS
1	729		N/A	N/A	N/A				546	603	909
2	1065	1131							945		
4	1815	2010				1900	1866				
6	2565	2889				2733	2802	2613			
8	3315	3771				3570	3552	3363			
10	4062	4653				4404	4488	4113			
12	4812	5529				5238	5238	4863			

Lifting Instructions

The Trane Company recommends that the contractor use spreader bars and slings to rig units and subassemblies (sections) as shown.

- Always assemble the unit at the installation site.
- Always rig subassemblies or sections as they ship from the factory.
- Make the loop of the sling parallel to the direction of airflow, whenever possible.

The following instructions cover lifting the unit as well as inlet and exhaust hoods and external pipe chases. Follow specific instructions.

WARNING

Follow good lifting practices before lifting the unit to include following instructions in this manual, estimating center of gravity,

and test lifting the unit to check balance and stability.

Do NOT use fork lifts for handling units.

Never lift units in windy conditions or raise units above personnel.

Failure to follow all instructions may result in personal injury or equipment damage.

- 1 Before lifting the unit, estimate the approximate center of gravity and test lift the unit to determine balance and stability.

NOTE: PREPARATION OF THE ROOF CURB OR PIER MOUNT AND ROOF OPENINGS SHOULD BE COMPLETED BEFORE LIFTING UNIT TO THE ROOF. SEE THE ASSEMBLY SECTION OF THIS MANUAL.

USE ALL OF THE LIFT LUGS PROVIDED.

NEVER STACK THE PIPE CABINET AND INLET HOODS ON THE UNIT AS THE UNIT IS BEING LIFTED.

- 2 Lift all sections individually using all lifting lugs provided and shown in *Figure 4* . See specific instructions for handling the inlet and exhaust hoods and pipe chase in paragraphs following.
- 3 Remove all wooden blocks before installing the unit to the roof curb (see *Figure 5*).
- 4 After the sections are in place, assemble them (see Unit Assembly).

Lifting Inlet and Exhaust Hoods

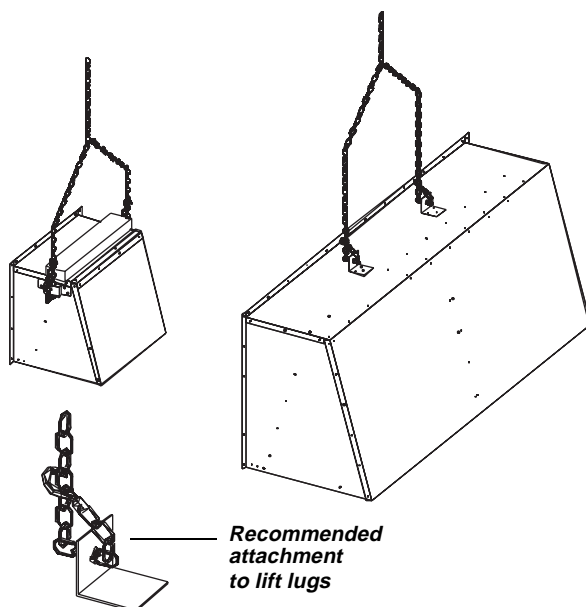
⚠ CAUTION
Do not attach the hood to the unit prior to lifting the unit. Doing so could damage the equipment.

Follow all warnings lifting instructions in the general Lifting section of this manual to include test lifting.

Lift the hood sections individually as shown in *Figure 2* . Attach the cables, chains or straps to lifting lugs as shown.

Attach the hood to the unit only after all sections are in place.

Figure 2
Inlet and Exhaust Hood Lifting



Lifting the External Pipe Cabinet (Chase)

⚠ CAUTION
Do not attach the pipe chase to the unit prior to lifting the unit. Doing so could damage the equipment.

Follow all warnings lifting instructions in the general Lifting section of this manual to include test lifting.

Lift the pipe chase section individually as shown in *Figure 3* . Attach the cables, chains or straps to lifting lugs as shown.

Attach the pipe chase to the unit only after all sections are in place.

Figure 3
Pipe Cabinet Lifting

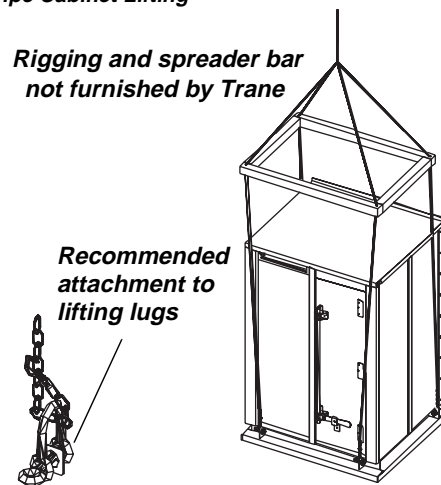


Figure 4
Field Unit Lifting

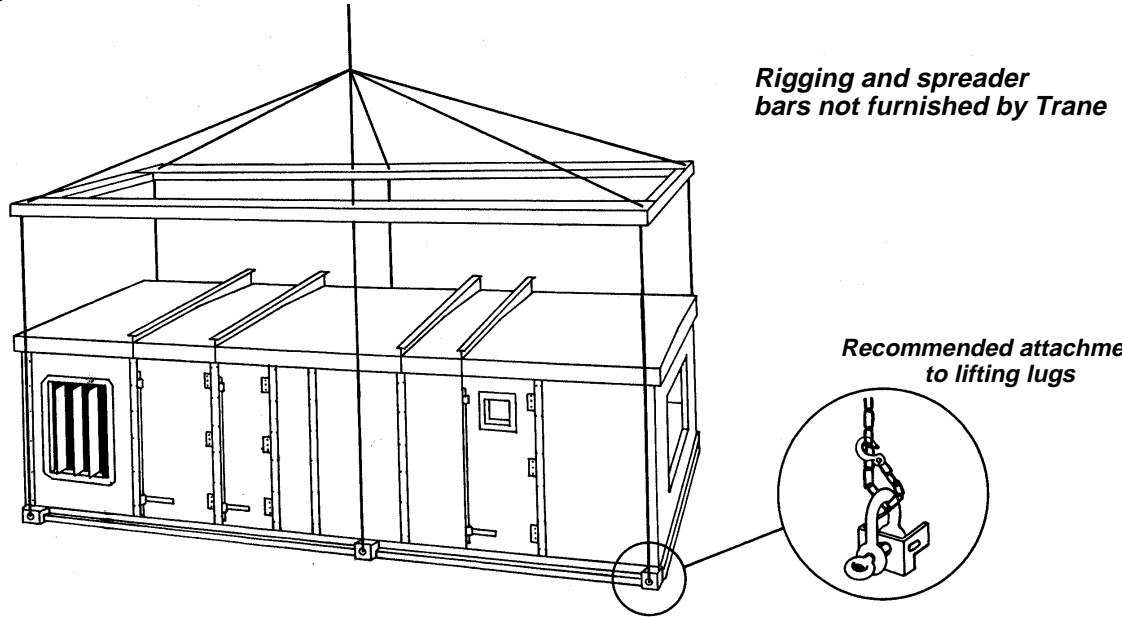
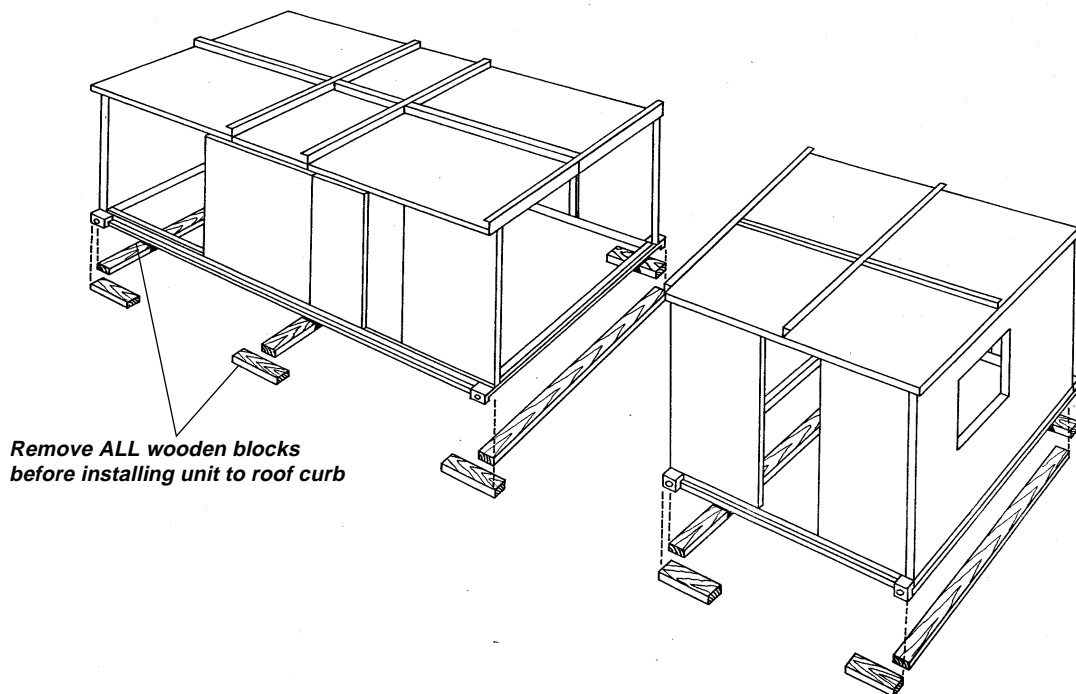


Figure 5
Shipping Block Removal

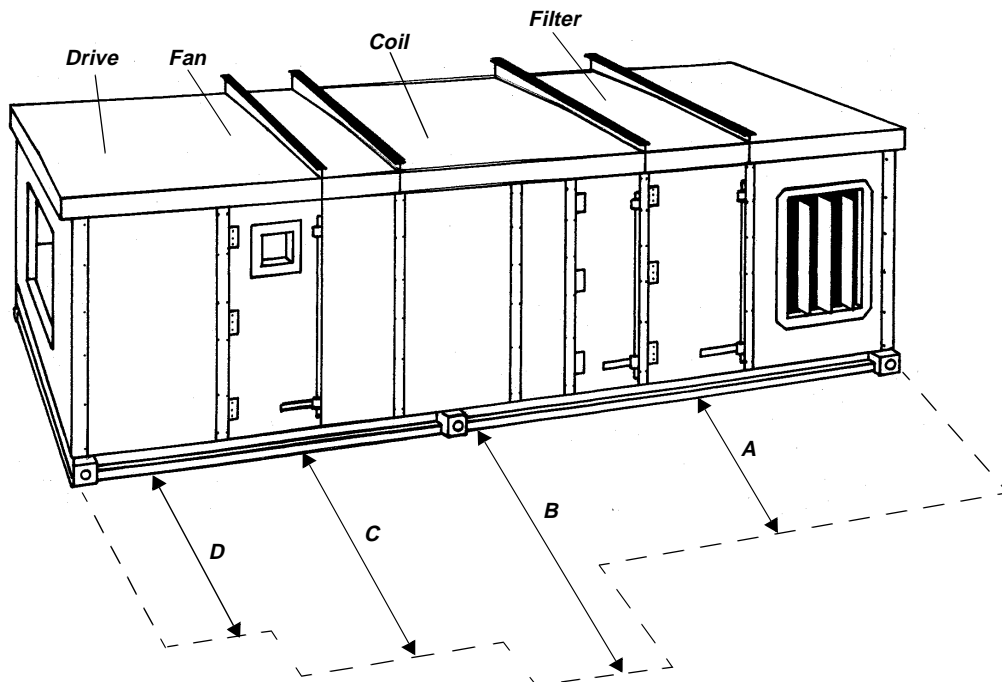


Installation

When preparing the unit site, consider the following:

- 1 Ensure that the site can support the total weight of the unit. *Table 1* and *Table 2* list approximate section weights.

Figure 6
Service Clearances



- 2 Allow sufficient space for the recommended service access. Refer to *Figure 6* for FC, BI and AF fan wheels and for plug fans.
- 3 Confirm that the foundation of the mounting platform is large enough to include the unit dimensions. Refer to unit submittals for specific dimensions.

Table 22
Service Clearances (in inches)

Unit Size	Filter A	Coil Removal B	Fan C	Starter D
3	48	48	48	60
6	48	60	48	60
8	48	64	48	60
10	48	75	51	60
12	48	79	54	60
14	48	83	58	60
17	48	89	61	60
21	48	91	60	60
25	48	93	66	60
30	48	106	66	60
35	48	110	65	60
40	48	123	70	60
50	48	134	77	60

Table 22
Service Clearances (in inches)

Unit Size	Filter A	Coil Removal B	Fan C	Starter D
66	52	150	93	60
80	56	150	91	60
100	58	165	101	60

The floor or foundation must be level for proper coil drainage and condensate flow.

- 4 Allow the proper height for condensate drain requirements. Insufficient height may inhibit condensate drainage and result in flooding the unit.
- 5 Provide adequate lighting for maintenance personnel to perform maintenance duties.
- 6 Provide permanent power outlets in close proximity of the unit for installation and maintenance.

Unit Assembly

The T-Series Climate Changer is extremely versatile and can be assembled in many configurations. **Prior to unit assembly, refer to the correct submittals and unit tagging for correct placement of accessory sections.** Failure to review the submittal could result in performance or assembly problems. If there are any discrepancies, contact your local Trane representative before proceeding.

IMPORTANT: All shipping support screws on the face of the sections and sectional subassemblies must be removed and discarded to permit proper fit-up and sealing of the surfaces.

General

WARNING

To avoid personal injury or death keep open flame away from unit exterior or interior. Do not weld or use cutting torch on the exterior or interior of the unit. The unit contains polyurethane insulation. Failure to keep open flame away from unit exterior or interior may result in the production of toxic gas that could result in death or serious injury.

CAUTION

The internal sections of this unit containing electrical components must not exceed 104° F temperature. Internal sections of the unit not containing electrical components must not exceed 180° F temperature. Failure to comply with temperature requirements may cause equipment damage.

Units may be mounted on the roof with a roof curb or pier mount. Refer to submittals for dimensions and roof openings. Provide clearance around the unit to allow adequate free air and necessary service access. Also, allow room for supply and return

pipng, ductwork, electrical connections, and coil removal.

The building roof must be able to support the entire weight of the unit, roof curb and accessories. See *Table 1* thru *Table 4* for unit and accessory weights.

- Prepare the roof curb or pier mount and roof openings **before** hoisting the unit to the roof.
- Check that the gasketing is intact and provides an airtight seal with the unit base. Refer to the applicable roof curb installation manual.
- Complete all ductwork, piping and electrical connections only after mounting the unit. Refer to unit submittals.

All T-Series Climate Changer units are identified by a multiple-character model number that identifies each section. It is located on the panel on the inside of the supply fan section access door. Be sure to refer to the information on the nameplate when ordering replacement parts or requesting service

Assembly Hardware

T-Series Climate Changers ship with all necessary assembly hardware and gasket material. This hardware is packaged in either a clear plastic envelope or cardboard box and can be found inside the Fan section, Access section, or Mixing section. The number of sections to be assembled often makes it necessary to use more than one section to ship the material. Please check *all* sections thoroughly before contacting your Trane Company Representative to report missing hardware.

Unit Assembly - All Sizes

Mounting

If a unit arrives in **sections**, then each section **must** be individually hoisted, set on a roof curb or pier mount and assembled.

The pipe cabinet **must** also be mounted as an individual section. Refer to the pipe cabinet assembly section following for specific instructions.

When mounting the unit on its roof curb or pier mount make sure that the gasketing between the roof curb or pier mount and unit base provides an airtight seal. See *Figure 7* and *Figure 8* for suggested pier/rail mounting.

Figure 7
Pier Locations (Typical)

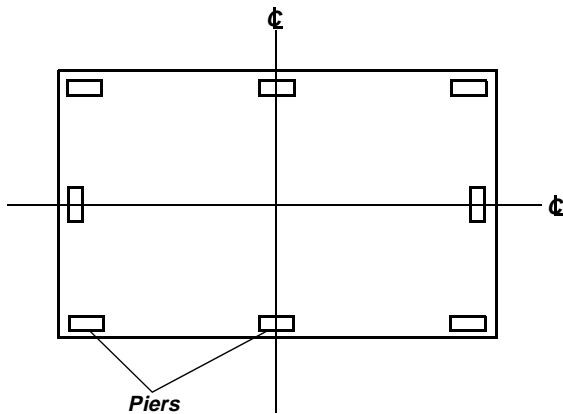
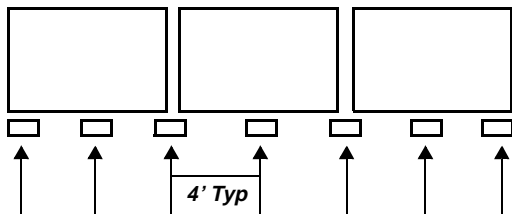


Figure 8
Side View of Unit with Two Shipping Splits

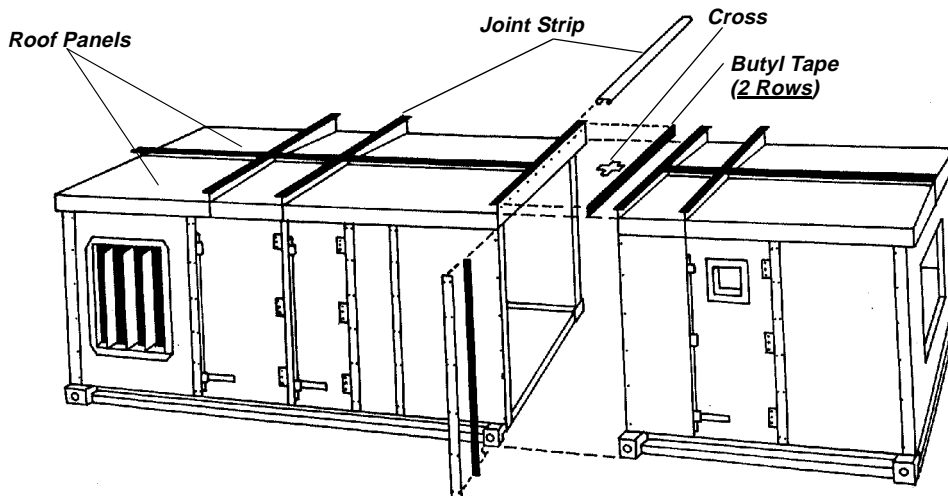


Unit Supports for Pier Mounts

NOTE: PIERS BENEATH SHIPPING SPLITS MUST BE STRUCTURALLY SOUND TO SUPPORT THE WEIGHT OF THE UNIT

Roof Assembly (for Unit Sizes 50-100 only)

Figure 9
Roof Assembly



Locate one pier at each corner, **as a minimum**, directly underneath any shipping split (ensure full support under each side), and then every four feet at equally spaced intervals around the perimeter of the unit. Both the unit and the pipe cabinet should be supported by their base channel around the entire perimeter.

CHECK THAT THE UNIT IS LEVEL TO ENSURE PROPER OPERATION.

IMPORTANT: FOR PROPER OPERATION, THE UNIT MUST BE INSTALLED LEVEL (ZERO TOLERANCE) IN BOTH HORIZONTAL AXES. FAILURE TO LEVEL THE UNIT PROPERLY CAN RESULT IN CONDENSATE MANAGEMENT PROBLEMS SUCH AS STANDING WATER INSIDE THE UNIT. STANDING WATER AND WET SURFACES INSIDE AIR HANDLING UNITS CAN RESULT IN MICROBIAL GROWTH (MOLD) IN THE DRAIN PAN THAT MAY CAUSE UNPLEASANT ODORS AND SERIOUS HEALTH-RELATED INDOOR AIR QUALITY PROBLEMS.

For vertical discharge units, allow space under the unit for supply air ductwork connections.

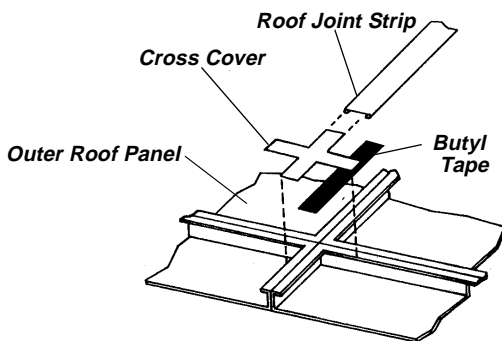
Assembling the Unit

Before sections are joined for final assembly, a butyl tape seal must be made at the roof connection and then hardware and sealing metal strips are installed at the base assembly, the roof joint or joints and both side panel seams.

NOTE: THE BUTYL TAPE APPLIED THE ROOF PANELS WILL COVER THE DRILLED HOLES.

- 1 Apply butyl tape along four roof panel seams where they come together.
- 2 Join the panels together at the seams and secure them in place with 5/16 X 3/4" screws and nuts.
- 3 Apply a strip of butyl tape along the center of the joint and place the cross cover directly over it as shown in *Figure 10*.
- 4 Slide the three roof joint strips (one long and two short) along the flat flange formed by the joined roof panels in the three directions shown, allowing 4" overhang at the ends.
- 5 Crimp down the three overhanging ends and secure with #10-16 x 3/4" self-drilling screws.

Figure 10
Roof Assembly Joints



Unit Sizes 50-100

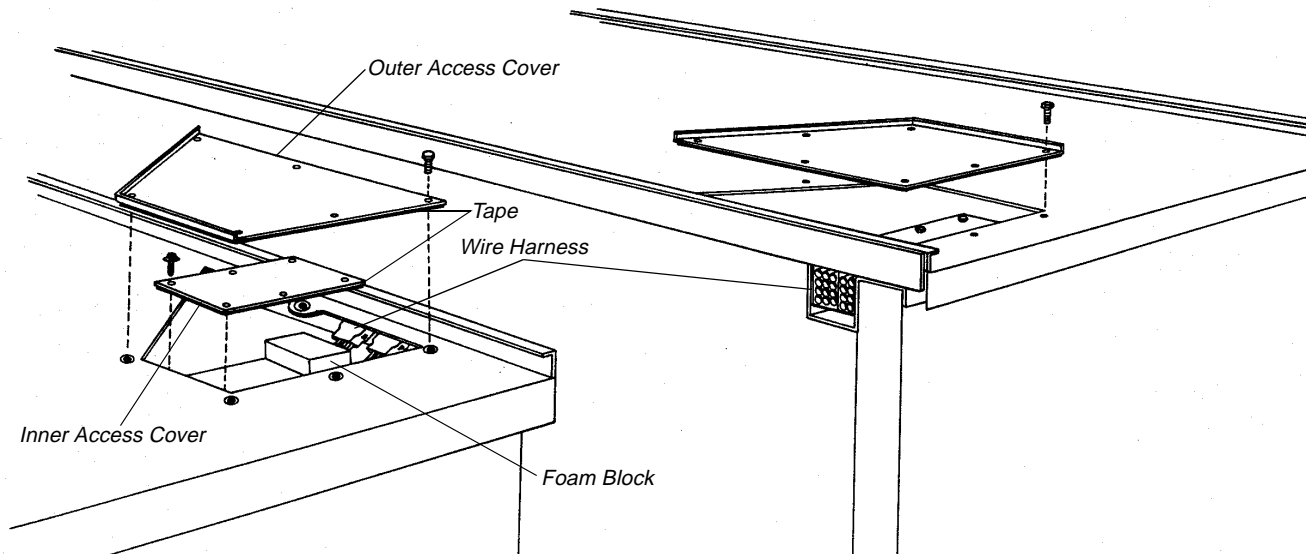
Control Wiring Assembly at Section Splits (All Unit Sizes) (Reference Figure 11)

- 1 Sections Must be together
- 2 Remove outer and inner raceway access covers on both sections adjacent to shipping split.
- 3 Remove top foam blocks in raceway.
- 4 Route wire harness(es) under inner roof through raceway and make connection to corresponding wire harness.
- 5 Replace foam blocks.

IMPORTANT: FOR PROPER UNIT OPERATION, THE FOAM BLOCKS MUST BE INSTALLED IN THE RACEWAY. FAILURE TO INSTALL THE FOAM BLOCKS CAN RESULT IN CONDENSATE MANAGEMENT PROBLEMS.

- 6 Remove backing from inner access cover tape and replace inner access cover.
- 7 Remove backing from outer access cover tape and replace outer access cover.

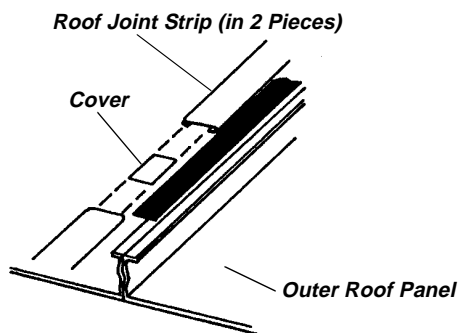
Figure 11
Control Wiring Assembly



Roof Assembly at Section Splits (All Unit Sizes)

- 1 Apply two rows of butyl tape at the roof seams, covering the hole pattern.
- 2 Align the roof panels together at the seams and bring the two sections together. Secure the roof panels in place with 5/16 X 3/4" screws and 5/16" nuts.
- 3 Slide the roof joint strip along the flat flange formed by the joined roof panels, allowing 4" hang on the ends.
- 4 (For Unit Sizes 3 - 40 when the roof joint strip is in two pieces): Apply a piece of butyl tape where the strips come together and place a cover directly over the tape. Then slide the two strips on the roof panels as shown in Figure 12.
- 5 Crimp down the two overhanging ends and secure with #10-16 x 3/4" sheet metal screws.

Figure 12
Roof Assembly at Section Splits

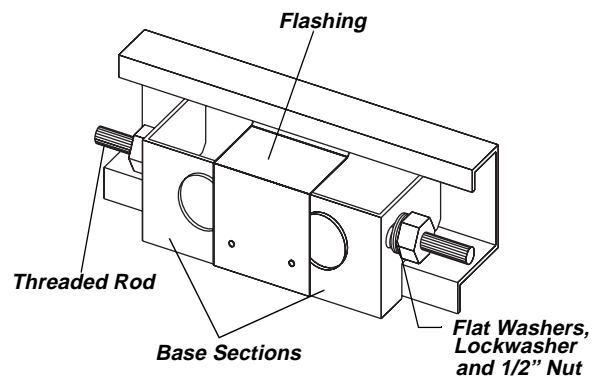


Unit Sizes 3-40

Base Assembly

- 1 Slide the 1/2" threaded rod through the hole in each of the two joined base sections as shown.
- 2 Install two flat washers, lockwasher, and 1/2" nut at each rod end. Tighten both nuts.
- 3 Install the flashing piece on the base assembly. Secure in place with two #10-16 x 3/4" sheet metal screws.
- 4 Repeat steps 1 - 3 for the base assembly on the other side of the unit.

Figure 13
Joining Base Assembly



Panel Assembly

- 1 Leaving the paper backing on the tape, apply butyl tape (tape side down) along the length of the panel seam.

NOTE: THE SEAM CAP SHOULD BE CUT TO SIZE TO COVER THE SEAM AND TAPE.

- 2 Install the seam cap directly over the seam and tape. Attach using #10-16 x 3/4" screws through all predrilled holes in the cap.
- 3 Caulk the gap between the top of the seam cap and the bottom of the raceway.

Figure 14
Panel Assembly

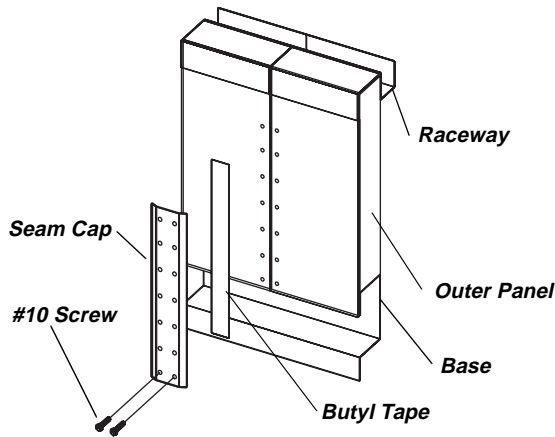
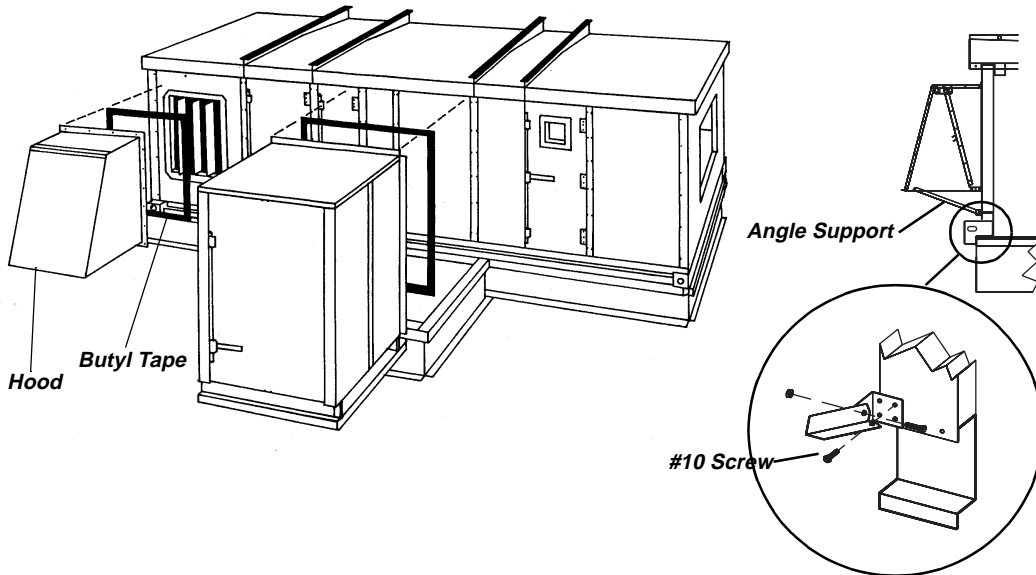


Figure 15
Hood and Pipe Cabinet Installation



Hood (Back and Side) Installation

Inlet hoods should be installed after the unit has been set in place. They should not be stacked on the unit as it is being hoisted. Mounting hardware and caulking tape for the inlet hoods are located inside the unit. For installation complete the following:

NOTE: THE HOOD ASSEMBLY SHOULD BE SUPPORTED BY CHAINS, SPREADER BAR, OR OTHER MEANS (SEE LIFTING INSTRUCTIONS SECTION) WHEN INSTALLED TO THE UNIT. MOUNTING TAPE AND HARDWARE ARE LOCATED INSIDE THE UNIT.

- 1 Apply the 1" butyl tape in a strip around the perimeter of the hood.
- 2 Using the lifting lugs, hoist the hood and center it over the panel opening as shown in.
- 3 Attach the hood to the unit with the 1/4-20 self-drilling screws provided. Use ALL holes drilled in the attachment flanges.
- 4 Attach the two hood angle supports (when provided) to the hood at one end and the bracket on the unit as shown. Secure with 5/16" lock bolts and lock nuts and #10-3/4 self-drilling screws.

Pipe Cabinet (Chase) Installation

Installation of the cabinet will be different depending on the extent of the piping installation. Follow the appropriate instructions below.

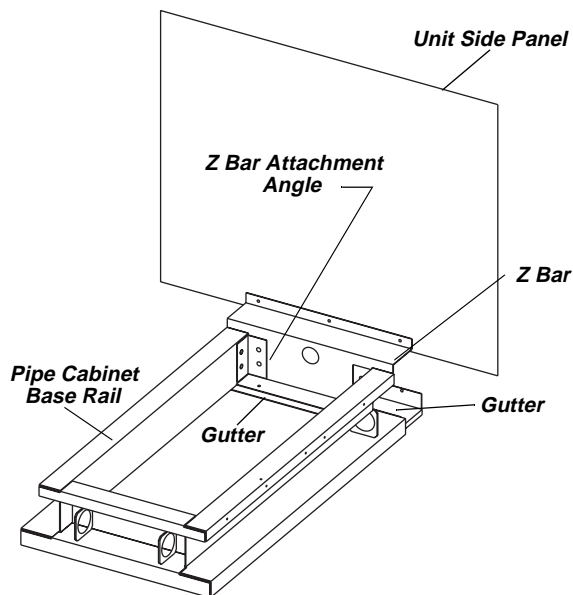
INSTALLATION OF THE PIPE CHASE CABINET REQUIRES ASSEMBLY OF THE CURB AND INSTALLING THE CABINET TO BOTH THE CURB AND THE UNIT AS DESCRIBED BELOW.

THE PIPE CABINET SHOULD BE SUPPORTED BY CHAINS, SPREADER BAR, OR OTHER MEANS (SEE LIFTING INSTRUCTIONS SECTION) WHEN INSTALLING.

MOUNTING TAPE AND HARDWARE ARE LOCATED INSIDE THE UNIT.

- 1 Assemble the pipe cabinet curb and attach to the roof or mounting surface.
- 2 If piping is not already run through the roof, follow steps 2 through 5 only. First remove the paper backing from the butyl tape on the Z bar and pipe chase side panels. (A gasket should already be in place from the curb installation.) Set the cabinet on top of the curb.

Figure 16
Pipe Cabinet Installation



- 3 Attach the Z bar to the unit side panel with #10 self-drilling screws (Figure 16).
- 4 Attach the Z bar to the gutter with #10 screws.

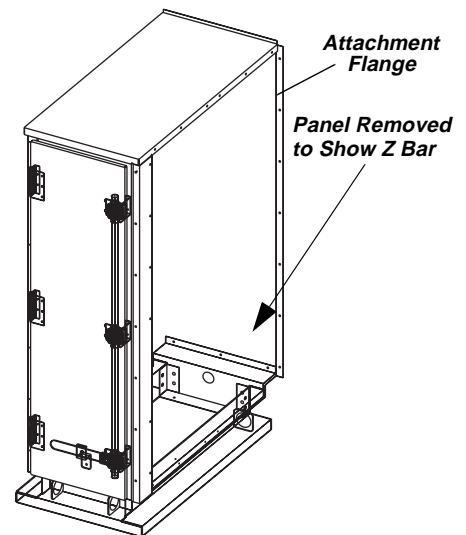
NOTE: USE ALL HOLES DRILLED IN THE ATTACHMENT FLANGES.

- 5 Attach the pipe cabinet side (attachment) flanges

to the unit panel with #10 screws.

- 6 If piping is already run through the roof, follow steps 6 through 13. First remove the Z bar from the pipe cabinet.
- 7 Remove the paper backing from the butyl tape on the Z bar and set the Z bar on top of the gutter
- 8 Attach the Z bar to the unit side panel with #10 screws.
- 9 Attach the Z bar to the gutter with #10 screws.
- 10 Remove the paper backing from the butyl tape on the pipe chase side panels. Set the cabinet on top of the curb (Figure 17).

Figure 17
Pipe Cabinet Attachment



NOTE: USE ALL HOLES DRILLED IN THE ATTACHMENT FLANGES.

- 11 Attach the pipe cabinet side flanges to the unit panel with #10 screws.
- 12 Attach the pipe cabinet base rail to the Z bar with bolts provided.
- 13 Apply caulk between the Z bar, the cabinet side flanges, the base and around the drain connection hole.

Component Installation Requirements

The T-Series Climate Changer is extremely versatile and the assembled unit is a complete air handling system. Each section may have installation requirements that will affect the performance of the unit.

High Efficiency Bag and Cartridge Filter Section

The Bag and Cartridge Filter sections can be used as either a pre-filter section, a Final Filter section or both. This is determined by placement in relation to the fan.

Filter Installation

NOTE: CARTRIDGE AND BAG FILTERS PROVIDED BY TRANE ARE FITTED WITH A 7/8" HEADER THAT FITS IN THE FILTER TRACK. IF USING FILTERS SUPPLIED BY ANOTHER MANUFACTURER, FILTERS SHOULD BE PURCHASED WITH A 7/8" HEADER. IN SOME CASES IT MAY BE NECESSARY TO GASKET THE LOCALLY PURCHASED FILTERS TO INSURE A GOOD AIR SEAL.

FILTERS SHOULD BE INSTALLED WHEN THE UNIT IS SET. THIS WILL PROTECT INTERNAL COMPONENTS SUCH AS THE UNIT'S HEATING AND COOLING COILS.

Trane recommends the use of disposable pre-filters with high efficiency filters. Disposable pre-filters slide into the mounting tracks just ahead of the bag/cartridge filters.

WARNING

**Pressurized Cabinet!
Disconnect all electric power
before opening door. Failure to
disconnect power before servicing
can cause severe personal injury.**

- 1 Disconnect the power to the unit.
- 2 Open the filter section access door.
- 3 Remove the adjustable block-off from the filter track.
- 4 Slide the filters into the tracks. Note that bag filters must be installed with the pleats in the vertical plane.
- 5 Slide the adjustable block-offs into the filter track. The block-off is intended to make a seal when the access door is closed. It is adjustable and may require a few changes to insure a proper seal.

- 6 Close the access door and confirm that there is a good seal of the filter track block-off against the access door.

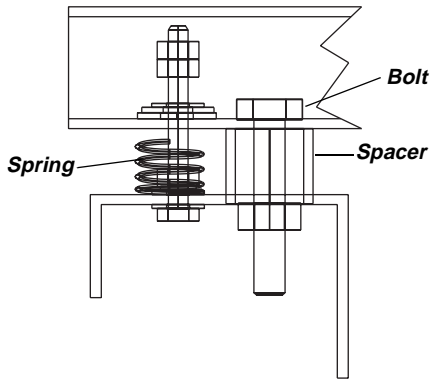
Fan Section

The Fan section can be configured as either draw-thru or blow-thru. Review the submittals and unit tagging prior to assembly.

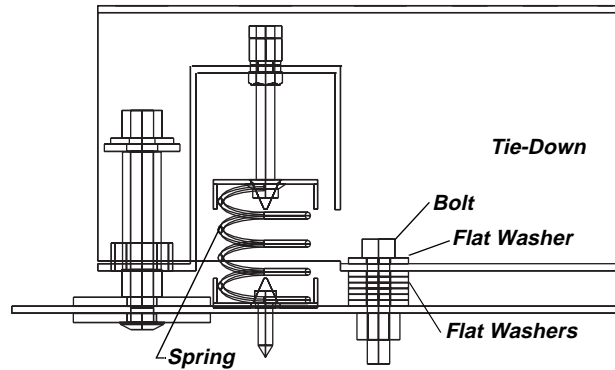
The fan and motor assembly are internally isolated. The fan and motor bases are bolted to four spring isolators (see *Figure 19*). The isolators are secured to the fan section support base. Four (4) shipping tie-downs are bolted adjacent to the isolators between the fan isolation base and the support frame.

The shipping tie-downs secure the isolation base to the support assembly to prevent any damage to the fan section during shipment of the air handler. The shipping spacers must be removed prior to unit operation unless the unit is to be externally isolated.

Figure 18
Shipping Spacer



Tie-Down Removal, Sizes 3-8



Tie-Down Removal, Sizes 10-50

Unit Isolation

Review the mechanical specifications and determine the type of isolation to be used prior to removing the shipping tie-downs. Remove the tie-downs only if the factory provided isolation is to be used. If external isolation is intended, review the portion of this manual titled "External Isolation."

Internal Isolation

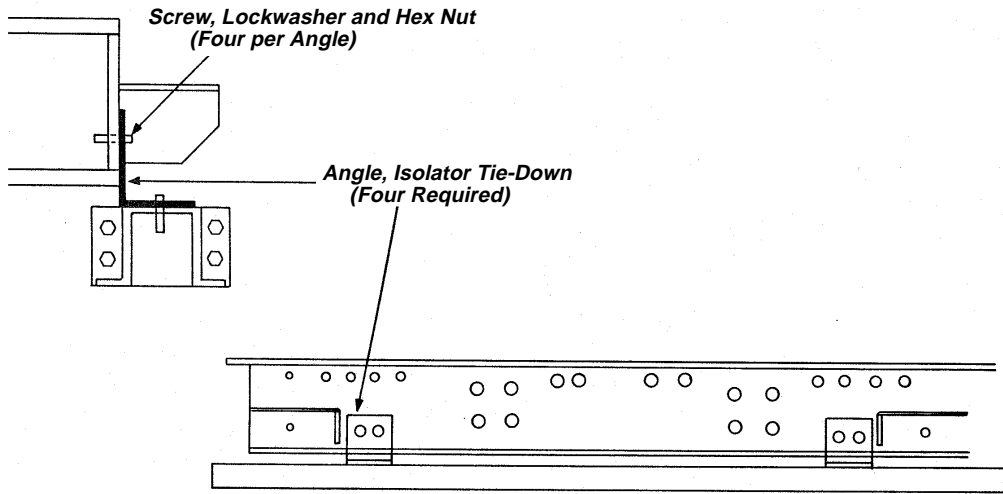
The T-Series Climate Changer Fan section is internally isolated. The unit ships with the internal isolation base secured to prevent damage to the fan and motor assembly during shipment. To activate the isolation, remove the shipping tie-downs.

Shipping Tie-down Removal

There are four types of shipping tie-downs used to secure the isolation base:

- Sizes 3 - 8 use a 3/8"x1" pipe. (See *Figure 18* .)
- Sizes 10 - 30, except plug fans, use washers with a bolt. (See *Figure 18* .)
- Sizes 35 - 50, except plug fans, use a tie-down bolt and shim. (See *Figure 18* .)
- Size 66 -100 and plug fans use a tie-down angle and bolt. (See *Figure 19* .)

Figure 19
Shipping Angle and Isolator Tie-down Removal for Unit Sizes 66, 80 and 100 (Includes Plug Fans)



Remove the shipping tie-downs per the following instructions:

- 1 Shipping tie-downs are located at each corner of the isolation base. Access for removal of shipping spacer is available through the fan module access doors.
- 2 Remove the bolt. This will release the isolator and make it possible to remove the pipe or spacer.

Isolator Adjustment

Once the shipping tie-downs are removed and the internal isolation is released, it may be necessary to adjust the isolators to achieve the proper operation height of the fan and motor isolation base.

The isolators are bolted between the fan and motor isolation base. There are five designs based on unit size and fan type. Specific isolator clearances are listed in *Table 23*. The measurement is taken between the top of the floor panel (or support channel on sizes 66-100) and the bottom of the isolation base channel for all sizes.

Table 23
Isolator Minimum Clearance Adjustments (in)

Unit Size	Fan Type	Isolator Type	Req'd Clearance
3-8	FC	Rubber	1.0
3-8	FC	Spring	1.0
10-30	FC	Rubber	0.5
10-30	FC and BI	Spring	0.5
21-50	Plug	Spring	0.5
35-50	FC & AF	Spring	0.5
66-100	FC, AF & Plug	Spring	1.0

Set-Up

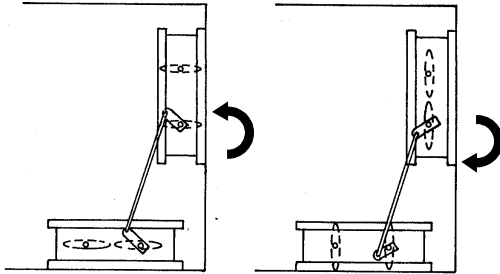
Once the T-Series Climate Changer is assembled and installed, attention must be directed to individual components for proper operation.

Dampers

(Including filter mixing sections, mixing sections, face and bypass dampers and Traq dampers)

Before installing the Mixing sections fitted with filter racks, be sure adequate clearance is provided to open the access doors and install the filters. Filter installation is explained in the section titled "Filter Installation."

Figure 20
Typical Mixing Box Configuration (sizes 3-100)s



actuators. The actuators should be sized according to the torques given in *Table 24*.

NOTE: MIXING SECTIONS, AND FACE AND BYPASS DAMPERS ARE DESIGNED, FOR THE DAMPER ACTUATORS TO BE DIRECT COUPLED AND INSTALLED IN THE AIR STREAM. IF OTHER PROVISIONS ARE REQUIRED, MODIFICATIONS TO THE SECTION WILL BE THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR.

Rods, Operators and Settings

The T-Series Climate Changer is available with factory mounted controls or end devices. If the unit is not ordered with controls or end devices, it is the responsibility of the installer to provide and install the Dampers are factory installed and adjusted. There are three damper blade configurations available: parallel blade, opposed blade, and Traq dampers.

Opposed and Parallel Dampers

Opposed and parallel dampers in units size 3 through 100 have an internal jack-shaft. See *Figure 21*. A 90° jack shaft rotation gives a 95° blade travel.

Figure 21
Typical Internal Face and Bypass Configuration

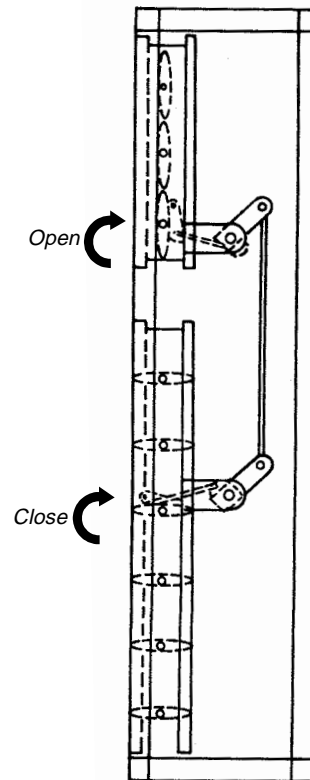


Table 24
Damper Torque at 1 in wg, Air Pressure Drop in lb-in

Unit Size	Mixing Box (Back and Bottom)	Internal Face and Bypass	Face Damper	Economizer Exhaust Side Mixing Box
3	8	10	9	6
6	14	15	14	9
8	16	24	19	12
10	38	41	25	16
12	43	44	33	19
14	44	59	35	23
17	65	64	45	26
21	66	79	53	30
25	85	95	62	36
30	101	112	65	44
35	138	90	95	52
40	148	100	106	60
50	162	136	144	76
66	218	201	181	103
80	245	230	224	122
100	307	291	284	151

Table 25
Torque and Force Required to Operate Inlet Vanes (FC, BI, and AF Fans) in lb-in

Unit Size	Fan Size	Fan Outlet Velocity			
		2000 FPM		3000 FPM	
		Open (Torque)	Close (Torque)	Open (Torque)	Close (Torque)
3	9 FC	N/A	N/A	N/A	N/A
6	12 FC	10.0	3.5	22.5	7.8
	10 FC	5.7	2.9	19.6	6.5
8	13 FC	10.9	3.9	24.5	8.7
	12 FC	10.0	3.5	22.5	7.8
	13 FC	10.9	3.9	24.5	8.7
10	15 FC	14.1	5.0	31.9	11.4

Table 25
Torque and Force Required to Operate Inlet Vanes (FC, BI, and AF Fans) in lb-in

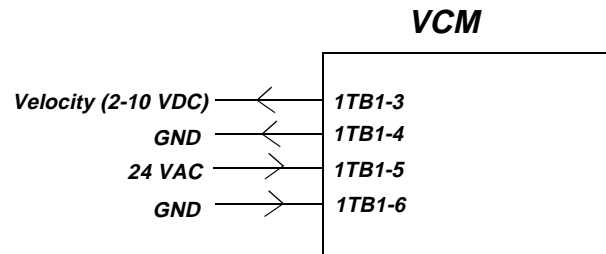
Unit Size	Fan Size	Fan Outlet Velocity			
		2000 FPM		3000 FPM	
		Open (Torque)	Close (Torque)	Open (Torque)	Close (Torque)
12	13BI	38.0	N/A	40.0	N/A
	15 FC	14.1	5.0	31.9	11.4
14	16 FC	18.0	6.4	40.5	14.4
	15 BI	38.0	N/A	40.0	N/A
17	16 FC	18.0	6.4	40.5	14.4
	18 FC	23.1	8.3	52.2	18.6
21	16 BI	44.0	N/A	50.0	N/A
	18 FC	23.1	8.3	52.2	18.6
	20 FC	24.0	9.0	54.0	19.5
25, 30	18 BI	54.0	N/A	60.0	N/A
	20 FC	24.0	9.5	54.0	19.5
	22 FC	25.0	9.5	56.0	21.0
35	20 BI	66.0	N/A	74.0	N/A
	22 FC	25.0	9.5	56.0	21.0
	25 FC	26.5	10.0	59.7	22.5
40	22 BI	90.0	N/A	100.0	N/A
	27 fc	115	46	200	104
	25 FC	26	1	59	22
50	24 FC	31	7	70	17
	30 FC	150	65	220	120
	27 FC	115	46	200	104
66	27 AF	46	11	103	25
	33 FC	215	100	310	180
	30 FC	150	65	220	120
80	30 AF	62	15	142	35
	33 FC	215	100	310	180
	36 AF	113	27	256	63
100	33 AF	84	20	189	46
	40 AF	100	62	216	140
	36 AF	113	27	256	63

Traq Dampers

Traq dampers are fitted in mixing sections in several possible configurations. These low leak dampers modulate and measure air flow.

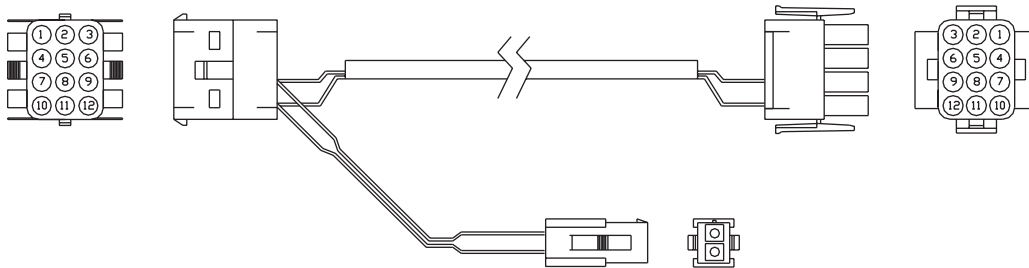
Each Traq damper section is supplied with a factory-mounted ventilation control module (VCM) on the interior of the mixing box. The VCM has an input terminal for power and an output terminal for air velocity. (See *Figure 22*.)

Figure 22
Traq Damper Terminal Connections.



The actuators, factory-mounted or field-supplied, are separately wired and controlled by a PCM or other building logic. *Figure 23* illustrates the typical quick connect scheme.

Figure 23
Typical Quick Connects with Wiring Identification



VCM (Transducer) Calibration

The VCM has an auto-zero function that recalibrates the transducer once every minute.

Input Power Signal

The only input signal the VCM needs is the 24 VAC power connected to terminals TB5 and TB6.

Output Velocity Signal

The 2 - 10 VDC linear output signal from the VCM represents air velocity. This voltage can be converted to represent cfm or L/s using the formula and *Table 26* following. For example, if the VCM on a Size 21 T-Series Climate Changer has a 10-volt signal, it would represent 16650 cfm (7859 L/s) through the Traq damper. If this voltage is 6 volts, air flow through the Traq damper would be 8325 cfm (3930 L/s).

Using the formulas

$$\text{cfm} = k (\text{cfm @ 10V}) [\text{volts}-2/8]$$

$$\text{L/s} = k (\text{L/s @ 10V}) [\text{volts}-2/8], \text{ and tables following}$$

TSC Size	cfm @ 10V	L/s @ 10V
3	2304	1087
6	4609	2175
8	4609	2175
10	6913	3263
12	10900	5145
14	10900	5145
17	10900	5145
21	16650	7859
25	10900	5145
30	24970	11786
35	24970	11786
40	24970	11786
50	34630	16345
66	46200	21806
80	57820	27291
100	69270	32695

For Traq Dampers, use the following table.

Table 26
VCM Voltage Versus Airflow - Traq Dampers (at Sea Level)

TSC Size	Side Installation		Back Installation	
	cfm @ 10V	L/s @ 10V	cfm @ 10V	L/s @ 10V
3	4609	2175	2304	1088
6	4609	2175	4609	2175
8	4609	2175	4609	2175
10	7400	3493	6913	3263
12	7400	3493	11100	5239
14	7400	3493	11100	5239
17	9218	4351	11100	5239
21	9218	4351	11563	5458
25	14800	6986	16965	8007
30	14800	6986	17344	8186
35	23126	10915	24970	11786
40	23091	10899	25447	12011
50	23126	10915	34636	16348
66	33929	16014	46181	21797
80	46181	21797	57727	27247
100	50894	24022	69272	32696

Altitude can be adjusted for using the following factors:

Elevation (ft)	"k"	Elevation (ft)	"k"
Sea Level	1.000	6000	0.897
1000	0.982	7000	0.876
2000	0.964	8000	0.860
3000	0.949	9000	0.846
4000	0.930	10000	0.825
5000	0.914		

Inlet Guide Vanes

Inlet guide vanes can be provided with factory mounted actuator motors when ordered with factory mounted controls or end devices. If actuators are not ordered factory mounted, it is the responsibility of the contractor to provide the actuator and all mounting hardware.

The Inlet guide vanes are designed for the actuators to be internally mounted in the fan section. Size the actuators based on operating torque requirements.

NOTE: TO PROVIDE EVEN TORQUE DISTRIBUTION AND RELIABLE VANE TRACKING, IT IS RECOMMENDED THAT TWO EQUALLY SIZED ACTUATORS BE MOUNTED ON EACH SIDE OF THE FAN HOUSING FOR UNIT SIZES 35, 50, 66, 80, AND 100.

BEFORE OPERATION, INSPECT THE VANE ASSEMBLY FOR FREEDOM OF MOVEMENT. IF RESISTANCE IS ABOVE THE TORQUES GIVEN IN TABLE 25 CHECK THE ASSEMBLY FOR ANY BINDING OR MISALIGNMENT. DO NOT FORCE THE VANES.

Duct Connections

All duct connections to the T-Series Climate Changer should be installed in accordance with the standards of the National Fire Protection Association(NFPA) for installing of air conditioning and ventilating systems other than residence type (NFPA 90A), and residence type warm air heating and air conditioning systems (NFPA 90B).

See unit submittal documentation for additional duct mounting information.

To ensure the highest fan efficiency, duct turns and transitions must be made carefully minimizing air friction losses and turbulence. Proper duct work

installation, as outlined by such organizations as SMACNA (Sheet Metal and Air Conditioning Contractors National Association, Inc.) should be adhered to.

Fan Discharge Connections

When using lined duct, the insulation should not obstruct the discharge opening. (See Figure 24 .)

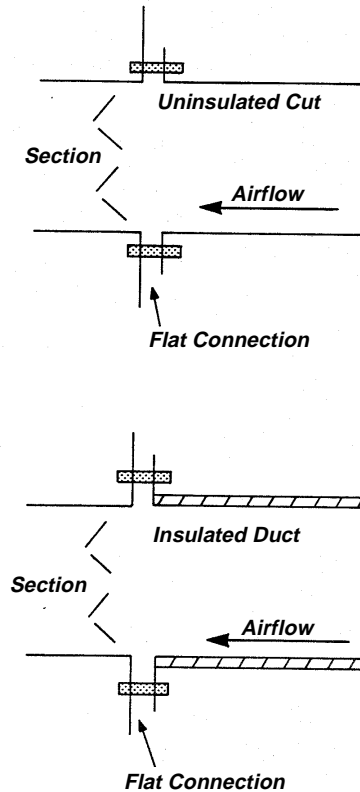
Connections made directly to the discharge opening of the fan should have a minimum of 3 fan diameters of straight duct before any turns or transitions. The first turn of the connection should be in the same direction as the fan rotation. The air that the fan discharges into the duct is extremely turbulent and requires some length of duct to stabilize. Abrupt changes in duct work directly off the fan discharge will affect fan performance.

Damper Sections

Standard damper sections include mixing sections, filter mixing sections, face damper sections, internal face and bypass sections, and economizer sections.

Duct work attached to the standard damper sections should be sized to fit the opening of the damper. This information is provided in the submittals. When using lined duct, ensure that the insulation does not obstruct the damper opening. (See Figure 24 .)

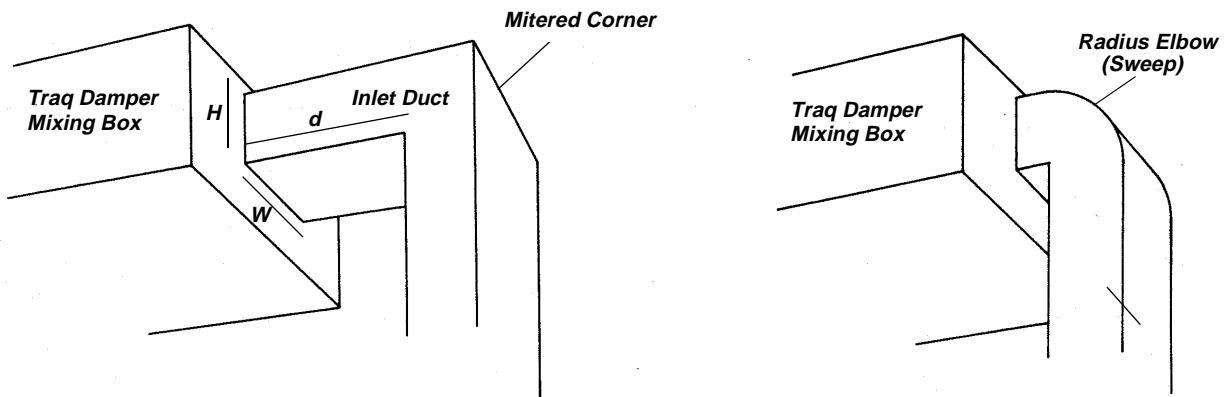
Figure 24
Typical Section with Duct Flat/Flange Connections



Traq Dampers

Traq dampers are installed in mixing sections. Size the duct connection to attach to the specified portion on the face of the section. (See Figure 25 .)

Figure 25
Traq Damper Duct Connections



$$d = 1 \text{ hydraulic duct diameter} = \frac{2 \times W \times H}{W + H}$$

Discharge Plenum

Discharge plenum sections are available with or without openings. Sections with openings have a framed opening that can be used to secure the duct to the frames. If the duct is lined, it is important that the insulation does not obstruct the opening of the section.

Miscellaneous Sections

Miscellaneous sections include access sections, coil sections, fan sections and intake sections.

If the duct is lined, it is important that the insulation does not obstruct the opening of the section.

Internal Face and Bypass

Duct connections for internal face and bypass damper sections are similar to the miscellaneous sections. Duct work can be attached directly to this frame.

Drain Pan

Piping

Condensate Drain Pan Connections

CAUTION

Failure to provide adequate condensate piping may result in water damage to the equipment and or building.

Threaded condensate drain connections are provided on only one side of the coil section. Pitch the connection lines horizontal or downward toward an open drain. Trane recommends installing a plug to facilitate cleaning of the trap.

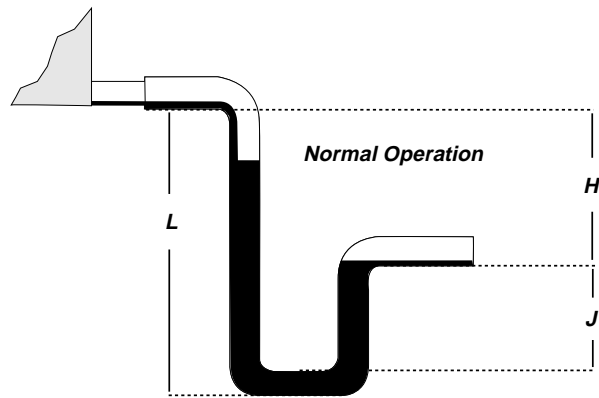
IMPORTANT: PROPER TRAPPING OF THE COOLING COIL CONDENSATE DRAIN LINES IS NECESSARY FOR PROPER CONDENSATE MANAGEMENT. IMPROPER TRAPPING CAN RESULT IN STANDING WATER INSIDE THE UNIT OR WET INTERIOR SURFACES THAT CAN CAUSE UNPLEASANT ODORS AND SERIOUS HEALTH-RELATED INDOOR AIR QUALITY PROBLEMS.

It is essential that the drain pan condensate trap be deep enough and of the correct design to ensure a water seal in the trap while allowing the condensate pan to drain. Insufficient depth or incorrect design can cause the drain pan to overflow.

NOTES: THE DRAIN CONNECTION SIZE IS 1" NPT EXTERNAL FOR UNIT SIZES 3 THROUGH 30; 1-1/2" NPT EXTERNAL FOR UNIT SIZES 35, 40, 50; 1-1/4" INTERNAL THREADS ON SIZES 66, 80, 100.

DRAIN PANS MUST BE PRIMED AT START-UP TO OPERATE PROPERLY.

Figure 26
Drain Pan Trapping for Section under Negative Pressure

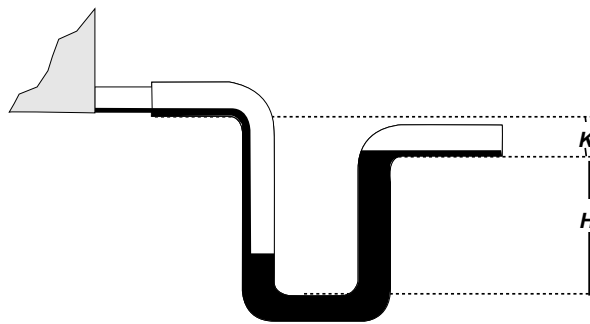


$$H = (1'' \text{ for each } 1'' \text{ of maximum negative pressure}) + 1''$$

$$J = 1/2 H$$

$$L = H + J + \text{Pipe Diameter} + \text{Insulation}$$

Figure 27
Drain Pan Trapping for Section under Positive Pressure



$$K = \text{min. } 1/2''$$

$$H = 1/2'' \text{ plus maximum total static pressure}$$

Negative Pressure Section

Trap the drain pan as illustrated in *Figure 26*, which also illustrates the proper piping as well as the operation of the trap. Use the formula given in *Figure 26* to determine the correct minimum depth for the condensate trap.

Positive Pressure Section

The positive pressure section requires a different design than the negative pressure trap. Refer to *Figure 27* and the formula provided to determine the minimum trap depth.

Units With More Than One Drain Pan

With the T-Series Climate Changer, each section can be ordered with or without a drain pan. When more than one section has a drain pan, you must trap each section individually. Connecting all drains to a common line with only one trap will result in condensate retention, and possible water damage to the air handler or adjoining space.

If a section has a drain pan for cleaning purposes only, it does not need a trap; however a cap or shut off valve should be installed on the drain connection. Only sections handling condensate, such as a cooling coil section or eliminator section, require a trap. *Figure 28* through *Figure 37* are examples of typical installations.

Coil Piping And Connections

See *Table 27* through *Table 29* for connection sizes. For supply, vent and drain connections, refer to *Figure 28* through *Figure 37*.

NOTE: DRAIN AND VENT CONNECTIONS ARE PROVIDED AS STANDARD ON UW, UU, DD, AND D COILS ONLY. ALL OTHERS, IF REQUIRED, MUST BE FIELD INSTALLED.

NOTE: DRAIN AND VENT CONNECTIONS ON THE UU AND UW COILS ARE RECESSED. IF EXTENDED DRAINS AND VENTS ARE REQUIRED, THEY MUST BE FIELD PROVIDED.

General Coil Piping Recommendations

Proper installation, piping and trapping is necessary to ensure satisfactory coil operation and to prevent operational damage.

- Support all piping independently of the coils.
- Provide swing joints or flexible fittings on all connections that are adjacent to heating coils in order to absorb thermal expansion and contraction strains.
- If ordered with factory mounted controls, install the control valves. The valves ship separately in

Table 27
Shipping Coil Water and Steam Connection Sizes

Coil Type	Header Height	Supply	Return	Drain/Vent
W, WA	18, 24, 30, 33	2-1/2	2-1/2	1/2
W	42, 48, 54	2-1/2	2-1/2	1/2
D, DD, WD, K	18, 24, 30, 33	2-1/2	2-1/2	1/2
P2	18, 24, 30	3/4	3/4	1/2

the unit. The contractor should supply the pipe nipples, couplings, etc. for installation.

NOTE: WHEN USING ELECTRONIC VALVE ACTUATORS ON CHILLED WATER VALVES, THE VALVE SHOULD BE MOUNTED ABOVE THE HORIZONTAL POSITION TO PREVENT COLLECTION OF CONDENSATE IN THE ACTUATOR ELECTRONIC CIRCUITS AND SUBSEQUENT ACTUATOR FAILURE.

WHEN USING ELECTRONIC VALVE ACTUATORS ON HOT WATER OR STEAM COILS, THE ACTUATOR SHOULD BE INSTALLED APPROXIMATELY 45 DEGREES FROM VERTICAL. VERTICAL INSTALLATION OF A VALVE ACTUATOR ON A HOT WATER OR STEAM COIL WILL EXPOSE THE ACTUATOR TO HIGH TEMPERATURES, RESULTING IN ACTUATOR FAILURE.

THE EXTERNAL CABINET IS ONLY SUFFICIENTLY SIZED FOR HOUSING COIL PIPING. ALL VALVES AND VALVE ACTUATORS MUST BE LOCATED ELSEWHERE.

For best results, The Trane Company recommends that a short pipe nipple be used on the coil headers prior to making any welded flange or welded elbow type connections.

IMPORTANT: TEFLON TAPE OR PIPING COMPOUND SHOULD NOT BE USED FOR ANY FIELD CONNECTIONS BECAUSE ITS HIGH LUBRICITY MAY ALLOW CONNECTIONS TO BE OVER-TIGHTENED, RESULTING IN DAMAGE TO THE COIL HEADER.

NOTE: USE A BACK-UP WRENCH WHEN ATTACHING PIPING TO COILS WITH TUBE HEADER CONSTRUCTION TO PREVENT DAMAGE TO THE COIL HEADER. DO NOT USE BRASS CONNECTORS. BRASS DISTORTS EASILY AND COULD CAUSE CONNECTION LEAKS.

When attaching the piping to the coil header, make the connection only tight enough to prevent leaks. Maximum recommended torque is 200 pound-feet.

Use pipe sealer on all thread connections.

After completing the piping connections, use mastic to seal between the pipe and casing before insulating the pipe.

Table 27
Shipping Coil Water and Steam Connection Sizes

Coil Type	Header Height	Supply	Return	Drain/Vent
P4	18, 24, 30	1	1	1/2
P8	18, 24, 30	1-1/4	1-1/4	1/2
WC	18	1	1	1/2
WC	24	1-1/4	1-1/4	1/2
WC	30, 33	2-1/2	1-1/2	1/2
NS	18	2	1	1
NS	24	2-1/2	1-1/4	1-1/4
NS	30, 33	3	1-1/4	1-1/4

Table 28
UF Refrigerant Coil Connections (Inches)

Unit Size	Header Height	Rows	Dist. Tube	No. Circuits	Circuiting	1 Distributor		2 Distributors		4 Distributors	
						Liquid	Suction	Liquid	Suction	Liquid	Suction
3	21	4, 6, 8	1/4	16	Full			1-1/8	1-5/8		
			3/16	16				1-1/8	1-5/8		
		4, 6	1/4	8	Half	1-1/8	1-5/8	7/8	1-3/8		
			3/16	8		1-1/8	1-5/8	5/8	1-3/8		
		4	1/4	4	Qtr.	7/8	1-3/8	7/8	1-3/8		
			3/16	4		5/8	1-3/8	5/8	1-3/8		
6	23	4, 6, 8	1/4	18	Full			1-1/8	1-5/8		
			3/16	18				1-1/8	1-5/8		
		4, 6	1/4	9	Half	1-1/8	1-5/8	7/8	1-3/8		
			3/16	9		1-1/8	1-5/8	Note 1	1-3/8		
		4	1/4	4	Qtr.	7/8	1-3/8	7/8	1-3/8		
			3/16	4		5/8	1-3/8	5/8	1-3/8		
8,10	27	4, 6, 8	1/4	21	Full			Note 2	1-5/8		
			3/16	21				1 1/8	1-5/8		
		4, 6	1/4	10	Half	1-1/8	1-5/8	7/8	1-3/8		
			3/16	10		1-1/8	1-5/8	7/8	1-3/8		
		4	1/4	5	Qtr.	7/8	1-3/8	7/8	1-3/8		
			3/16	5		7/8	1-3/8	5/8	1-3/8		
12	32	4, 6, 8	1/4	25	Full			1-3/8	1-5/8		
			3/16	25				1-1/8	1-5/8		
		4, 6	1/4	12	Half	1-3/8	1-5/8	1-1/8	1-3/8		
			3/16	12		1-1/8	1-5/8	7/8	1-3/8		
		4	1/4	6	Qtr.	1-1/8	1-5/8	7/8	1-3/8		
			3/16	6		7/8	1-3/8	5/8	1-3/8		
14	35	4, 6, 8	1/4	27	Full			1-3/8	1-5/8		
			3/16	27				1 1/8	1-5/8		
		4, 6	1/4	13	Half	1-3/8	1-5/8	1 1/8	1-3/8		
			3/16	13		1-1/8	1-5/8	7/8	1-3/8		
		4	1/4	6	Qtr.	1-1/8	1-5/8	7/8	1-3/8		
			3/16	6		7/8	1-3/8	5/8	1-3/8		
17	37	4, 6, 8	1/4	29	Full					1-1/8	Note 3
			3/16	29						Note 4	Note 3
		4, 6	1/4	14	Half			1-1/8	1-3/8		
			3/16	14				7/8	1-3/8		

Table 28
UF Refrigerant Coil Connections (Inches)

Unit Size	Header Height	Rows	Dist. Tube	No. Circuits	Circuiting	1 Distributor		2 Distributors		4 Distributors	
						Liquid	Suction	Liquid	Suction	Liquid	Suction
21	45	4, 6, 8	1/4	35	Full					1-1/8	1-5/8
			3/16	35						1-1/8	1-5/8
		4, 6	1/4	17	Half			1-1/8	1-5/8	7/8	1-3/8
			3/16	17				1-1/8	1-5/8	Note 5	1-3/8
25,30	51	4, 6, 8	1/4	40	Full					1-1/8	1-5/8
			3/16	40						1 1/8	1-5/8
		4, 6	1/4	20	Half			1-1/8	1-5/8	7/8	1-3/8
			3/16	20				1-1/8	1-5/8	7/8	1-3/8

Notes:

Number of connections - Size (Inches)

1. 1- 5/8, 1- 7/8

2. 1-1 1/8 and 1-1 3/8

3. 3-1 3/8 and 1-1 5/8

4. 3-7/8 and 1-1 1/8

5. 3-5/8 and 1-7/8

Table 29
UF Refrigerant Coil Connections (Inches)

Unit Size	Header Height	Rows	Dist. Tube	No. Circuits	Circuiting	2 Distributors		4 Distributors		8 Distributors	
						Liquid	Suction	Liquid	Suction	Liquid	Suction
35,40	57	4, 6, 8	1/4	45	Full			1-3/8	1-5/8		
			3/16	45				1-1/8	1-5/8		
		4, 6	1/4	22	Half	1-3/8	1-5/8	Note 1	1-3/8		
			3/16	22		1-1/8	1-5/8	7/8	1-3/8		
50	2-32	4, 6, 8	1/4	50	Full			1-3/8	1-5/8		
			3/16	50				1-1/8	1-5/8		
		4, 6	1/4	24	Half	1-3/8	1-5/8	1-1/8	1-3/8		
			3/16	24		1-1/8	1-5/8	7/8	1-3/8		
66	2-37	4, 6, 8	1/4	58	Full					1-1/8	Note 2
			3/16	58						Note 3	Note 2
		4	1/4	29	Half			1-1/8	1-3/8		
			3/16	29				7/8	1-3/8		
80	2-45	4, 6, 8	1/4	70	Full					1-1/8	1-5/8
			3/16	70						1-1/8	1-5/8
		4	1/4	35	Half			1-1/8	1-5/8	7/8	1-3/8
			3/16	35				1-1/8	1-5/8	Note 4	1-3/8
100	2-51	4, 6, 8	1/4	80	Full					1-1/8	1-5/8
			3/16	80						1-1/8	1-5/8
		4, 6	1/4	40	Half			1-1/8	1-5/8	7/8	1-3/8
			3/16	40				1-1/8	1-5/8	7/8	1-3/8

Notes:

Number of connections - Size (Inches):

1. 2-7/8, 2-1-1/8

2. 6-1 3/8 and 2-1-5/8

3. 6-7/8 and 2-1-1/8

4. 6-5/8 and 2-7/8

Figure 28
Coil Type UW 2-Row RH and LH Small Coil Section
Connections with Drain and Vent Locations

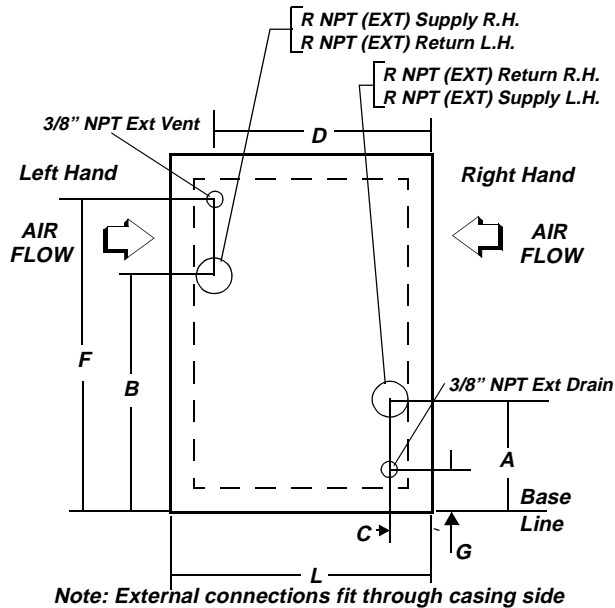


Table 30
2-Row UW Coil Dimensions

Unit Size	L	A	B	C	D	F	G	R
3	11	10-9/16	13-11/16	4-1/2	6-1/2	21-5/8	2-5/8	1-1/2
6	11	12-1/16	14-3/16	4-1/2	6-1/2	24-5/8	2-5/8	1-1/2
8	11	13-15/16	17-1/16	4-1/2	6-1/2	26-3/8	2-5/8	1-1/2
10	11	13-15/16	17-1/16	4-1/2	6-1/2	26-3/8	2-5/8	1-1/2
12	11	16-7/16	19-9/16	4-1/4	6-3/4	33-3/8	2-5/8	2
14	11	13-15/16	20-13/16	4-1/4	6-3/4	25-7/8	2-5/8	2
17	11	18-15/16	22-1/16	4-1/4	6-3/4	38-3/8	2-5/8	2
21	11	20-5/8	25-3/4	3-3/4	7	42-1/8	2-5/8	2-1/2
25	11	25-3/4	26-7/8	3-3/4	7	45-1/4	2-5/8	2-1/2
30	11	25-3/4	26-7/8	3-3/4	7	45-1/4	2-5/8	2-1/2
35	11-1/2	29-7/16	30-9/16	4-3/8	7-1/8	58-3/4	3-5/32	2-1/2
40	11-1/2	29-7/16	30-9/16	4-3/8	7-1/8	58-3/4	3-5/32	2-1/2

Figure 29
Coil Type UW 2-Row RH and LH Medium Coil Section Connections with Drain and Vent Location

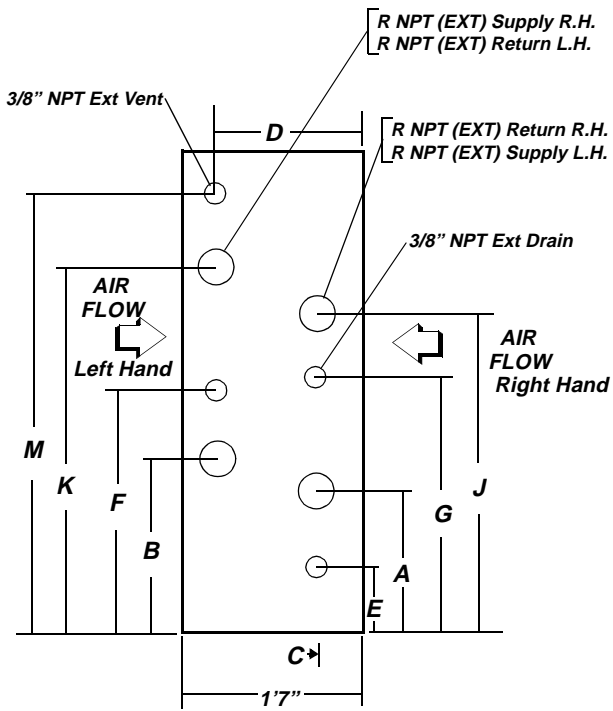


Table 31
2-Row UW Coil Dimensions

Unit Size	A	B	C	D	E	F	G	J	K	M	R
50	18-7/8	19-3	5-1/2	7-25/32	5-1/8	35-1/2	39-1/8	52-7/8	55-3/4	69-1/2	2
66	27-3/4	30-7/8	5-1/2	7-25/32	11-1/2	47-1/8	50-1/2	66-3/4	69-7/8	96-1/8	2
80	31-1/2	34-5/8	5-1/2	8-1/16	11-1/2	54-5/8	58	78	81-1/8	101-1/8	2-1/2
100	34-5/8	37-3/4	5-1/2	8-1/16	11-1/2	60-7/8	64-1/4	87-3/8	90-1/2	113-5/8	2-1/2

Figure 30

Coil Type UU 4 and 8-Row and UW 4, 6, and 8-Row, RH and LH Medium Coil Connections with Drain and Vent Locations (Unit Sizes 3 - 40).

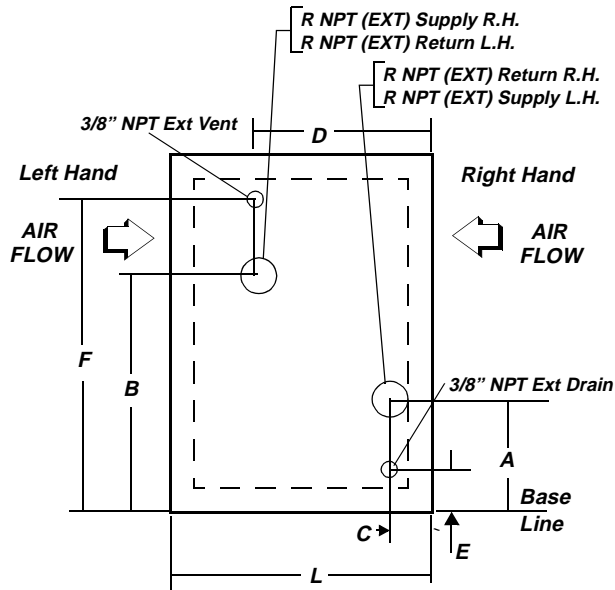


Table 32
2-Row UW Coil Dimensions

Unit Size	L	A	B	C	D	F	G	R
3	11	10-9/16	13-11/16	4-1/2	6-1/2	21-5/8	2-5/8	1-1/2
6	11	12-1/16	14-3/16	4-1/2	6-1/2	24-5/8	2-5/8	1-1/2
8	11	13-15/16	17-1/16	4-1/2	6-1/2	26-3/8	2-5/8	1-1/2
10	11	13-15/16	17-1/16	4-1/2	6-1/2	26-3/8	2-5/8	1-1/2
12	11	16-7/16	19-9/16	4-1/4	6-3/4	33-3/8	2-5/8	2
14	11	13-15/16	20-13/16	4-1/4	6-3/4	25-7/8	2-5/8	2
17	11	18-15/16	22-1/16	4-1/4	6-3/4	38-3/8	2-5/8	2
21	11	20-5/8	25-3/4	3-3/4	7	42-1/8	2-5/8	2-1/2
25	11	25-3/4	26-7/8	3-3/4	7	45-1/4	2-5/8	2-1/2
30	11	25-3/4	26-7/8	3-3/4	7	45-1/4	2-5/8	2-1/2
35	11-1/2	29-7/16	30-9/16	4-3/8	7-1/8	58-3/4	3-5/32	2-1/2
40	11-1/2	29-7/16	30-9/16	4-3/8	7-1/8	58-3/4	3-5/32	2-1/2

Table 33
UW 4, 6, and 8-Row, RH and LH Medium Coil Dimensions in inches

UW Coil Section								
Unit Size	L	A	B	C	D			R
					4 ROW	6 ROW	8 ROW	
3	15-1/2	10-9/16	13-11/16	3-15/16	7-3/16	9-5/16	11-9/16	1-1/2
6	15-1/2	12-1/6	15-3/16	3-15/16	7-3/16	9-5/16	11-9/16	1-1/2
8	15-1/2	13-15/16	17-1/16	3-15/16	7-3/16	9-5/16	11-9/16	1-1/2
10	15-1/2	13-15/16	17-1/16	3-15/16	7-3/16	9-5/16	11-9/16	1-1/2
12	15-1/2	16-7/16	19-9/16	3-15/16	7-3/16	9-5/16	11-9/16	2
14	15-1/2	17-11/16	20-13/16	3-15/16	7-3/16	9-5/16	11-9/16	2
17	15-1/2	18-15/16	22-1/6	3-15/16	7-3/16	9-5/16	11-9/16	2
21	15-1/2	22-5/8	25-3/4	3-15/16	7-3/16	9-5/16	11-9/16	2-1/2
25	15-1/2	25-3/4	28-7/8	3-15/16	7-3/16	9-5/16	11-9/16	2-1/2
30	15-1/2	25-3/4	28-7/8	3-15/16	7-3/16	9-5/16	11-9/16	2-1/2
35	16	32-9/16	29-7/16	4-3/16	7-7/16	9-5/8	11-13/16	2-1/2
40	16	32-9/16	29-7/16	4-3/16	7-7/16	9-5/8	11-13/16	2-1/2

Table 34
UU 4 and 8-Row RH and LH Medium Coil Connection Dimensions in inches

UU Coil Section						
Unit Size	C	D		R	E	F
		4 ROW	8 ROW			
3	N/A	N/A	N/A	N/A	2-5/8	21-5/8
6	N/A	N/A	N/A	N/A	2-5/8	24-5/8
8	N/A	N/A	N/A	N/A	2-5/8	28-3/8
10	N/A	N/A	N/A	N/A	2-5/8	28-3/8
12	4-1/2	6-5/8	11	2-1/2	2-5/8	31-3/8
14	4-1/2	6-5/8	11	2-1/2	2-5/8	35-7/8
17	4-1/2	6-5/8	11	2-1/2	2-5/8	38-3/8
21	4-1/2	6-5/8	11	2-1/2	2-5/8	42-1/4
25	4-1/2	6-5/8	11	2-1/2	2-5/8	45-1/4
30	4-1/2	6-5/8	11	2-1/2	2-5/8	45-1/4
35	4-3/4	6-15/16	11-1/4	2-1/2	3-3/16	58-13/16
40	4-3/4	6-15/16	11-1/4	2-1/2	3-3/16	58-13/16

Figure 31

Coil Type UU 4 and 8-Row & UW 4, 6, and 8-Row RH and LH Medium Coil Section Connections (Unit Sizes 50 - 100) with Drain and Vent Location

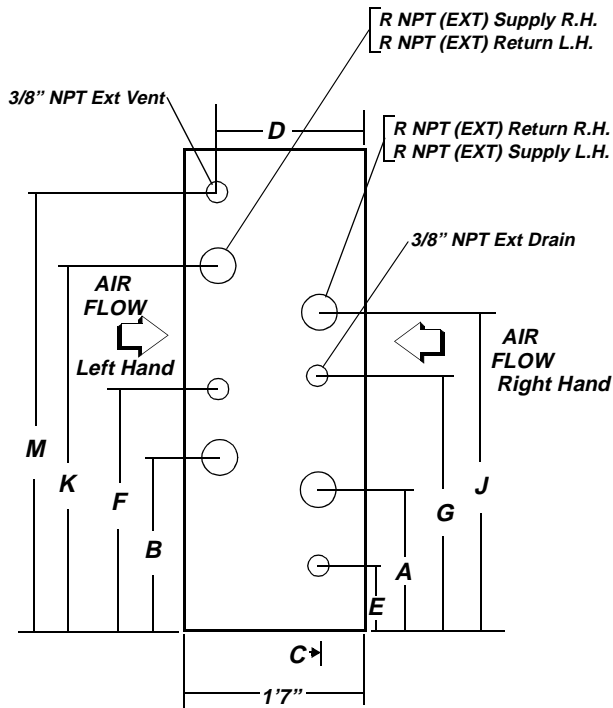


Table 35

Coil Type UU 4 and 8-Row & UW 4, 6, and 8-Row RH and LH Medium Coil Section Connections Dimensions in inches

Unit Size	A	B	E	F	G	J	K	M	R
50	18-3/4	21-7/8	60	35-5/8	39	52-3/4	55-7/8	69-5/8	2
66	27-3/4	30-7/8	11-1/2	47-1/8	50-1/2	66-3/4	69-7/8	74-1/8	2
80	31-1/2	34-5/8	11-1/2	54-5/8	58	42	81-1/8	101-1/8	2-1/2
100	34-11/16	37-3/4	11-1/2	60-11/16	64-1/4	87-3/8	90-7/16	113-5/8	2-1/2

Table 36

Coil Type UU 4 and 8-Row & UW 4, 6, and 8-Row RH and LH Medium Coil Drain and Vent Location Dimensions in inches

Unit Size	UW COIL SECTION				UU COIL SECTION		
	C	D			C	D	
		4 ROW	6 ROW	8 ROW		4 ROW	8 ROW
50	5-1/8	8-3/8	10-1/2	12-11/16	5-5/8	7-13/16	12-1/8
66	5-1/8	8-3/8	10-1/2	12-11/16	5-5/8	7-13/16	12-1/8
80	5-1/ (130.2)	8-3/8	10-1/2	12-11/16	5-5/8	7-13/16	12-1/8
100	5-1/8	8-3/8	10-1/2	12-11/16	5-5/8	7-13/16	12-1/8

Figure 32
Coil Type WC-24" Headers with Drain and Vent Locations

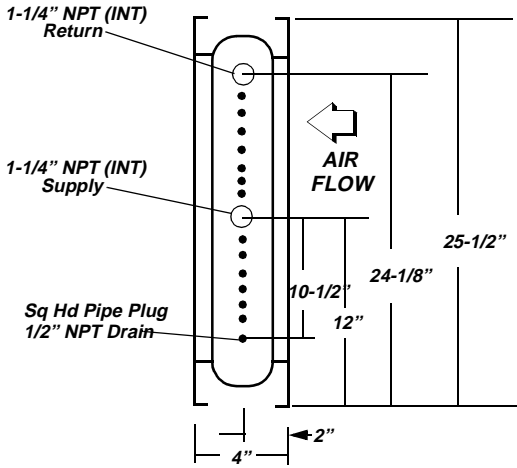


Figure 33
Coil Type P2, 18, 24" Headers with Drain and Vent Locations

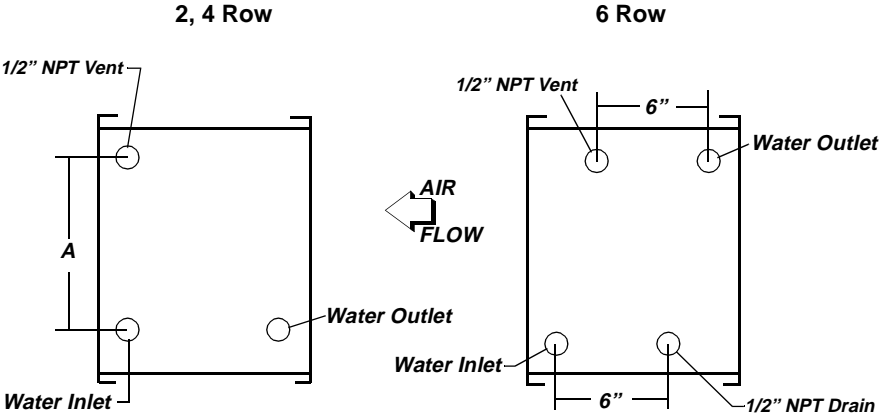


Table 37
Coil Type P2, 18, 24" Headers Dimensions (in)

Header	A
18	16.5
24	22.5

Figure 34
Coil Type P4, 18, 24" Headers with Drain and Vent Location

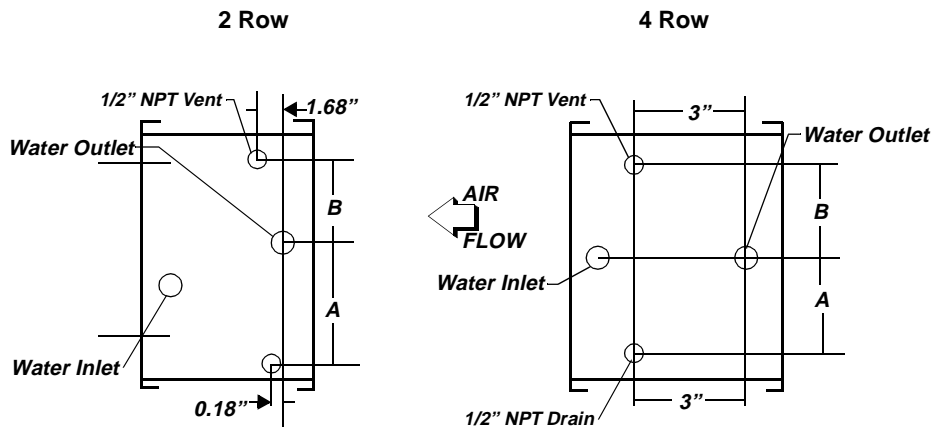


Table 38
Coil Type P4, 18, 24" Headers Dimensions (2-Row) in inches

Header	A	B
18	10.5	6
24	13.5	9

Table 39
Coil Type P4, 18, 24" Headers Dimensions (4-Row) in inches

Header	A	B
18	7.5	9
24	10.5	12

Figure 35
Coil Type P4, 18, 24" Headers with Drain and Vent Location (6 and 8 Row)

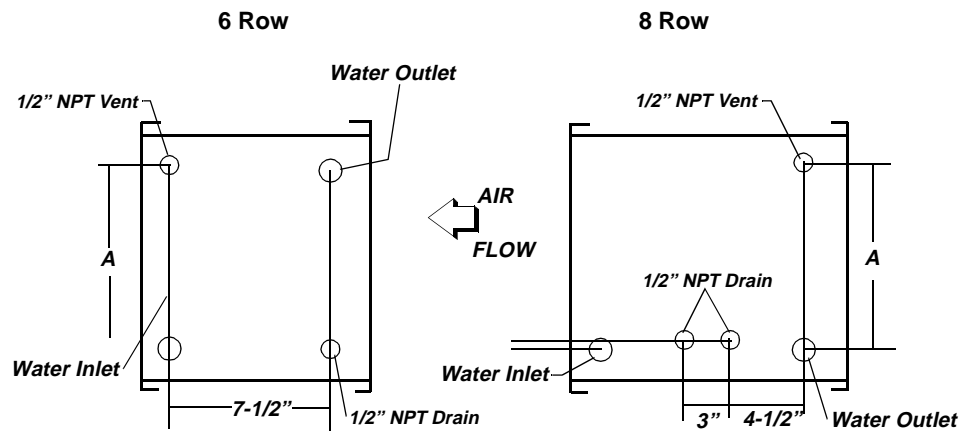


Table 40
Coil Type P4, 18, 24" Headers with Drain and Vent Location (8 Row) Dimensions in inches

Header	A
18	16.5
24	22.5

Figure 36
Coil Type P8, 18, 24" Headers with Drain and Vent Locations

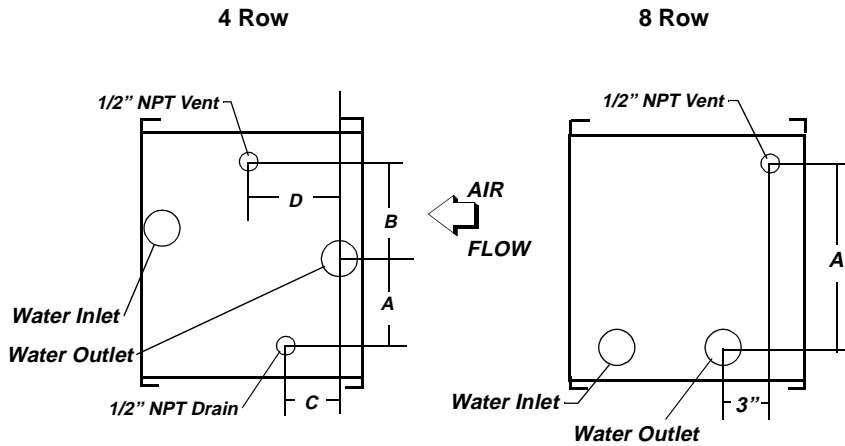


Table 41
Coil Type P8, 18, 24" Headers (4-Row) Dimensions in inches

Header	A	B	C	D
18	7.5	9	1.2	1.2
24	10.5	12	0	4.5
30	13.5	15	1.2	1.2

Table 42
Coil Type P8, 18, 24" Headers (8-Row) Dimensions in inches

Header	A
18	16.5
24	22.5
30	28.5

Figure 37
Coil Type W with 18, 24, 30 and 33" Headers and with Drain and Vent Locations

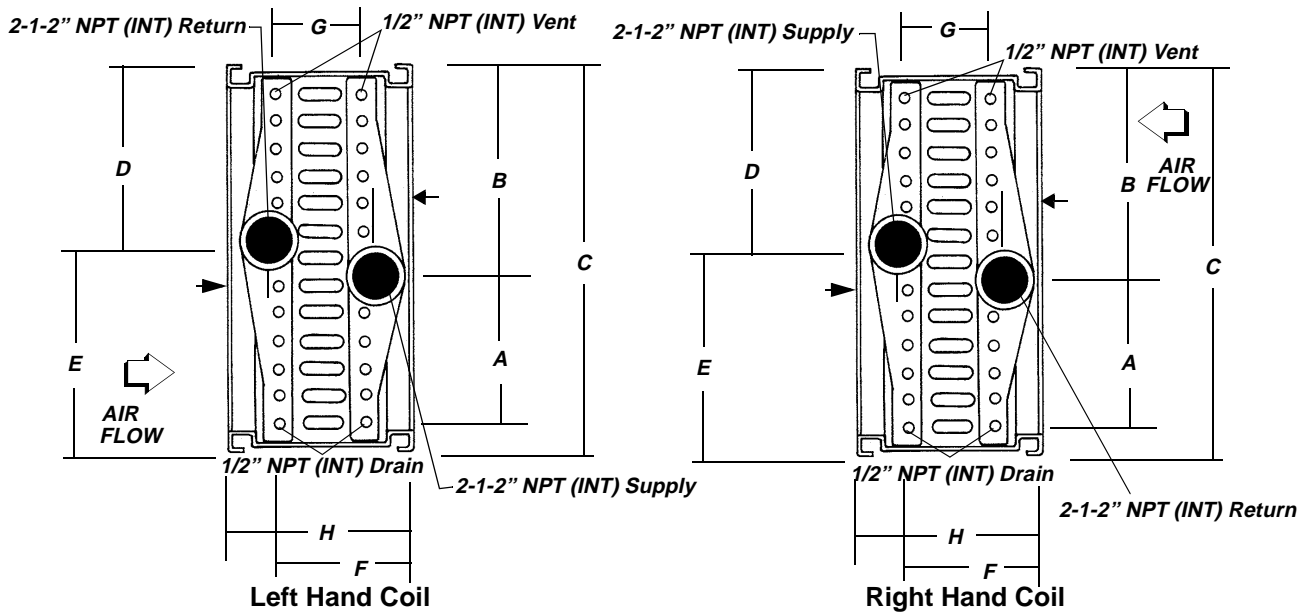


Table 43

Coil Type W with 18, 24, 30 and 33" Headers and with Drain and Vent Locations Dimensions in inches

Coil Size	2-Row				4-Row		6-Row		8-Row				
	A	B	C	D	E	H	F	H	F	H	F		
18	6-3/4	9-3/4	19-1/2	8-1/4	11-1/4	6-1/2	4	9-1/2	7	12-1/2	10	15-1/2	13
24	9-3/4	12-3/4	25-1/2	11-1/4	14-1/4	6-1/2	4	9-1/2	7	12-1/2	10	15-1/2	13
30	12-3/4	15-3/4	31-1/2	14-1/4	17-1/4	6-1/2	4	9-1/2	7	12-1/2	10	15-1/2	13
33	14-1/4	17-1/4	34-1/2	15-3/4	18-3/4	6-1/2	4	9-1/2	7	12-1/2	10	15-1/2	13

Note: Coil Connections available right or left hand (determined by facing into air flow)

Table 44

Coil Type W Coil Connections (Left and Right Hand) in inches

Header	G
3	3
4	4.5
6	7.5
8	10.5

NOTE: THE PIPING PENETRATION INTO THE UNIT CASING MUST BE SEALED BEFORE INSULATING. FAILURE TO SEAL THE PENETRATION WILL PERMIT INFILTRATION OF UNCONDITIONED AIR INTO THE SECTION.

When subjected to freezing temperatures, provisions must be made to protect coils that are not in use. See section titled "Coil Winterization."

NOTE: IF GLYCOL IS USED IN THE CHILLED WATER OR HOT WATER SYSTEMS, BE SURE TO USE A GLYCOL APPROVED FOR USE WITH COMMERCIAL COOLING SYSTEMS AND COPPER TUBE COILS. FOLLOW THE MANUFACTURER'S RECOMMENDATIONS FOR WATER TREATMENT AND MIX. FAILURE TO DO SO COULD AFFECT COIL PERFORMANCE OR DAMAGE THE TUBES OR BRAZE JOINTS.

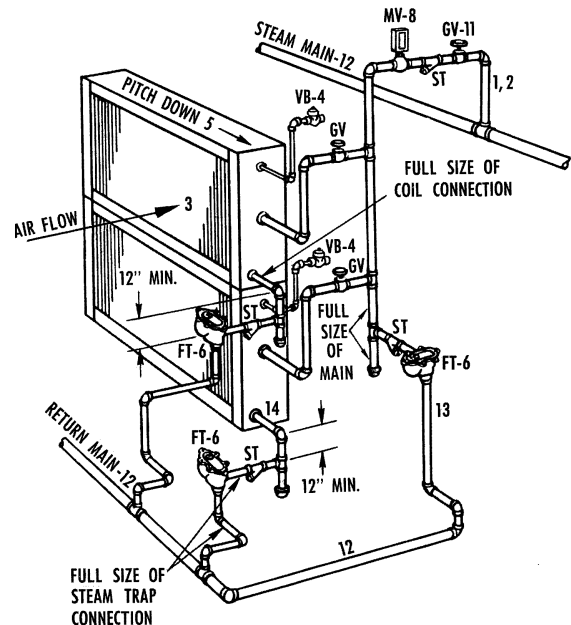
Coils should be installed with field fitted drains and vents to permit winterization of coils not in use, and to assist in evacuating air from the chilled water system during start-up.

⚠ CAUTION

Failure to properly protect coils not in use during freezing temperatures may result in coil freeze-up damage. Refer to the section titled "Coil Winterization" for specific instructions.

Steam Coil Piping

Figure 38
Typical Piping for Type NS Steam Coils and Horizontal Tubes for Horizontal Airflow



Code of System Components (Piping Diagrams)	
FT	Float and thermostatic steam trap
BT	Bucket steam trap
GV	Gate valve
OV	Automatic two-position (on-off) control valve
TV	Automatic three-way control valve
VB	Vacuum breaker
CV	Check valve
ST	Strainer
AV	Automatic or manual air vent

T-Series Climate Changers fitted with steam coils have labeled holes for piping penetrations. Check that the coil is installed correctly and that the unit installation agrees with the submittals.

Refer to *Figure 38* for typical steam coil piping.

CAUTION

Condensate must flow freely from the coil to prevent coil damage from water hammer, unequal thermal stresses, freeze-up damage and corrosion. Complete the following recommendations to prevent damage:

- 1 Install a 1/2" 15 swing-check vacuum breaker in the unused condensate return connection at the top of the coil. This vacuum breaker should be installed as close to the coil as possible.
- 2 Vent the vacuum breaker to the atmosphere or pipe it to the return main at the discharge side of the steam trap.

NOTE: VACUUM BREAKER RELIEF IS MANDATORY WHEN THE COIL IS CONTROLLED BY A MODULATING STEAM SUPPLY OR TWO-POSITION (ON-OFF) AUTOMATIC STEAM SUPPLY VALVE. VACUUM BREAKER RELIEF IS ALSO RECOMMENDED WHEN FACE AND BYPASS CONTROL IS USED.

CAUTION

The 1/2" 15 swing-check vacuum breaker is recommended because of the low cracking pressure of 3- to 5-inches of water. Some other vacuum breakers, such as spring loaded ball-check vacuum breakers, have cracking pressures as high as 17-inches of water. Substitution of the 1/2" 15 swing-check vacuum breaker could result in damage to the coil by preventing proper evacuation of condensate from the coil.

The coil condensate return line must be piped full size of the condensate trap connection, except for a short nipple screwed directly into the coil headers condensate return tapping. Do not bush or reduce the coil return tapping size.

Proper steam trap selection and installation is necessary for satisfactory coil performance and service life. For installation, use the following steps:

- 1 Install the steam trap discharge 12 inches below the condensate return connection. 12 inches provides sufficient hydrostatic head pressure to overcome trap losses and ensures complete condensate removal.
 - * Use float and thermostatic traps with atmospheric pressure gravity condensate return, with automatic controls or where the possibility of low pressure supply steam exists. Float and thermostatic traps are recommended because of gravity drain and continuous discharge operation.
 - * Use bucket traps ONLY when the supply steam is not modulated and 25 psig or higher.
- 2 Trap each coil separately to prevent holding up condensate in one or more of the coils.
- 3 Install strainers as close as possible to the inlet side of the trap.
- 4 If installing coils in series airflow, control each coil bank independently with a automatic steam control valve. Size the traps for each coil using the capacity of the first coil in direction of airflow.
- 5 Use a V-Port modulating valve to obtain gradual modulation of the coil steam supply.
- 6 Do not modulate systems with overhead or pressurized returns unless the condensate is drained by gravity into a receiver, vented to atmosphere and returned to the condensate pump.
- 7 Slowly turn the steam on full for at least 10 minutes before opening the fresh air intake on units with fresh air dampers.
- 8 Pitch all supply and return steam piping down 1-inch per 10 feet in the direction of the steam or condensate flow.
- 9 Do not drain the steam mains or take-offs through the coils. Drain the mains ahead of the coils through a steam trap to the return line.
- 10 Assure continuous condensate removal. Overhead returns require 1 psig of pressure at the steam trap discharge for each 2-foot elevation.

Hot Water Coil Piping

Figure 39
Typical Piping for Type WC Water Coil

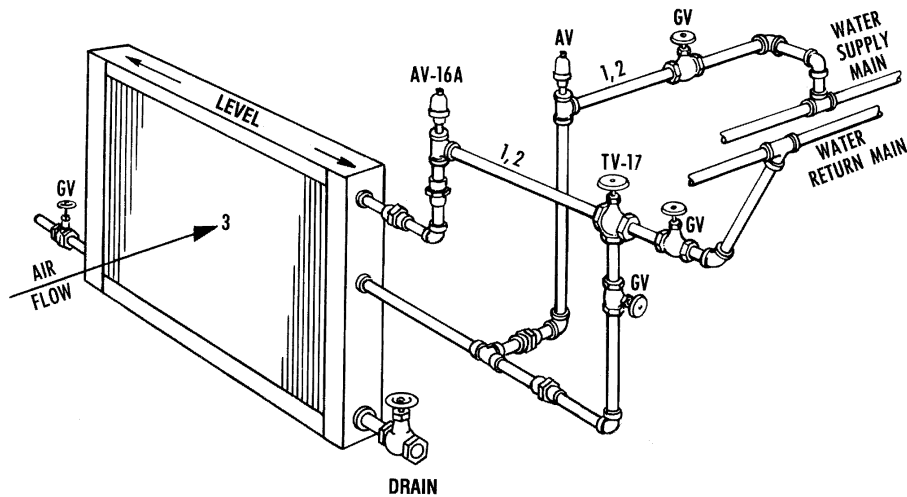
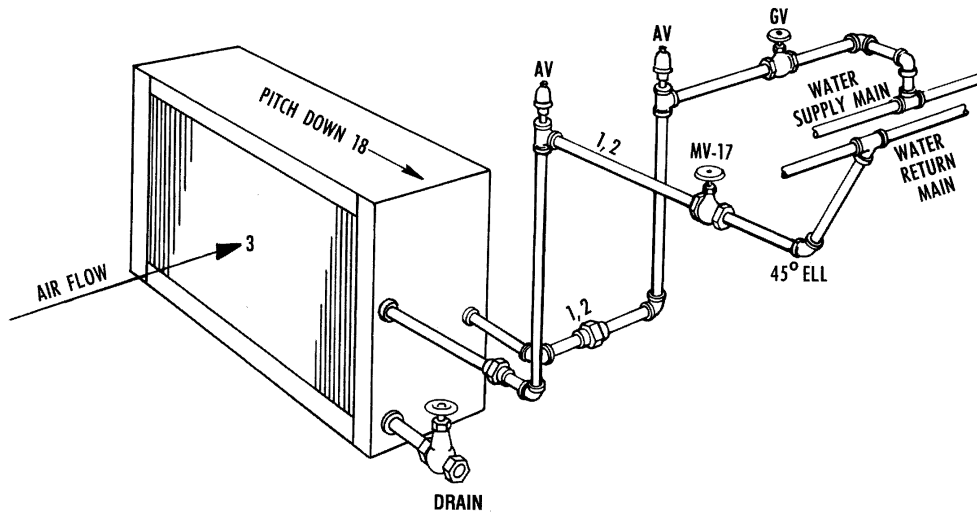


Figure 40
Typical Piping for Type W Two-Row Water Coil



Code of System Components (Piping Diagrams)

FT	Float and thermostatic steam trap
BT	Bucket steam trap
GV	Gate valve
OV	Automatic two-position (on-off) control valve
TV	Automatic three-way control valve
VB	Vacuum breaker
CV	Check valve
ST	Strainer
AV	Automatic or manual air vent

Refer to Figure 39 through Figure 42 for typical hot water coil piping.

- Check the coil for fin damage and straighten if necessary.
- Check that the coil is installed correctly with the air flow in the same direction as indicated on the nameplate or coil casing.

Figure 41
Typical Piping for Type DD Water Coil

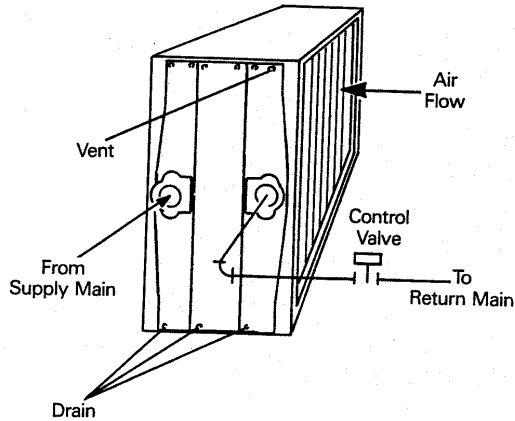
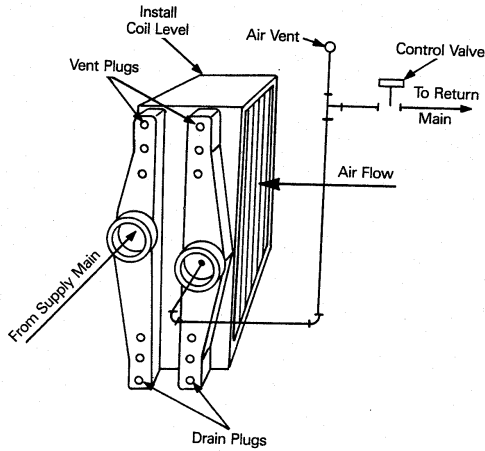


Figure 42
Typical Piping for Type W Water Coil



Type W, WC, UA, UW, and UU hot water coils are self-venting only if the water velocity exceeds 1.5 feet per second (fps). If it is below 1.5 fps, vent by one of the following methods:

- 1 Install an air vent in the top pipe plug tapping of the return header.
- 2 Vent from the top return header horizontally to the return piping when the return line rises and is above the top of the coil. (See Figure 41 through Figure 42 .)

CAUTION

Do not throttle or modulate the water flow for coils that are exposed to freezing temperatures. Coil damage may result from coil freeze-up.

- 3 Install a drain line and shutoff valve in the supply line near the coil.

Type W, D, K, UW and UU water coils are self-venting only if the water velocity exceeds 1.2 fps. Type DD coils are self venting only if the water velocity exceeds 2.5 fps. If water velocity is below these minimums vent by following one of the following methods:

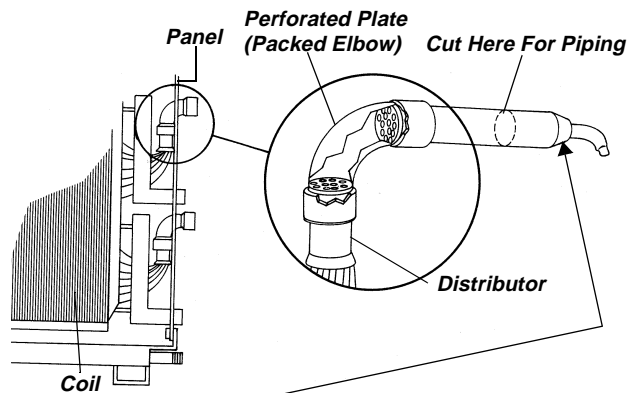
- Install an air vent in the top pipe plug tapping of the return header
- Vent from the top return header horizontally to the return piping when the return line rises and is above the top of the coil.

Refrigerant Coil Piping

Units that are UL listed shall not have refrigerant temperatures and pressures exceeding that listed on the coil nameplate.

For unit-installed refrigerant coils, packed elbows are provided. Pipe connections can be made as shown in Figure 43 .

Figure 43
Type F Refrigerant Coil with Packed Elbow



NOTE: TYPE UF COILS ARE FITTED WITH 5/8" TUBE AND CAP ASSEMBLY TO SEAL VACUUM AND NITROGEN CHARGE. DO NOT USE CAP AND TUBE TO MAKE REFRIGERATION CONNECTIONS.

NOTE: TYPE F AND UF COILS HAVE BEEN DEHYDRATED AND CHARGED WITH A HOLDING CHARGE OF DRY NITROGEN. TO PREVENT LEAKS AND SYSTEM CONTAMINATION, DO NOT BREAK THE SEALS UNTIL THE COIL IS INSTALLED.

- 1 Check that the coil is installed correctly with airflow in the same direction as indicated on the

coil nameplate or casing. The suction connection must be at the bottom of the suction header.

- 2 Follow accepted refrigeration piping practices and safety precautions for typical refrigerant coil piping and components. See *Figure 43*. Specific recommendations are provided with the highside components, including instructions for pressure-testing, evacuation, and system charging. General recommendations for component selection and line sizing follow.
- 3 Leak-test the entire refrigeration system after all piping is complete.
- 4 Charge the unit according to approximate weight requirements, operating pressures and superheat/subcooling measurements.
- 5 Adjust the thermal expansion valve setting if necessary.

General Refrigerant Piping Recommendations

IMPORTANT: REFER TO THE NOTE ON THE INSIDE FRONT COVER OF THIS MANUAL REGARDING HANDLING OF REFRIGERANTS

Liquid Line Components

Trane recommends the use of a properly sized liquid line filter-drier installed upstream from the expansion valve and as close to the evaporator coil as possible. Base filter-drier selection on a maximum pressure drop of 2 psi at the design condition.

- 1 Install moisture indicator/sight glass between the expansion valve and filter-drier. The moisture indicator/sight glass must be sized to match the size of the liquid line at the thermal expansion valve.
- 2 Size liquid line shutoff valve with an access port using the selected liquid line OD, and install it close to the condenser.
- 3 Minimize use of other valves, tube bends and reducers since these items tend to increase pressure drop and to reduce subcooling at the expansion valve. Liquid line receivers, other than those factory-installed, are not recommended.
- 4 The Thermal Expansion Valve (TEV) must be selected for proper size and capacity. The size of the TEV should cover the full range of loadings. Check that the valve will successfully operate at the lightest load condition. Also consider the use of a hot gas bypass valve when sizing the TEV. Select expansion valves with external equalizer connections, and those designed to operate against a back pressure of 20 pounds per square inch higher than actual evaporator pressure.
- 5 Install the TEV directly on the coil liquid connection (distributor) provided. The liquid distributor must be in a true vertical position.

CAUTION

Disassemble the thermal expansion valve before completing the brazing connections. If necessary, wrap the valve in a cool, wet cloth while brazing. Failure to protect the valve from high temperatures may result in damage to the internal components.

Suction Line Components

Install suction line pressure tap on the leaving side of the evaporator coil near the TEV sensing bulb location. Accurate superheat measurement and thermal expansion valve adjustment demands that suction pressure be measured near the evaporator coil.

Usually, suction line filter-driers are only necessary on systems that have experienced a severe compressor motor burnout or other failure which results in extremely high refrigerant temperature. Do not leave this filter-drier in the suction line permanently.

Liquid Line Sizing

All compressors have a Refrigerant Charge Limit (RCL) that must not be exceeded. Since the RCL and pressure drop are in direct conflict with each other, Trane recommends that the liquid line be sized as small as possible, while maintaining a low enough pressure drop to ensure 5°F of subcooling at the expansion valve.

Suction Line Sizing

Suction line tubes must be sized to maintain refrigerant vapor velocities that are high enough to ensure oil entertainment under all operating conditions.

It is not necessary to pitch horizontal suction lines toward the compressor when the refrigerant coil is used with Trane condensing units that are designed with a gas trap in the suction line just prior to the compressor.

Wiring

⚠ WARNING

Disconnect electrical power source before servicing the unit or connecting electrical wires.

Failure to do so may result in personal injury or death from electrical shock or entanglement in moving parts. If the unit includes a factory-mounted starter, use of the lockout/tagout on the disconnect is required while servicing the unit.

If the unit does not include a factory-mounted starter, wiring to the unit fan motor must be provided by the installer and must comply with all national and local electrical codes. The installer must also furnish a fused disconnect switch in compliance with national and local electrical codes. Fan motors require overload protective devices rated or selected in compliance with the National Electric Code or Canadian Electric Code. Specific unit and motor connection diagrams are attached to the unit.

⚠ CAUTION

Use copper conductors only for terminal connections. Use of aluminum or other type of wiring may result in galvanic corrosion or overheating and resultant equipment damage.

Fan motors require motor overload protective devices that are rated or selected in compliance with the National Electric Code or Canadian Electric Code. Specific unit and motor connection diagrams are provided on the unit. If wiring directly to the motor, a flexible connection at the motor to permit fan belt adjustment should be provided. Fractional horsepower motors may be factory connected to a terminal box on the unit. If this construction is provided, the installer should complete field wiring to this connection box.

For a typical high voltage wiring schematic, see *Figure 44* following.

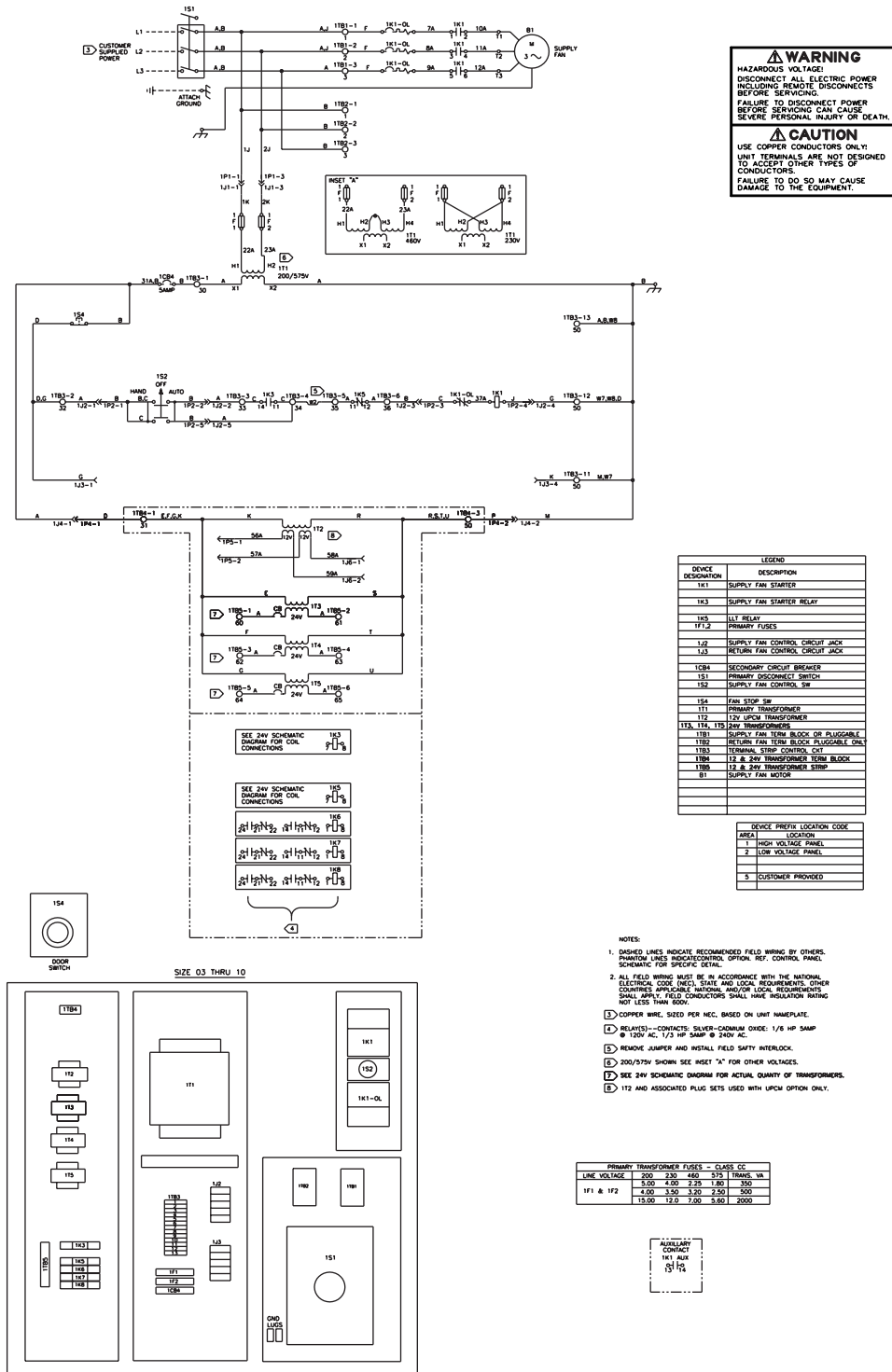
Connection of junction sections to unit end devices is accomplished using the connections shown in *Figure*

23 . See unit control drawings for specific connection information.

For typical field wiring to units with DDC:

- Provide 120 VAC power for control. A dedicated circuit is recommended. Units with a factory-mounted starter or VFD do not require this circuit as they are powered by the oversized control transformer in the starter or VFD.
- If unit ships in multiple sections, fasten quick connects (*Figure 23*) before sections bolt together.
- Field mount and wire outside air sensor and space sensor, if ordered.

Figure 44
Typical High Voltage Wiring Schematic



Installation Checklist

The following is an abbreviated list of the detailed installation information given in this manual and should be used as an aid to ensure proper installation. For complete instructions, refer to the appropriate sections of the manual.

⚠ WARNING

Disconnect electrical power source when servicing the unit. Failure to do so may result in injury or death from electrical shock.

Secure drive sheaves before servicing the unit to ensure that rotor cannot free-wheel. Failure to secure drive sheaves can cause severe personal injury.

- 1 Examine the unit and components for material shortage or shipping damage.
- 2 Check unit location for unit dimensions, weights and clearances.
- 3 Rig each section properly and hoist it to its final position.
- 4 For split ship units with factory mounted controls, connect color coded and numbered quick connect plugs (reference *Figure 44*).
- 5 Check that unit is installed level.
- 6 Remove fan isolator tie-down bolt, if unit is not externally isolated. See *Figure 18* and *Figure 19*.
- 7 Inspect Inlet Guide Vanes and adjust if necessary.
- 8 Install damper operator motors and connecting linkage. Check damper operation and linkage alignment.
- 9 Install filters, if supplied.
- 10 Connect supply and return air ductwork.
- 11 Complete coil and condensate drain piping connections.
- 12 Reference CLCH-IOP-1 for more details on the installation of units with factory mounted controls.
- 13 Complete electrical connections to the unit and PCM.

- 14 Leave the unit installation and maintenance manual with the unit.

Prestart-Up Checks

Before operating the unit, complete the following checks for safe and efficient operation.

⚠ WARNING

Disconnect electrical power source when connecting or disconnecting electrical wires for test procedures. Do not open service access doors while the unit is operating. Failure to exercise caution when completing test procedures or while inspecting unit operation may result in injury or death from electrical shock, air movement or rotating parts.

- Rotate all fan wheels manually. Fans should turn freely in the proper direction.
- Check fan drive belt tension.

NOTE: IF T-SERIES CLIMATE CHANGER FAN IS GOING TO OPERATE AT OTHER THAN DESIGN RPM OR WITH A VARIABLE SPEED DRIVE NOT SUPPLIED BY TRANE, THE UNIT VIBRATION LEVELS SHOULD BE CHECKED AT THE NEW RPM AND THROUGHOUT THE SPEED RANGE. RE-BALANCE OR CORRECT VIBRATIONS AS NECESSARY.

- Check fan hub set screws, sheave set screws and bearing set screws for proper torque (*Table 45*). Fan sheaves should be tight and aligned. Bearing set screws should be aligned. See section titled "Periodic Maintenance" for alignment instructions.

Table 45
Fan Bearing Setscrew Torque Settings (lb-ft)

Screw Size	Hex Size	Torque
1/4	1/8	5.5-7.5
5/16	5/32	10.5-13.7
3/8	3/16	19-25
7/16	7/32	29-37.5
1/2	1/4	42-54.2

- Inspect fan motor and bearings for proper lubrication. Refer to *Table 49* for fan grease recommendations. Contact the motor

representative for motor lubrication recommendations.

- Inspect electrical connections. They should be clean and secure. Compare actual wiring with specific diagrams on the unit.
- Check piping and valve for leaks. Open or close the valves to check operation. Drain lines should be open.
- If unit has a refrigerant coil, it must be charged, leak-tested, and ready for operation according to instructions provided with the condenser equipment. Adjust superheat setting.
- Check that air filters are in place and positioned properly.
- Remove all foreign material from the drain pan and check pan opening and condensate line for obstructions.
- Check unit for debris.
- Close and secure all unit access doors.

Start-Up

⚠ CAUTION
Inadequate lubrication of fan motor or bearings may result in premature bearing or motor failure.

- 1 Inspect electrical connections. They should be clean and secure. Compare actual wiring with specific diagrams provided on the unit.
- 2 Check piping and valves for leaks. Open or close the valves to check for proper operation. Drain lines should be open.

⚠ CAUTION
The use of untreated or improperly treated water in unit coils may cause scaling, erosion, corrosion, algae, slime or other equipment damage. Consult a qualified water treatment specialist to determine if water treatment is required. The Trane Company assumes no responsibility for equipment damage caused by untreated or improperly treated water.

- 3 If equipped with a refrigerant coil, charge and leak-test the unit to and ready it for operation according to instructions provided with the condenser equipment. Adjust superheat setting.
- 4 Check that all air filters are in place and positioned properly. Under Periodic Maintenance, see section titled "Air Filters."

NOTE: UL-LISTED UNITS REQUIRE A "TOOL-ONLY" REMOVABLE LATCH ON ACCESS DOORS. THE HANDLE TIE-DOWN SCREW SHIPPED WITH THE UNIT MEETS THIS REQUIREMENT, AND SHOULD REMAIN IN PLACE WHEN THE ACCESS DOOR IS CLOSED.

- 5 Close and secure all unit access doors. Check that the latch set screws are tight.
- 6 Remove all foreign material from the drain pan and check drain pan opening and condensate line for obstructions.

- 7 Check unit for debris.
- 8 Reference CLCH-IOP-1 for more details on the start-up of units with factory mounted controls.

Start-Up Procedures

After completing all prestart-up checks and procedures, the unit may be started. The following checks and adjustments should be made during initial start-up:

⚠ WARNING
Disconnect electrical power prior to access into a fan or ductwork. Even when locked out electrically, fans may cause injury or damage if the impeller is subject to "wind-milling." The impeller should be secured to physically restrict rotational movement. Failure to secure impeller can cause severe personal injury or death.

Disconnect electrical power source when connecting or disconnecting electrical wires for test procedures. Do not open service access doors while the unit is operating. Failure to exercise caution when completing test procedures or while inspecting unit operation may result in injury or death from electrical shock, air movement or rotating parts.

If the unit was stored for an extended period of time, the following items should be checked before starting the unit.

- 1 Inspect motor bearings for moisture and rust. Replace bearings if necessary and repack with new grease.
- 2 Check motor winding. An acceptable winding resistance reading is from 6 meg-ohms to infinity. If reading is less than 5 meg-ohms, winding should be dried out in an oven or by a blower.
- 3 Inspect the entire motor for rust and corrosion.
- 4 Lubricate the motor as instructed in the section titled "Periodic Maintenance," or as indicated by the maintenance tag on the motor.

- 5 Bump-start unit and observe the fan wheel for proper rotation, as indicated by rotation arrow located on fan housing.
- 6 Measure the motor voltage and amperage on all phases to ensure proper operation. The readings should fall within the range given on the motor nameplate.

Maximum allowable voltage imbalance is two percent. Voltage imbalance is defined as 100 times the sum of the deviation of the three voltages from the average, divided by twice the average voltage. For example, if the three measured voltages are 221, 230 and 227, the average voltage would be 226 volts.

The percent of voltage imbalance is then calculated:

$$\frac{100 \times \{ [226-221] + [230-226] + [227-226] \}}{2 \times 226}$$

= 2.2% (*Unacceptable*)

In this example, 2.2 percent imbalance is not acceptable and the power company should be notified to correct it.

- Check unit vibration if the fan speed is changed more than 5% from the original designed rpm, or if parts such as shafts, fan wheels, bearings, or other drive components are replaced. Do not exceed max. fan rpm.
- Pay particular attention to any vibration, noise or overheating of the motor and fan bearings. (Bearings may run warm during break in.)

Excessive Vibration

EXCESSIVE VIBRATION MUST BE CORRECTED TO PREVENT BEARING AND SHAFT DAMAGE. SEE THE SECTION TITLED "TROUBLESHOOTING" FOR DETAILS ON THE COMMON CAUSES FOR VIBRATION.

Determine Fan RPM

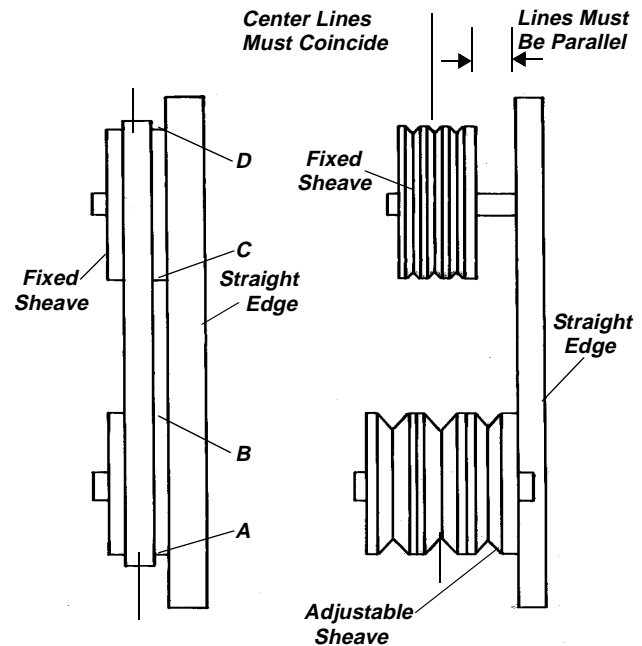
Fan rpm can be determined by using a strobe-type tachometer, or revolution counter.

Sheave Alignment

Align the fan and motor sheaves by using a straightedge. 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 to confirm that the shaft is parallel. For uneven width sheaves, place a string in the center groove of both sheaves and pull tight. Adjust

sheaves and tighten the sheave set screws to the proper torque given in *Table 47*.

Figure 45
Proper Drive Alignment



⚠ WARNING
Disconnect electrical power prior to access into a fan or ductwork. Even when locked out electrically, fans may cause injury or damage if the impeller is subject to "wind-milling." The impeller should be secured to physically restrict rotational movement. Failure to secure impeller can cause severe personal injury or death.

Fan Belt Alignment

Tighten the belts slightly and rotate the drive several times.

On multiple belt drives, determine that the force of deflection is approximately the same on each belt by pushing each belt in an equal distance at a point halfway from each sheave. If this force is not the same for each belt, the motor and fan shaft are not parallel. Realign as required.

After realignment, tighten the belts again to the standard belt tensioning specifications. See the following section.

Over-tensioning of belts can cause damage to bearings, shafts, and drive components. Belts should not squeal at start-up. Belt tension should be rechecked after 8 hours, 24 hours, and 100 hours of operation and monthly thereafter. When the belt is in operation, the tight side of the belt should form a straight line from sheave with only a slight bow on the slack side.

Fan Belt Tension

NOTE: FAN BELT TENSION SHOULD BE CHECKED AT LEAST THREE TIMES DURING THE FIRST DAYS OF OPERATION, SINCE THERE IS A RAPID DECREASE IN TENSION UNTIL BELTS SETTLE IN. REFER TO THE DRIVE STICKER FOR PROPER TENSION.

Figure 46
Typical Drive Belt Label

Browning U-BELT DRIVE KIT 1627373
 MODULE 0400
 PURCHASE ORD. NUMBER B24597-061 H5D073B A
 CUSTOMER'S KIT # H5D073B A-012-0400
 MTR HP. = 10.0
 FAN RPM=1458 CD= 9.4 AT 3.00 TRN OPN
 TENSION INFO - 3.86 LB., 0.14 IN.
 DRIVE'S BELTS - B40
 MOTOR SHEAVE - 2VP75X 1 3/8
 MOTOR BUSHING - NONE REQUIRED
 FAN SHEAVE - 2B5U80
 FAN BUSHING - B 1 7/16

⚠ WARNING

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.

Disconnect electrical power prior to access into a fan or ductwork. Even when locked out electrically, fans may cause injury or damage if the impeller is subject to "wind-milling." The impeller should be secured to physically restrict rotational movement. Failure to secure impeller can cause severe personal injury or death.

Figure 47
Fan Sheave Pitch Diameter

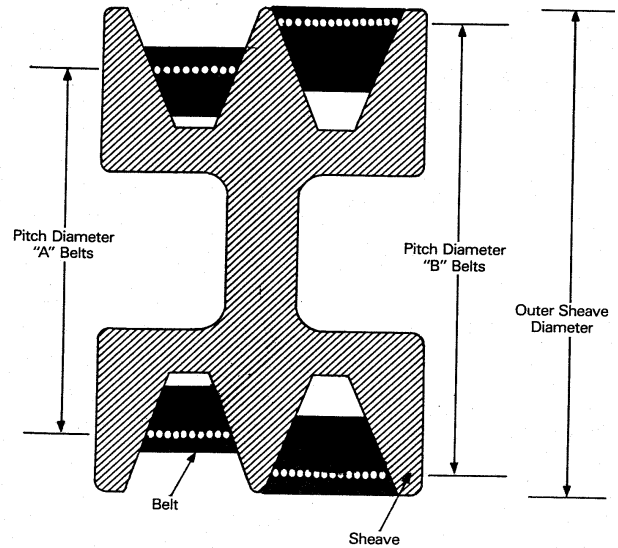


Table 46
Values for K-Factor (Belt Cross Section Types)

Belt Type	A	B	C	D	E	3L	4L
K Factor	8	13	40	80	95	6	6

Belt Type	5L	3V	5V	8V	AX	BX	CX	DX
K Factor	6	6	12	25	11	18	54	101

Figure 48
Belt Tension Measurement

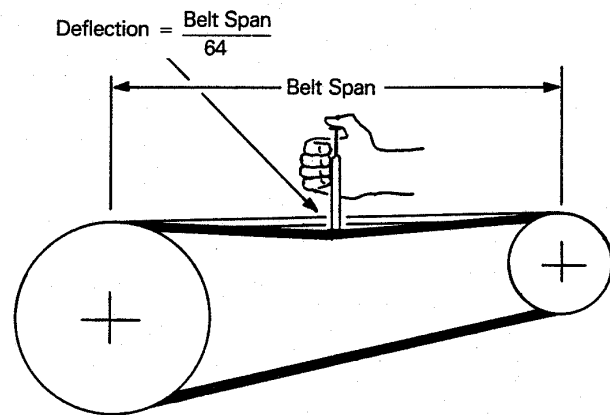
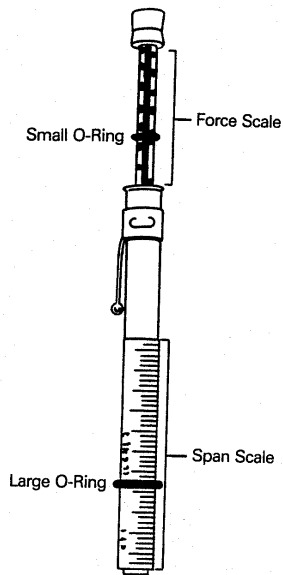


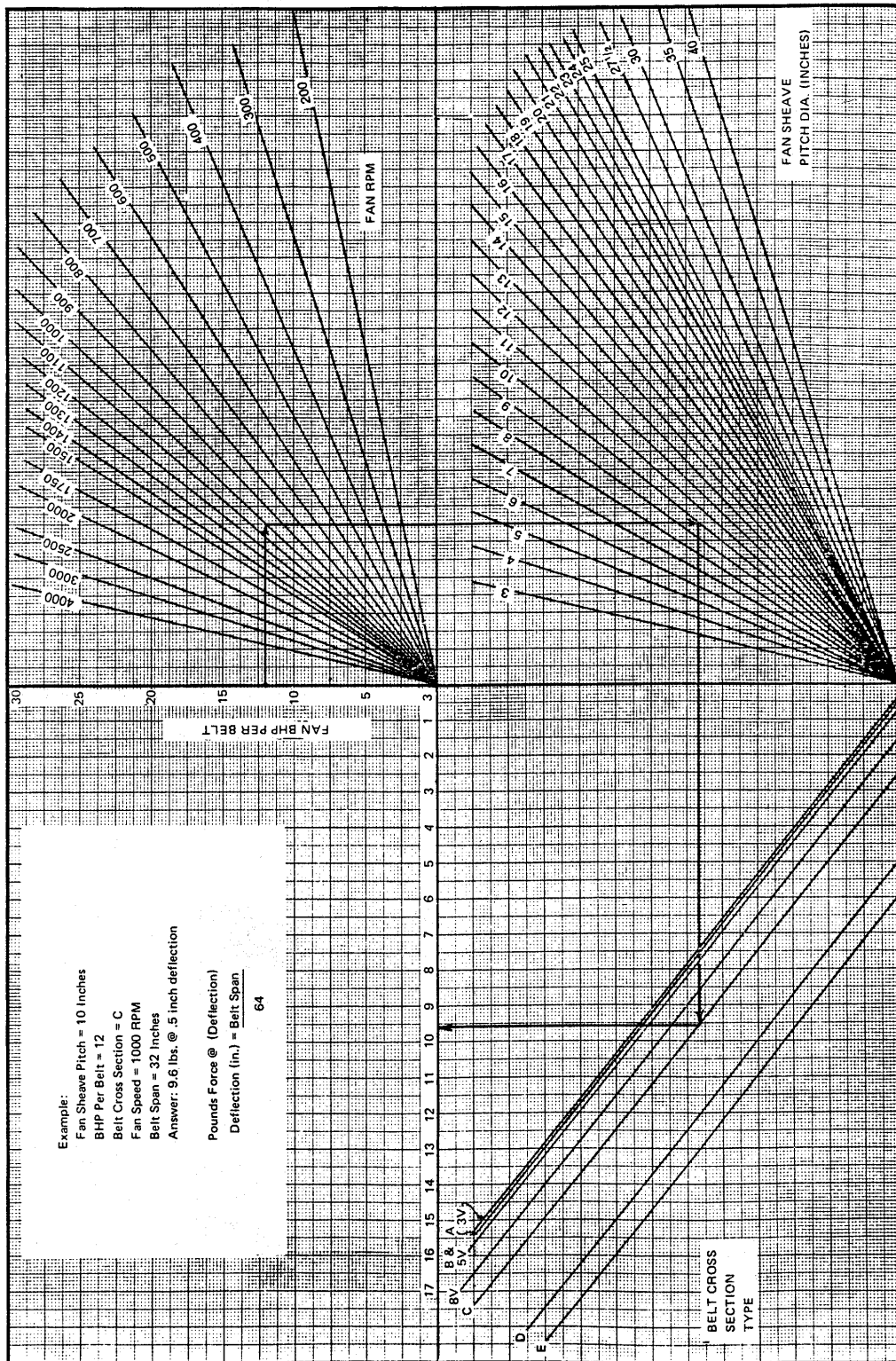
Figure 49
Belt Tensioner



Proper belt tension is required to ensure maximum bearing and drive component life and is based on fan brake horsepower requirement. Use *Table 47* to find the proper belt tension and refer to the inset for an example. To use the table, you must know:

- Fan design brake horsepower (bhp) per belt (not motor hp)
- Fan rpm
- Fan sheave pitch diameter, found by measuring where the middle of the belt rides in the sheave (See *Figure 47*)
- Type of belt cross-section (stamped on the belt)

Table 47
Belt Tension



As shown in the example of *Table 47*, the correct tension (pounds force) is 9.6 pounds, at 1/2-inch deflection. Deflection is determined by dividing the belt span distance by 64, as shown in *Figure 48*.

To measure belt tension, use a belt tensiometer as shown in *Figure 49*. Determine actual deflection by depressing one belt with the belt tensiometer and measuring the deflection relative to the other belts or to belt line. Adjust the belt tension to the correct pounds force and tighten all set screws to the proper torque. (See *Table 47*.)

For belt cross-section types not given in *Table 47*, use the following equations to calculate correct belt tension.

$$F = (T + K)/16$$

where

F = force measured in pounds at specific deflection.

K = constant determined by belt cross-section type.

T = 24,750 (fan hp per belt)/ belt speed

$$\text{Belt speed} = ((\text{fan pitch diameter})/12) \times 3.1416 \times \text{fan rpm}$$

For example, given the following:

Motor sheave pitch diameter: 5.7 inches, eight groove

Fan sheave pitch diameter: 10.0 inches, eight groove

Fan horsepower: 2.4 bhp

Fan rpm: 1000 rpm

Belt type: C

Sheave span: 32 inches

$$\text{Belt speed} = (10/12) \times 3.14 \times 1000 = 2618$$

$$T = (24,750 \times (2.4 \text{ bhp}/2 \text{ belts})/2618 = 113.4 \text{ lb}$$

$$F = (113.4 + 40)/16 = \underline{9.6 \text{ lb.}}$$

$$\text{Also, } D = (\text{Belt span (inches)})/64 = 32/64 = .50 \text{ in.}$$

Therefore, the belt tensiometer should read 11.5 pounds force at 15/16-inch deflection. This will yield 159.4 pounds force belt tension.

Belt tensions determined by using *Table 46* are minimum values. The correct operating tension for a V-belt drive is the lowest tension at which the belts will not slip under the peak load conditions. It may be necessary, however, to increase the tension of some drives to reduce excessive belt flopping or to reduce excessive start-up squealing.

NOTE: THERE IS A LABEL LOCATED ON THE BEARING SUPPORT ON THE DRIVE SIDE OF THE UNIT THAT LISTS ALL DRIVE PARTS AND THE PROPER BELT TENSION FOR THE SPECIFIC DRIVE.

CAUTION

Do not over-tension the belts. Excessive tension will reduce fan and motor bearing life, accelerate belt wear and possibly cause shaft failure.

Periodic Maintenance

The following checklist is provided as an abbreviated guide to periodic maintenance. Detailed procedural information is given after this checklist.

⚠ WARNING

Disconnect electrical power and allow rotating parts to stop before servicing the unit. Exercise caution if unit must be on for test or maintenance procedures. Failure to do so may result in injury or death from electrical shock or moving parts.

Disconnect electrical power prior to access into a fan or ductwork. Even when locked out electrically, fans may cause injury or damage if the impeller is subject to “wind-milling.” The impeller should be secured to physically restrict rotational movement. Failure to secure impeller can cause severe personal injury or death.

After 48 Hours Operation

Belts have acquired their permanent stretch. Readjust but do not over-tighten. See section titled “Fan Belt Tension” for instructions.

Weekly

Observe unit weekly for any change in running condition and unusual noise.

Every Month

- Check air filters. Clean or replace if clogged or dirty. Coat permanent filters with oil after cleaning. Change bag filters when pressure drop is 1-inch W.G.
- Relubricate fan bearings if operating conditions include high speeds, moist or dirty air, or high temperatures.
- Relubricate motor bearings in accordance with motor manufacturer’s recommendations if

operating conditions include high speeds, moist or dirty air, or high temperatures.

- Check and adjust fan belt tension.

Every Three to Six Months

- Check fan bearing grease line connections. Lines should be tight to the bearings.
- Relubricate fan bearings.
- Check motor lubrication. Recommendations are provided on the motor tag or on a unit sticker.
- Check bearing and motor bracket bolt torque.
- Align fan and motor sheaves. Tighten sheave set screws to the proper torque.
- Check and adjust fan belt tension.
- Tighten electrical connections.
- Inspect coils for dirt build-up or coil freeze-up.

Every Year

- Inspection the unit casing for corrosion. If damage is found, clean and repaint the surface with a rust-resistant primer and vinyl chlorinated lacquer.
- Clean the fan wheels and fan shaft. Remove rust with an emery cloth and apply a coat of LPS #3 or an equivalent.
- Inspect the condensate drain pan and drain line, remove sludge or foreign materials that might obstruct proper drainage. Remove obstacles.

Table 48
Minimum Hex Head Bolt Torque in lb-ft

Grade 5 Bolts		
Size (inches*)	Thread Designation	Min. Torque
1/4, 20	UNC	6
1/4, 28	UNF	7
5/16, 18	UNC	14
5/16, 24	UNF	16
3/8, 16	UNC	24
3/8, 24	UNF	28
7/16, 14	UNC	42
7/16, 20	UNF	45
1/2, 13	UNC	69
1/2, 20	UNF	83
9/16, 12	UNC	99

Table 48
Minimum Hex Head Bolt Torque in lb-ft

Grade 5 Bolts		
Size (inches*)	Thread Designation	Min. Torque
9/16, 18	UNF	118
5/8, 11	UNC	150
5/8, 18	UNF	176
3/4, 10	UNC	254
3/4, 16	UNF	301
7/8, 9	UNC	358
7/8, 14	UNF	422
1, 8	UNC	500
1, 14	UNF	602

*NOTE: Soft metric conversions not acceptable for screw and hex sizes

- Check damper linkages, set screws and blade adjustment. Clean, but do not lubricate, the nylon damper rod bushings.
- Clean damper operators.
- Inspect the control and power box wiring for secure connections and insulation.
- Rotate the fan wheel and check for obstructions in the fan housing. The wheel should not rub on the fan housing. Adjust the center if necessary and tighten wheel set screws to the proper torque.
- Check condition of gasketing and insulation around unit, door and dampers.
- Examine flex connections for cracks or leaks. Repair or replace damaged material.

Drain Pans

Inspecting and Cleaning Drain Pans

For units with sloped drain pans, if evidence of standing water or condensate overflow exists, identify and remedy the cause immediately. (Refer to the troubleshooting section for possible causes and solutions.) If microbial growth (mold) in the drain pan is observed, clean the pan immediately using the following procedure:

- 7 Disconnect all electrical power to the unit.
- 8 Don the appropriate personal protective equipment (PPE).
- 9 Remove all standing water.

- 10 Use a scraper or other tools to remove any solid matter. Remove solid matter with a vacuum device that uses high efficiency particulate arrestance (HEPA) filters with a minimum efficiency of 99.97% at 0.3 micron particle size.
- 11 Thoroughly clean the contaminated area with a mild bleach and water solution or an EPA-approved sanitizer specifically designed for HVAC use. Carefully follow the sanitizer manufacturer's instructions regarding the use of the product.
- 12 Immediately rinse the drain pan thoroughly with fresh water to prevent potential corrosion from the cleaning solution of the drain pan and drain line components.
- 13 Allow the unit to dry thoroughly before putting the system back into service.
- 14 Determine and correct the cause of the microbial contamination.
- 15 Be careful that the contaminated material does not contact other areas of the unit or building. Properly dispose of all contaminated materials and cleaning solution.

IMPORTANT: STANDING WATER IN DRAIN PANS CAN PROMOTE MICROBIAL GROWTH (MOLD) THAT MAY CAUSE UNPLEASANT ODORS AND SERIOUS HEALTH-RELATED INDOOR AIR QUALITY PROBLEMS. IF MOLD IS FOUND, IT MUST BE REMOVED IMMEDIATELY AND THAT PORTION OF THE UNIT PROPERLY CLEANED AND SANITIZED.

Air Filters

Catalog data tables provide filter size, type and quantity.

Throwaway Filters

To replace throwaway filters, install new filters with the directional arrows pointing in direction of airflow.

NOTE: FILTERS MUST HAVE AN AIRTIGHT SEAL TO PREVENT AIR BYPASS. IF USING OTHER THAN TRANE-SUPPLIED FILTERS, APPLY FOAM GASKETING TO THE VERTICAL EDGES OF THE FILTER.

Permanent Filters

To clean permanent filters, wash under a stream of water to remove dirt and lint. Remove oil filter with a wash of mild alkali solution. Rinse in clean, hot water and allow to dry. Coat both sides of the filter by immersing or spraying it with Air Maze Filter Lote W or an equivalent. Allow to drain and dry for about 12 hours.

Cartridge or Bag Filters

To install cartridge or bag filters, complete the following:

⚠ WARNING

Disconnect electrical power source, and allow all rotating equipment to stop before inspecting or servicing the unit. Failure to do so may result in personal injury or death from electrical shock or rotating parts.

- 1 Open the filter section access door and remove the filters and block-offs from their installed position.
- 2 Keeping the bag filters folded, slide each filter into the filter rack, pushing them tightly against the unit. Pleats should be in the vertical position.
- 3 If using the optional pre-filters, slide them into the appropriate filter rack.
- 4 If fixed and adjustable block-offs are provided with the unit, slide the fixed block-offs into the filter track before the adjustable block-off. The adjustable block-off should always be installed last, next to the access door.
- 5 Close and secure the access door. If the door can be closed without compressing the filter, adjust the block-off by loosening its screws and position it to provide an airtight seal.

Fans

Inspecting and Cleaning Fans

Fan sections of air handlers should be inspected every six months at a minimum or more frequently if operating experience dictates. Accumulated dirt and organic matter on the interior surfaces of fans should be cleaned immediately. The suggested procedure for cleaning these surfaces is:

- 1 Disconnect all electrical power to the unit.
- 2 Don the appropriate personal protective equipment (PPE).
- 3 Use a portable vacuum with HEPA filtration to remove the loose dirt and organic matter. The filter should be 99.97% efficient at 0.3 micron particle size.
- 4 If no microbial growth (mold) exists, thoroughly clean the fan and associated components with an

industrial cleaning solution. Carefully follow the cleaning solution manufacturers instructions regarding use of their product.

- 5 If microbial growth (mold) is present, remove the contamination (Step 2) and thoroughly clean the affected area with an EPA-approved sanitizer specifically designed for HVAC use. Carefully follow the sanitizer manufacturers instructions regarding the use of the product.
- 6 Rinse the affected surfaces thoroughly with fresh water and a fresh sponge to prevent potential corrosion of metal surfaces.
- 7 Allow the unit to dry completely before putting it back into service.
- 8 Use caution to assure that any contaminated material does not contact other areas of the unit or building. **Properly dispose of all contaminated materials and cleaning solution.**

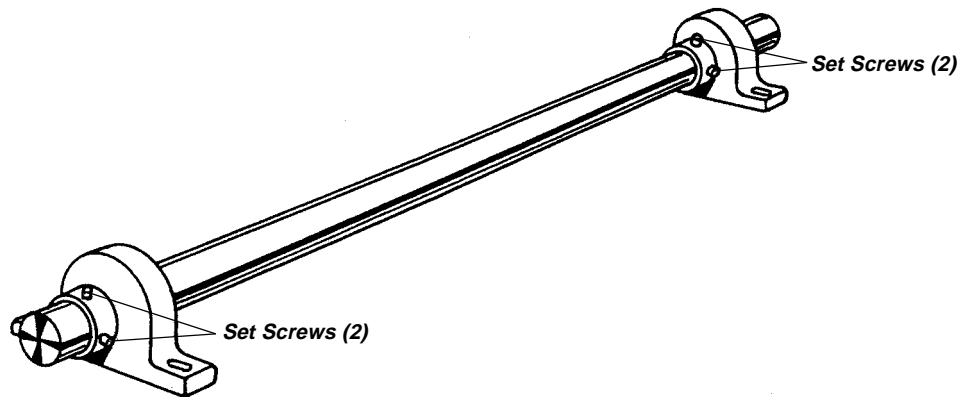
IMPORTANT: IF MICROBIAL GROWTH (MOLD) WAS FOUND, THE CAUSE OF THE CONTAMINATION MUST BE DETERMINED AND ACTION TAKEN TO ASSURE IT DOES NOT RECUR.

Fan Bearings and Motors

Bearing Set screw Alignment

Align bearing set screws as illustrated in *Figure 50*. Reference *Table 45* for bearing set screw torque.

Figure 50
Bearing Setscrew Alignment



Fan Bearing Lubrication

Table 49
Recommendations for Grease-Lubricated Fan Bearings

Operating Conditions	Greasing Intervals	
	-20° F to +140° F	140° F to 200° F
Clean, Dry	3-6 months	1-3 months
Dirty, Dry	1-3 months	1-4 weeks
Dirty, Wet, High Humid.	1-4 weeks	1-14 days

Recommended Greases	Recommended Operating Range
Texaco-Multi Fak #2	-20° F to +250° F
Shell Alvania #2	-20° F to +250° F
Mobil Mobilux #2	-20° F to +250° F
Exxon Unirex #2	-20° F to +250° F
Texaco Prem. RB	-20° F to +250° F
Mobil 532	-20° F to +250° F
Exxon Beacon	-65° F to +250°
Keystone 84H	-40° F to +225° F

Shaft Size (In)	Max. Grease Cap. of Bearing (Oz.)
1/2 to 3/4	1/8
7/8 to 1-3/16	3/8
1-1/4 to 1-1/2	5/8
1-11/16 to 1-15/16	7/8
2 to 2-7/16	1-1/4
2-1/2 to 2-15/16	2

Note: Greases used should conform to NLGI No. 2 penetration. Fan bearings should be lubricated with a lithium base grease which conforms to NLGI Number 2 for consistency. See Table 49 and Table 50 for

recommended lubricants and bearing grease capacities.

⚠ CAUTION
Improper lubrication can result in premature bearing failure.

Do not mix greases with different bases within the bearing. This can cause an audible squealing noise that may be transmitted through the system ductwork. Premature bearing failure may result.

To lubricate the fan bearings, complete the following:

⚠ WARNING
Disconnect electrical power source before servicing the unit. If unit must be on for maintenance procedures, exercise extreme caution. Failure to do so may result in personal injury or death from electrical shock or entanglement in moving parts.

Disconnect electrical power prior to access into a fan or ductwork. Even when locked out electrically, fans may cause injury or damage if the impeller is subject to “wind-milling.” The impeller should be

secured to physically restrict rotational movement. Failure to secure impeller can cause severe personal injury or death.

- 1 Disconnect main power switch.
- 2 Check grease lines for tight connections at the grease fitting.
- 3 Using a manual low pressure grease gun, add grease until a light bead of grease appears at the bearing grease seal. Turn the fan wheel manually while adding grease.

Fan Motors

Inspect fan motors periodically for excessive vibration or temperature. Operating conditions will vary the frequency of inspection and lubrication. *Table 51* lists recommended motor greasing intervals. Motor lubrication instructions are found on the motor tag or nameplate. For a list of compatible greases, see *Table 49*.

Table 50
Fan Bearing Maximum Grease Capacity

Shaft Size in inches	Capacity in fl. oz.
1/2 - 3/4	1/7
7/8 - 1-3/16	3/8
1-1/4 - 1-1/2	5/8
1-11/16 - 1-15/16	7/8
2 - 2-7/16	1-1/4
2-1/2 - 2-15/16	2

Table 51
Recommended Motor Greasing Schedule

Avg. Daily Operating Hours	Avg. Environment	.3 to 7.5 HP Motors	10 to 30 HP Motors
8-16	Clean and Dry	Every 5 years	Every 3 years
12-24	Moderate Dirt or Moisture	Every 2 years	Every year
Any	Severe (very dirty or high temperatures)	Every 6 months	Every 3 months

To relubricate the motor, consult the maintenance tag provided by the vendor.

Refer to *Table 48* for minimum torque of motor mounting and bearings bolts.

WARNING

Disconnect power source for motor lubrication. Failure to do so may result in injury or death.

Disconnect electrical power prior to access into a fan or ductwork. Even when locked out electrically, fans may cause injury or damage if the impeller is subject to “wind-milling.” The impeller should be secured to physically restrict rotational movement. Failure to secure impeller can cause severe personal injury or death.

Coil Cleaning

The frequency of required cleaning is dependent on the operating hours of the system, filter maintenance and efficiency and dirt load.

IMPORTANT: COILS BECOME EXTERNALLY FOULED AS A RESULT OF NORMAL OPERATION. DIRT ON THE SURFACE OF THE COIL REDUCES IT'S ABILITY TO TRANSFER HEAT THAT CAN RESULT IN COMFORT PROBLEMS, INCREASED RESISTANCE TO AIR FLOW AND THUS INCREASED OPERATING ENERGY COSTS. IF THE DIRT ON THE SURFACE OF THE COIL BECOMES WET, SUCH AS COMMONLY OCCURS WITH COOLING COILS, MICROBIAL GROWTH (MOLD) CAN RESULT THAT MAY CAUSE UNPLEASANT ODORS AND SERIOUS HEALTH-RELATED INDOOR AIR QUALITY PROBLEMS.

Steam, hot water and chilled water coils

Steam, hot water and chilled water coils should be kept clean to maintain maximum performance. If fins become dirty, clean with steam and detergent, hot water spray and detergent, or one of the commercially available chemical coil cleaners. Rinse coils thoroughly after cleaning.

WARNING

Follow all directions provided with chemical cleaners to avoid personal injury and/or coil damage. Commercially available chemical cleaners may contain caustic or hazardous agents.

- 1 Disconnect all electrical power to the unit.
- 2 Don the appropriate personal protective equipment (PPE).
- 3 Gain access to the coil section of the unit (both sides).
- 4 Use a soft brush to remove loose debris from both sides of the coil.
- 5 Use a steam cleaning machine, starting from the top of the coil and working downward. Clean the leaving air side of the coil first, then the entering air side. Use a block-off to prevent steam from blowing through the coil and into a dry section of the unit.
- 6 Repeat step 5 as necessary.
- 7 Confirm that the drain line is open following the cleaning.
- 8 Allow the unit to dry thoroughly before putting the system back in service.
- 9 Straighten any coil fins that may have been damaged during the cleaning process with a fin rake.
- 10 Replace all panels and parts and restore electrical power to the unit.
- 11 Use caution to assure that any contaminated material does not contact other areas of the unit or building. **Properly dispose of all contaminated materials and cleaning solution.**

Type K cooling coils

Type K cooling coils have removable headers for cleaning. A small nylon or fiber brush may be used to clean the tubes. After cleaning, flush with water. When removing any header, replace the rubber sealing gasket and be sure that it seats properly when header is installed. If necessary, pull out turbulators, clean the tubes and replace turbulators. When header covers are replaced, apply washers under the bolt heads. Bolts should be evenly tightened to 50 pound-feet of torque.

Refrigerant coils

Refrigerant coils should be kept clean to maintain maximum performance. If fins become dirty, clean with cold water and detergent, or one of the commercially available chemical coil cleaners. Rinse coils thoroughly after cleaning.

⚠ CAUTION
Follow directions provided with the cleaner to avoid coil damage.

⚠ WARNING
Never use steam or hot water to clean a refrigerant coil. Dangerous pressures may be built up by the improper application of heat resulting in equipment damage or personal injury.

- 1 Follow steps 1-4 from **Steam and Water Coil** Cleaning procedure preceding.
- 2 Mix a high quality coil cleaning detergent with water according to the manufacturers instructions. If the detergent is strongly alkaline after mixing (PH 8.5 or higher), it must contain an inhibitor. Carefully follow the detergent manufacturers instructions on the use of the product.
- 3 Place the mixed solution in a garden pump-up sprayer or high pressure sprayer. If a high pressure sprayer is used, note the following:
 - Maintain a minimum nozzle spray angle of 15 degrees.
 - Spray perpendicular to the coil face.
 - Protect other areas of the air handler and internal controls from contact with moisture or the cleaning solution.
 - Keep the nozzle at least 6 inches from the coil.
 - Do not exceed 600 psi.
- 4 Spray the leaving air side of the coil first, then the entering air side. Use a block-off to prevent spray from going through the coil and into a dry section of the unit and/or system ductwork. Carefully follow the cleaning solution manufactures usage instructions.
- 5 Thoroughly rinse both sides of the coil and the drain pan with cool, clean water.
- 6 Repeat steps 4 and 5 as necessary.
- 7 Straighten any coil fins that may have been damaged during the cleaning process with a fin rake.
- 8 Confirm that the drain line remains open following the cleaning process.

- 9 Replace all panels and parts and restore electrical power to the unit.
- 10 Allow the unit to dry thoroughly before putting the system back into service.
- 11 Use caution to assure that any contaminated material does not contact other areas of the unit or building. **Properly dispose of all contaminated materials and cleaning solution.**

tightened beginning in the center and working toward the outside.

Coil Winterization

Provisions must be made to drain coils that are not in use when subjected to freezing temperatures. Coil type NS may be adequately drained in its pitched position within the unit and the installer must provide appropriate piping for adequate drainage.

Coil types UU, D, DD, (provided with drain and vent) K, W, WC, and P can be adequately drained as installed in their level position.

CAUTION

Failure to properly drain and vent coils when not in use during freezing temperatures may result in coil freeze-up damage.

CAUTION

Use caution in removing header plugs from P2, P4 and P8 coils. Over torquing may result in twisted tubes.

Type UW Coil - (Leveled/pitched— not fully drainable)

Remove the vent and drain plugs and blow the coils out as completely as possible with compressed air. The coils should then be filled and drained several times with full strength inhibited ethylene glycol, so that it will mix thoroughly with the water retained in the coil. Drain the coil out as completely as possible.

Type K Coils

To winterize Type K coils, remove the header covers. If tubes are fouled, clean with nylon or fiber brush. To ensure that no water will remain in the coil, do not replace the header covers until the coils are put back into service. When the coils are put back into service, new gaskets must be used. When header covers are replaced, apply washers under the bolt heads and tighten bolts evenly to 50 pound-feet. Bolts should be

Troubleshooting

Use the table in this section to assist in identifying the cause or causes of a malfunction in T-Series Climate Changer operation. The column header “RECOMMENDED ACTION” suggests repair procedures.

NOTE: THIS TABLE IS INTENDED AS A DIAGNOSTIC AID ONLY. FOR DETAILED REPAIR PROCEDURES, CONTACT YOUR LOCAL TRANE SERVICE COMPANY.

WARNING

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.

Disconnect electrical power prior to access into a fan or ductwork. Even when locked out electrically, fans may cause injury or damage if the impeller is subject to “wind-milling.” The impeller should be secured to physically restrict rotational movement. Failure to secure impeller can cause severe personal injury or death.

Table 52
T-Series Climate Changer Trouble Analysis

SYMPTOM	PROBABLE CAUSE	RECOMMENDED ACTION
Bearing is excessively hot	<i>First start after relubrication (Grease distribution)</i>	<i>Allow machine to cool down and restart.</i>
	<i>Over-lubrication</i>	<i>Clean surface of grease and purge.</i>
	<i>Over tensioned belts</i>	<i>Adjust belt tension.</i>
	<i>No lubricant</i>	<i>Apply lubricant. Check bearings for damage.</i>
	<i>Misaligned bearing</i>	<i>Correct alignment. Check shaft level.</i>
Motor fails to start	<i>Blown fuse or open circuit breaker</i>	<i>Replace fuse or reset circuit breaker.</i>
	<i>Overload trip</i>	<i>Check and reset overload.</i>
	<i>Improper wiring or connections</i>	<i>Check wiring with diagram supplied on unit.</i>
	<i>Improper current supply</i>	<i>Compare actual supply power with motor nameplate recommendations. Contact power company for adjustments.</i>
	<i>Mechanical failure</i>	<i>Check that motor and drive rotate freely. Check bearing lubricant.</i>
Motor stalls	<i>Open phase</i>	<i>Check line for an open phase.</i>
	<i>Overloaded motor</i>	<i>Reduce load or replace with larger motor.</i>
	<i>Low line voltage</i>	<i>Check voltage across AC line. Correct voltage if possible.</i>
Excessive vibration	<i>Poor alignment</i>	<i>Align bearing set screws (Figure 50). Loosen and retighten bearing set screws.</i>
	<i>Shipping spacers not removed</i>	<i>Remove shipping spacers and/or bolts. See Figure 18 and Figure 19 .</i>
	<i>Over tensioned belts</i>	<i>Adjust belt tension.</i>
	<i>Misaligned drive</i>	<i>Align drive.</i>

Table 52
T-Series Climate Changer Trouble Analysis

SYMPTOM	PROBABLE CAUSE	RECOMMENDED ACTION
Motor runs and then dies down	<i>Partial loss of line voltage</i>	<i>Check for loose connections. Determine adequacy of main power supply.</i>
	<i>Stator shorts when motor warms up</i>	<i>Replace stator.</i>
Motor does not come up to speed	<i>Low voltage at motor terminals</i>	<i>Check voltage across AC line and correct voltage loss if possible.</i>
	<i>Line wiring to motor too small</i>	<i>Replace with larger sized wiring.</i>
Motor overheats	<i>Overloaded motor</i>	<i>Reduce load or replace with a larger motor.</i>
	<i>Motor fan is clogged with dirt preventing proper ventilation</i>	<i>Remove fan cover, clean fan and replace cover.</i>
Excessive motor noise	<i>Motor mounting bolts loose</i>	<i>Tighten motor mounting bolts.</i>
	<i>Rigid coupling connections</i>	<i>Replace with flexible connections.</i>
	<i>Worn motor bearings</i>	<i>Replace bearings and seals.</i>
	<i>Fan rubbing on fan cover</i>	<i>Remove interference in motor fan housing.</i>
Rapid motor bearing wear	<i>Excessive overhung load due to overtensioned drive</i>	<i>Check belt tension and overhung load.</i>
	<i>Excessive overhung load due to a small diameter motor sheave</i>	<i>Replace sheave with larger one.</i>
Loose fan belt	<i>Motor is poorly positioned</i>	<i>Adjust belt tension.</i>
	<i>Worn or damaged belt</i>	<i>Replace belt or belt set. Check sheave alignment.</i>
	<i>Worn sheaves</i>	<i>Replace sheaves.</i>
Shorter belt life	<i>Worn sheaves</i>	<i>Replace sheaves.</i>
	<i>Misaligned belt</i>	<i>Realign drive with MVP sheave set at mean pitch diameter.</i>
	<i>Grease or oil on belts</i>	<i>Check for leaky bearings. Clean belts and sheaves.</i>
	<i>Belt slipping</i>	<i>Adjust tension.</i>
	<i>Belts rubbing</i>	<i>Remove obstruction or realign drive for clearance.</i>
	<i>Poor alignment</i>	<i>Loosen bearing set screws and realign (See Figure 50 .)</i>
Bearing noise	<i>Inadequate lubrication</i>	<i>Grease bearing(s).</i>
	<i>Air is bypassing coil</i>	<i>Prevent bypass with block-offs.</i>
Low coil capacity (Chilled water)	<i>Coil tubes are blocked</i>	<i>Clean and unblock tubes.</i>
	<i>Incorrect airflow</i>	<i>Check fan operating conditions.</i>
	<i>Incorrect gpm</i>	<i>Check water pumps, valves and lines for obstructions.</i>
	<i>Incorrect water temperature</i>	<i>Provide proper water temperature.</i>
	<i>Air is bypassing coil</i>	<i>Prevent bypass with block-offs.</i>
Low coil capacity (Refrigerant)	<i>Coil tubes are blocked</i>	<i>Clean and unblock tubes.</i>
	<i>Incorrect airflow</i>	<i>Check fan operating conditions.</i>
	<i>Expansion valve not operating</i>	<i>Check sensing bulb location and TXV operation.</i>

Table 52
T-Series Climate Changer Trouble Analysis

SYMPTOM	PROBABLE CAUSE	RECOMMENDED ACTION
	<i>Poor refrigerant distribution</i>	<i>Check for blockage in distributor and tubes.</i>
<i>Drain pan is overflowing</i>	<i>Plugged drain line</i>	<i>Clean drain line.</i>
	<i>Unit not level</i>	<i>Level unit.</i>
<i>Standing water in drain pan</i>	<i>Improper trap design</i>	<i>Design trap for unit.</i>
<i>Excess dirt in unit</i>	<i>Missing filters</i>	<i>Replace filters.</i>
	<i>Filter bypass</i>	<i>Reduce filter bypass.</i>
<i>Mold inside air handler</i>	<i>Standing water in drain pan</i>	<i>See "Standing water" symptom.</i>

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