FOR YOUR SAFETY
If you smell gas:

1. **Open windows.**
2. **DO NOT try to light any appliance.**
3. **DO NOT use electrical switches.**
4. **DO NOT use any telephone in your building.**
5. **Extinguish any open flame.**
6. **Leave the building.**
7. **Immediately call your local gas supplier after leaving the building. Follow the gas supplier's instructions.**
8. **If you cannot reach your gas supplier, call the Fire Department.**

⚠ WARNING

Fire Hazard

Keep all flammable objects, liquids and vapors the minimum required clearances to combustibles away from equipment.

Some objects will catch fire or explode when placed close to equipment.

Failure to follow these instructions can result in death, injury or property damage.

⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can result in death, injury or property damage. Read the Installation, Operation and Service Manual thoroughly before installing or servicing this equipment.

Installation must be done by a contractor qualified in the installation and service of gas-fired heating equipment or your gas supplier.

NOT FOR RESIDENTIAL USE

C ETL US LISTED Intertek

CANADA: 100% OUTSIDE AIR ONLY

© 2021 Specified Air Solutions

Weather-Rite™

TT-Series

Direct, Gas Fired, Industrial Air Handler

Installation, Operation & Service Manual

TT0510
TT1025
TT1530
TT2035
TT2545
TT3060
TT3580
TT4095
TT5515

Installer

Please take the time to read and understand these instructions prior to any installation. Installer must give a copy of this manual to the owner.

Owner

Keep this manual in a safe place in order to provide your service technician with necessary information.

Weather-Rite
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Comstock Park, MI 49321
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www.weather-rite.com

P/N WR161100NA Rev G 09/21

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Printed in the U.S.A.

SECTION 1: AIR HANDLER SAFETY

Your Safety is Important to Us! This symbol is used throughout the manual to notify you of possible fire, electrical or burn hazards. Please pay special attention when reading and following the warnings in these sections.

Installation, service and, at a minimum, annual inspection of air handlers must be done by a contractor qualified in the installation and service of gas-fired heating equipment.

Read this manual carefully before installation, operation or service of this equipment.

This air handler is designed for heating non-residential indoor spaces. Do not install in residential spaces. These instructions, the layout drawing, local codes and ordinances and applicable standards that apply to gas piping, electrical wiring, ventilation, etc. must be thoroughly understood before proceeding with the installation.

Protective gear is to be worn during installation, operation and service. Thin sheet metal parts have sharp edges. To prevent injury, the use of work gloves is recommended.

Before installation, check that the local distribution conditions, nature of gas and pressure and adjustment of the appliance are compatible.

The equipment must be applied and operated under the general concepts of reasonable use and installed using the best building practices.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

Children should be supervised to ensure that they do not play with the appliance.

For additional copies of the Installation, Operation and Service Manual, please contact WEATHER-RITE™.

Gas-fired appliances are not designed for use in atmospheres containing flammable vapors or dust or atmospheres containing chlorinated or halogenated hydrocarbons. Recirculated room air may be hazardous if containing flammable solids, liquids, and gases; explosive materials; and/or substances which may become toxic when exposed to heat (i.e. refrigerants, aerosols, etc.).

1.1 Description of Operation

This air handler is a direct-fired, electric, steam, hot water and/or energy recovery heated fresh air appliance. It is designed for indoor or outdoor installation with fresh outdoor air delivered to the burner. Air handlers are designed to operate in temperatures as low as -30 °F (-34 °C) variable frequency drive is only approved for applications 15 °F (-9 °C) and above, unless a control enclosure heater is installed. The air handler is factory-tested and may be designed to operate using natural gas or LPG (check the air handler's rating plate for information on the appropriate gas). The heat will modulate to maintain the selected supply air temperature or room air temperature, depending on the selected controls. *See Page 92, Section* .

The air handler may be provided with several different controls and options to meet various application requirements. Be sure to read this entire manual before installation and start-up.

1.2 Inspection and Setup

The air handler may ship in multiple sections based upon the configuration selected. The air handler was inspected and operated prior to shipment. Immediately upon receipt of the air handler, check the fuel and electrical requirements of the air handler and verify that they match the fuel and electrical supply available. Verify that the specifications on the air handler rating plate match the order. Check the air handler for any damage that may have occurred during shipment. If any damage is found, file a claim with the transporting agency. Do not refuse shipment. Check the installation location to ensure proper clearances to combustibles. *See Page 8, Section 3.1*.

Any small options which do not come attached to the air handler will be found inside the air handler.

Larger accessories (i.e. legs, stand, filter section, inlet hood) may either ship with the air handler or separately on another truck. Check the bill of lading for information.

1.3 Temporary Storage

If the air handler must be temporarily stored (ie. job site is not ready for installation of the air handler), the following procedure should be performed. After unloading unit from truck, place on a flat clean surface in a protected area. The air handler should be set on 4" x 4" (10 cm x 10 cm) pieces of timber to elevate unit off the ground. Cover air handler with a tarp or weatherproof material to ensure protection from the environment. Manually rotate the fan wheel every 15 days to eliminate grease from settling in the fan bearings and creating flat spots on the shaft.

Air handlers built for indoor installation are not weatherized.

Weather-Rite LLC will not be held responsible for any damage that may occur from outdoor storage.

1.4 Safety Labels and Their Placement

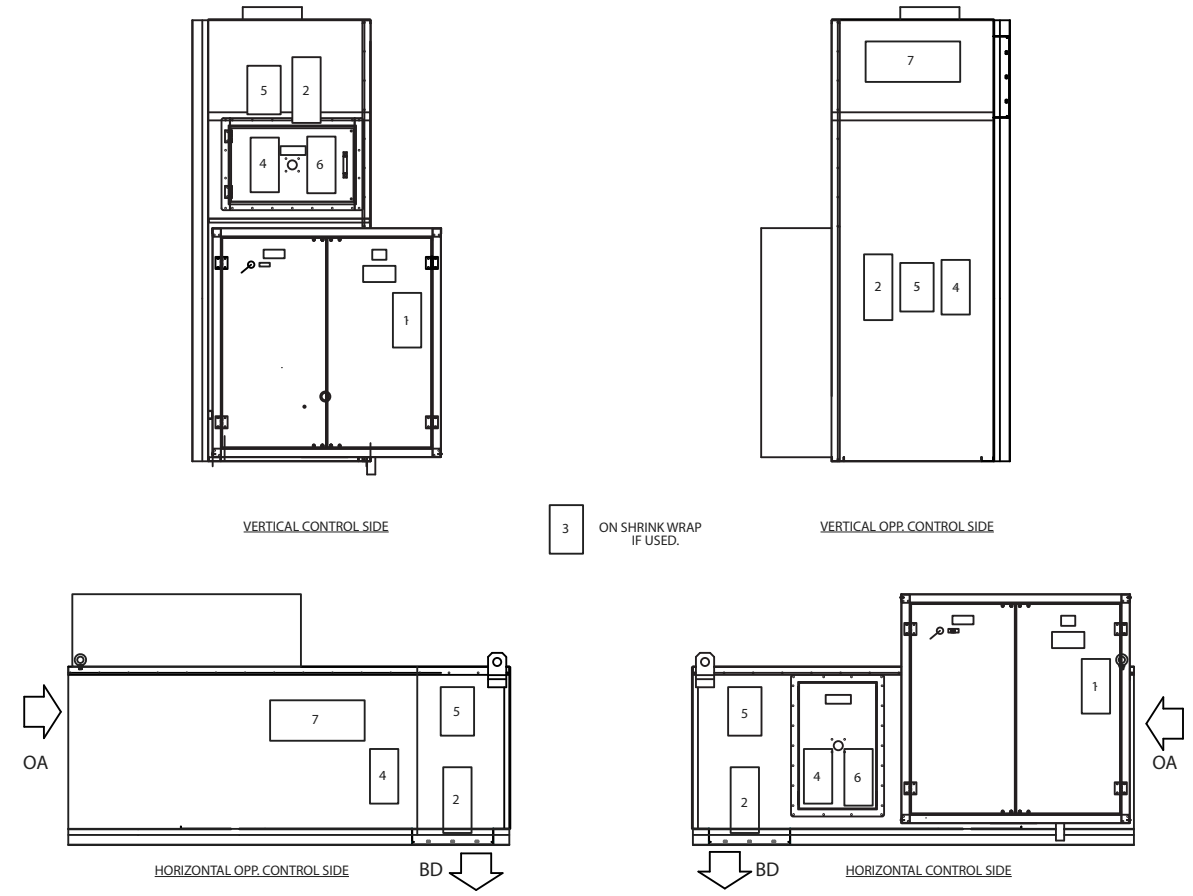
Product safety signs or labels should be replaced by product user if they are no longer legible. Please contact Weather-Rite LLC or your WEATHER-RITE™ independent distributor to obtain replacement signs or labels. *See Page 3, Figure 1 through Page 5, Figure 3*.

1.5 California Proposition 65

In accordance with California Proposition 65 requirements, a warning label must be placed in a highly visible location on the outside of the equipment (i.e., near equipment's serial plate). See label placement drawing on *Page 3, Figure 1 through Page 5, Figure 3* for label location. Avoid placing labels on areas with extreme heat, cold, corrosive chemicals or other elements. To order additional labels, please contact Weather-Rite LLC or your WEATHER-RITE™ independent distributor.

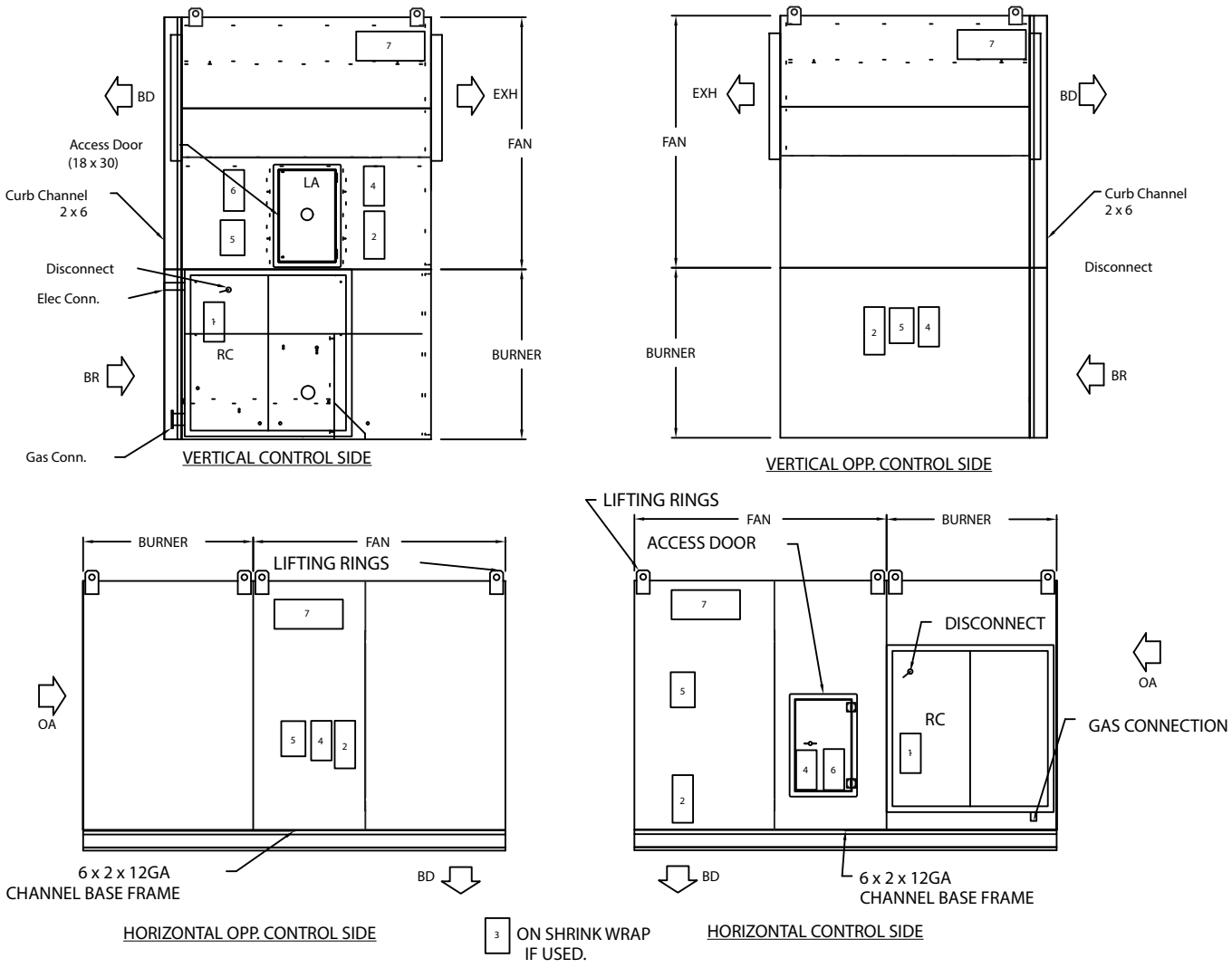
1.6 Label Placement

FIGURE 1: TT0510 - TT2545



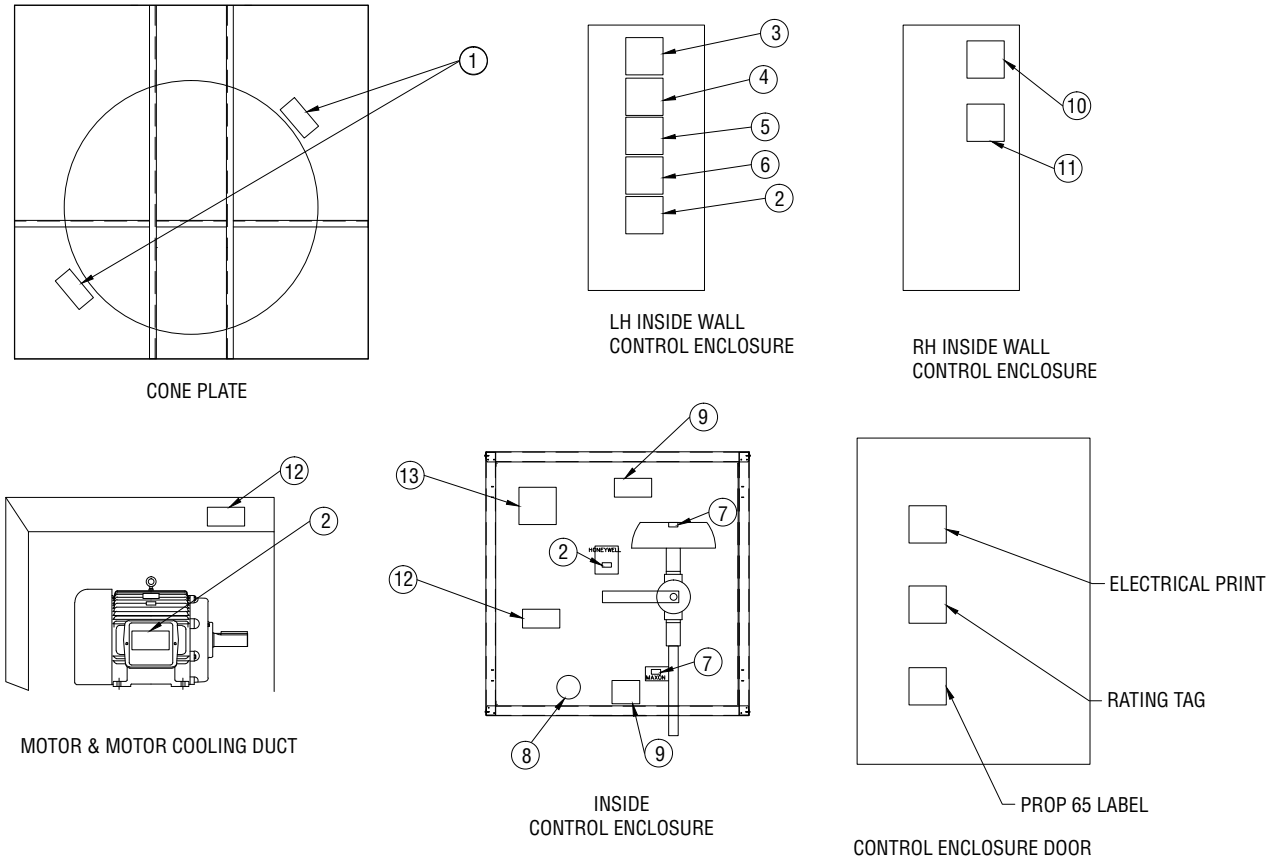
Item	Part Number	Description
1	19305	Label Shock Hazard
2	19304	Label Severe Injury Hazard
3	19307	Label Crush Hazard
4	19308	Label Fire Hazard
5	19309	Label Falling Hazard
6	19306	Label Burn Hazard
7	91040039	Weather-Rite Logo Label
8	91070015	Proposition 65 Label

FIGURE 2: TT3050 and TT5515



Item	Part Number	Description
1	19305	Label Shock Hazard
2	19304	Label Severe Injury Hazard
3	19307	Label Crush Hazard
4	19308	Label Fire Hazard
5	19309	Label Falling Hazard
6	19306	Label Burn Hazard
7	91040039	Weather-Rite Logo Label
8	91040015	Proposition 65 Label

FIGURE 3: TT-Series Interior



Item	Part Number	Description	Qty.
1		Label - Rotation	2
2		Label - High Voltage	2
3		Label - Caution Don't Overtighten Belt	1
4		Label - Alignment Guide	1
5		Label - Weather-Rite Factory Direct Parts Information	1
6		Label - Bearing Lube Chart	1
7		Label - Gas Type	3
8		Label - Outdoor Temp Sensor	1
9		Label - Min/Max Gas Pressures Required	1
10		Label - Regulator Model Number	1
11		Label - Regulator/Internal Relief Required	1
12		Label - Notice To Installer	1
13		Label - Caution Yellow Wire Not Diffused	1
14	91070015	Proposition 65 Label	1

SECTION 2: INSTALLER RESPONSIBILITY

⚠ WARNING

Explosion Hazard

Equipment must have access to uncontaminated air at all times.

Failure to follow these instructions can result in death, injury or property damage.

The installer is responsible for the following:

- To install and commission the air handler, as well as the gas and electrical supplies, in accordance with applicable specifications and codes. Weather-Rite LLC recommends the installer contact a local building inspector or Fire Marshal for guidance.
- To use the information given in a layout drawing and in the manual together with the cited codes and regulations to perform the installation.
- To install the air handler in accordance with clearances to combustibles.
- To furnish all needed materials not furnished as standard equipment.
- To plan location of supports.
- To provide access to air handler for servicing.
- To provide the owner with a copy of this Installation, Operation and Service Manual.
- To never use air handler as support for a ladder or other access equipment and never hang or suspend anything from heater.
- To ensure there is adequate air circulation around the air handler and to supply air for combustion, ventilation and distribution in accordance with local codes.
- To assemble or install any accessories or associated duct work using best building practices.
- To properly size supports and hanging materials.
- To ensure air handler is placed in an approved application.
- To provide building pressure relief/dampers fans to prevent over pressurization of a building, if needed.

2.1 Corrosive Chemicals

⚠ CAUTION

Product Damage Hazard

Do not use equipment in area containing corrosive chemicals.

Refer to appropriate Material Safety Data Sheets (MSDS).

Failure to follow these instructions can result in product damage.

Weather-Rite LLC cannot be responsible for ensuring that all appropriate safety measures are undertaken prior to installation; this is entirely the responsibility of the installer. It is essential that the contractor, the sub-contractor, or the owner identifies the presence of combustible materials, corrosive chemicals or halogenated hydrocarbons* anywhere in the premises.

** **Halogenated Hydrocarbons** are a family of chemical compounds characterized by the presence of halogen elements (fluorine, chlorine, bromine, etc.). These compounds are frequently used in refrigerants, cleaning agents, solvents, etc. If these compounds enter the air supply of the burner, the life span of the air handler components will be greatly reduced. The location of the outside air supply must be carefully chosen to supply outside air, free of these compounds, to the burners whenever the presence of these compounds is suspect. Warranty will be invalid if the air handler is exposed to halogenated hydrocarbons.*

2.2 National Standards and Applicable Codes

All appliances must be installed in accordance with the latest revision of the applicable standards and national codes. This refers also to the electric, gas and venting installation. Note: Additional standards for installations in public garages, aircraft hangars, etc. may be applicable.

2.3 Required Equipment

When lifting of the equipment is required, the installing contractor is responsible for supplying or arranging for the appropriate lifting equipment so that

the air handler and accessories may be placed in a safe manner.

The qualified installer or service technician is responsible for having the appropriate equipment for the safe installation and start-up of an industrial air handler. Tools required to commission the equipment include, but are not limited to, the following:

- Various screwdriver types and sizes
- Various adjustable wrenches
- Torque wrenches
- Pipe wrenches sized appropriately for the gas train components
- Drill motor and various drill bits and runners
- U-tube manometer or gas pressure gauge
- Volt meter
- Clamp style ammeter
- Belt tension gauge
- Thermometer

SECTION 3: CRITICAL CONSIDERATIONS

⚠WARNING

Fire Hazard

Keep all flammable objects, liquids and vapors the minimum required clearances to combustibles away from equipment.

Some objects will catch fire or explode when placed close to equipment.

Failure to follow these instructions can result in death, injury or property damage.

⚠WARNING

Explosion Hazard

Fresh air supply duct and burner housing must be purged with fresh air four times before every ignition.

Explosive vapors will ignite if not evacuated before ignition attempt.

Failure to follow these instructions can result in death, injury or property damage.

3.1 Required Clearances to Combustibles

Clearances are the required distances that combustible objects must be away from the air handler to prevent fire hazards. Combustibles are materials that may catch on fire and include common items such as wood, paper, rubber, fabric, etc. **Maintain clearances to combustibles at all times for safety.**

Check the clearances on each air handler being installed to make sure the product is suitable for your application and the clearances are maintained. Clearances to combustibles for all models are 6"(15.2 cm) on all surfaces. Read and follow the safety guidelines below:

- Locate the air handler so that the air intakes are not too close to any exhaust fan outlets, gasoline storage or other contaminants that could potentially cause dangerous situations.
- Keep gasoline or other combustible materials including flammable objects, liquids, dust or vapors away from this air handler or any other appliance.
- Maintain clearances from heat sensitive material, equipment and workstations.

Clearances to combustibles do not denote clearances for accessibility. Minimum clearance for access is 48" (122 cm). Minimum clearance for accessibility applies to the control enclosure, fan access panel and filter access panel (when equipped).

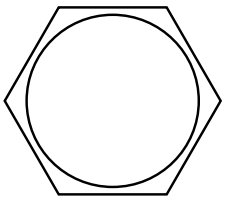
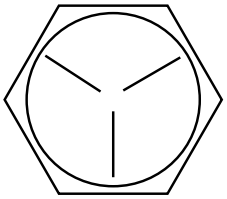
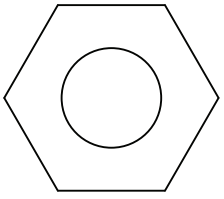
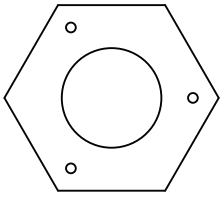
The stated clearances to combustibles represent a surface temperature of 90 °F (50 °C) above room temperature (90 °F [50 °C] plus ambient temperature). Building materials with a low heat tolerance (i.e. plastics, vinyl siding, canvas, tri-ply, etc.) may be subject to degradation at lower temperatures. It is the installer's responsibility to assure that adjacent materials are protected from degradation.

• Maintain clearances from vehicles parked below the air handler. *See Page 9, Section 4.4*.

3.2 Hardware

Unless otherwise specified, all hardware must be torqued to settings on *Page 8,Table 1*.

Table 1: Recommended Torque Settings

Bolt Head Grade Marking		
Nut Grade Marking		
Bolt Size	**Grade 2**	**Grade 5**
10-24	27 in•lb	42 in•lb
1/4-20	65 in•lb	101 in•lb
5/16-18	11 ft•lb	17 ft•lb
3/8-16	19 ft•lb	30 ft•lb

SECTION 4: NATIONAL STANDARDS AND APPLICABLE CODES

4.1 Gas Codes

The type of gas appearing on the nameplate must be the type of gas used. Installation must comply with national and local codes and requirements of the local gas company.

United States: Refer to NFPA 54/ANSI Z223.1 - latest revision, National Fuel Gas Code.

Canada: Refer to CSA B149.1- latest revision, Natural Gas and Propane Installation Code.

4.2 Installation Codes

Installations must be made in accordance with the Standard for the Installation of Air-Conditioning and Ventilating Systems, NFPA 90A - latest revision for the installation of air conditioning and ventilating systems.

4.3 Aircraft Hangars

Installation in aircraft hangars must be in accordance with the following codes:

United States: Refer to Standard on Aircraft Hangars, NFPA 409 - latest revision.

Canada: Refer to Natural Gas and Propane Installation Code, Standard CSA B149.1 - latest revision.

4.4 Parking Structures and Repair Garages

Installation in garages must be in accordance with the following codes:

United States: Refer to standard for Parking Structures, NFPA 88A - latest revision or Code for Motor Fuel Dispensing Facilities and Repair Garages, NFPA 30A - latest revision.

Canada: Refer to Natural Gas and Propane Installation Code, standard CSA B149.1 - latest revision.

4.5 Electrical

Electrical connection to air handler must be in accordance with the following codes:

United States: Refer to National Electrical Code®, NFPA 70 - latest revision. Wiring must conform to the most current National Electrical Code®, local ordinances, and any special diagrams furnished.

Canada: Refer to Canadian Electrical Code, CSA C22.1 Part 1 - latest revision.

4.6 Venting

The venting must be installed in accordance with the requirements within this manual and the following codes:

United States: Refer to NFPA 54/ANSI Z223.1- latest revision, National Fuel Gas Code.

Canada: Refer to CSA B149.1 - latest revision, Natural Gas and Propane Installation Code.

4.7 High Altitude

These air handlers are approved for installations up to 2000' (609.6 m) (in the US) and 4500' (1371.6 m) (in Canada) without modification. Consult factory if US installation is above 2000' (609.6 m) or Canadian installation is above 4500' (1371.6 m).

SECTION 5: SPECIFICATIONS

Dimension and estimated weight tables apply to both vertical and horizontal units of the same style.
All dimensions are in inches and all weights are in pounds, but are subject to change without notice.
Dimensions apply to both horizontal and vertical units. Filters and legs are shipped loose. Control enclosure for 3" or smaller manifolds is 57"H x 57"W x 25"D. (B dimension of model TT0510 cabinet is approximately 20" smaller than the control enclosure. Model TT2545 control enclosure is 57"H x 57"W x 20"D.) To minimize water entrainment, an inlet hood with drift eliminator or inlet plenum is recommended. Outdoor duct sizes vary. Control enclosure can be located on left or right side of unit. (Shown on right side in drawings.) Consult Weather-Rite LLC for additional information.
All industrial air handlers are built based on customer specific static pressure.
All ductwork and connections must be sized per SMACNA (Sheet Metal and Air Conditioning Contractors' National Association).
The legend below details abbreviations used in this section and applies to *Page 11, Figure 4 through Page 18, Figure 11*.

Legend
OA = Outside Air
CE = Control Enclosure
BD = Bottom Discharge
LD = Left Discharge
RD = Right Discharge
UD = Up Discharge
BR = Bottom Return
RR = Right Return
LR = Left Return
ER = End Return
FJ = Field Joint
AD1 = Access Door **
AD2 = Access Door ***

** Model TT5515

*** Models TT0510 - TT4095

FIGURE 4: TT AM Vertical Model Dimensions

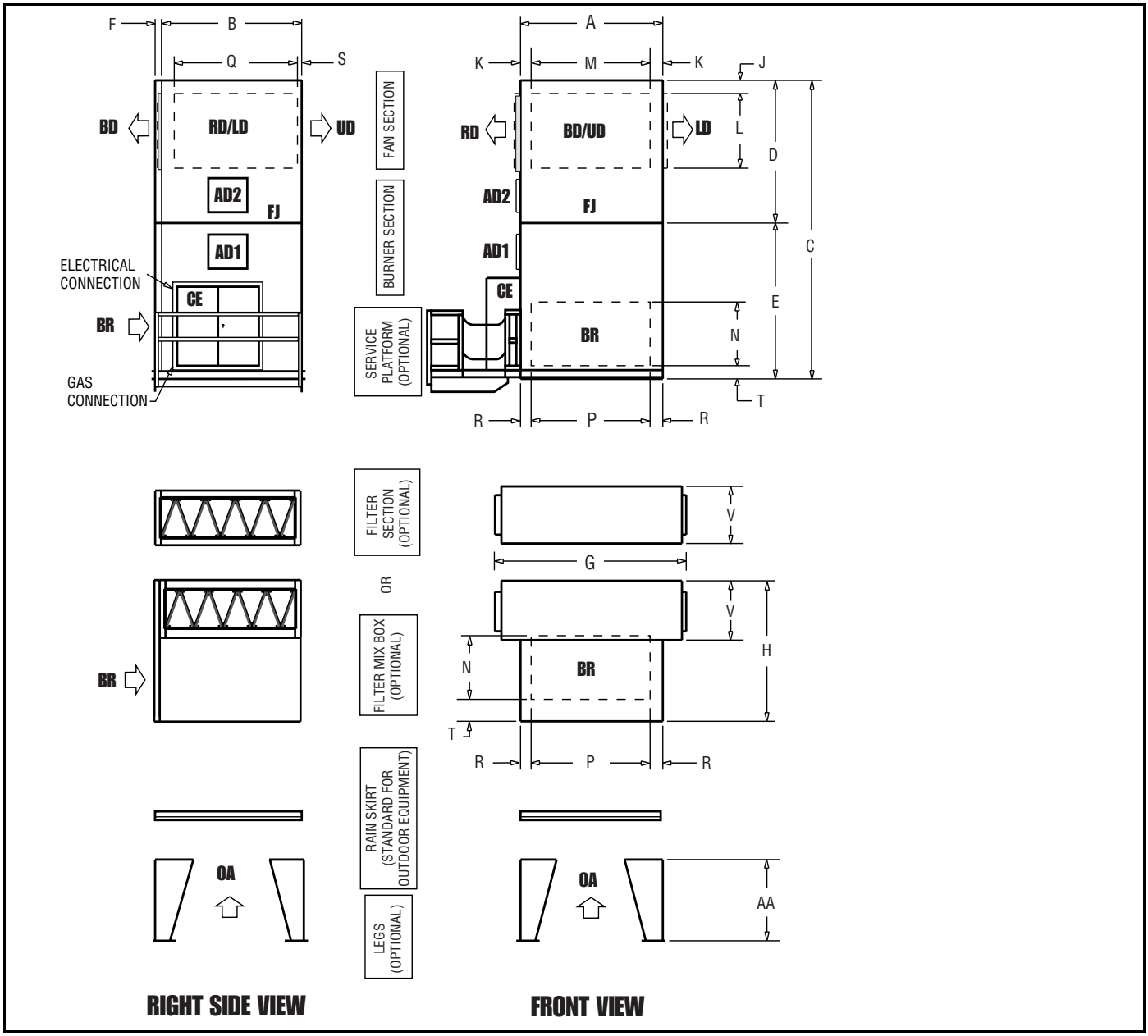


Table 2: TT AM Dimensions

Model	Air Handler					Base Frame Formed Channel	Base Frame Structural Angle	Filter Section Width	Filter Mixbox Length	Filter Mixbox Length With Side Return			Discharge Length	Discharge Width	Return Air Length	Return Air Length	Return Air Width	Return Air Height	Discharge Height					Filter Length	Plenum Width	Plenum Length	Inlet Hood Length	Minimum Leg Height	Plenum Height
	Width	Height	Length																										
	A	B	C	D	E	F		G	H	H1	J	K	L	M	N	N1	P	P1	Q	R	R1	S	T	V	X	Y	Z	AA	BB
TT05 10	40	40	109	-		4	-	62	62	62	4	5.5	20	29	18	27	32	22	34	4	2	3	10	30	40	60	48	36	40
TT10 25	58	58	120	-		4	-	62	66	77	5	5.5	25	47	26	41	50	32	50	4	2	3	4	30	63	77	72	36	63
TT15 30	63	63	130	-		4	-	81	68	77	6	6.5	33	50	30	41	55	40	53	4	2	3	4	30	63	77	84	36	63
TT20 35	69	69	137	-		4	-	81	70	79	6	6.5	36	56	32	43	61	46	59	4	2	3	4	30	76	84	84	36	76
TT25 45	76	76	140	-		4	-	81	72	80	6	6.5	39	63	34	44	68	53	66	4	2	3	4	30	76	84	84	36	76
TT30 60	94	94	154	90	64	6	-	100	77	85	6	6.5	48	81	38	50	86	65	84	4	2	3	4	30	94	77	96	48	94

TT3580	104	96	158	94	64	6	-	119	84	100	6	6.5	50	91	45	65	96	67	90	4	2	3	4	30	112	120	96	48	96
TT4095	112	96	163	94	69	-	3	119	84	107	6	6.5	50	99	44	72	104	64	90	4	2	3	4	30	112	120	96	48	96
TT5515	131	112	177	81	96	-	4	139	94	112	6	7.5	60	116	48	77	123	76	106	4	2	3	4	30	131	138	96	48	112

FIGURE 5: TT AM Horizontal Model Dimensions

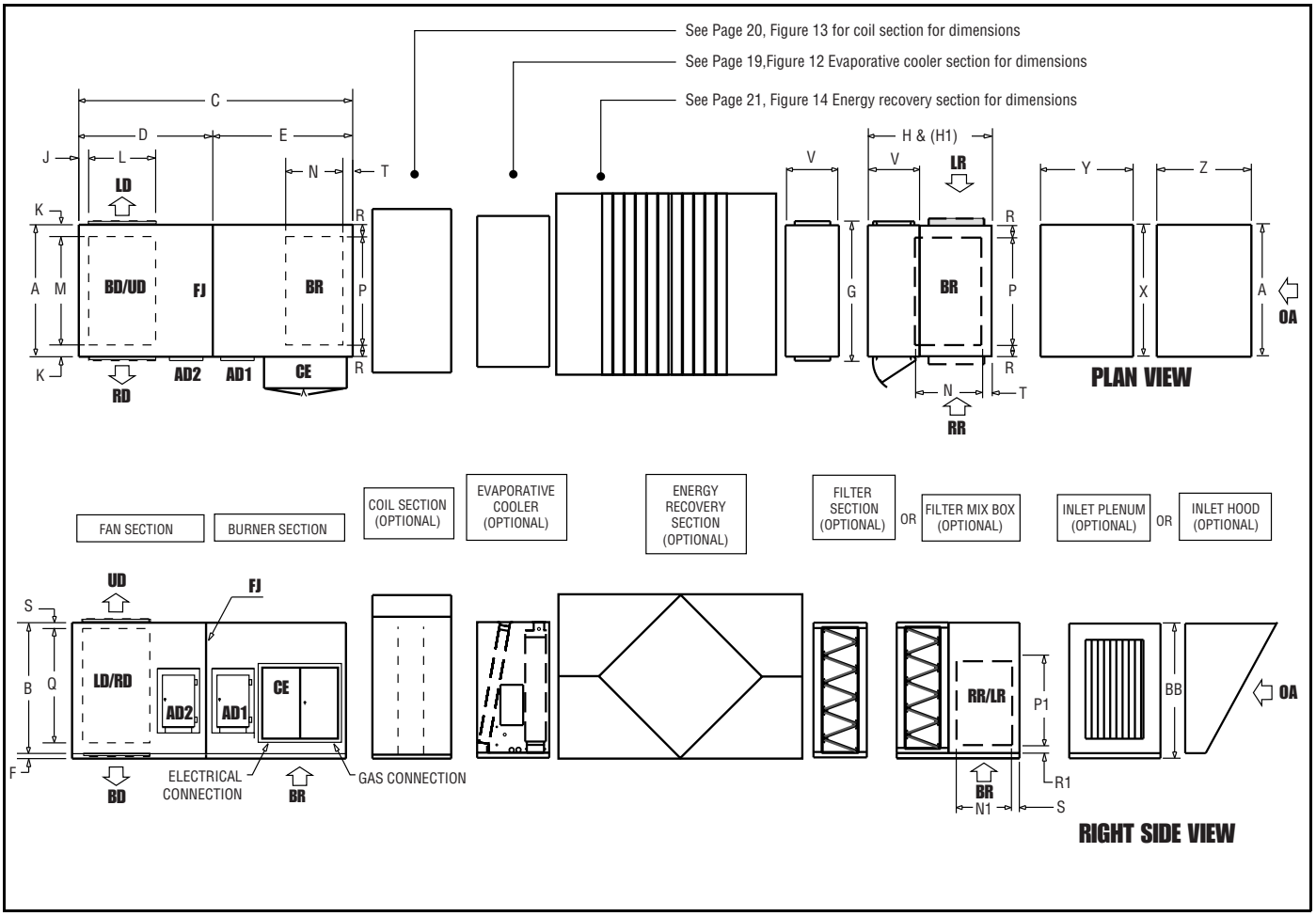


Table 3: TT AM Approximate Shipping Weights

Model	Horizontal Fan Section	Horizontal Burner Section	Horizontal Service Platforms			Filter Section	Filter Mixbox	Inlet Hood	Inlet Plenum	Vertical Service Platform	Vertical Fan Section	Vertical Burner Section
			Basic	With Outside Air Add	With Filter Mix Box Add							
TT0510	1,254		475	70	190	320	611	80	343	340	1,289	
TT1025	2,110		520	70	205	465	843	135	657	430	2,129	
TT1530	2,427		606	69	209	525	1,012	210	661	470	2,443	
TT2035	2,783		630	70	215	600	1,122	226	866	500	2,816	
TT2545	3,114		650	68	230	640	1,230	248	870	525	3,150	
TT3060	2,673	1,936	710	70	240	760	1,707	395	1,157	600	2,663	2,029
TT3580	2,961	2,126	735	65	275	875	2,084	410	1,635	620	3,129	2,228
TT4095	4,219	2,332	760	65	275	1,125	2,220	425	2,052	630	4,553	2,541
TT5515	4,101	4,849	820	70	310	1,400	2,776	590	2,128	720	4,503	4,983

FIGURE 6: TT MUA Vertical Model Dimensions

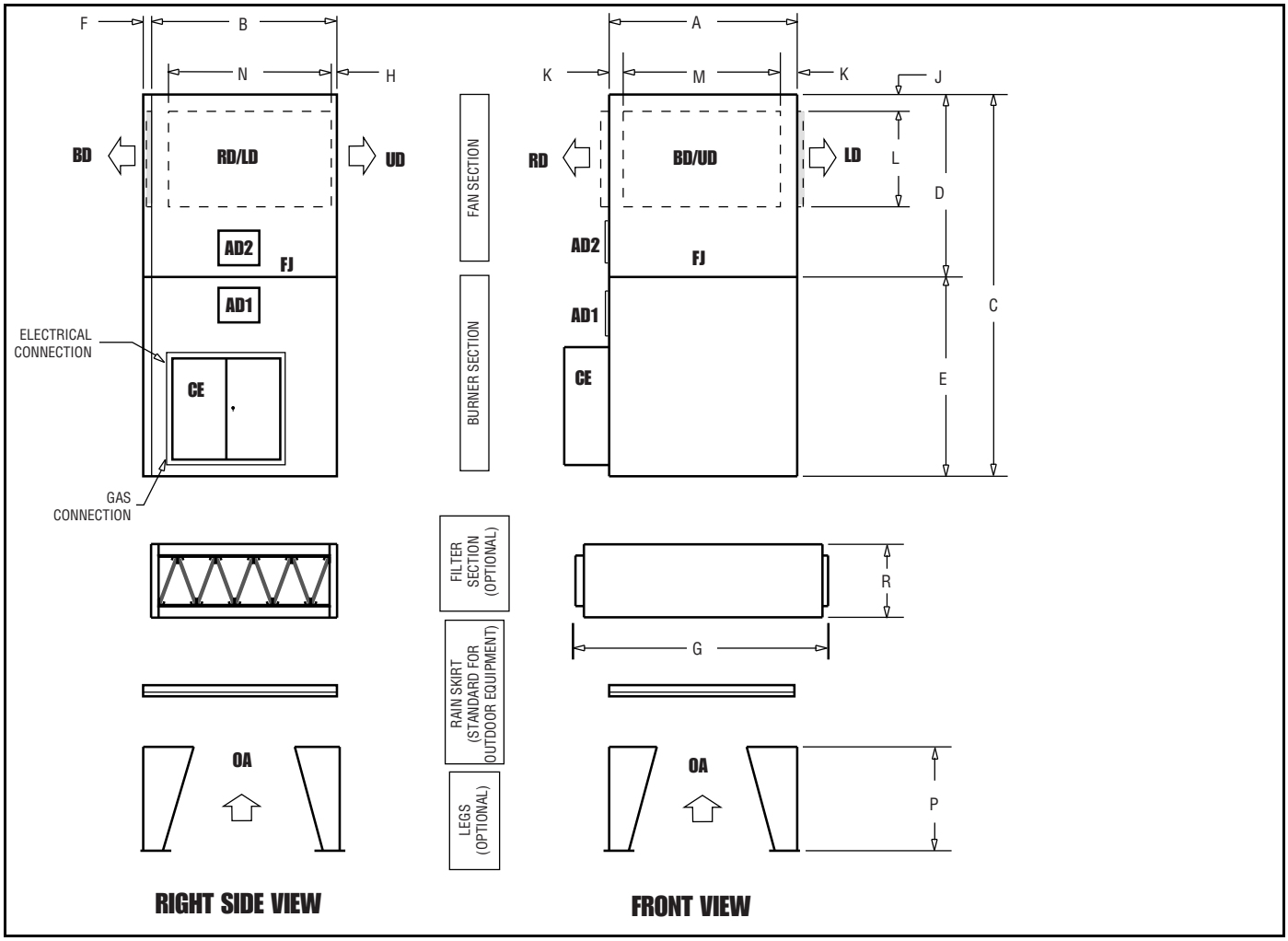


Table 4: TT MUA Dimensions

Model	Air Handler					Base Frame Formed Channel	Base Frame Structural Angle	Filter Section Width				Discharge Length	Discharge Width	Discharge Height	Minimum Leg Length	Filter Section Length	Plenum Width	Plenum Length	Inlet Hood Length	Plenum Height
	Width	Height	Length																	
	A	B	C	D	E	F		G	H	J	K	L	M	N	P	R	X	Y	Z	BB
TT05 10	40	40	109	-		4	-	62	3	4	5.5	20	29	34	36	30	52	60	48	40
TT10 25	58	58	120	-		4	-	62	3	5	5.5	25	47	50	36	30	63	77	72	63
TT15 30	63	63	130	-		4	-	81	3	6	6.5	33	50	53	36	30	76	84	84	63
TT20 35	69	69	137	-		4	-	81	3	6	6.5	36	56	59	36	30	76	84	84	76
TT25 45	76	76	140	-		4	-	81	3	6	6.5	39	63	66	36	30	94	77	84	76
TT30 60	94	94	154	90	64	6	-	100	3	6	6.5	48	81	84	48	30	112	120	96	94
TT35 80	104	96	158	94	64	6	-	119	3	6	6.5	50	91	90	48	30	112	120	96	96
TT40 95	112	96	163	94	69	-	3	119	3	6	6.5	50	99	90	48	30	131	138	96	96
TT55 15	131	112	168	81	87	-	4	139	3	6	7.5	60	116	106	48	30	131	138	96	112

FIGURE 7: TT MUA Horizontal Model Dimensions

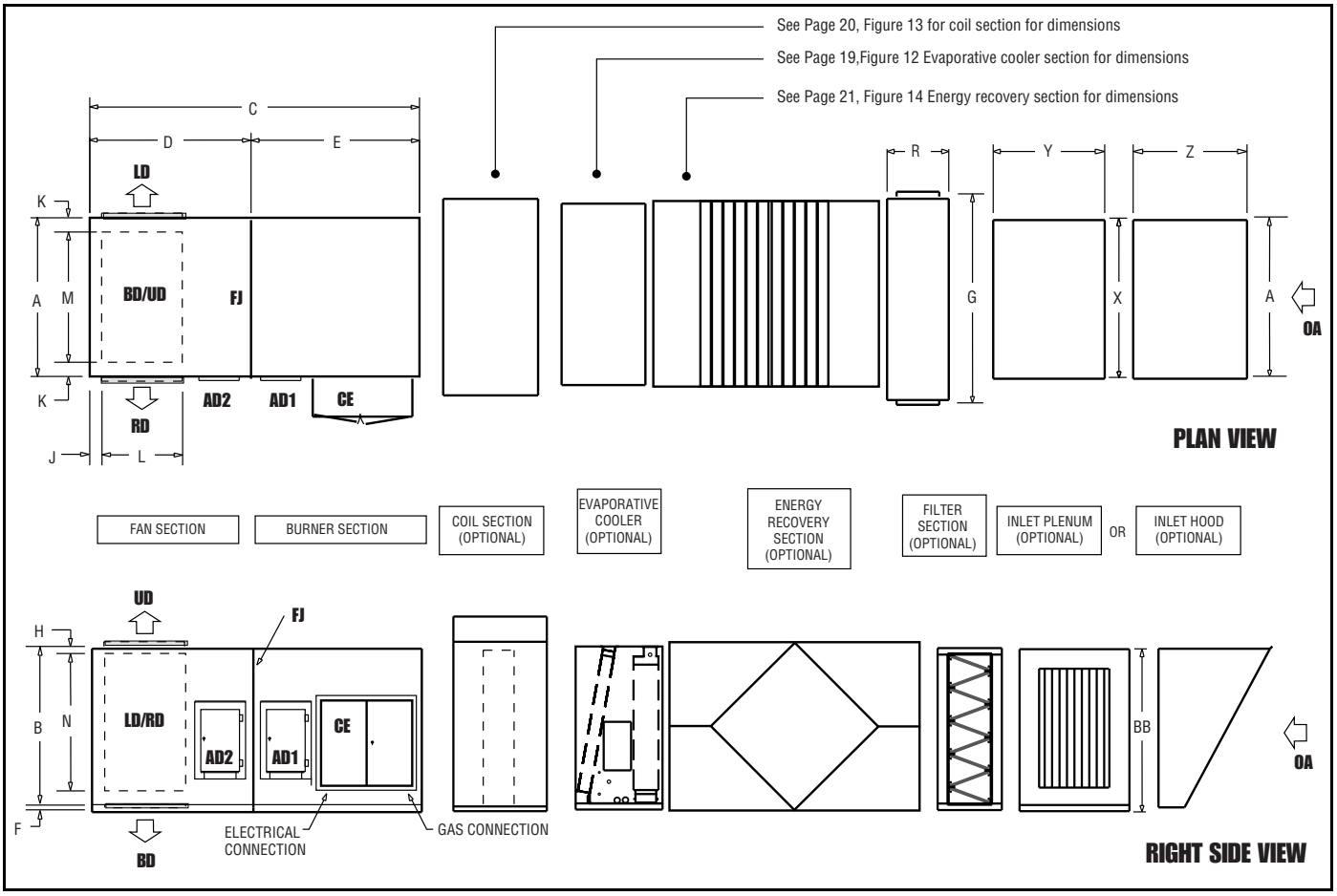


Table 5: TT MUA Approximate Shipping Weights

Model	Horizontal Fan Section	Horizontal Burner Section	Filter Section	Inlet Hood	Inlet Plenum	Vertical Fan Section	Vertical Burner Section
TT0510	1,325		320	80	452	1,360	
TT1025	2,110		465	135	657	2,129	
TT1530	2,530		525	210	862	2,546	
TT2035	2,783		600	226	866	2,816	
TT2545	3,305		640	248	1,126	3,341	
TT3060	2,808	1,973	760	395	1,627	2,798	2,076
TT3580	3,036	2,159	875	410	1,635	3,204	2,234
TT4095	4,525	2,361	1,125	425	2,052	4,859	2,441
TT5515	4,101	5,210	1,400	590	2,128	4,503	5,044

FIGURE 8: TT FR Vertical Model Dimensions

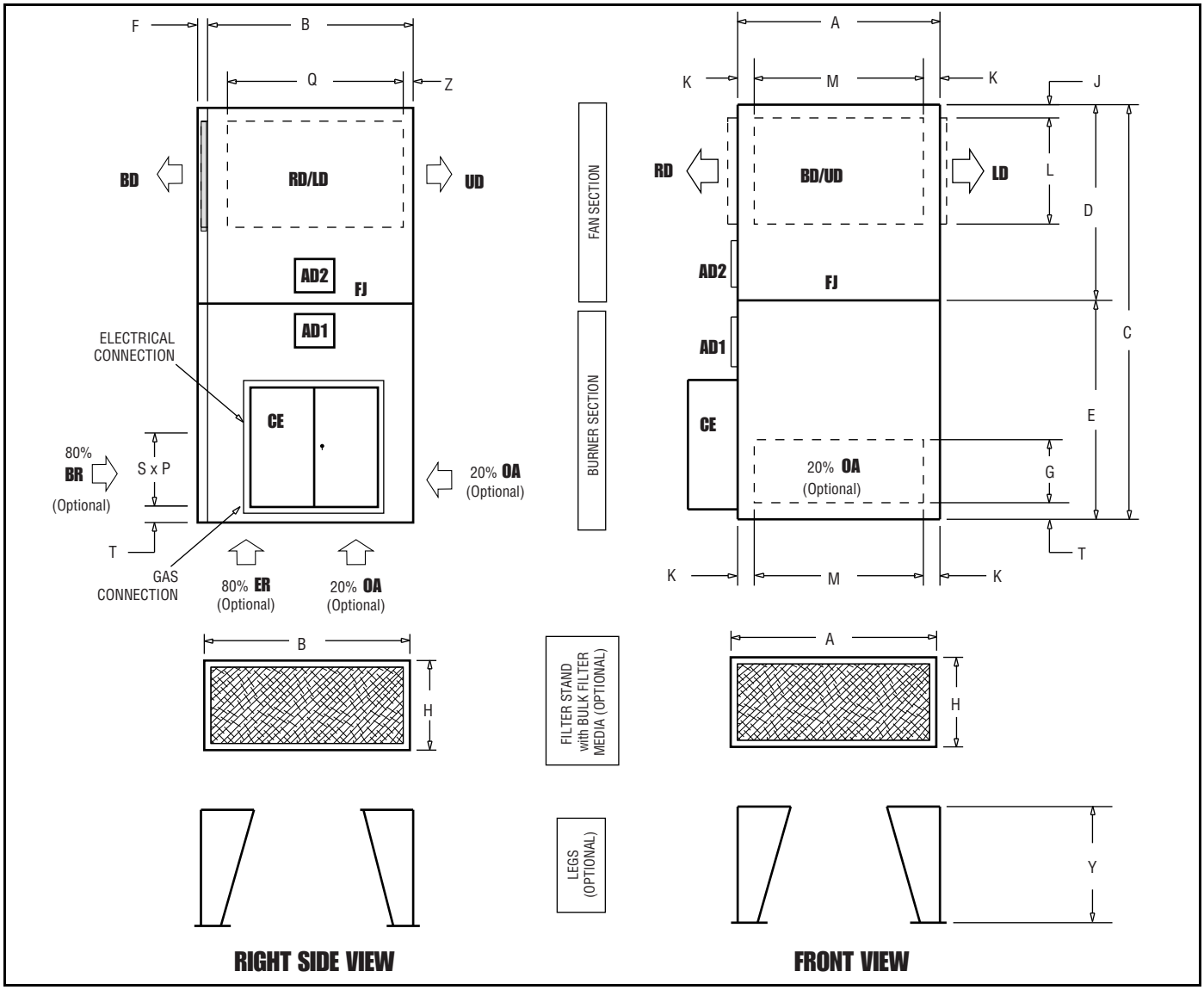


Table 6: TT FR Dimensions

Model	Air Handler					Base Frame Formed Channel	Base Frame Structural Angle	Outside Air Length	Filter Stand Height			Discharge Length	Discharge Width	Discharge Length	Return Air Width	Discharge Height		Return Air Length		Louver Height	Inlet Hoot / Duct Height	Inlet Hood Length	Minimum Leg Height	
	Width	Height	Length																					
	A	B	C	D	E	F		G	H	J	K	L	M	N	P	Q	R	S	T	U	W	X	Y	Z
TT05 10	40	40	109	-		4	-	10	24	4	5.5	20	29	30	32	34	4	18	10	28	21	27	36	3
TT10 25	58	58	120	-		4	-	12	36	5	5.5	25	47	30	50	50	4	26	4	34	30	35	36	3
TT15 30	63	63	130	-		4	-	12	36	6	6.5	33	50	30	55	53	4	30	4	34	32.5	37	36	3
TT20 35	69	69	137	-		4	-	16	36	6	6.5	36	56	30	61	59	4	32	4	45	35.5	39	36	3
TT25 45	76	76	140	-		4	-	16	36	6	6.5	39	63	30	68	66	4	34	4	45	39	42	36	3
TT30 60	94	94	154	90	64	6	-	20	36	6	6.5	48	81	30	86	84	4	38	4	56	48	50	48	3
TT35 80	104	96	158	94	64	6	-	20	48	6	6.5	50	91	30	96	90	4	45	4	56	49	51	48	3
TT40 95	112	96	163	94	69	-	3	24	60	6	6.5	50	99	30	104	90	4	44	4	68	49	51	48	3
TT55 15	131	112	177	81	96	-	4	24	60	6	7.5	60	116	30	123	106	4	48	4	68	57	57	48	3

FIGURE 9: TT FR Horizontal Model Dimensions

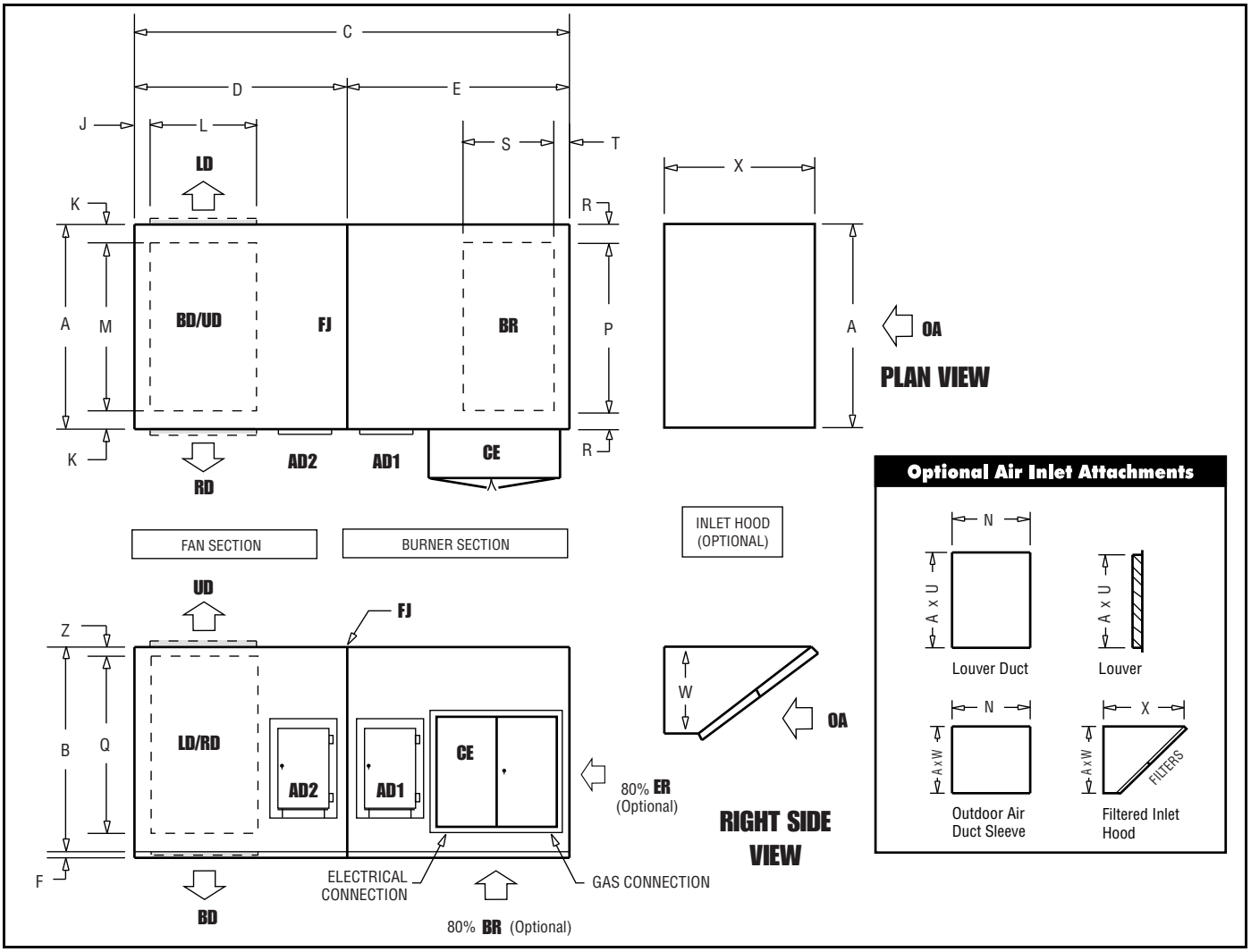


Table 7: TT FR Approximate Shipping Weights

Model	Horizontal Fan Section	Horizontal Burner Section	Filter Section	Inlet Hood	Vertical Fan Section	Vertical Burner Section	Filter Stand
TT0510	1,245		320	80	1,230		95
TT1025	2,055		465	135	2,054		140
TT1530	2,354		525	210	2,360		150
TT2035	2,716		600	226	2,704		160
TT2545	3,034		640	248	3,017		175
TT3060	2,673	1,712	760	395	2,663	1,805	350
TT3580	2,961	1,847	875	410	3,129	1,949	400
TT4095	4,219	1,994	1,125	425	4,553	2,203	450
TT5515	4,101	4,418	1,400	590	4,503	4,552	500

FIGURE 10: TT VAV Vertical Model Dimensions

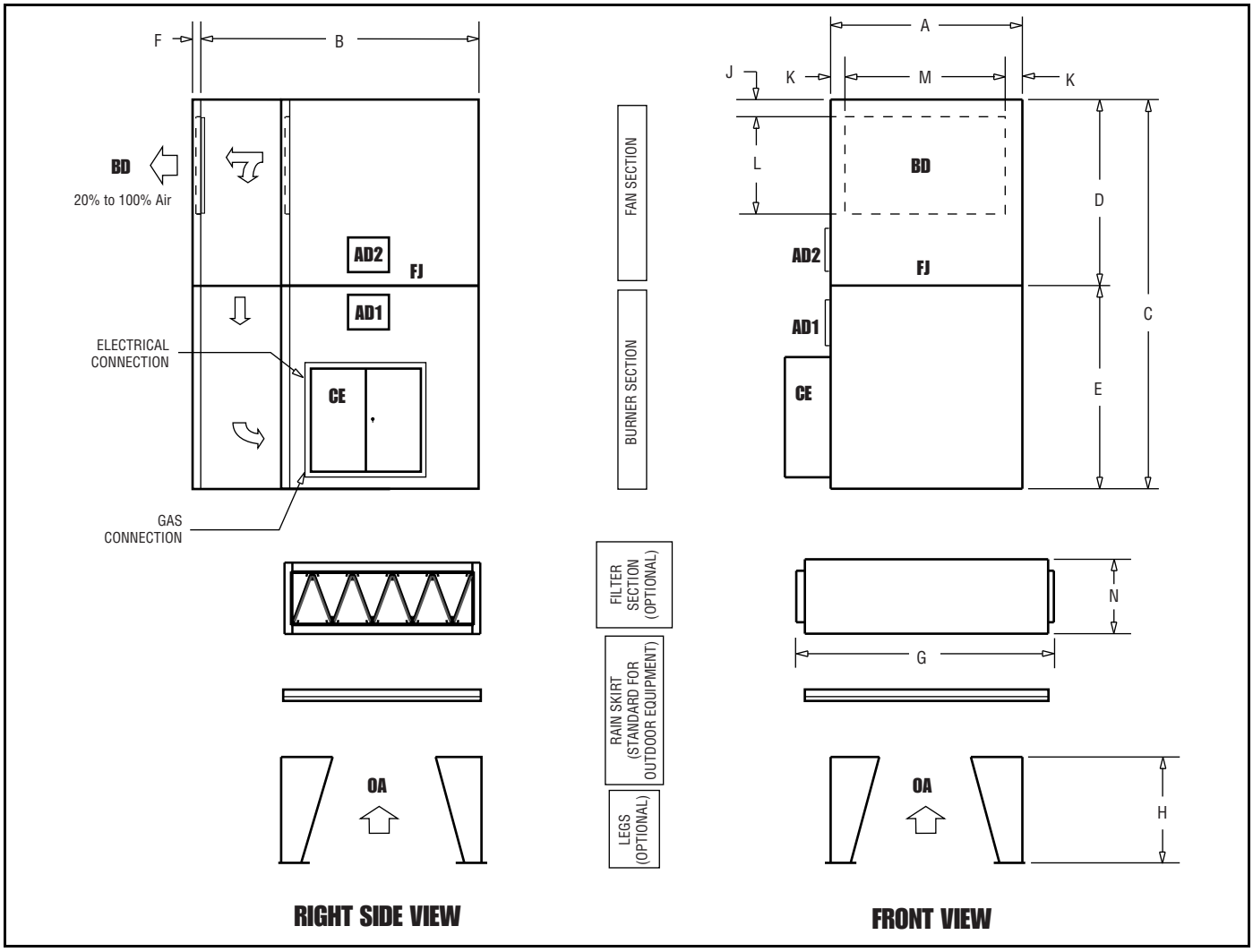


Table 8: TT VAV Dimensions

Model	Air Handler					Base Frame Formed Channel	Base Frame Structural Angle	Filter Section Width	Minimum Leg Height			Discharge Length	Discharge Width	Filter Section Length	Plenum Width	Plenum Length	Inlet Hood Length	Plenum Height
	Width	Height	Length															
	A	B	C	D	E	F		G	H	J	K	L	M	N	X	Y	Z	BB
TT05 10	40	59	109	-		4	-	10	36	4	5.5	24	29	30	40	60	48	40
TT10 25	58	84	120	-		4	-	12	36	5	5.5	32	47	30	63	77	72	63
TT15 30	63	92	130	-		4	-	12	36	6	6.5	35	50	30	63	77	84	63
TT20 35	69	102	137	-		4	-	16	36	6	6.5	35	56	30	76	84	84	76
TT25 45	76	109	140	-		4	-	16	36	6	6.5	40	63	30	76	84	84	76
TT30 60	94	138	154	90	64	6	-	20	48	6	6.5	43	81	30	94	77	96	94
TT35 80	104	140	158	94	64	6	-	20	48	6	6.5	43	91	30	112	120	96	96
TT40 95	112	137	163	94	69	-	3	24	48	6	6.5	43	99	30	112	120	96	96
TT55 15	131	156	177	81	96	-	4	24	48	6	7.5	43	116	30	131	138	96	112

FIGURE 11: TT VAV Horizontal Model Dimensions

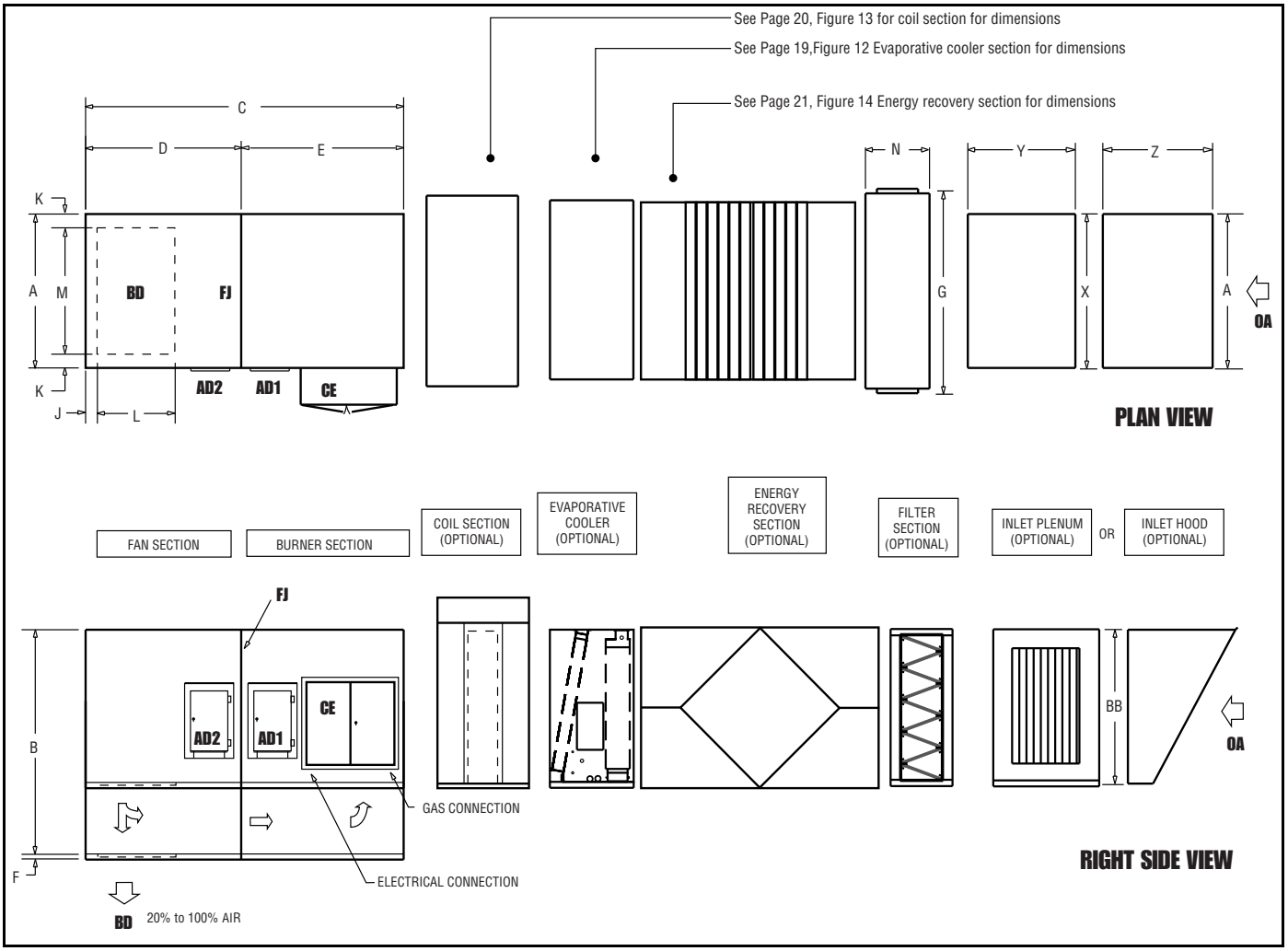


Table 9: TT VAV Approximate Shipping Weights

Model	Horizontal Fan Section	Horizontal Burner Section	Filter Section	Inlet Hood	Inlet Plenum	Vertical Fan Section	Vertical Burner Section
TT0510	1,564		320	80	343	1,589	
TT1025	2,585		465	135	657	2,627	
TT1530	2,982		525	210	661	3,033	
TT2035	3,413		600	226	866	3,470	
TT2545	3,804		640	248	870	3,870	
TT3060	3,333	2,396	760	395	1,157	3,323	2,489
TT3580	3,711	2,626	875	410	1,635	3,879	2,278
TT4095	4,959	2,842	1,125	425	2,052	5,293	3,051
TT5515	4,971	5,699	1,400	590	2,128	5,373	5,833

FIGURE 12: Evaporative Cooling

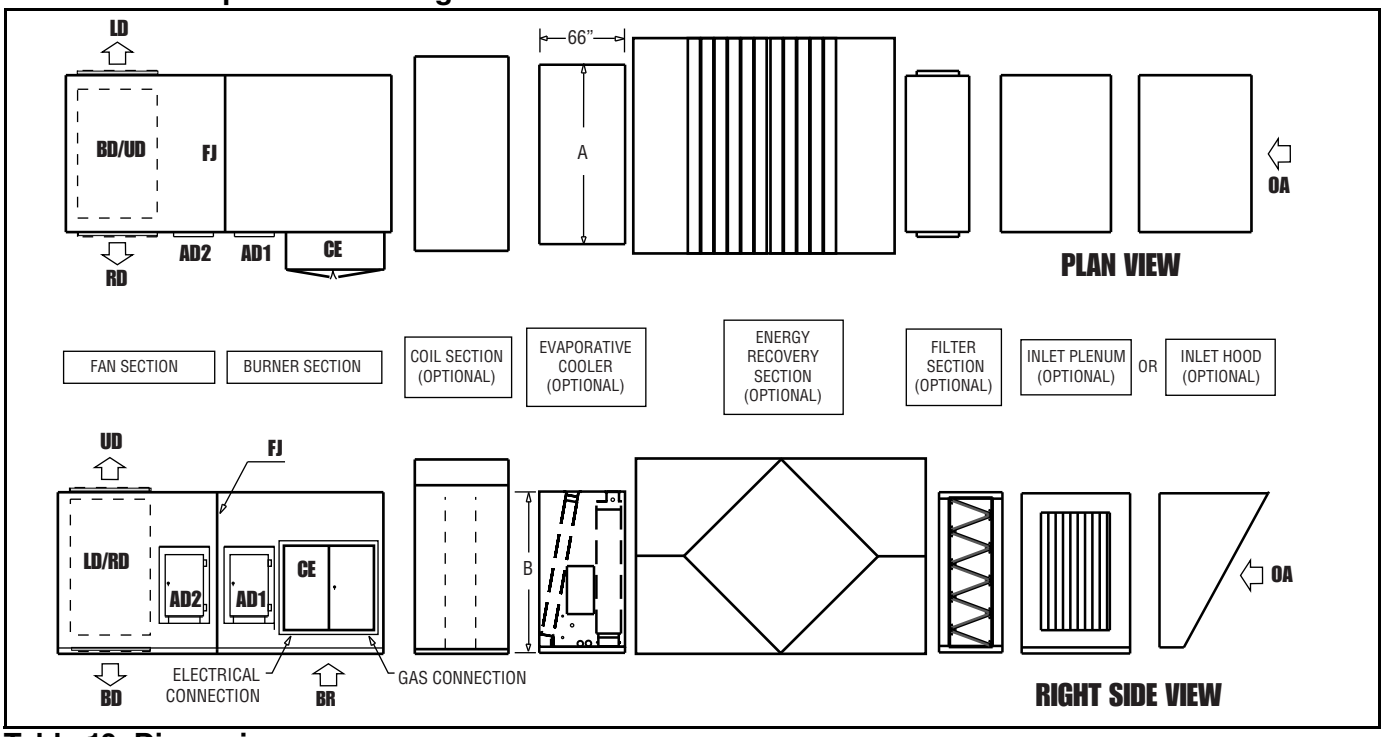


Table 10: Dimensions

Applicable Cabinet	Model 550 FPM	Max CFM	Applicable Cabinet	Model 750 FPM	Max CFM	Dimensions	
						A	B
TT0510	ECM24	4,000	TT0510	ECM24D	5,800	40	40
TT0510-TT1025	ECM36	10,000	TT1025	ECM36D	13,700	58	58
TT1025	ECM40	12,000	TT1025-TT1530	ECM40D	16,600	63	63
TT1025	ECM44	14,500	TT1025-TT1530	ECM44D	19,600	69	69
TT1025-TT1530	ECM49	17,700	TT1025-TT2545	ECM49D	24,300	76	76
TT1025-TT2545	ECM54	23,000	TT2035	ECM54D	31,200	85	85
TT1530-TT2545	ECM60	28,000	TT2545-TT3060	ECM60D	38,500	49	49
TT2035	ECM66	31,600	TT2545-TT3580	ECM66D	43,100	104	96
TT2035	ECM73	34,100	TT3580	ECM73D	46,600	112	96
TT3580	ECM80/ECM89	48,000	TT3580	ECM80D/ ECM89D	65,300	131	112

NOTE: Evaporative Cooling Section is 42".
Transition section is 24". Total length is 66". Applicable for MUA/AM/VAV styles only.

Table 11: Leaving Dry Bulb Temperature Drop (Average)

Wet Bulb Depression (°F)	Temperature Drop (°F) for Stated Media Depth (in)					
	4"	6"	8"	12"	18"	24"
10.0	5.3	6.8	7.9	8.9	9.8	9.9
12.5	6.6	8.5	9.8	11.1	12.2	12.3
15.0	7.9	10.2	11.8	13.3	14.6	14.8
17.5	9.2	11.9	13.8	15.6	17.1	17.3
20.0	10.5	13.6	15.8	17.8	19.5	19.7
22.5	11.8	15.3	17.7	20.0	21.9	22.2
25.0	13.2	17.0	19.7	22.2	24.4	24.7
27.5	14.5	18.7	21.7	24.4	26.8	27.2
30.0	15.8	20.4	23.6	26.7	29.3	29.6
32.5	17.1	22.1	25.6	28.9	31.7	32.1
35.0	18.4	23.8	27.6	31.1	34.1	34.6
37.5	19.7	25.5	29.5	33.3	36.6	37.0
40.0	21.1	27.2	31.5	35.6	39.0	39.5

NOTE: Weather-Rite LLC's standard media thickness equals 12".

Table 12: Air Density Ratio

Temperature (°F)	Density Ratio for Stated Elevation (ft/in HG)										
	0/ 29.92	1,000/ 28.86	2,000/ 26.82	3,000/ 26.82	4,000/ 25.84	5,000/ 24.90	6,000/ 23.98	7,000/ 23.09	8,000/ 22.22	9,000/ 21.39	10,000/ 20.58
68°	1.00	0.97	0.93	0.90	0.87	0.84	0.80	0.77	0.75	0.72	0.69
70°	1.00	0.96	0.93	0.90	0.86	0.83	0.80	0.77	0.74	0.71	0.69
72°	1.00	0.96	0.93	0.89	0.86	0.83	0.80	0.77	0.74	0.71	0.69
74°	0.99	0.96	0.92	0.89	0.86	0.83	0.80	0.77	0.74	0.71	0.68
76°	0.99	0.95	0.92	0.89	0.85	0.82	0.79	0.76	0.73	0.71	0.68
78°	0.99	0.95	0.92	0.88	0.85	0.82	0.79	0.76	0.73	0.70	0.68
80°	0.98	0.95	0.91	0.88	0.85	0.82	0.79	0.76	0.73	0.70	0.68

NOTE: Table to be used when calculating total tonnage of cooling adjusted for elevation.

FIGURE 13: Mechanical Cooling

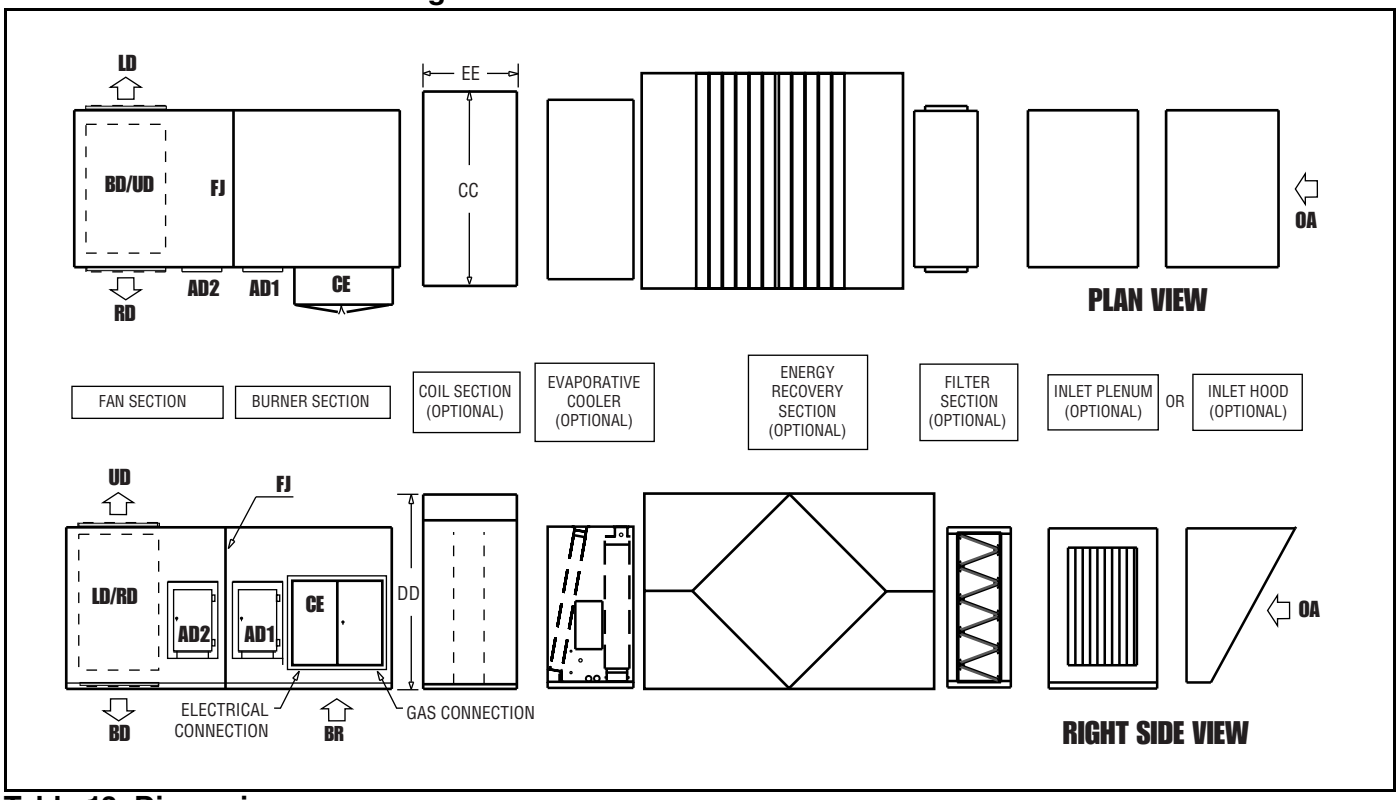


Table 13: Dimensions

Airflow - Cubic Feet per Minute (CFM)	Compatible Cabinet Sizes	Range of Available Tons of Cooling	Quantity of Coils	Square Feet	Fin Area (L x H) of Each Coil (in)*	Coil Face Velocity		Width	Height	Length
						Low	High	CC	DD	EE
3,000-7,000	24	8-35	1	13.8	33 x 60	218	509	68	40	72
7,001-10,000	24	18-50	1	18.0	36 x 72	389	556	80	44	72
10,001-20,000	36-40	25-100	2	38.3	27 x 102	261	523	110	65	72
20,001-27,500	36-44	50-138	2	52.5	35 x 108	381	524	116	80	78
27,501-30,000	40-49	69-150	2	61.2	39 x 113	449	490	121	90	78
30,001-35,000	49-60	75-175	2	70.0	41 x 123	428	500	131	96	84
35,001-50,000	60-73	88-250	2	93.8	45 x 150	373	533	154	105	84
50,001-60,000	66-80	125-300	3	106.5	36 x 142	469	563	150	126	102
60,001-65,000	73-89	150-325	3	117.0	36 x 156	513	556	164	126	102

Table 14: Estimated Tons of Cooling

Airflow - Cubic Feet per Minute (CFM)	0% OA/ 100% RA	25% OA/ 75% RA	50% OA/ 50% RA	75% OA/ 25% RA	100% OA/ 0% RA
	Estimated tons of cooling required to achieve 55/54 leaving air condition (chart based on OA conditions 94/74 and RA conditions of 80/67)				
5,000	16	19	22	24	27
7,500	24	28	33	35	41
10,000	32	38	44	47	54
12,500	39	47	55	59	68
15,000	47	56	66	71	81
20,000	63	75	88	95	108
25,000	79	94	110	118	135
30,000	95	113	132	142	162
35,000	110	131	154	165	189
40,000	126	150	176	189	216
45,000	142	169	197	213	243
50,000	158	188	219	236	270
55,000	173	206	241	260	297
60,000	189	225	263	284	324
65,000	205	244	285	308	351

FIGURE 14: Energy Recovery

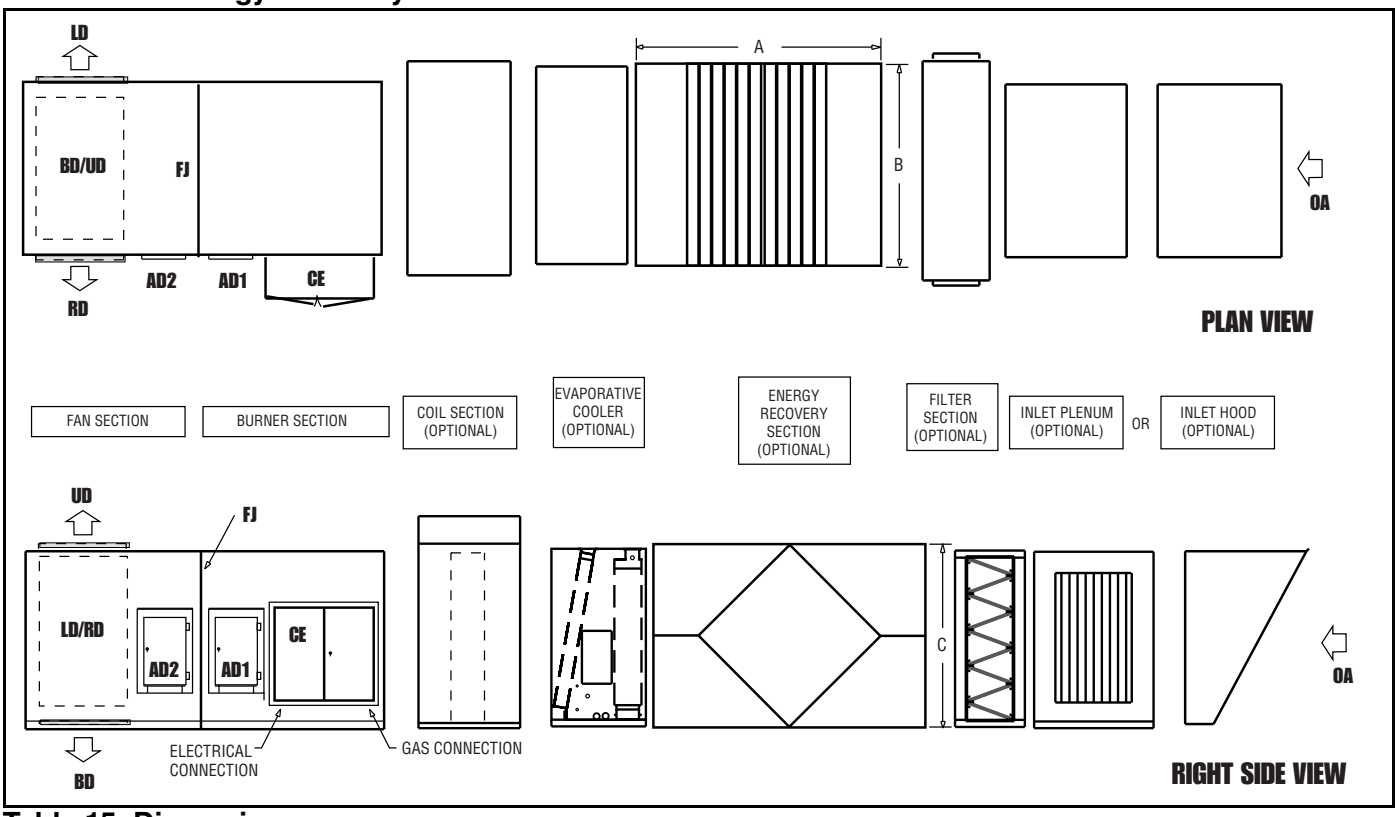


Table 15: Dimensions

Applicable Model		Airflow Cubic Feet per Minute (CFM)	Dimensions			Estimated Weights					
			Length	Width	Height	Module	Inlet Hood	Exhaust Fan	Exhaust Hood	Downturn Section	Filter Housing
MUA	AM		A	B	C						
TT0510	TT0510	4,000-7,000	109	58	69	1,000	150	400	150	250	225
TT1025	TT1025	7,001-15,000	120	85	94	1,900	200	550	200	450	425
		15,001-20,000	130	94	96	2,000	200	800	225	450	425
TT1530	TT1530	20,001-25,000	137	94	123	2,700	300	800	250	550	475
	TT2035	25,001-30,000	140	108	123	2,900	300	800	250	600	550
TT2035	TT2545	30,001-35,000	150	131	123	4,800	300	1,280	275	750	600
TT2545	-	35,001-40,000	160	146	123	5,000	350	1,490	300	750	675
TT3060	TT3580	50,001-60,000	164	212	123	6,400	400	1,924	325	1,300	925

Table 16: Energy Recovery

Compatible Cabinet Size		Supply/Exhaust Air Cubic Feet	Pressure Drop (in wc)		Efficiency		Air Velocity Supply (face/channel) (ft/min)	
MUA	AM	per Minute (CFM)	Supply	Exhaust	Supply	Exhaust	Supply	Exhaust
TT0510	TT0510	4,000	0.42	0.45	59%	59%	329.19 / 851.18	367.34 / 889.82
		5,000	0.63	0.67	60%	60%	411.49 / 1,064.04	459.17 / 1,112.20
		6,000	0.88	0.94	59%	59%	493.79 / 1,276.74	551.01 / 1,334.75
		7,000	1.17	1.25	59%	59%	576.09 / 1,489.31	642.84 / 1,557.43
TT1025	TT1025	7,001	0.29	0.30	63%	61%	240.04 / 632.20	267.85 / 658.93
		8,000	0.37	0.39	63%	61%	274.33 / 722.60	306.12 / 752.99
		9,000	0.45	0.48	63%	61%	308.62 / 812.94	344.38 / 847.09
		10,000	0.55	0.59	63%	61%	342.91 / 903.25	382.64 / 941.23
		11,000	0.66	0.70	63%	61%	377.20 / 993.53	420.91 / 1,035.40
		12,000	0.77	0.82	63%	61%	411.49 / 1,083.78	459.17 / 1,129.59
		13,000	0.89	0.95	63%	61%	445.78 / 1,174.00	497.44 / 1,223.81
		14,000	1.03	1.09	63%	61%	480.08 / 1,264.21	535.70 / 1,318.05
		15,000	1.17	1.24	63%	61%	514.37 / 1,354.39	573.97 / 1,412.31
		15,001	0.70	0.74	62%	61%	403.43 / 1,021.84	450.17 / 1,065.94
		16,000	0.79	0.84	62%	60%	430.32 / 1,089.88	480.18 / 1,137.09
		17,000	0.88	0.94	62%	60%	457.22 / 1,157.91	510.19 / 1,208.25
		18,000	0.98	1.05	62%	60%	484.11 / 1,225.92	540.20 / 1,279.42
		19,000	1.08	1.16	62%	60%	511.01 / 1,293.92	570.22 / 1,350.60
		20,000	1.19	1.27	61%	60%	537.90 / 1,361.91	600.23 / 1,421.78
TT1530	TT1530	20,001	0.72	0.77	62%	60%	457.22 / 1,130.29	510.19 / 1,179.84
		21,000	0.79	0.85	61%	60%	480.08 / 1,186.72	535.70 / 1,238.92
		22,000	0.87	0.92	61%	60%	502.94 / 1,243.14	561.21 / 1,297.99
		23,000	0.94	1.00	61%	60%	525.80 / 1,299.55	586.72 / 1,356.99
		24,000	1.02	1.09	61%	59%	548.66 / 1,355.95	612.23 / 1,415.99
		25,000	1.10	1.17	61%	59%	571.52 / 1,412.35	637.74 / 1,474.99
TT1530	TT2035	25,001	0.83	0.89	61%	60%	489.87 / 1,218.80	546.64 / 1,272.52
		26,000	0.90	0.96	61%	60%	509.47 / 1,267.47	568.50 / 1,323.44
		27,000	0.96	1.03	61%	60%	529.06 / 1,316.14	590.37 / 1,374.35
		28,000	1.03	1.10	61%	59%	548.66 / 1,364.80	612.23 / 1,425.25
		29,000	1.10	1.17	61%	59%	568.25 / 1,413.45	634.10 / 1,476.15
		30,000	1.17	1.25	61%	59%	587.85 / 1,462.10	655.96 / 1,527.05
		30,000	0.87	0.92	61%	60%	493.79 / 1,243.14	551.01 / 1,297.99
TT2035	TT2545	31,001	0.92	0.98	61%	60%	510.25 / 1,284.50	569.38 / 1,341.26
		32,000	0.98	1.04	61%	60%	526.71 / 1,325.87	587.74 / 1,384.53
		33,000	1.03	1.10	61%	59%	543.17 / 1,367.23	606.11 / 1,427.79
		34,000	1.09	1.17	61%	59%	559.63 / 1,408.59	624.48 / 1,471.06
		35,000	1.15	1.23	61%	59%	576.09 / 1,449.94	642.84 / 1,514.32
TT2545	-	35,001	0.93	0.99	61%	60%	514.37 / 1,289.10	573.97 / 1,346.07
		36,000	0.98	1.04	61%	60%	529.06 / 1,325.87	590.37 / 1,384.53
		37,000	1.03	1.10	61%	59%	543.76 / 1,362.63	606.77 / 1,422.98
		38,000	1.08	1.15	61%	59%	558.46 / 1,399.40	623.16 / 1,461.44
		39,000	1.13	1.21	61%	59%	573.15 / 1,436.16	639.56 / 1,499.90
		40,000	1.19	1.27	61%	59%	587.85 / 1,472.92	655.96 / 1,538.36
-	TT3060	40,001	0.79	0.84	61%	60%	477.09 / 1,184.03	532.38 / 1,236.11
		42,000	0.87	0.92	61%	60%	500.95 / 1,243.14	558.99 / 1,297.99
		44,000	0.94	1.01	61%	60%	524.80 / 1,302.23	585.61 / 1,359.80
		46,000	1.02	1.09	61%	59%	548.66 / 1,361.32	612.23 / 1,421.61
		48,000	1.11	1.18	61%	59%	572.51 / 1,420.40	638.85 / 1,483.42
		50,000	1.20	1.28	61%	59%	596.37 / 1,479.48	665.47 / 1,545.23
TT3060	TT3580	50,001	0.83	0.89	61%	60%	489.87 / 1,218.80	546.64 / 1,272.52
		52,000	0.90	0.96	61%	60%	509.47 / 1,267.47	568.50 / 1,323.44
		54,000	0.96	1.03	61%	60%	529.06 / 1,316.14	590.37 / 1,374.35
		56,000	1.03	1.10	61%	59%	548.66 / 1,364.80	612.23 / 1,425.25
		58,000	1.10	1.17	61%	59%	568.25 / 1,413.45	634.10 / 1,476.15
		60,000	1.17	1.25	61%	59%	587.85 / 1,462.10	655.96 / 1,527.05

NOTE: Model sizes apply to MUA style cabinets. Consult factory when selecting energy recovery for AM style cabinets. All weights are in pounds.

Table 17: Fan Selection Chart

Airflow Cubic Feet per Minute (CFM)	Model	Discharge Velocity Feet per Minute (FPM)	Required Motor Horse Power (HP) @ Noted External Static Pressure (in wc)									Brake Horse Power (HP) @ Noted External Static Pressure (in wc)									dBA Decibel @ Noted External Static Pressure (in wc)
			0	0.25	0.5	0.75	1	1.25	1.5	1.75	2	0	0.25	0.5	0.75	1	1.25	1.5	1.75	2	0
5,000	TT0510	1,241	2	2	2	3	3	3	3	CF	CF	1.1	1.4	1.6	1.9	2.2	2.5	2.8	CF	CF	65
6,000	TT0510	1,490	2	2	3	3	3	5	5	5	5	1.4	1.7	2.0	2.3	2.6	3.0	3.3	3.6	4.0	68
7,000	TT0510	1,738	2	3	3	3	5	5	5	5	5	1.8	2.1	2.5	2.8	3.1	3.5	3.9	4.2	4.6	71
8,000	TT0510	1,986	3	3	5	5	5	5	5	7.5	7.5	2.2	2.6	3.0	3.3	3.7	4.1	4.5	4.9	5.3	74
9,000	TT0510	2,234	3	5	5	5	5	7.5	7.5	7.5	7.5	2.7	3.1	3.5	4.0	4.4	5.1	5.3	5.7	6.1	76
10,000	TT0510*	2,483	CF	CF	5	5	7.5	7.5	7.5	7.5	10	3.2	3.7	4.2	4.6	5.1	5.6	6.1	6.6	7.0	78
10,000	TT1025	1,226	3	3	5	CF	CF	CF	CF	CF	CF	2.1	2.6	3.2	CF	CF	CF	CF	CF	CF	71
12,500	TT1025	1,532	5	5	5	5	7.5	7.5	7.5	CF	CF	2.8	3.4	4.0	4.6	5.3	6.0	6.6	CF	CF	73
15,000	TT1025	1,838	5	5	7.5	7.5	7.5	10	10	10	15	3.7	4.4	5.0	5.7	6.4	7.2	7.9	8.7	9.5	75
15,000	TT1530	1,309	5	5	7.5	7.5	7.5	10	10	CF	CF	3.4	4.1	4.8	5.5	6.3	7.2	8.0	CF	CF	74
17,500	TT1025	2,145	7.5	7.5	7.5	10	10	10	15	15	15	4.9	5.6	6.3	7.6	7.9	8.6	9.5	10.3	11.2	78
17,500	TT1530	1,527	5	7.5	7.5	7.5	10	10	10	15	15	4.2	5.0	5.8	6.6	7.5	8.3	9.2	10.2	11.1	76
20,000	TT1025	2,451	CF	10	10	10	15	15	15	15	15	6.3	7.1	7.9	8.7	10.1	10.4	11.3	12.2	13.1	80
20,000	TT1530	1,745	7.5	7.5	7.5	10	10	15	15	15	15	5.3	6.1	7.0	7.9	8.8	9.5	10.6	11.7	12.8	78
20,000	TT2035	1,429	5	7.5	7.5	10	10	15	15	15	15	4.7	5.6	6.5	7.5	8.5	9.5	10.6	11.7	12.8	77
22,500	TT1025*	2,757	CF	CF	15	15	15	15	15	20	20	8.1	9.0	9.8	10.7	11.6	12.5	13.5	14.5	15.5	82
22,500	TT1530	1,964	7.5	10	10	15	15	15	15	15	20	6.6	7.5	8.4	9.4	10.3	11.4	12.4	13.4	14.5	80
22,500	TT2035	1,607	7.5	7.5	10	10	15	15	15	15	20	5.6	6.6	7.6	8.6	9.7	10.8	11.9	13.1	14.3	78
22,500	TT2545	1,319	7.5	7.5	10	10	15	15	15	20	20	5.1	6.1	7.2	8.3	9.5	10.7	12.0	14.7	16.2	71
25,000	TT1025**																				
25,000	TT1530	2,182	CF	10	15	15	15	15	20	20	20	10.3	11.2	12.1	13.1	14.0	15.0	16.0	17.7	18.1	86
25,000	TT2035	1,786	7.5	10	10	15	15	15	15	20	20	8.2	9.1	10.1	11.1	12.1	13.2	14.3	15.4	16.5	82
25,000	TT2545	1,465	7.5	10	10	15	15	15	15	20	20	6.7	7.8	8.8	9.9	11.0	12.2	13.4	14.7	15.9	80
27,500	TT2035	1,964	10	10	15	15	15	15	20	20	20	5.9	7.0	8.2	9.4	10.6	11.9	13.2	14.6	15.9	73
27,500	TT2545	1,612	7.5	10	10	15	15	15	20	20	20	10.0	11.0	12.1	13.1	14.2	15.4	16.5	17.7	18.9	83
30,000	TT1530*	2,618	15	15	20	20	20	20	25	25	25	8.1	9.1	10.3	11.4	12.6	13.9	15.1	16.4	17.7	81
30,000	TT2035	2,143	15	15	15	15	20	20	20	20	25	6.9	8.1	9.3	10.5	11.9	13.2	14.6	16.0	17.4	75
30,000	TT2545	1,758	10	10	15	15	15	20	20	20	25	12.6	13.7	14.8	15.5	16.6	17.8	19.1	20.3	21.6	86
30,000	TT3060	1,111	7.5	10	15	15	15	20	20	25	25	8.0	9.2	10.5	11.9	13.2	14.6	16.1	17.6	19.1	77
32,500	TT2035	2,322	15	15	15	20	20	20	20	25	25	7.0	8.4	9.8	11.2	12.7	14.3	15.8	17.5	19.2	73
32,500	TT2545	1,905	10	15	15	15	20	20	20	25	25	11.4	12.6	13.8	15.1	16.4	17.8	19.2	20.6	22.1	84
35,000	TT2035*	2,500	15	20	20	20	20	25	25	25	30	8.0	9.4	10.8	12.3	13.9	15.5	17.2	18.9	20.6	75
35,000	TT2545	2,051	15	15	15	20	20	20	25	25	25	13.4	14.6	16.0	17.3	18.7	20.1	21.6	23.1	24.6	86
35,000	TT3060	1,296	10	15	15	20	20	20	25	25	30	9.0	10.5	12.0	13.6	15.2	16.9	18.6	20.4	22.2	77
37,500	TT2545*	2,198	15	15	20	20	20	25	25	25	30	8.0	9.6	12.9	14.8	16.7	18.7	20.7	22.9	25.0	73
37,500	TT3060	1,388	10	15	15	15	20	20	25	25	25	10.2	11.7	13.3	15.0	16.6	18.4	20.2	22.0	23.9	78
40,000	TT2545*	2,344	20	20	20	25	25	25	30	30	30	8.9	10.6	12.3	14.1	15.9	17.8	19.8	21.8	23.9	75
40,000	TT3060	1,481	15	15	15	20	20	25	25	25	30	11.4	13.1	14.7	16.4	18.2	20.0	25.4	27.5	29.5	80
40,000	TT3580	1,266	15	15	20	20	25	25	30	30	40	9.8	11.6	13.4	15.2	17.1	19.1	21.1	23.2	25.3	76
45,000	TT2545*	2,637	20	25	25	30	30	30	40	40	40	10.5	12.5	14.6	16.7	19.0	21.3	23.8	26.3	29.0	72
45,000	TT3060	1,667	15	15	20	20	25	25	30	30	40	14.5	16.2	18.0	19.8	21.7	23.7	25.7	27.7	29.7	82
45,000	TT3580	1,424	15	15	20	20	25	25	30	30	30	12.0	13.9	15.8	17.8	19.8	21.9	24.1	26.4	28.6	79
50,000	TT3060	1,852	20	20	20	25	25	30	30	40	40	18.2	20.0	21.9	23.8	25.9	28.0	30.1	32.2	34.4	85
50,000	TT3580	1,582	15	20	20	25	25	30	30	40	40	14.6	16.6	18.7	20.8	23.0	25.2	27.4	29.8	32.3	81
50,000	TT4095	1,455	15	15	20	25	30	30	40	40	40	12.5	14.7	16.9	19.2	21.6	24.0	26.5	32.9	35.7	77

Table 18: Fan Selection Chart (continued)

Airflow Cubic Feet per Minute (CFM)	Model	Discharge Velocity Feet per Minute (FPM)	Required Motor Horse Power (HP) @ Noted External Static Pressure (in wc)									Brake Horse Power (HP) @ Noted External Static Pressure (in wc)									dBA Decibel @ Noted External Static Pressure (in wc)
			0	0.25	0.5	0.75	1	1.25	1.5	1.75	2	0	0.25	0.5	0.75	1	1.25	1.5	1.75	2	0
55,000	TT3060**	2,037	20	25	25	25	30	30	40	40	40	18.1	20.0	21.9	23.9	26.0	28.1	30.1	32.3	34.6	83
55,000	TT3580	1,741	20	20	20	25	25	30	30	40	40	15.0	17.1	19.2	21.2	23.5	25.7	28.1	30.4	32.8	80
55,000	TT4095	1,600	20	20	25	25	30	30	30	CF	CF	16.1	18.4	20.8	23.2	25.6	28.2	30.8	CF	CF	75
60,000	TT3060**	2,222	25	25	30	30	40	40	40	40	40	22.0	24.1	26.2	28.3	30.5	32.7	35.0	37.3	39.5	85
60,000	TT3580	1,899	20	25	25	25	30	30	40	40	40	18.1	20.2	22.4	24.7	27.0	29.4	31.8	34.3	36.9	81
60,000	TT4095	1,745	20	25	25	30	30	40	40	40	40	18.6	21.0	23.5	26.1	28.6	31.3	34.1	36.9	39.7	77
65,000	TT3580	2,057	25	25	30	30	40	40	40	40	50	21.6	23.9	26.2	28.6	31.1	33.6	36.1	38.8	41.4	83
65,000	TT4095	1,891	25	25	30	30	40	40	40	50	50	21.3	23.8	26.5	29.2	31.9	34.7	37.6	40.5	43.5	79
70,000	TT3580**	2,215	30	30	40	40	40	40	50	50	50	25.5	27.9	30.4	33.0	35.6	38.2	40.9	43.5	46.4	85
70,000	TT4095	2,036	25	30	30	40	40	40	50	50	50	24.5	27.1	29.8	32.7	35.6	38.5	41.5	44.5	47.6	81
75,000	TT3580**	2,374	30	40	40	40	50	50	50	50	60	30.0	32.6	35.2	37.9	40.6	43.4	46.2	49.1	52.0	87
75,000	TT4095	2,182	30	40	40	40	40	50	50	50	60	27.9	30.7	33.6	36.4	39.5	42.6	45.7	48.9	52.1	83
75,000	TT5515	1,552	25	25	30	40	40	CF	CF	CF	CF	21.3	24.5	27.9	31.3	34.8	CF	CF	CF	CF	73
80,000	TT3580**	2,532	40	40	50	50	50	50	60	60	60	35.1	37.8	40.6	43.4	46.3	49.2	52.1	55.1	58.2	88
80,000	TT4095	2,327	40	40	40	50	50	50	60	60	60	31.7	34.6	37.6	40.7	43.7	47.0	50.3	53.6	56.9	85
80,000	TT5515	1,655	25	30	40	40	40	50	CF	CF	CF	23.5	26.9	30.3	33.9	37.6	41.3	CF	CF	CF	75
85,000	TT4095**	2,473	40	40	50	50	50	60	60	60	75	36.0	39.1	42.3	45.5	48.7	51.9	55.4	58.8	62.4	86
85,000	TT5515	1,759	30	30	40	40	50	50	50	60	CF	25.8	29.4	33.0	36.6	40.4	44.3	48.3	52.3	CF	76
90,000	TT4095**	2,618	50	50	50	60	60	60	75	75	75	40.7	43.9	47.2	50.5	53.9	57.4	60.7	64.3	68.0	87
90,000	TT5515	1,862	30	40	40	40	50	50	60	60	60	28.3	32.0	35.8	39.6	43.5	47.5	51.6	55.8	60.0	78
95,000	TT4095*	2,764	50	50	60	60	60	75	75	75	75	45.9	49.2	52.6	56.1	59.6	63.2	66.8	70.5	74.1	88
95,000	TT5515	1,966	40	40	40	50	50	60	60	60	75	31.3	35.0	38.9	42.9	46.9	51.0	55.3	59.5	64.0	79
100,000	TT4095**	2,909	50	50	50	60	60	75	75	75	75	41.2	44.8	48.5	52.3	56.0	60.0	64.1	68.3	72.5	89
100,000	TT5515	2,069	40	40	50	50	60	60	60	75	75	34.3	38.1	42.2	46.2	50.5	54.7	59.0	66.2	68.0	80
110,000	TT5515	2,276	50	50	50	60	60	75	75	75	100	41.1	45.2	49.5	53.8	58.3	62.8	67.5	72.2	76.9	83
120,000	TT5515**	2,483	50	60	60	75	75	75	100	100	100	49.0	53.4	57.9	62.5	67.1	71.9	76.8	81.9	86.9	85
130,000	TT5515**	2,690	60	75	75	75	100	100	100	100	100	58.0	62.7	67.5	72.4	77.4	82.2	87.4	92.7	98.0	87
150,000	TT5515**	3,103	100	100	100	100	125	125	125	125	125	80.0	85.3	90.6	96.0	101.5	107.1	112.8	118.5	124.4	91

* MUA configuration only.

** AM requires high velocity return air damper.

¤ Class II wheels

CF= Consult Factory

IMPORTANT NOTES:

Sound levels are in dBA at 5' from the supply air opening. This figure does not account for attenuation, additional noise or directivity factors. More horsepower required includes both the running horsepower and the starting torque requirements. Horsepower can be greater than the standard fan curve charts. Brake horsepower does not include drive losses. For external static pressure greater than 2", contact your local representative or Weather-Rite LLC. For operation in altitudes exceeding 2000' above sea level, contact the factory. The recommended motor horsepowers shown for the Fan Selection Chart in the 0 in. wc external static pressure column include fan and burner static pressures only (internal equipment static pressure). Other cabinet options could add static pressure and should be included in the external static pressure used to select motor horsepower. See the Static Pressure Drops in *Table 20, Page 41* for the external static pressures that should be added for selected options.

Table 19: Static Pressure Drops for Options

Description	in wc
Cooling Coil Section	0.10
Cooling Coil	CF
Damper - Inlet	0.05
Damper - Low Leak	0.05
Damper - Discharge	0.10
Damper - Discharge, Low Leak	0.10
Supply Air End	CF
Discharge Plate	0.05
Discharge Head - One Way	0.10
Discharge Head - Three Way	0.10
Discharge Head - Four Way	0.05
Horizontal Inlet Hood	0.00
Horizontal Inlet Plenum	0.10
Vertical Inlet Plenum Base	0.05
Moisture Limiter For Horizontal Inlet Hood	0.10
Aluminum Mesh Filters For Horizontal Inlet Hood	0.15
Vertical Stand with Polyester Filters (FR)	0.25
Outside Air Filter Section, No Filters	0
Filtered Mixing Box, No Filters	0
Filters - Polyester	0.25
Filters - Aluminum Mesh	0.15
Filters - 30% Pleated	0.25
Custom Filter Options (Bag, Cartridge, HEPA)	CF
Evaporative Cooling Section (ECM)	0.25
Evaporative Cooling Section (ECM-D)	0.50

Note:

Calculate the static pressure for selected cabinet options plus any ductwork. Use external static pressure column found in *Page 24,Table 17 through Page 25,Table 18 Fan Selection Charts* to determine motor horsepower.

SECTION 6: LIFTING AN AIR HANDLER (RIGGING)

⚠ WARNING

Crush Hazard

Use proper lifting equipment and practices.

Failure to follow these instructions can result in death, injury or property damage.

The air handler must be installed in compliance with all applicable codes. The qualified installer or service technician must use best building practices when installing the air handler and any optional equipment. This appliance requires at least 4 CFM (6.8 m^3/h) of outside air per 1,000 Btu/h (.293 kW). Any air handler that recirculates air from the heated space must use the return air opening to prevent any return air from passing over the burner.

IMPORTANT: Four eye bolts are provided with each upright air handler. These eye bolts are to be used when lifting the air handler for placement on the provided support legs. DO NOT Install the support legs prior to lifting the air handler, damage to the legs and /or air handler may occur.

6.1 Preparing to Lift the Air Handler

Prior to lifting the air handler, the following steps must be performed:

1. Remove all packaging or banding that attached the air handler to the skid and ensure that the air handler is no longer bound to a skid or truck bed.
2. Remove all packaging or blockers.
3. Remove all of the accessories or packages that were shipped on the same skid, inside the air handler, or inside the control enclosure.
4. Inspect the air handler to:
   - Verify that there is no damage as a result of shipping.
   - Ensure that it is appropriately rated for the utilities available at the installation site.
   - Verify that the eye bolts (lifting lugs) are intact, undamaged and secured to the air handler.
   - Ensure factory-installed hardware is torqued to appropriate setting.
5. Prepare the installation location to be ready to accept the air handler (i.e. roof curb or legs).
6. Verify that the lifting equipment can handle the air handler's weight and the required reach. *See Page 12,Table 3*, *Page 14,Table 5*, *Page 16,Table 7*, *Page 18,Table 9 and Page 14, Table 5* for air handlers weight.

6.2 Lifting a Horizontal Air Handler

FIGURE 15: Lifting a Horizontal Air Handler Filter Section and Options (Model TT0510 - TT2545)

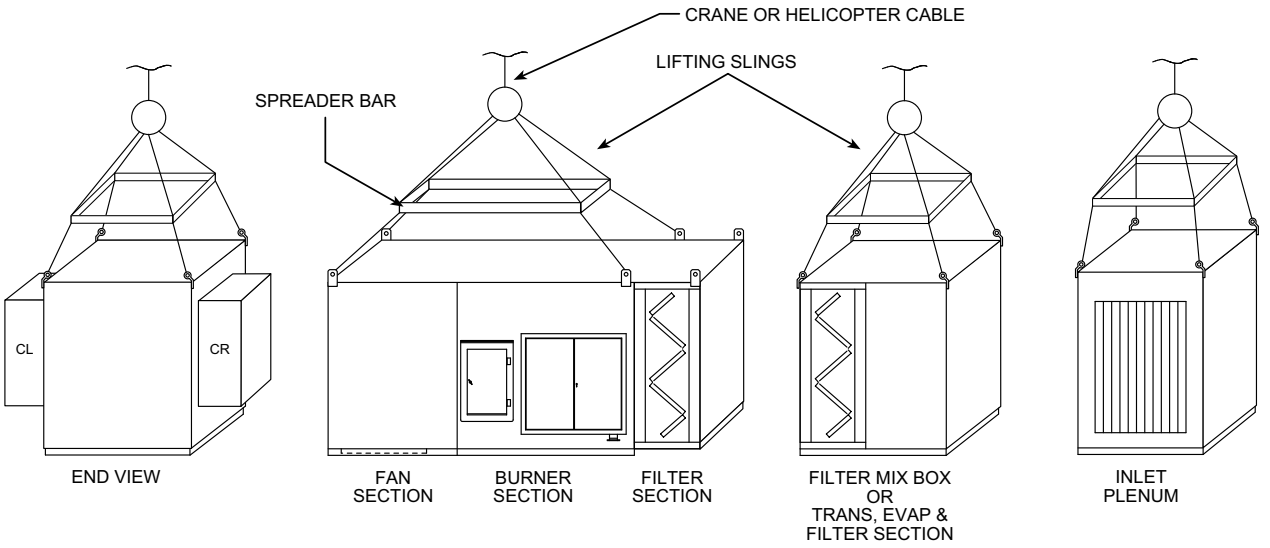
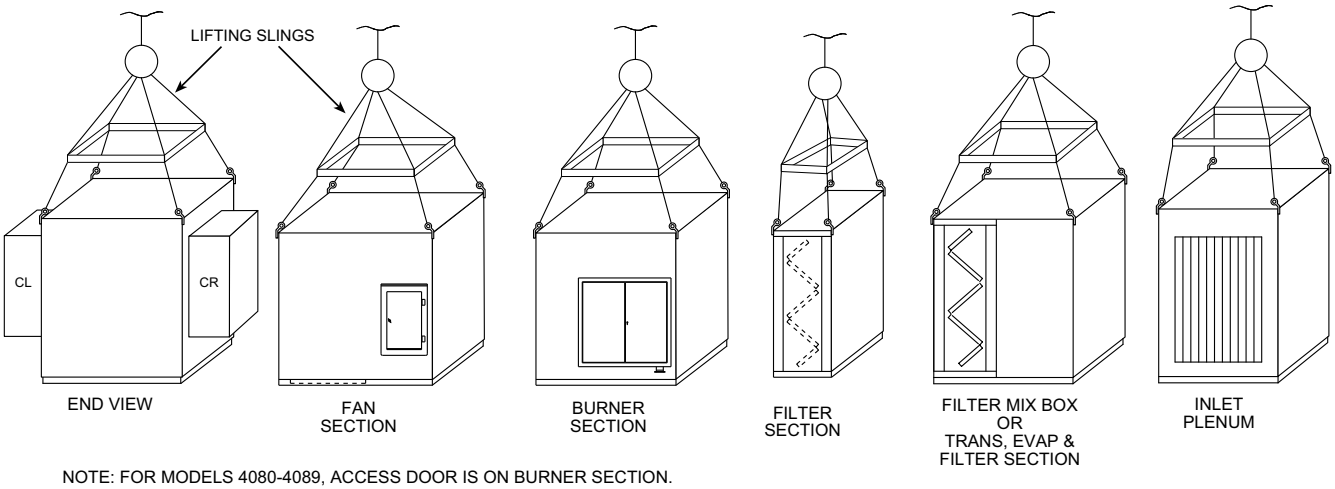


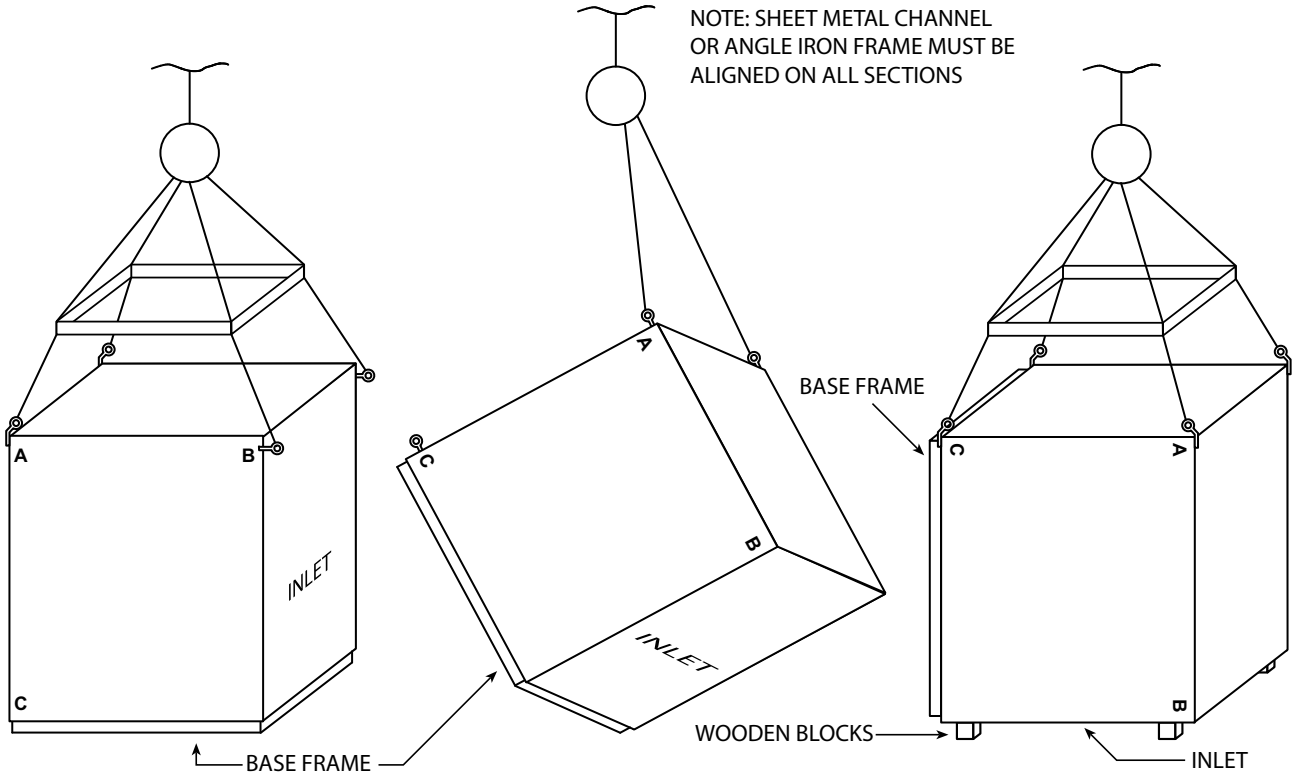
FIGURE 16: Lifting a Horizontal Air Handler with Options (Model TT5515)



NOTE: FOR MODELS 4080-4089, ACCESS DOOR IS ON BURNER SECTION.

6.3 Lifting an Vertical Air Handler

FIGURE 17: Lifting an Vertical Air Handler (All Models)



Shipping Position:

1. Attach crane sling hooks to eye bolts A & B (4 places.)
2. Lift off truck.
3. Place on a clean flat dry surface free from water, mud, etc.

Turning Position:

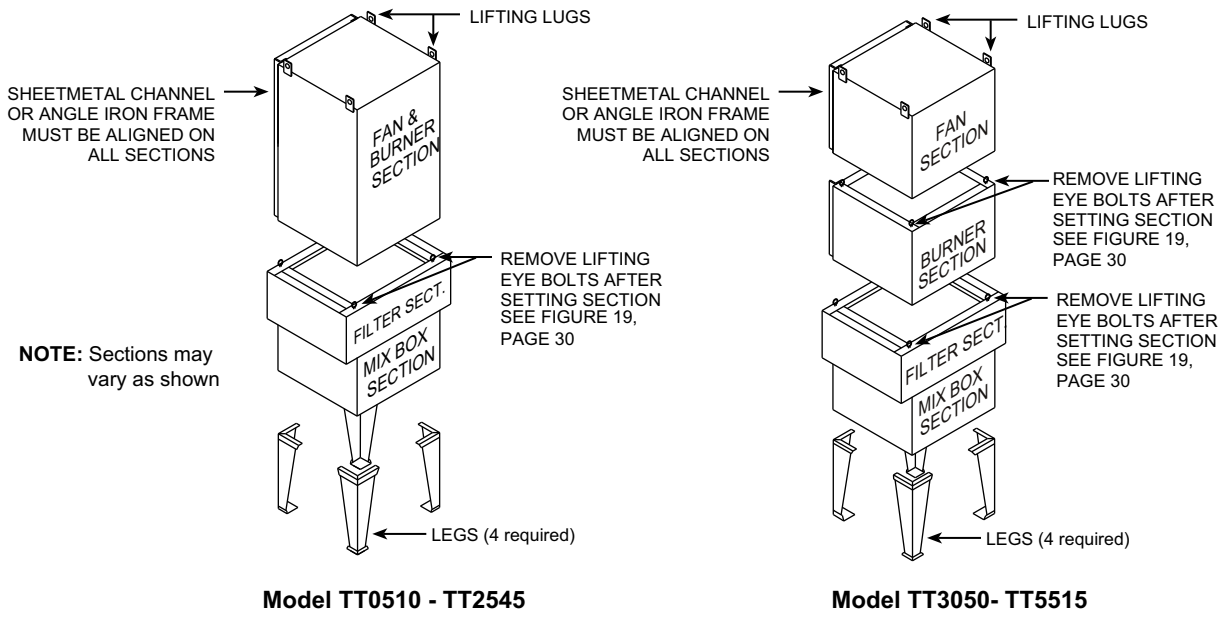
4. Remove eye bolts B. (2 places)
5. Attached eye bolts from B to corner C (2 places.)
6. Attach crane sling hook to A eye bolts A (2 places.)
7. Slowly raise and rotate 90 degrees.

Vertical Position:

8. Place air handler section on 4" (10.2 cm) wooden blocks.
9. Attach crane sling hooks to eye bolts A & C (4 places).
10. Air handler/section is now ready to be lifted into place.

NOTE: On fan sections lifting lugs are welded on supply air end.

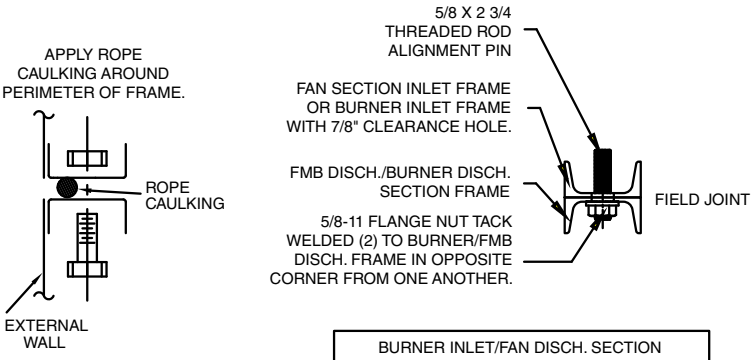
FIGURE 18: Lifting an Vertical Air Handler with Filter Section and Mixing Box



6.4 Upright Assembly Alignment

FIGURE 19: Inlet Alignment

DETAIL:

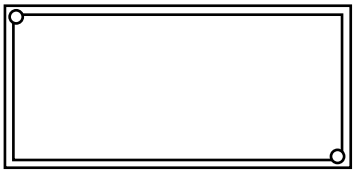


BURNER INLET/FAN DISCH. SECTION
FILTER MIXBOX DISCH./BURNER INLET
ALIGNMENT DETAIL.
(FOR UPRIGHTS MODELS TT2545-TT5515 ONLY)

SECTION VIEW-A

NOTE: THREADED ROD SHIPPED LOOSE. MOUNT IN OPPOSITE CORNERS WITH PROPER WELDED NUT.

PLAN VIEW:



SECTION 7: AIR HANDLER ASSEMBLY

⚠ WARNING			
			
Crush Hazard	**Falling Hazard**	**Severe Injury Hazard**	**Cut/Pinch Hazard**
Use proper lifting equipment and practices.	**Use proper safety equipment and practices to avoid falling.**	**Use proper lifting practices and equipment.** **Equipment and accessories are heavy.**	**Wear protective gear during installation, operation and service.** **Edges are sharp.**
Failure to follow these instructions can result in death, injury or property damage.			

For models TT0510 - TT2545, the burner and fan sections of the air handler are shipped as one piece. Filter section and/or filter mix box can be mounted to air handler when requested.

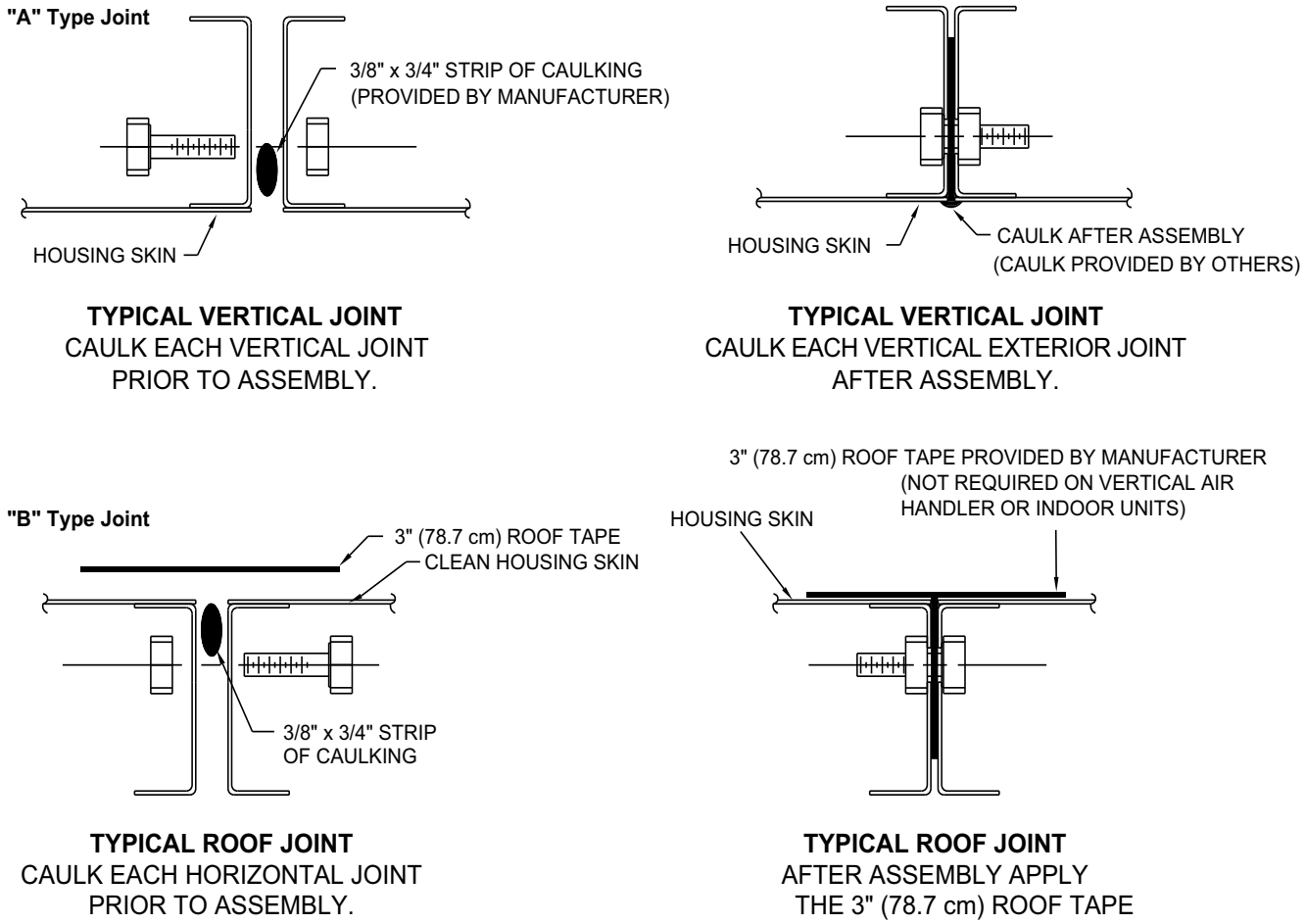
For model TT5515, the burner and fan sections of the air handler are shipped as two pieces that require field-assembly. To assemble, use the supplied hardware and bolt the fan section to the burner section through pre-drilled holes. Supplied hardware must be torqued to recommended specifications on *Table 1, Page 8*.

Caulk (provided by others) the sides, roof and bottom seams between the fan section and burner section. *See Page 33, Figure 7.1 through Page 35, Figure 22*.

NOTE: After the equipment sections are set together (if shipped separately), connection of the electrical conductors between the sections is required. The conductors are numbered on both ends. Join the conductors like numbers. The quantity of conductors supplied varies with the selected options. In addition, motor-supply conductors must be connected to the fan motor of model size TT4095. *See Page 37, Section 7.4*.

7.1 Caulking the Air Handler

FIGURE 20: Caulking Air Handler Joints



TYPICAL VERTICAL JOINT
CAULK EACH VERTICAL JOINT
PRIOR TO ASSEMBLY.

TYPICAL VERTICAL JOINT
CAULK EACH VERTICAL EXTERIOR JOINT
AFTER ASSEMBLY.

TYPICAL ROOF JOINT
CAULK EACH HORIZONTAL JOINT
PRIOR TO ASSEMBLY.

TYPICAL ROOF JOINT
AFTER ASSEMBLY APPLY
THE 3" (78.7 cm) ROOF TAPE

NOTE: FAILURE TO PROPERLY CAULK THE AIR HANDLER JOINTS WILL ALLOW WATER TO ENTER THE AIR HANDLER.

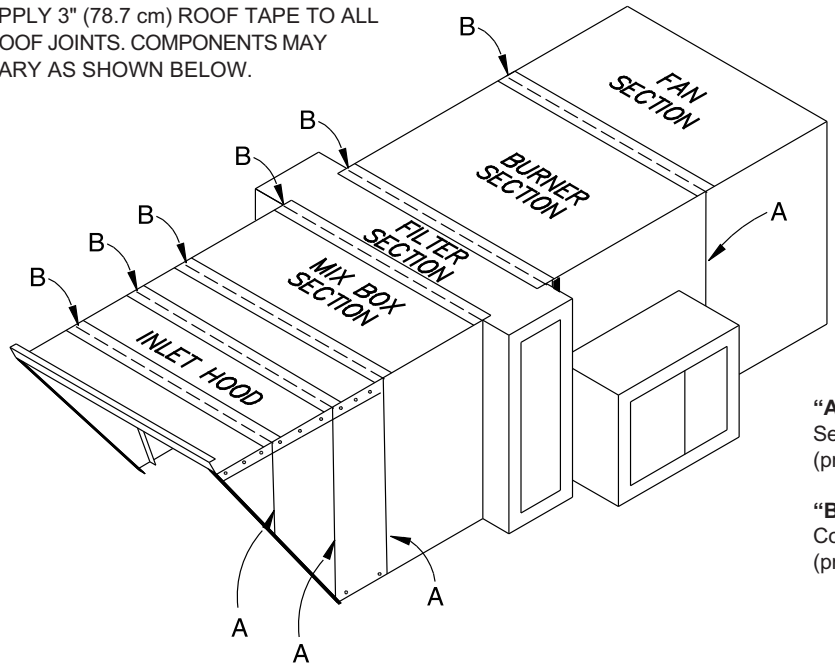
Instructions for Roof Tape Installation:

1. Wipe surface clean and dry.
2. Peel backing off 3" (78.7cm) roof tape.
3. Apply roof tape over field joint.
4. Press tape firmly to form a tight seal (roll out if possible).
5. 3" (78.7 cm) roof tape NOT required on vertical air handlers.
6. Do not apply roof tape when outside temperature is below 40° F.
7. Roof tape is not required for indoor air handlers.

7.2 Caulking a Horizontal Air Handler

FIGURE 21: Caulking a Standard Horizontal Air Handler

APPLY 3" (78.7 cm) ROOF TAPE TO ALL ROOF JOINTS. COMPONENTS MAY VARY AS SHOWN BELOW.

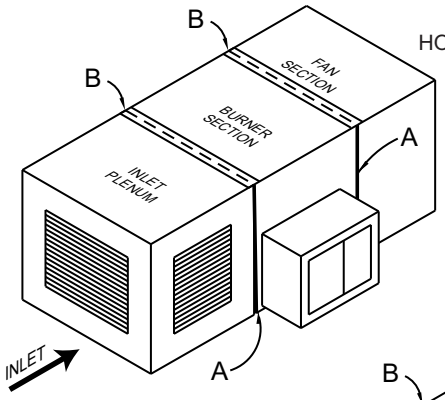


NOTE:
Failure to properly caulk the air handler joints will allow water to enter the air handler.

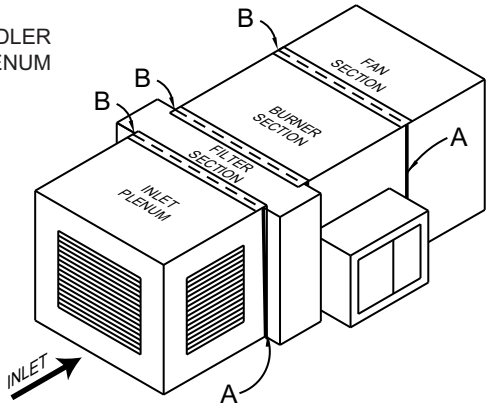
Caulk supply air/return sleeves as appropriate.

"A" Type Joint (typical both sides):
Seal with a **HEAVY** bead of calking. (provided by others)

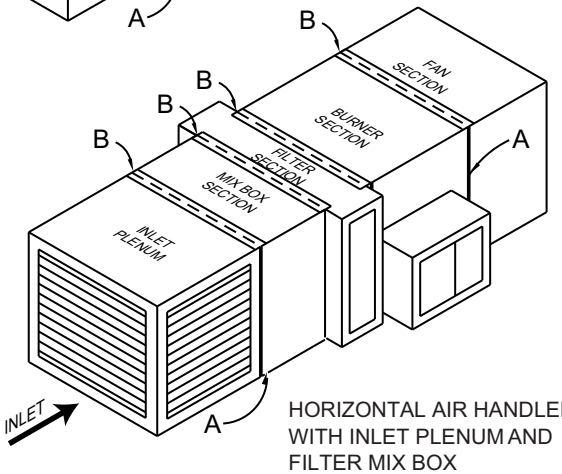
"B" Type Joint:
Cover with 3" (78.7 cm) Roof Tape. (provided by manufacturer)



HORIZONTAL AIR HANDLER WITH INLET PLENUM



HORIZONTAL AIR HANDLER WITH INLET PLENUM AND OUTSIDE AIR FILTER



HORIZONTAL AIR HANDLER WITH INLET PLENUM AND FILTER MIX BOX

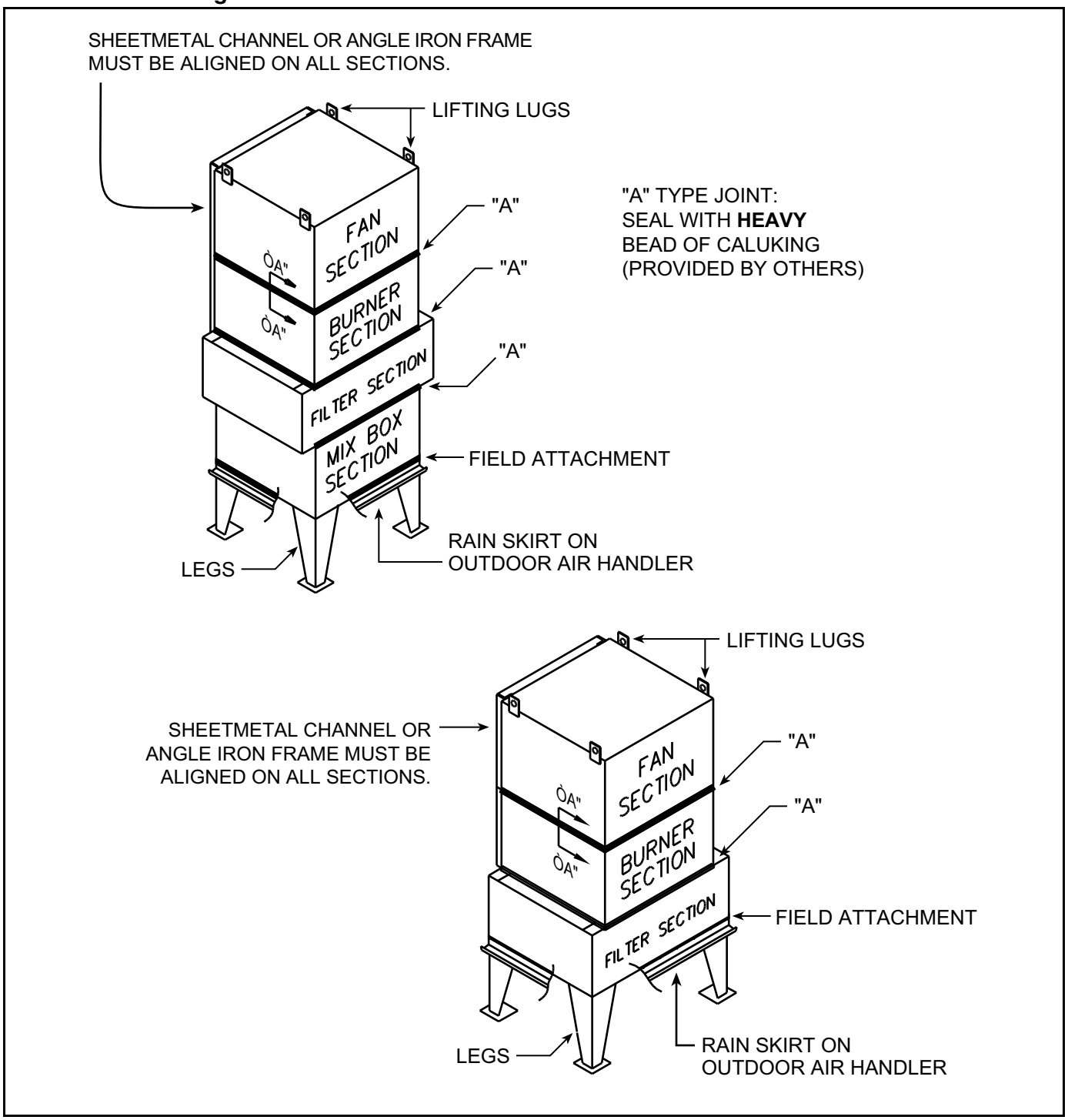
"A" Type Joint : Vertical joint on multiple-piece air handlers and inlet hoods. Run a **HEAVY** bead of caulking (provided by others).

"B" Type Joint : Roof joints on multiple-piece air handlers and inlet hoods. Cover with 3" (78.7 cm) roof tape (provided by manufacturer).

Note: Sections may vary as shown.

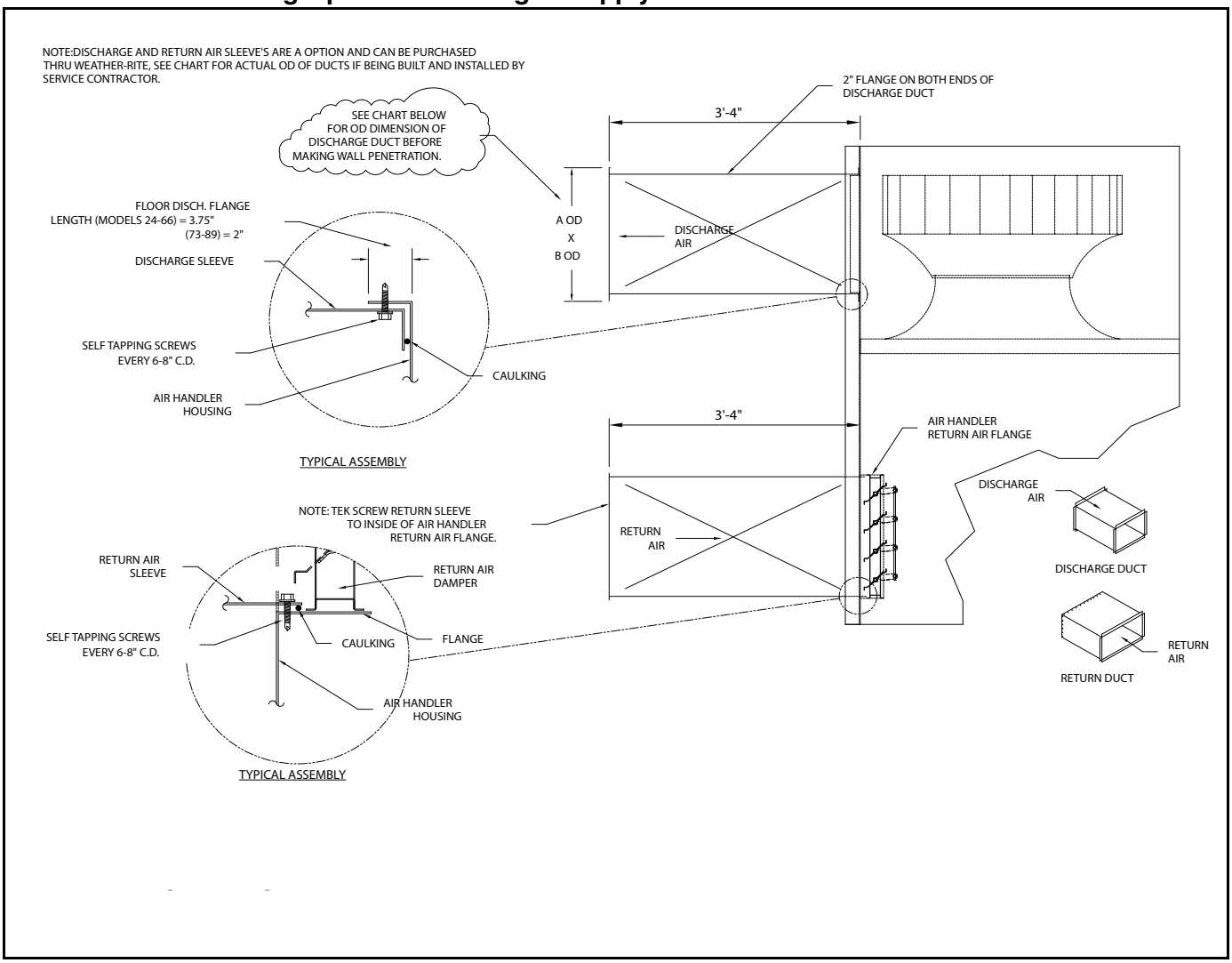
7.3 Caulking an Vertical Air Handler

FIGURE 22: Caulking a Standard Vertical Air Handler



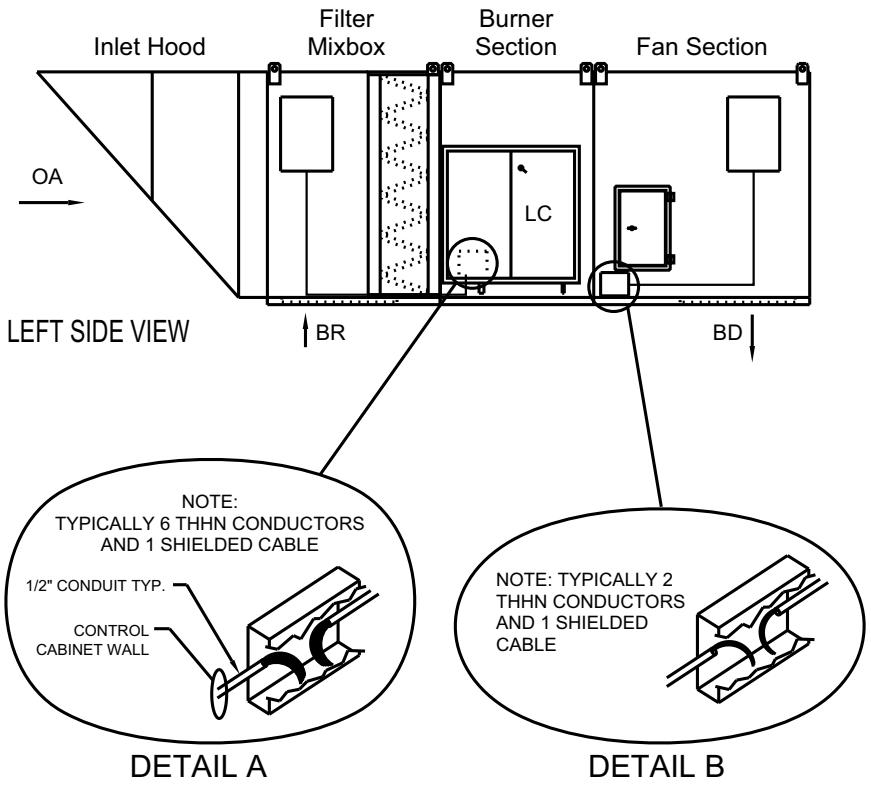
NOTE: Sections may vary as shown.

FIGURE 23: Assembling Optional Discharge / Supply and Return Sleeves.



7.4 Accessory Connections

FIGURE 24: Electrically Connecting Joined Sections



Legend	
OA	Outside Air
BR	Bottom Return
BD	Bottom Discharge
LC	Left Controls

FIGURE 25: Installing Cooling Coil Section

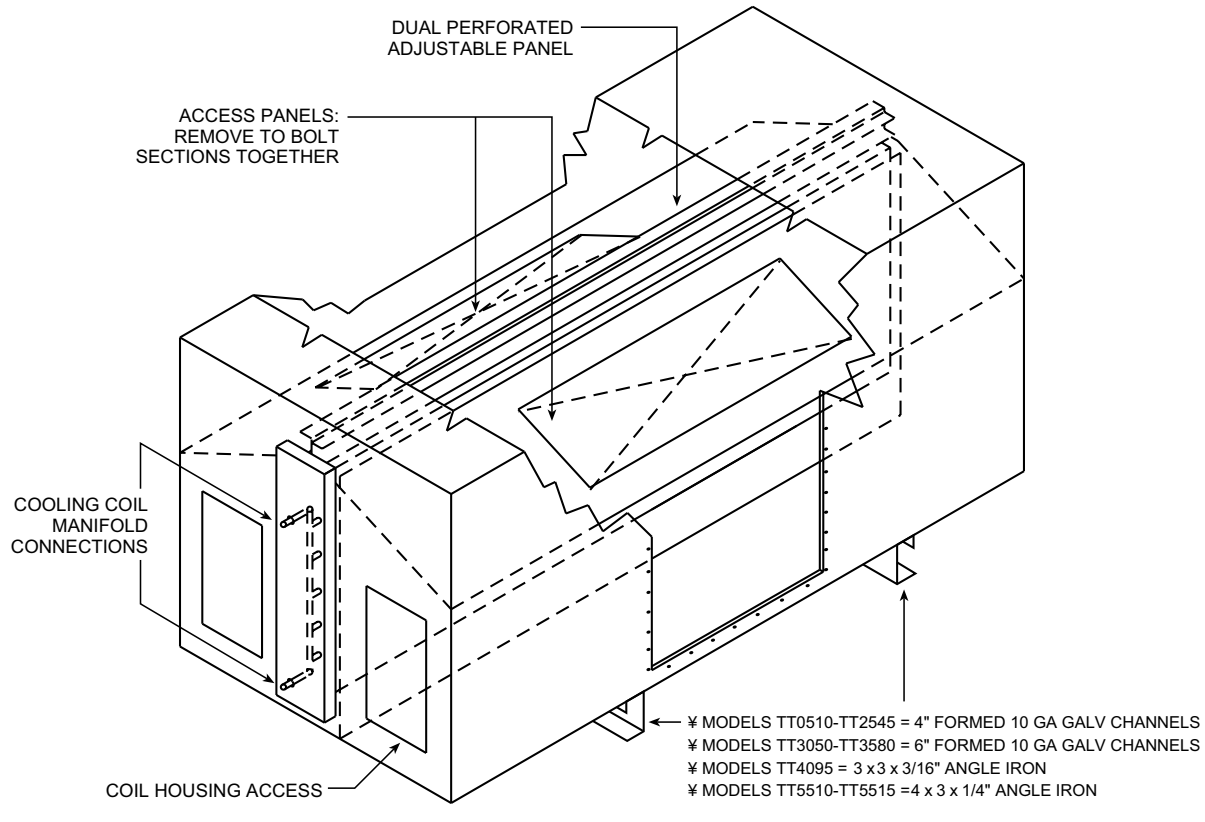


FIGURE 26: Installing Pressure Transmitter Tubing for AM and VAV

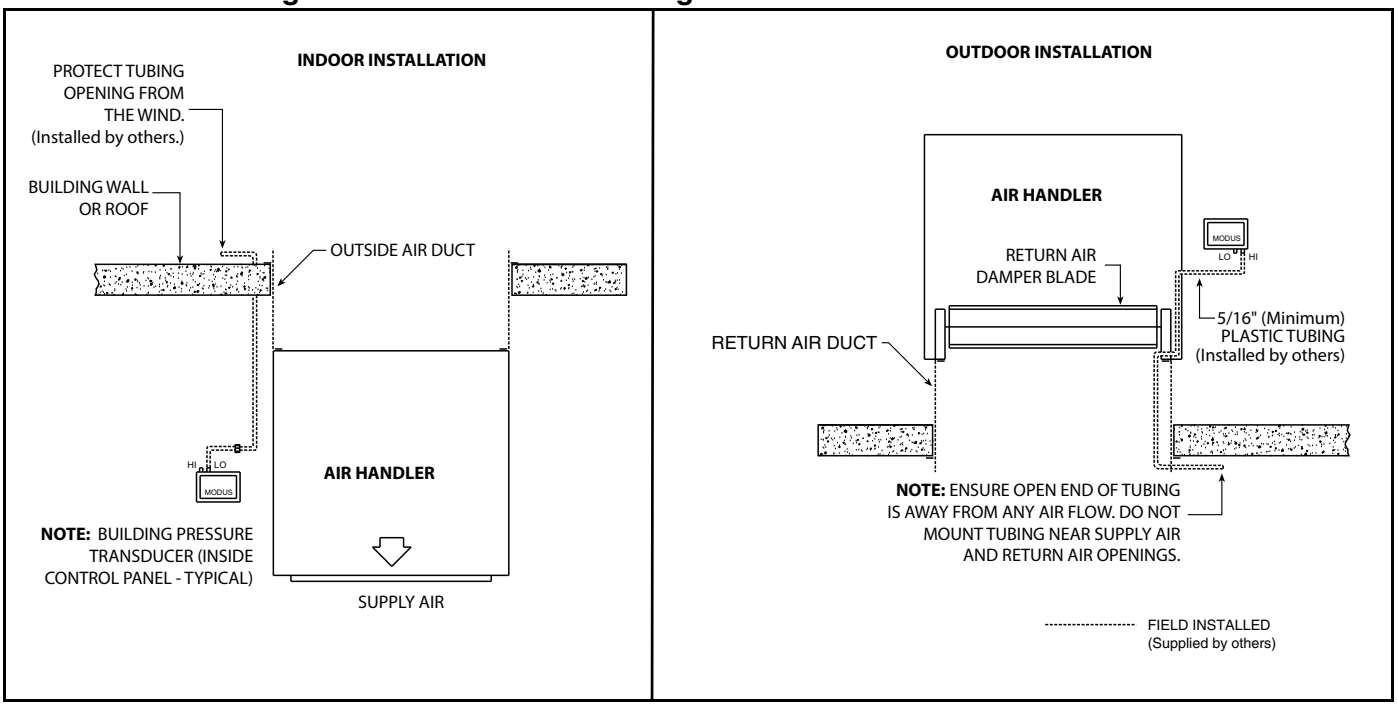


FIGURE 27: Typical Freeze Protection (Evaporative Cooling Package #1)

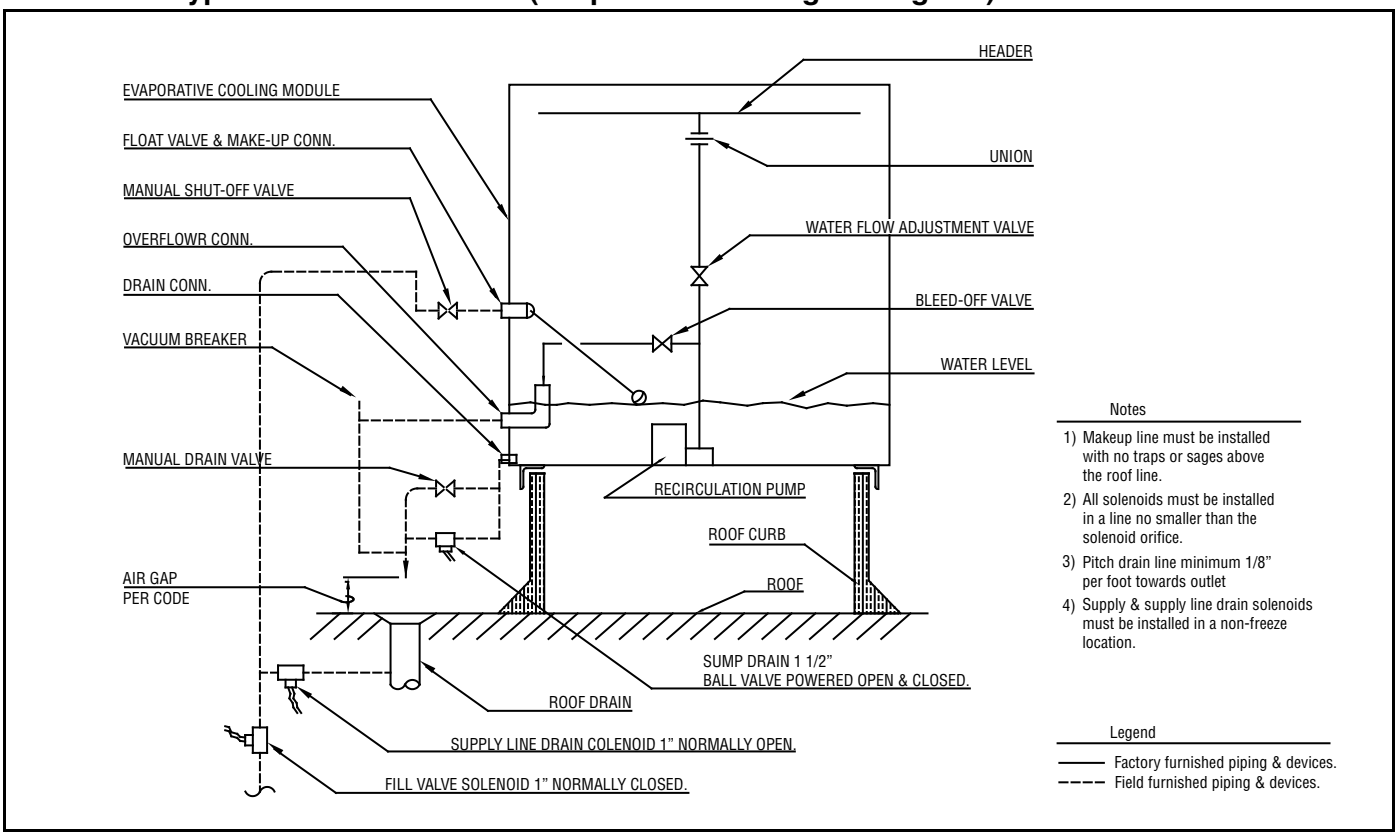


FIGURE 28: Conductivity Control and Freeze Protection (Evaporative Cooling Package #2)

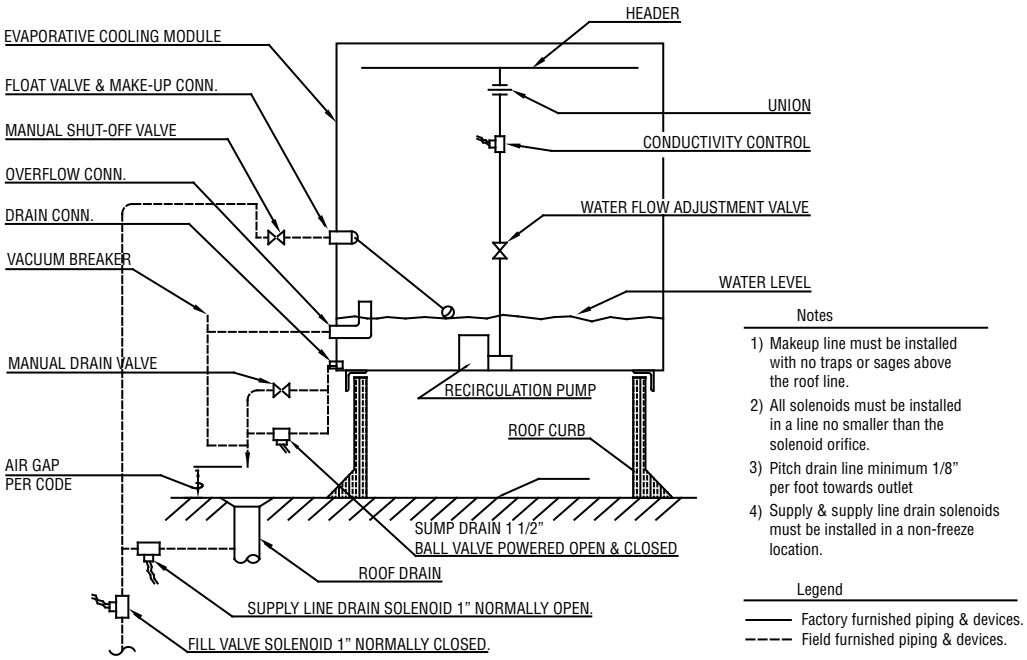


FIGURE 29: Protection and Auto-Flush (Evaporative Cooling Package #3)

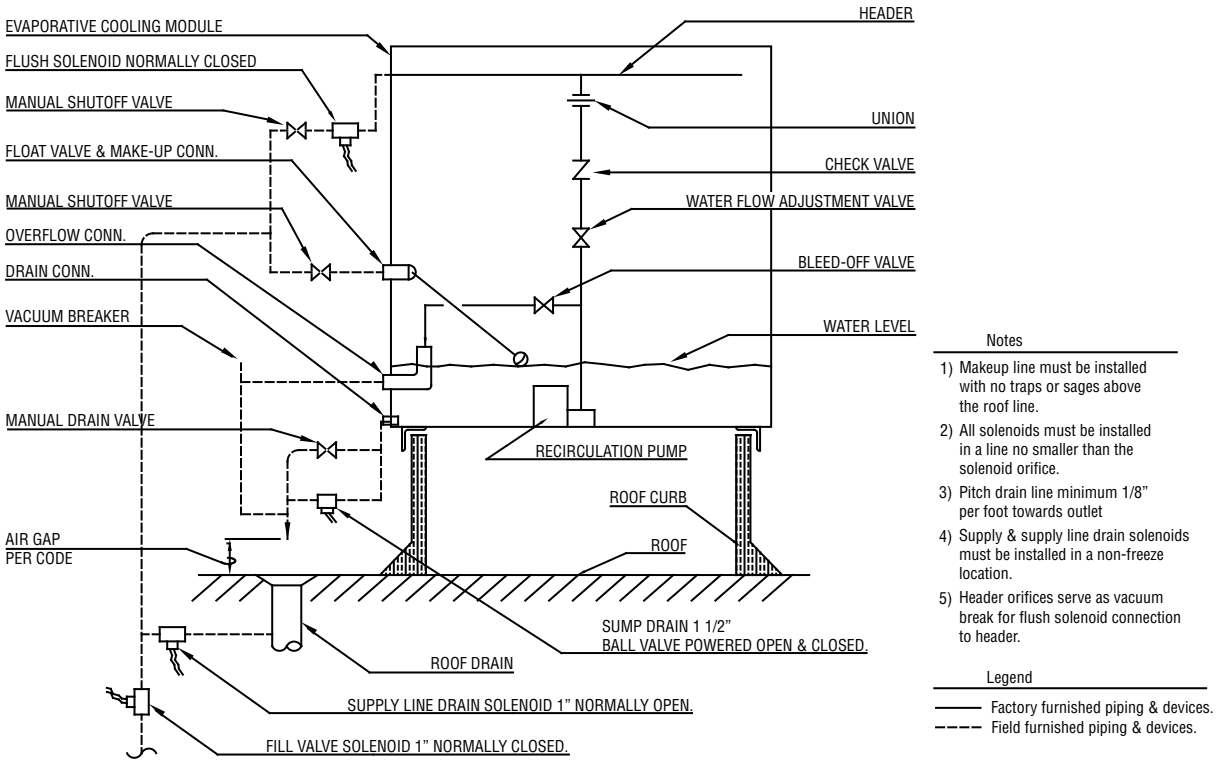
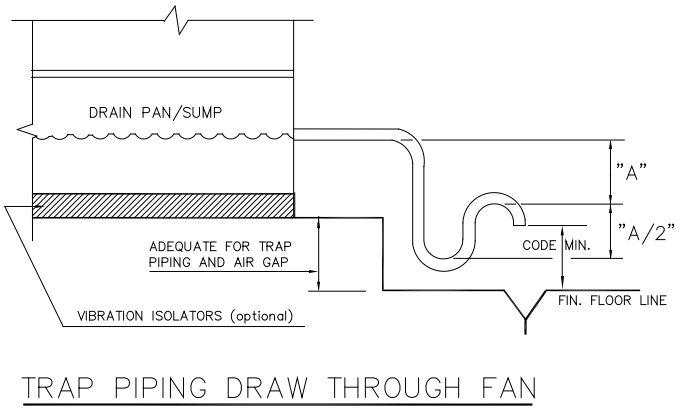


FIGURE 30: Evaporative Cooling Trap Detail



TRAP PIPING DRAW THROUGH FAN

SAMPLE COMPUTATION

OUTSIDE AIR INTAKE	0.10"
BURNER PROFILE	0.75"
FILTERS (DIRTY)	0.40"
COOLING COIL	1.00"
TOTAL NEGATIVE PRESSURE	2.25"
SAFETY FACTOR	2.00"
	4.25"

USE 4" FOR "A" DIMENSION

SECTION 8: ROOF CURB

⚠ WARNING




Crush Hazard	Falling Hazard	Severe Injury Hazard	Cut/Pinch Hazard
Use proper lifting equipment and practices.	**Use proper safety equipment and practices to avoid falling.**	**Use proper lifting practices and equipment.** **Equipment and accessories are heavy.**	**Wear protective gear during installation, operation and service.** **Edges are sharp.**

Failure to follow these instructions can result in death, injury or property damage.

The roof curbs that support the air handler and accessory sections are available for all horizontal air handlers. *See Page 41,Table 20* for roof curb. Roof curbs are shipped unassembled and require field assembly. Double check dimensions after assembly before roof material is installed and compare to the drawing *on Page 40, Figure 30*.

NOTE: Before installation, verify that you have the correct roof curb and all required assembly brackets. If any components are missing, contact Weather-Rite LLC or your WEATHER-RITE™ independent representative.

8.1 Roof Curb Assembly and Installation

Assemble roof curb according to the assembly drawings in *Page 43, Section 32*. Supplied hardware must be torqued to recommended specifications on *Page 8,Table 1*.

Place the curb on the roof in the position in which it will be installed. Check that the diagonal measurements are within 1/8"(3 mm) of each other. To ensure a weatherproof seal between the air handler and the curb, the curb must be level with no twist from end to end. Shim level as required and secure curb to roof deck using best building practices. The curb is self-flashing. Install roofing material as required.

Table 20: Roof Curbs (availability based on style)

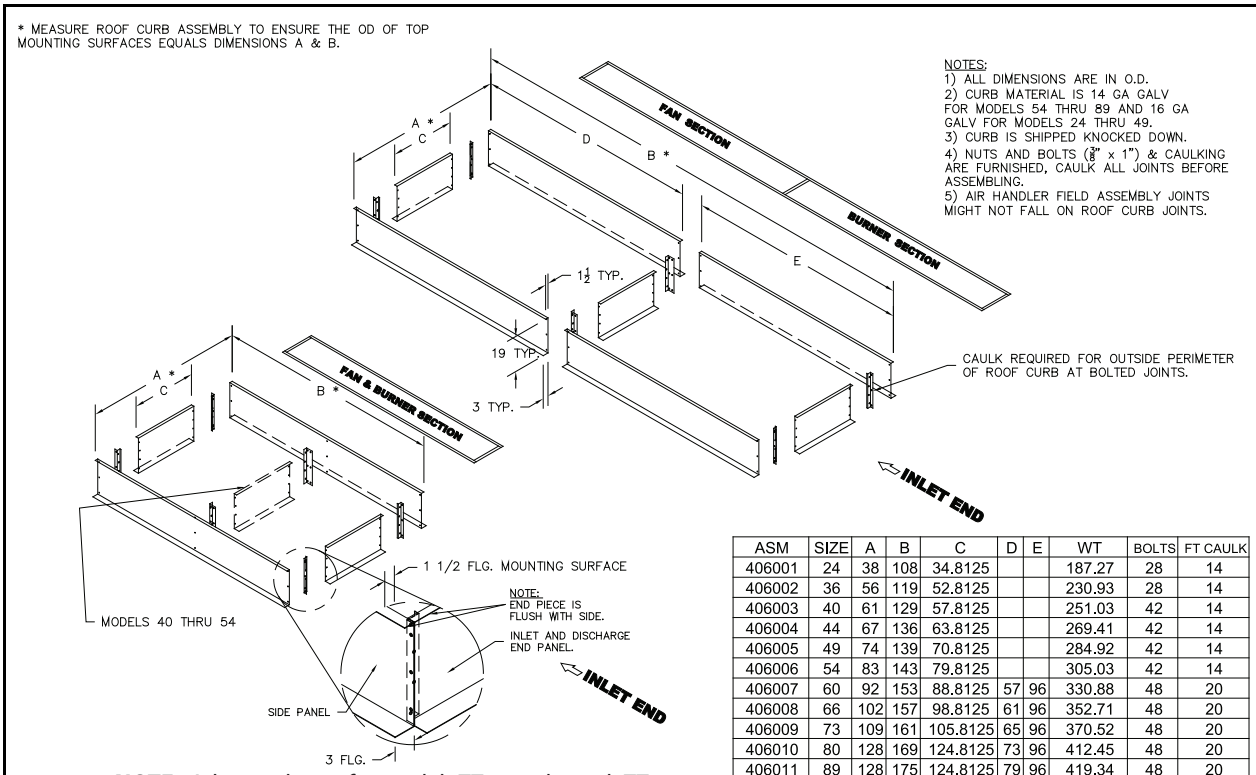
Style	Fan and Burner	Extended Curb (ADD for each section)					
		Inlet Coil	Mix Box	OA Filter*	Inlet Plenum	Evap. Cooling Section and Transition	External Fan Motor with Belt Guard
MUA	*	*		*	*	*	*
FR	*	*	*				*
AM	*	*	*	*	*	*	*
VAV	*	*		*	*	*	

*Curb add required only when an inlet plenum is ordered with an outside air filter section.

For pitched curbs, insulated curbs, wood nailers or cub mounted vibration isolation, consult the factory.

NOTE: Check the installation location to ensure proper clearances to combustibles and clearance for access. *Page 8, Section 3*.

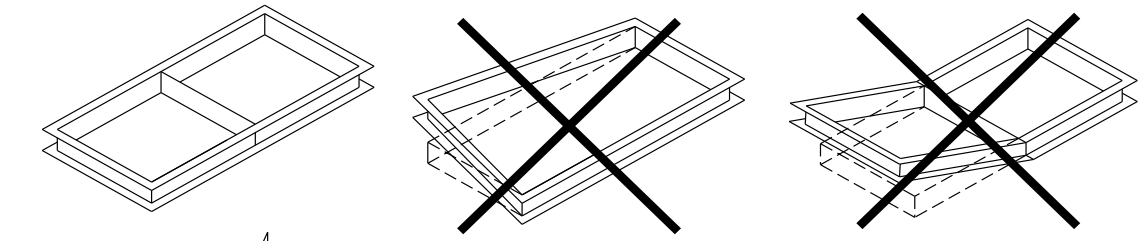
FIGURE 31: Roof Curb

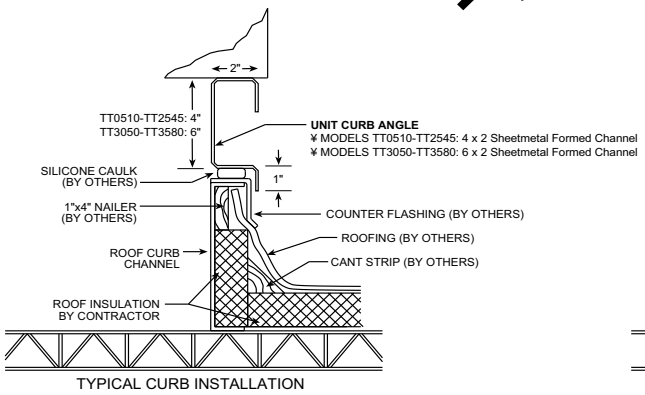


ASM	SIZE	A	B	C	D	E	WT	BOLTS	FT CAULK
406001	24	38	108	34.8125			187.27	28	14
406002	36	56	119	52.8125			230.93	28	14
406003	40	61	129	57.8125			251.03	42	14
406004	44	67	136	63.8125			269.41	42	14
406005	49	74	139	70.8125			284.92	42	14
406006	54	83	143	79.8125			305.03	42	14
406007	60	92	153	88.8125	57	96	330.88	48	20
406008	66	102	157	98.8125	61	96	352.71	48	20
406009	73	109	161	105.8125	65	96	370.52	48	20
406010	80	128	169	124.8125	73	96	412.45	48	20
406011	89	128	175	124.8125	79	96	419.34	48	20

NOTE: Adapter shown for models TT0510 through TT5515 horizontal AM, FMB and MUA.

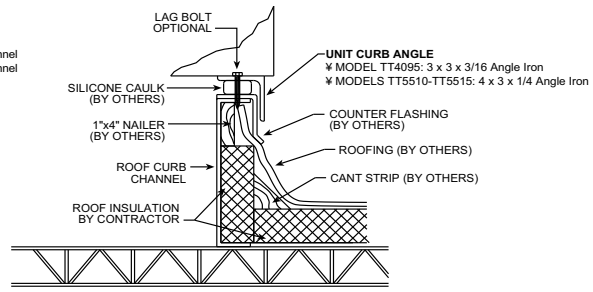
FIGURE 32: Roof Curb Installation





TYPICAL CURB INSTALLATION

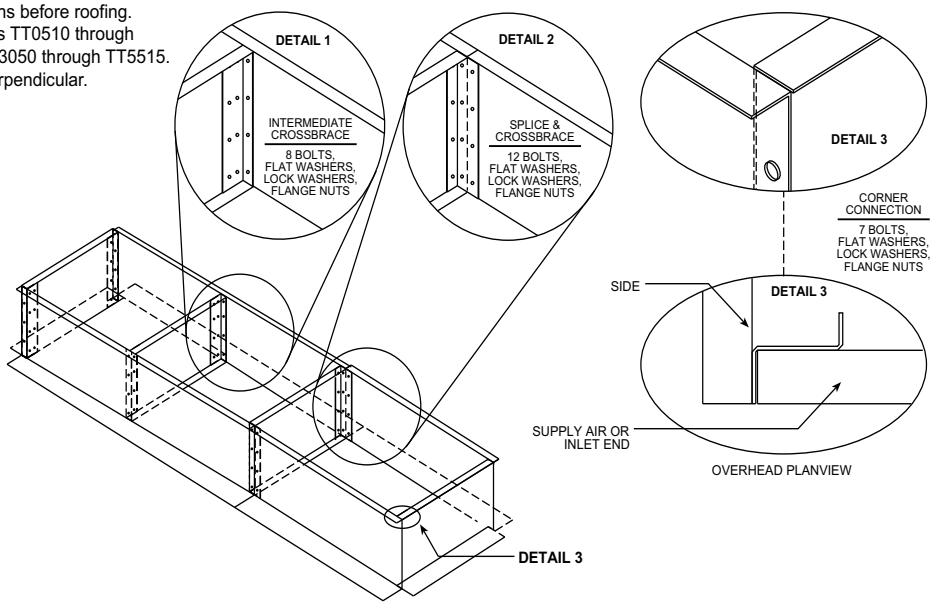
DO NOT TWIST OR BEND FRAME



TYPICAL CURB INSTALLATION

FIGURE 33: Roof Curb Assembly with Brackets

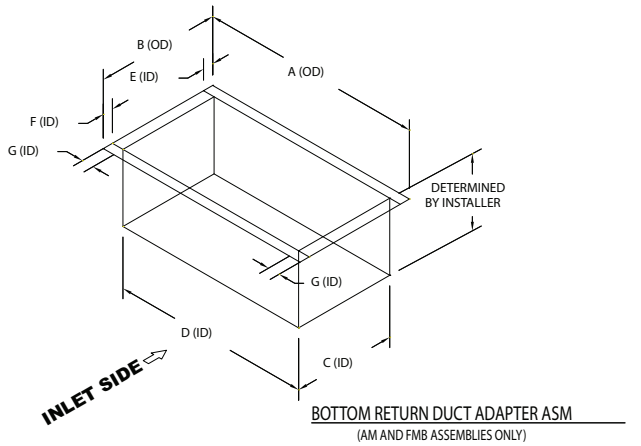
1. Refer to the assembly drawings shipped with the curb.
2. Curb length can vary by options selected.
3. Verify overall assembly dimensions before roofing.
4. Curb material is 16 GA for models TT0510 through TT2545 and 14 GA for models TT3050 through TT5515.
5. All top corners to be flush and perpendicular.
6. All joints must be caulked.



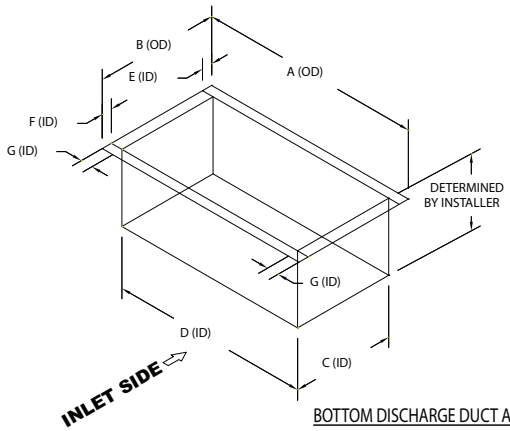
NOTE: All top corners to be flush and perpendicular. All joints must be caulked.

FIGURE 34: Duct Support Adapter

NOTE:
GASKET SPONGE REQUIRED ON TOP SIDE OF FLANGE PERIMETER.
MATERIAL TO BE ALUMINIZED 20ga. STEEL



BOTTOM RETURN DUCT ADAPTER ASM
(AM AND FMB ASSEMBLIES ONLY)



BOTTOM DISCHARGE DUCT ADAPTER ASM

BOTTOM RETURN DUCT ADAPTER								
ASM	SIZE	A	B	C	D	E	F	G
436126	24	38.00	24.69	17.81	31.88	3.44	3.44	3.06
436184	36	56.00	31.13	25.81	49.88	1.81	3.50	3.06
436196	40	61.00	35.13	29.81	54.88	1.81	3.50	3.06
436208	44	67.00	37.13	31.81	60.88	1.81	3.50	3.06
436220	49	74.00	39.13	33.81	67.88	1.81	3.50	3.06
436232	54	83.00	44.13	38.81	76.88	1.81	3.50	3.06
436247	60	92.00	43.13	37.81	85.88	1.81	3.50	3.06
436259	66	102.00	50.13	44.81	95.88	1.81	3.50	3.06
436268	73	109.00	48.62	43.25	101.88	1.81	3.56	3.56
436277	80	128.00	52.62	47.25	122.88	1.81	3.56	2.56
436277	89	128.00	52.62	47.25	122.88	1.81	3.56	2.56

BOTTOM DISCHARGE DUCT ADAPTER								
ASM	SIZE	A	B	C	D	E	F	G
436126	24	38.00	25.31	20.00	29.00	3.50	1.81	4.50
436184	36	56.00	31.31	25.00	47.00	4.50	1.81	4.50
436196	40	61.00	40.31	33.00	50.00	5.50	1.81	5.50
436208	44	67.00	43.31	36.00	56.00	5.50	1.81	5.50
436220	49	74.00	46.31	39.00	63.00	5.50	1.81	5.50
436232	54	83.00	50.31	43.00	72.00	5.50	1.81	5.50
436247	60	92.00	55.31	48.00	81.00	5.50	1.81	5.50
436259	66	102.00	57.31	50.00	91.00	5.50	1.81	5.50
436268	73	109.00	57.13	50.63	99.63	4.69	1.81	4.69
436277	80	128.00	67.13	60.63	116.63	4.69	1.81	5.69
436277	89	128.00	67.13	60.63	116.63	4.69	1.81	5.69

SECTION 9: INDOOR SUSPENSION MOUNTING - HORIZONTAL AIR HANDLER

⚠ WARNING		
		
Crush Hazard **Use proper lifting equipment and practices.**	**Crush Hazard** **Check blower assembly per maintenance section.** **Lack of blower assembly maintenance can cause excessive vibration.** **Excessive vibration can cause support failure.**	**Crush Hazard** **Hanging hardware must support equipment weight.** **Do not hang by lifting lugs.**
Failure to follow these instructions can result in death, injury or property damage.		

⚠ WARNING		
		
Falling Hazard **Use proper safety equipment and practices to avoid falling.**	**Severe Injury Hazard** **Use proper lifting practices and equipment.** **Equipment and accessories are heavy.**	**Cut/Pinch Hazard** **Wear protective gear during installation, operation and service.** **Edges are sharp.**
Failure to follow these instructions can result in death, injury or property damage.		

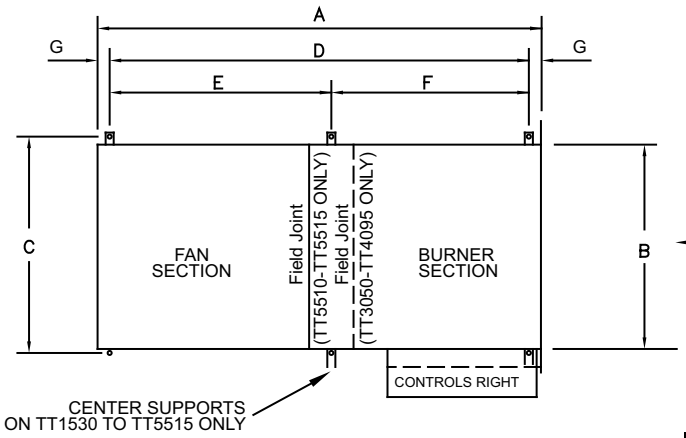
9.1 Suspension Mounting Assembly and Instructions

Indoor suspension mounting is available for all models in horizontal orientation. Suspension mounts are shipped assembled. The exterior frame perimeter includes additional L channel. Holes in the L channel allow for threaded rod to be used for suspension. Threaded rod is provided by others. Minimum threaded rod size is ¾".

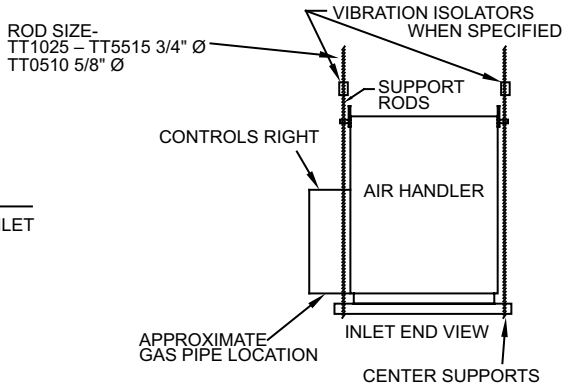
NOTE: Check to be sure all required components are present. If there are any missing, contact Weather-Rite LLC or your WEATHER-RITE™ independent distributor.

Once the suspension frame is secure, the air handler may be mounted. *See Page 27, Section 6.1* for safe lifting practices.

FIGURE 35: Indoor Suspension



PLAN VIEW
CONTROLS RIGHT SHOWN



NOTES:
1. CONSULT FACTORY FOR DIMENSIONS WHEN USING A 3V4 OR 4" MANIFOLD.
2. ALL DIMENSIONS & WEIGHTS ARE SUBJECT TO CHANGE WITHOUT NOTICE & SHOULD NOT BE USED FOR CONSTRUCTION UNLESS CERTIFIED.
3. ACCESSORIES MAY VARY BY INDIVIDUAL ORDER. CONSULT FACTORY FOR ADDITIONAL INFORMATION.
4. FOR NUMBER OF SUPPORT RODS CONSULT FACTORY.

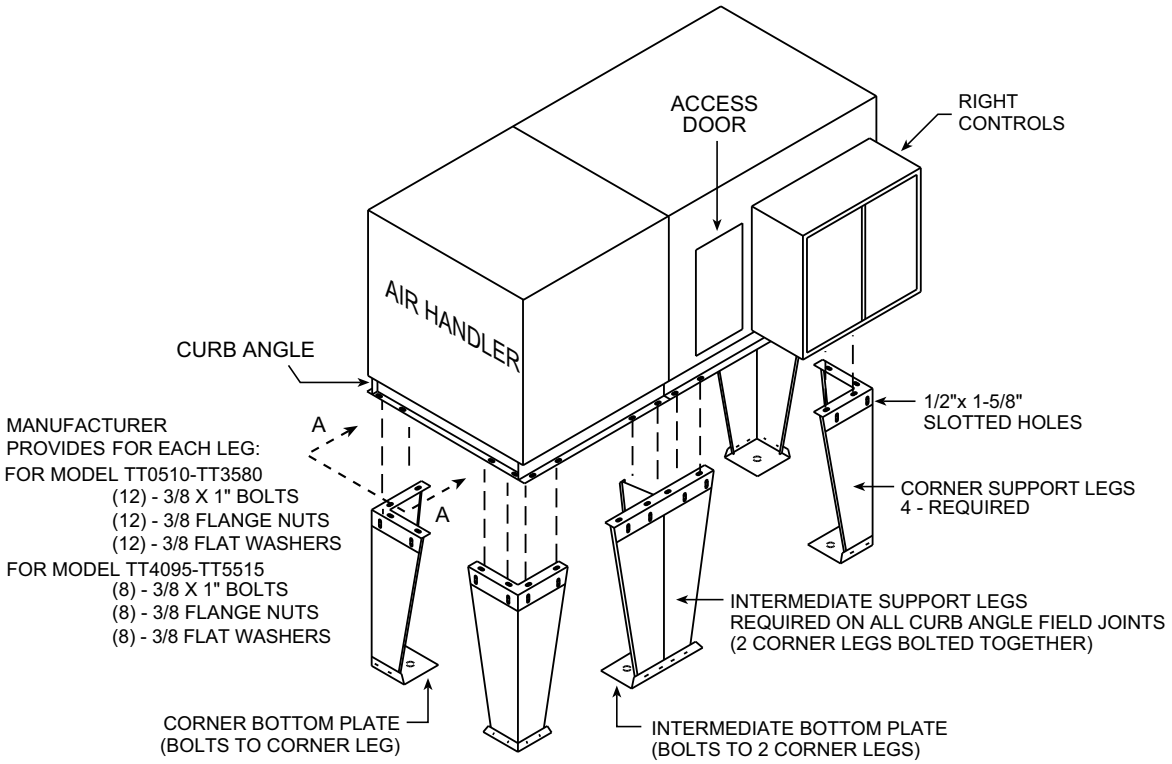
Model	A	B	C	D	E	F	G
TT0510	109	40	45	103	-	-	3
TT1025	120	58	63	114	-	-	3
TT1530	130	63	68	124	64	60	3
TT2035	137	69	74	131	67	64	3
TT2545	140	76	81	134	70	64	3
TT3060	154	94	99	148	84	64	3
TT3580	158	104	109	152	88	64	3
TT4095	163	112	117	157	88	69	3
TT5515	168	131	136	171	81	90	3

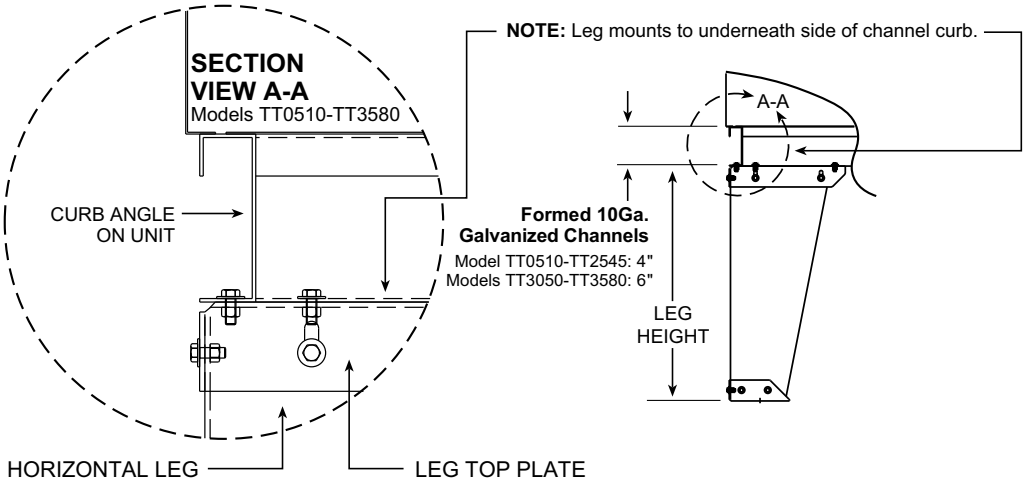
SECTION 10: LEG MOUNTING

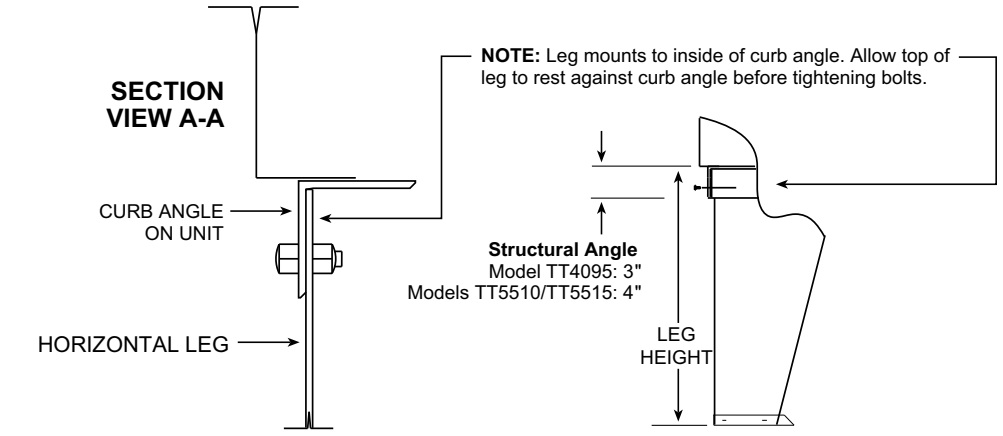
⚠ WARNING			
			
Crush Hazard **Use proper lifting equipment and practices.**	**Falling Hazard** **Use proper safety equipment and practices to avoid falling.**	**Severe Injury Hazard** **Use proper lifting practices and equipment.** **Equipment and accessories are heavy.**	**Cut/Pinch Hazard** **Wear protective gear during installation, operation and service.** **Edges are sharp.**
Failure to follow these instructions can result in death, injury or property damage.			

Vertical MUA, FR, AM and TT0510-TT2545 VAV units require a quantity of four legs. Vertical TT5515 VAV units without an OA filter section require a quantity of six legs (all of the same height). Vertical TT5515 VAV units with an OA filter section require a quantity of six legs (four legs of the same height and two legs at a height of 30" taller than the first four). Consult Factory if height of additional two legs exceed the standard leg offerings. Horizontal TT2545 require a minimum quantity of four legs. Horizontal TT5515 require a minimum quantity of eight legs. For every additional section (ie. mix box, coil, etc.) beyond the basic horizontal unit except for inlet hoods and outside air filter sections, an additional four legs must be added.

FIGURE 36: Assembling Legs for Horizontal Air Handlers



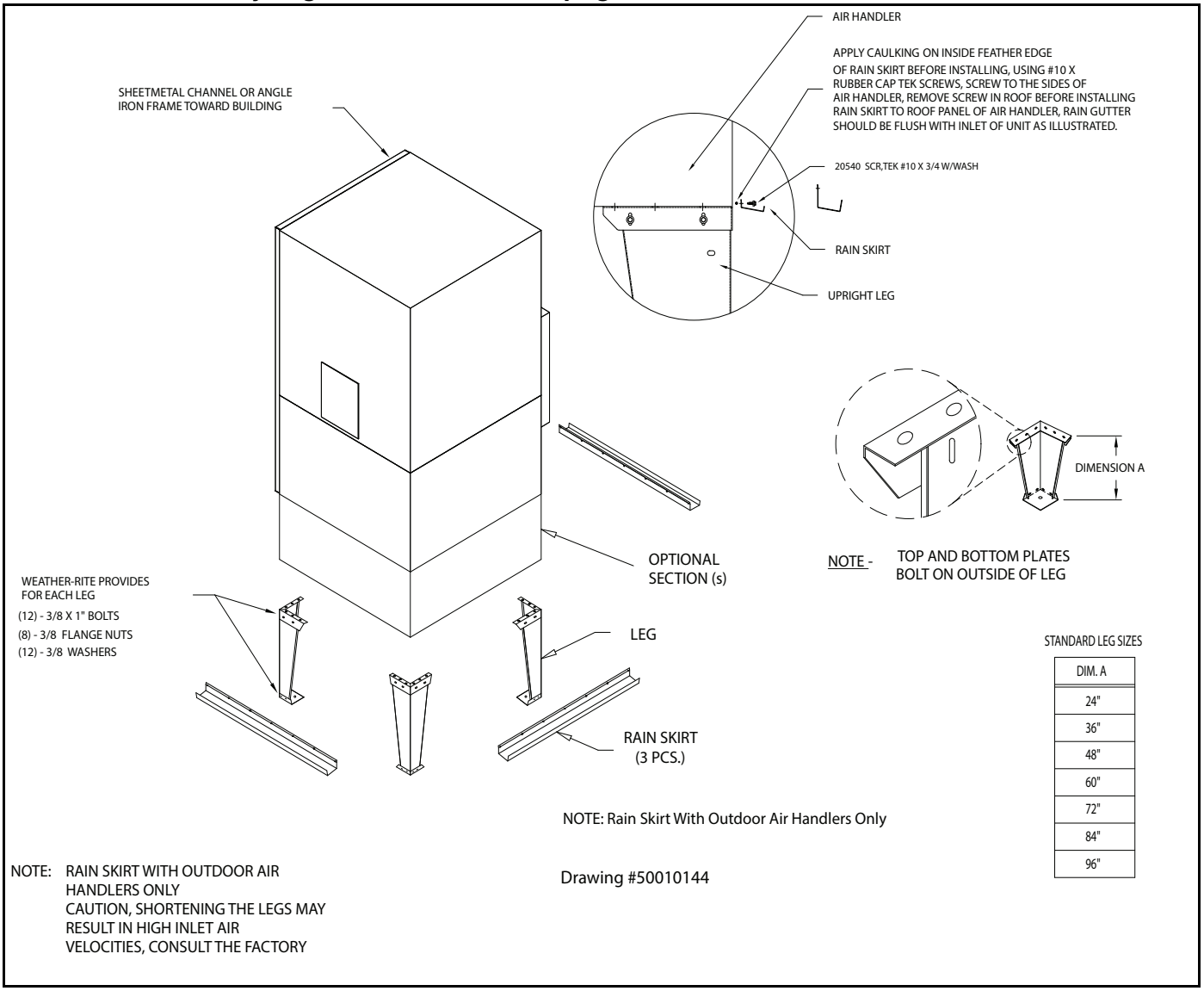




Leg Heights	
in	cm
24	61
36	91.4
48	121.9
60	152.4
72	182.9
84	213.4
96	243.8

NOTE: To shorten legs, consult factory.

FIGURE 37: Assembly Legs and Rainskirt for Upright Air Handlers



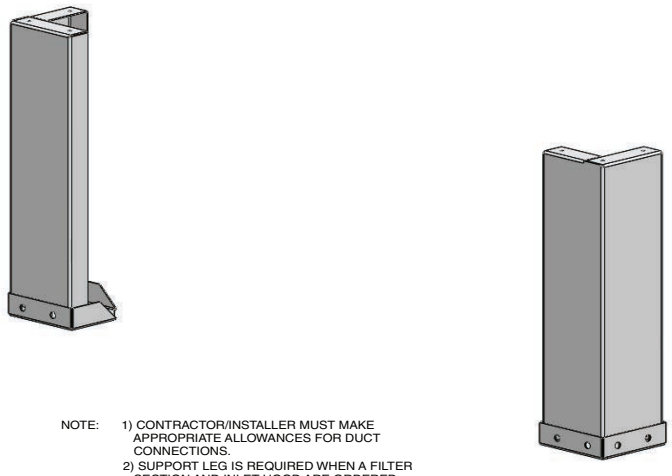
SECTION 11: FILTER SECTION

⚠ WARNING			
			
Crush Hazard **Use proper lifting equipment and practices.**	**Falling Hazard** **Use proper safety equipment and practices to avoid falling.**	**Severe Injury Hazard** **Use proper lifting practices and equipment.** **Equipment and accessories are heavy.**	**Cut/Pinch Hazard** **Wear protective gear during installation, operation and service.** **Edges are sharp.**
Failure to follow these instructions can result in death, injury or property damage.			

All filter sections are shipped assembled. Models TT0510-TT2545 ship attached to the base unit. Model TT5515 shipped loose and required field assembly to base unit.

NOTE: Check to be sure that all required components are present. If any are missing, contact Weather-Rite LLC or your WEATHER-RITE™ independent distributor.

FIGURE 38: Filter Section Support Assembly



NOTE: 1) CONTRACTOR/INSTALLER MUST MAKE APPROPRIATE ALLOWANCES FOR DUCT CONNECTIONS.
2) SUPPORT LEG IS REQUIRED WHEN A FILTER SECTION AND INLET HOOD ARE ORDERED.
3) SUPPORT LEG IS PROVIDED FOR USE WITH STANDARD 19" (50 cm) ROOF CURB. SUPPORT LEG FOR USE WITH STANDARD 46" (116.8 cm) LEGS PROVIDED BY OTHERS.

SECTION 12: INLET HOODS

⚠ WARNING			
			
Crush Hazard	**Falling Hazard**	**Severe Injury Hazard**	**Cut/Pinch Hazard**
Use proper lifting equipment and practices.	**Use proper safety equipment and practices to avoid falling.**	**Use proper lifting practices and equipment.** **Equipment and accessories are heavy.**	**Wear protective gear during installation, operation and service.** **Edges are sharp.**
Failure to follow these instructions can result in death, injury or property damage.			

Inlet hoods are shipped unassembled and must be assembled prior to installation.
NOTE: Check to be sure that all required components are present. If any are missing, contact Weather-Rite LLC or your WEATHER-RITE™ independent distributor.

12.1 Inlet Hood Assembly

FIGURE 39: Inlet Hood without Filters (TT0510-TT2545)

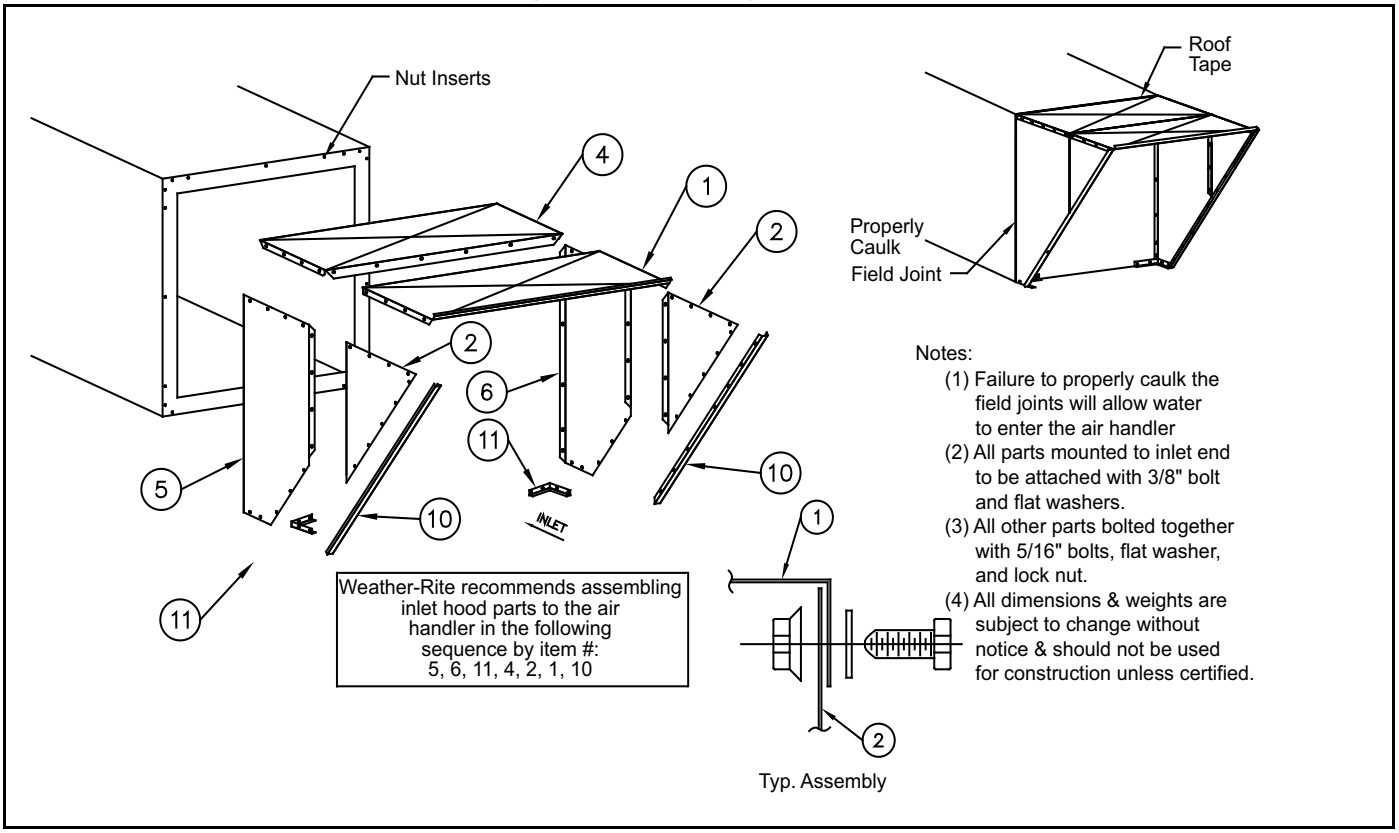


FIGURE 40: Inlet Hood without Filters (TT5515)

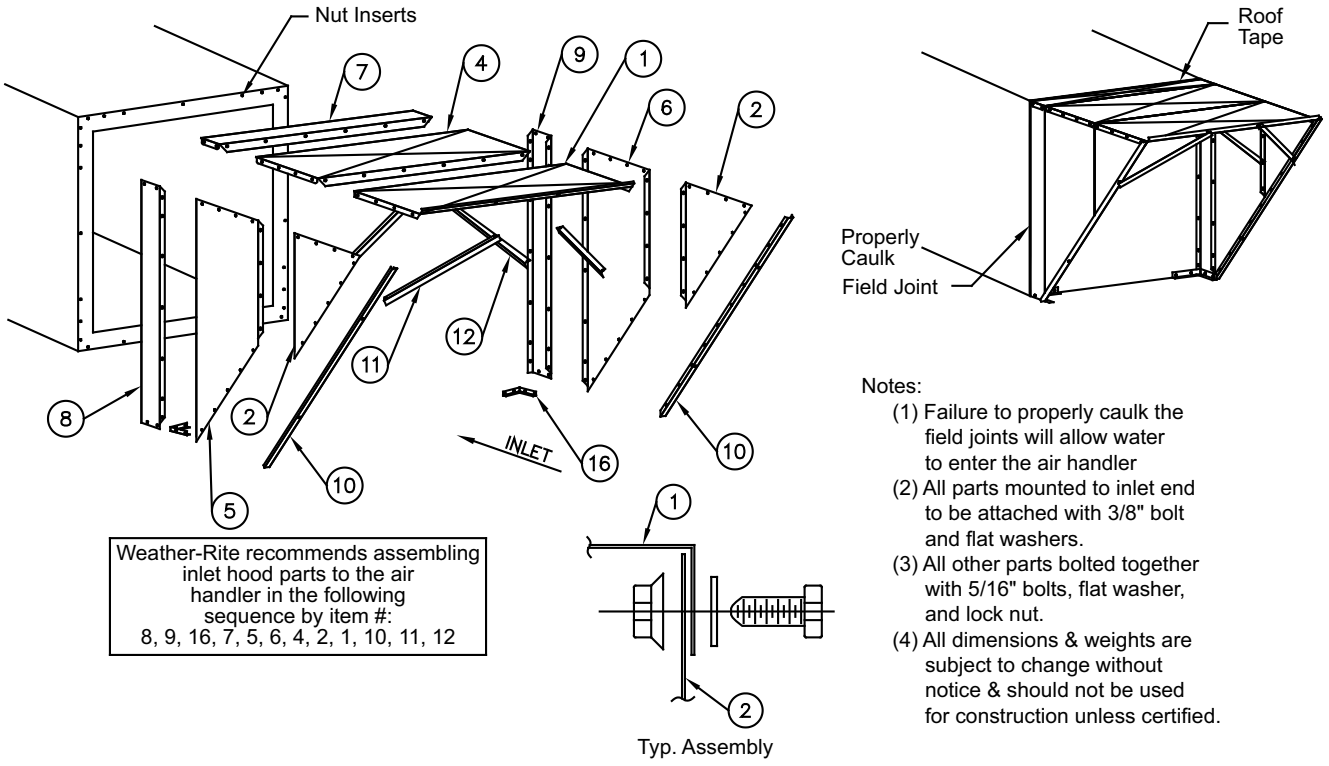
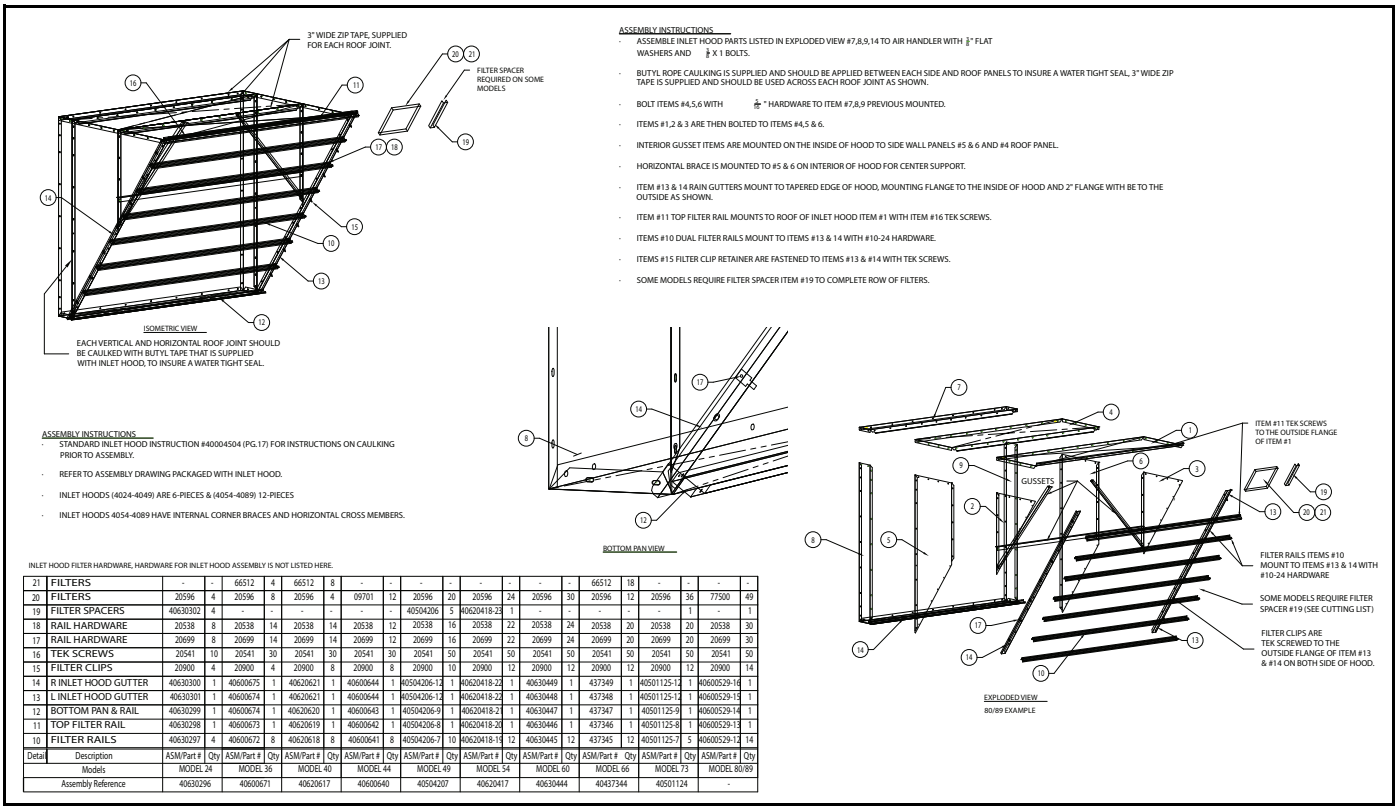


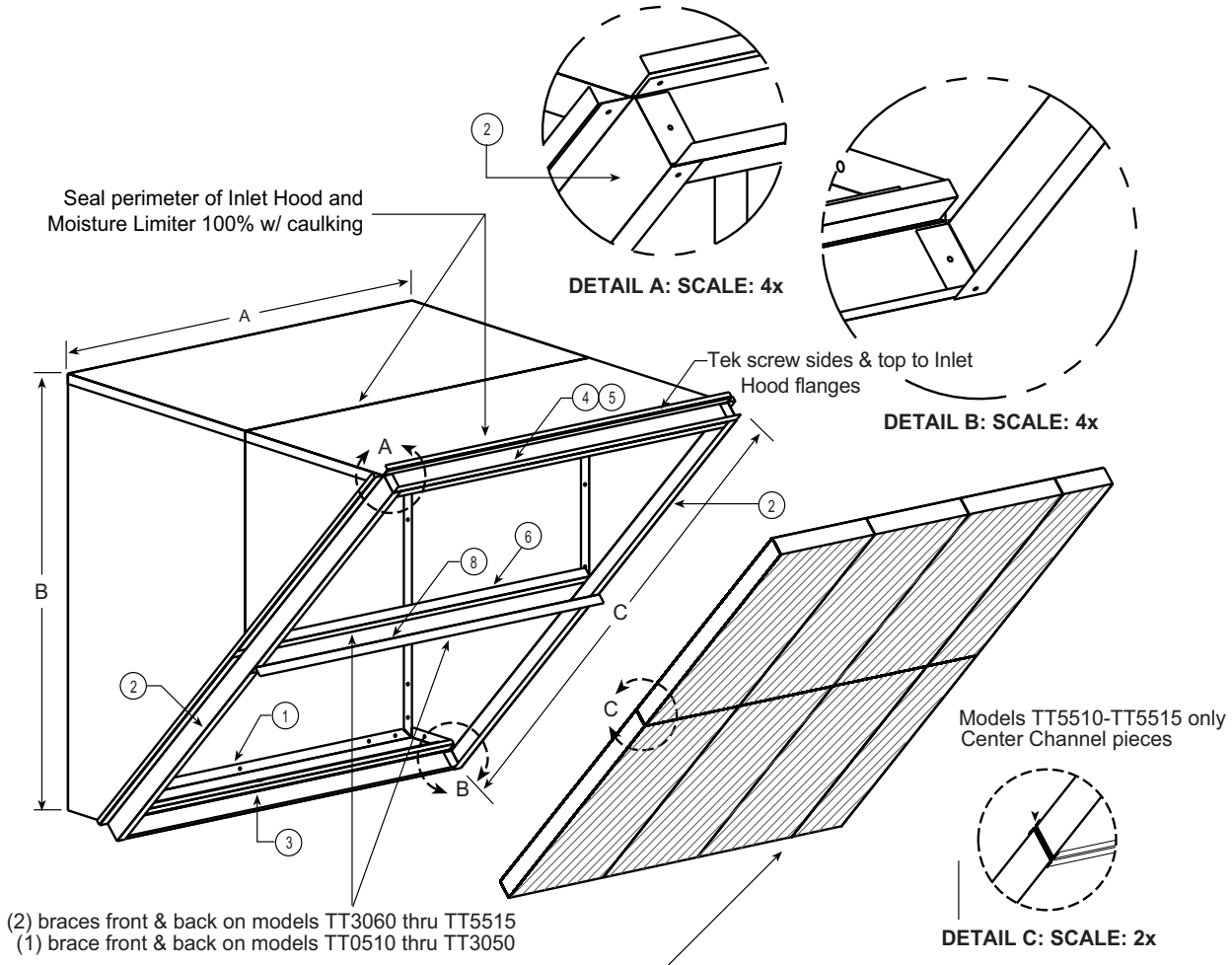
FIGURE 41: Inlet Hood with Permanent Filters



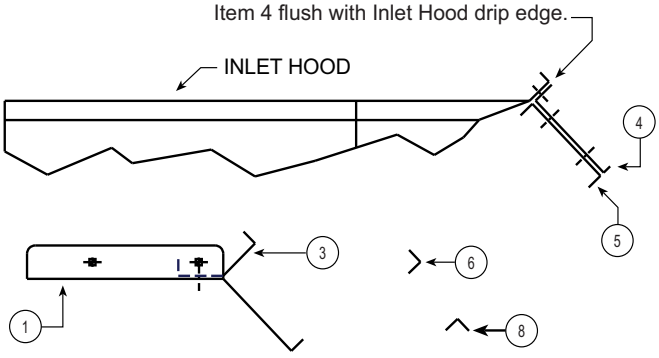
INLET HOOD FILTER HARDWARE, HARDWARE FOR INLET HOOD ASSEMBLY IS NOT LISTED HERE.

Detail	Description	ASM/Part #	Qty	ASM/Part #	Qty	ASM/Part #	Qty	ASM/Part #	Qty	ASM/Part #	Qty	ASM/Part #	Qty	ASM/Part #	Qty	ASM/Part #	Qty	ASM/Part #	Qty	ASM/Part #	Qty
21	FILTERS	-	-	66512	4	66512	8	-	-	-	-	-	-	-	-	66512	18	-	-	-	-
20	FILTERS	20596	4	20596	8	20596	4	09701	12	20596	20	20596	24	20596	30	20596	12	20596	36	77500	49
19	FILTER SPACERS	40630302	4	-	-	-	-	-	-	40504206	5	40620418-23	1	-	-	-	-	-	1	-	1
18	RAIL HARDWARE	20538	8	20538	14	20538	14	20538	12	20538	16	20538	22	20538	24	20538	20	20538	20	20538	30
17	RAIL HARDWARE	20699	8	20699	14	20699	14	20699	12	20699	16	20699	22	20699	24	20699	20	20699	20	20699	30
16	TEK SCREWS	20541	10	20541	30	20541	30	20541	30	20541	50	20541	50	20541	50	20541	50	20541	50	20541	50
15	FILTER CLIPS	20900	4	20900	4	20900	8	20900	8	20900	10	20900	12	20900	12	20900	12	20900	12	20900	14
14	R INLET HOOD GUTTER	40630300	1	40600675	1	40620621	1	40600644	1	40504206-12	1	40620418-22	1	40630449	1	437349	1	40501125-12	1	40600529-16	1
13	L INLET HOOD GUTTER	40630301	1	40600674	1	40620621	1	40600644	1	40504206-12	1	40620418-22	1	40630448	1	437348	1	40501125-12	1	40600529-15	1
12	BOTTOM PAN & RAIL	40630299	1	40600674	1	40620620	1	40600643	1	40504206-9	1	40620418-21	1	40630447	1	437347	1	40501125-9	1	40600529-14	1
11	TOP FILTER RAIL	40630298	1	40600673	1	40620619	1	40600642	1	40504206-8	1	40620418-20	1	40630446	1	437346	1	40501125-8	1	40600529-13	1
10	FILTER RAILS	40630297	4	40600672	8	40620618	8	40600641	8	40504206-7	10	40620418-19	12	40630445	12	437345	12	40501125-7	5	40600529-12	14
	Models	MODEL 24		MODEL 36		MODEL 40		MODEL 44		MODEL 49		MODEL 54		MODEL 60		MODEL 66		MODEL 73		MODEL 80/89	
	Assembly Reference	40630296		40600671		40620617		40600640		40504207		40620417		40630444		40437344		40501124		-	

FIGURE 42: Inlet Hood with Moisture Limiter



On models TT5510 & TT5515, moisture limited media is stacked two rows high and separated with sheetmetal channels pop riveted together. On all other models, moisture limited media is installed with full-lenth rows.



Assembly Instructions:

1. Pop rivet items #1 and #3 together and items #4 and #5 together and center channel piece (see detail C) for model TT5510-TT5515 only.
2. If inlet hood is currently mounted, remove corner brackets. Bolt floor (items #1 and #3) to bottom of the inlet frame and sides of hood.
3. Tek screw one side to inlet hood rain gutter and to floor.
4. Pop rivet back supports (item #6) to inlet hood rain gutter using notches in side as a guide.
5. Tek screw top (items #4 and #5) to top lip of hood and to sides.
6. Install Moisture Limiters media.
7. Tek screw the other side to inlet hood rain gutter and to floor.
8. Tek screw #8 moisture limiter media to front of inlet hood.
9. Seal all joints of inlet hood and perimeter of mist eliminator to inlet hood 100% with caulking.

NOTE: 1. Inlet hood framing side (item #2) not shown.
2. All dimensions are in inches.

Model	TT0510	TT1025	TT1530	TT2035	TT2545	TT3060	TT3580	TT4095	TT5515
A	40	58	63	69	76	94	104	112	131
B	48	72	84	84	84	94	96	96	112
C	$35^{7}/_{8}$	$83^{1}/_{2}$	$95^{5}/_{8}$	$99^{3}/_{4}$	$104^{5}/_{8}$	126	$123^{1}/_{2}$	$123^{1}/_{2}$	$140^{3}/_{4}$
Quantity of Media Pieces	3	5	5	6	6	8	9	9	22

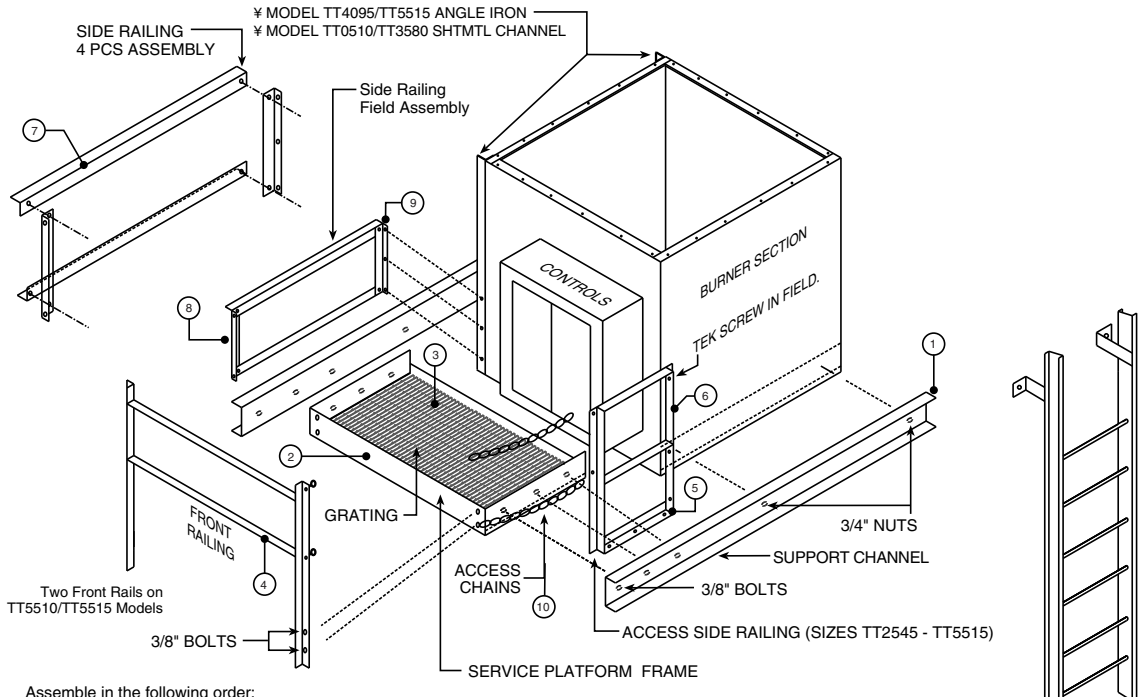
SECTION 13: SERVICE PLATFORM

⚠ WARNING			
			
Crush Hazard	**Falling Hazard**	**Severe Injury Hazard**	**Cut/Pinch Hazard**
Use proper lifting equipment and practices.	**Use proper safety equipment and practices to avoid falling.**	**Use proper lifting practices and equipment.** **Equipment and accessories are heavy.**	**Wear protective gear during installation, operation and service.** **Edges are sharp.**
Failure to follow these instructions can result in death, injury or property damage.			

13.1 Service Platform

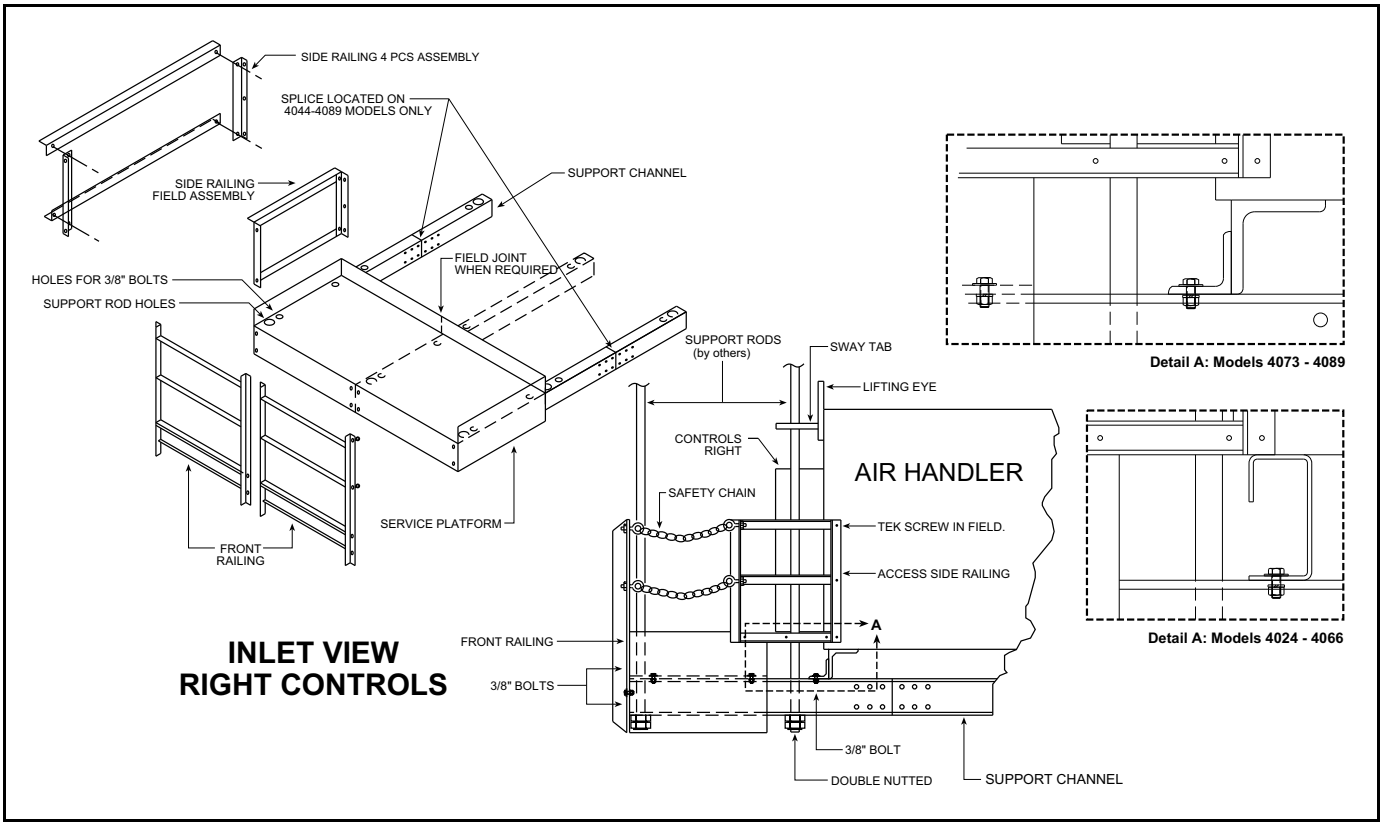
Ladders are available as an additional accessory for service platforms. Ladders are available with or without cages at various heights. Service Platforms are available for use with horizontal or vertical units.

FIGURE 43: Service Platform for an Vertical Air Handler



Assemble in the following order:
1. Bolt support channels to air handler with four ¾" nuts.
2. Bolt service platform frame between support channels with eight 3/8" x 1" bolts and fig nuts.
3. Lay grating inside service platform frame.
4. Bolt from railing to service platform with four 3/8" x 1" bolts and fig nuts.
5. Screw access railing to support channels with three #14 self-tapping screws.
6. Tek screw access railing to air handler roof.
7. Pre-assemble side railing (4 pieces) with four 3/8" x 1" bolts and fig nuts.
8. Bolt side railing to front railing with two 3/8" x 1" bolts and fig nuts.
9. Screw side railing to angle iron frame with three #14 self-tapping screws.
10. Attach safety chains between access side railing and front railing.

FIGURE 44: Service Platform for a Horizontal Air Handler



SECTION 14: DISCHARGE ACCESSORIES

⚠ WARNING			
			
Crush Hazard **Use proper lifting equipment and practices.**	**Falling Hazard** **Use proper safety equipment and practices to avoid falling.**	**Severe Injury Hazard** **Use proper lifting practices and equipment.** **Equipment and accessories are heavy.**	**Cut/Pinch Hazard** **Wear protective gear during installation, operation and service.** **Edges are sharp.**
Failure to follow these instructions can result in death, injury or property damage.			

14.1 One-Way, Three-Way and Four-Way Discharge Head Installation

All discharge heads are shipped assembled. The discharge head is designed for mounting to the face of the air handler (covering the supply air opening) or to an interior wall. All discharge heads must be field supported (by others). The discharge head has four outward-turned flanges. If the discharge head is to be installed to the face of the air handler, install hardware (provided by others) on all four sides of the discharge head.

Discharge heads can be installed on horizontal or vertical air handlers. To install the discharge head on an interior wall, drill holes in the flanges on all four sides of the discharge heads to accommodate lag bolts (supplied by others). Sheet metal (supplied by others) may be required.

Consult factory for detailed installation instructions based on unit orientation and discharge location.

FIGURE 45: Vertical Air Handler with Duct Sleeves and Discharge Head

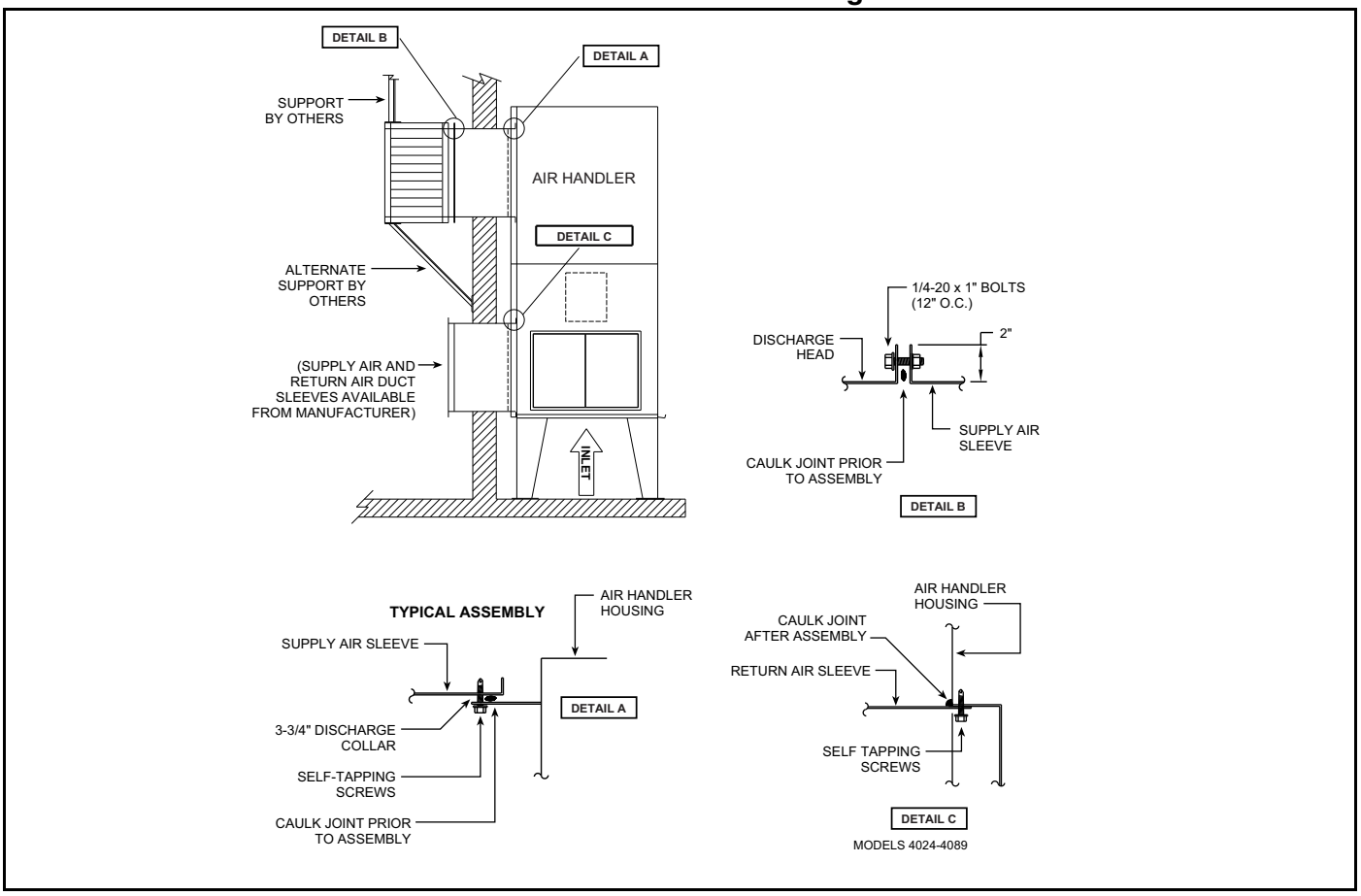
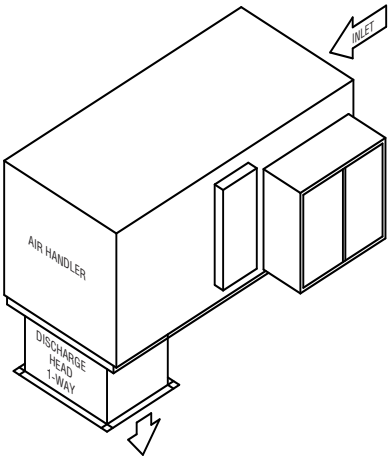


FIGURE 46: One-Way Discharge Head



Model	A	C	D	E	F	G
TT0510	40	24.25	33.25	2	40	3.5
TT1025	58	29.25	51.25	3	58	3.5
TT1530	63	37.25	54.25	4	63	4.5
TT2035	69	40.25	60.25	4	69	4.5
TT2545	76	43.25	67.25	4	76	4.5
TT3060	94	52.25	85.25	4	94	4.5
TT3580	104	54.25	95.25	4	96	4.5
TT4095	112	54.25	103.25	4	96	4.5
TT5515	131	64.25	120.25	4	112	5.5

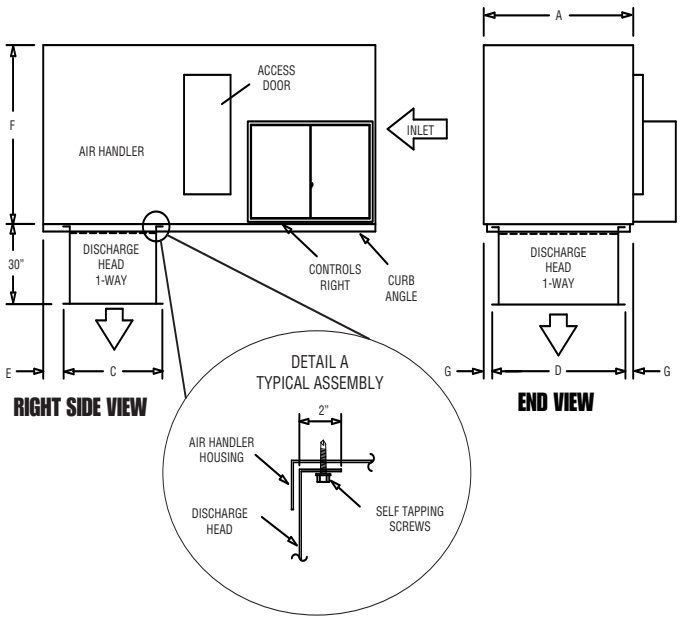
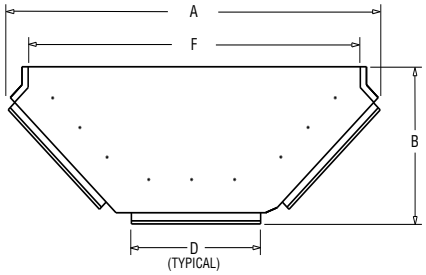
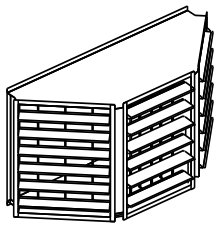
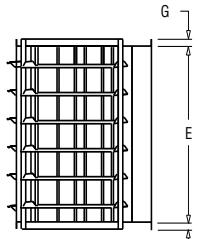


FIGURE 47: Three-Way Discharge Head

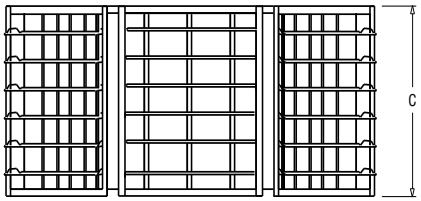


PLAN VIEW





SIDE VIEW



FRONT VIEW

Model	A	B	C	D	E	F	G
TT0510	44	25	24.4	14	20.3	29.3	2.1
TT1025	62	30	29.4	22	25.3	47.3	2.1
TT1530	65	31	37.4	23	33.3	50.3	2.1
TT2035	71	32	40.4	26	36.3	56.3	2.1
TT2545	78	34	43.4	28	39.3	63.3	2.1
TT3060	96	40	52.4	36	48.3	81.3	2.1
TT3580	106	43	54.4	40	50.3	91.3	2.1
TT4095	114	45	54.4	40	50.3	99.3	2.1
TT5515	131	48	60.4	50	60.3	116.3	2.1

FIGURE 48: Four-Way Discharge Head

Model	A	B	C	D	E	F
TT0510	40	40	46	24.3	33.3	2
TT1025	58	58	46	29.3	51.3	2
TT1530	63	63	46	37.3	54.3	2
TT2035	69	69	46	40.3	60.3	2
TT2545	76	76	46	43.3	67.3	2
TT3060	94	94	58	52.3	85.3	2
TT3580	96	104	58	54.3	95.3	2
TT4095	96	112	58	54.3	103.3	2
TT5515	112	131	58	64.3	120.3	2

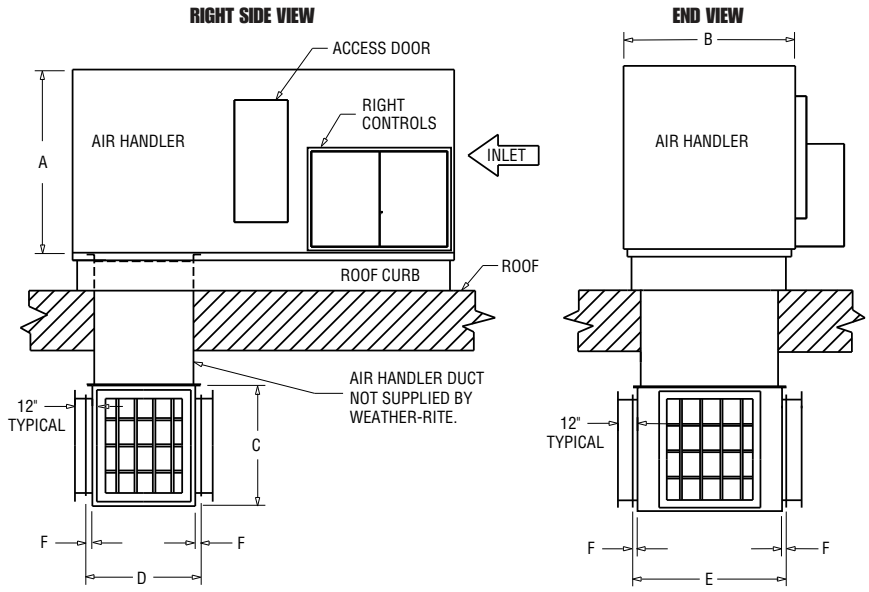
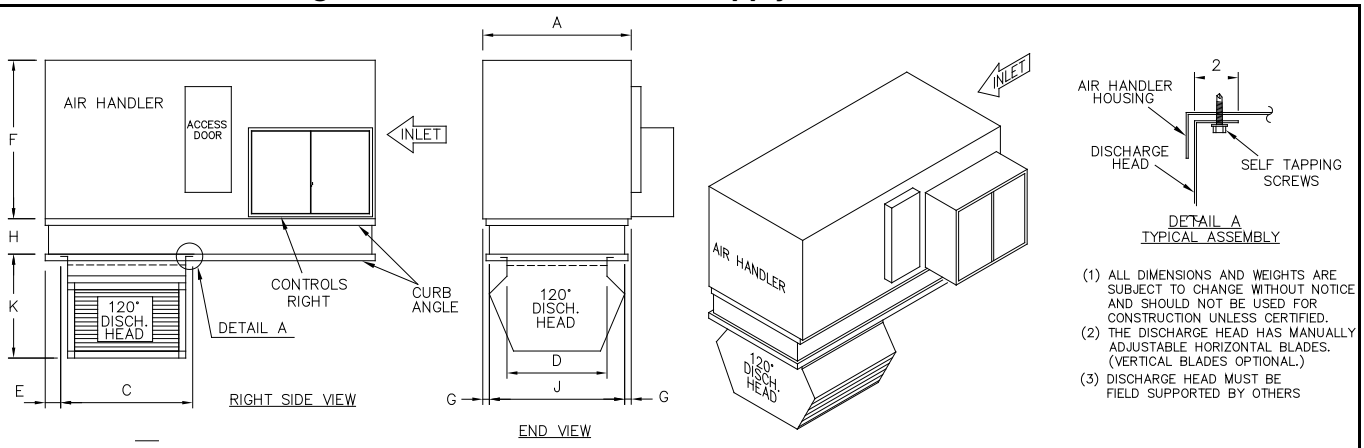


FIGURE 49: 120° Discharge Head Horizontal Bottom Supply Air



Model	A	C	D	E	F	G	H	J	K	Disch ID	Weight (lbs)
TT0510	40	20 1/4	24 1/4	3 7/8	40	5 3/8	19	47	30	24 x 29	75
TT1025	58	25 1/4	32 1/4	4 7/8	58	5 3/8	26	83	48	32 x 47	105
TT1530	63	33 1/4	35 1/4	5 7/8	63	6 3/8	31	73	39	35 x 50	140
TT2035	69	36 1/4	35 1/4	5 7/8	69	6 3/8	33	73	36	35 x 56	180
TT2545	76	39 1/4	40 1/4	5 7/8	76	6 3/8	33	78	36	40 x 63	190
TT3060	94	48 1/4	43 1/4	5 7/8	94	6 3/8	44	92	39	43 x 81	250
TT3580	104	50 1/4	43 1/4	5 7/8	96	6 3/8	44	97	37	43 x 91	290
TT4095	112	50 1/4	43 1/4	5 7/8	96	6 3/8	41	136	64	43 x 99	380
TT5515	131	60 1/4	43 1/4	5 7/8	112	7 3/8	44	145	63	43 x 116	480

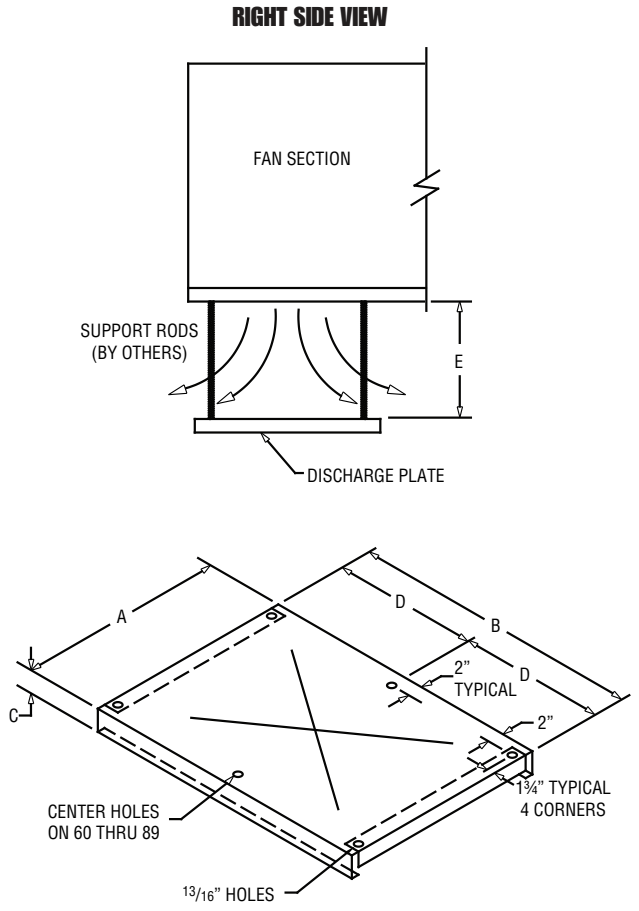
14.2 Splash Plate Installation

The splash plate is designed to hang, supported by suspension rods (rods provided by others) directly below the bottom discharge opening of a horizontal air handler. The center point of the splash plate must be located at the center point of the discharge opening and be positioned below the air handler within the range of dimensions show below as E (min) & E (max.). For model sizes 60-89, center support rods will be required (see illustration below).

NOTE: Be sure to include provisions in the structure suspending the discharge plate that will prevent sway/movement of the plate when the supply fan is in operation.

To attach all of the hanger rods to the splash plate, start by threading a flanged nut onto each hanger rod. Then, slip each hanger rod down through a hole located in each corner of the splash plate. Next, feed a flanged nut onto the rod below the splash plate. Adjusting the nuts will level the splash plate. Torque hardware after leveling.

FIGURE 50: Discharge Plate



Model	A	B	C	D	E (min.)	E (max.)	Weight (lbs)
TT0510	42	54	3	-	25	38	80
TT1025	47	72	3	-	36	54	110
TT1530	55	75	3	-	42	64	130
TT2035	58	81	3	-	46	70	140
TT2545	61	88	3	-	50	75	160
TT3060	70	106	3	53	64	96	230
TT3580	72	116	3	58	70	105	250
TT4095	72	124	3	62	75	112	260
TT5515	82	140	4	70	88	132	330

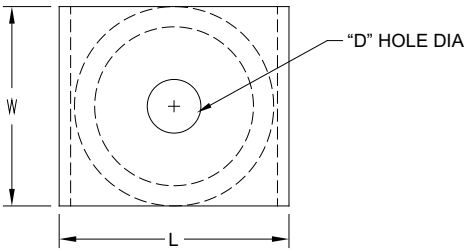
SECTION 15: VIBRATION ISOLATION

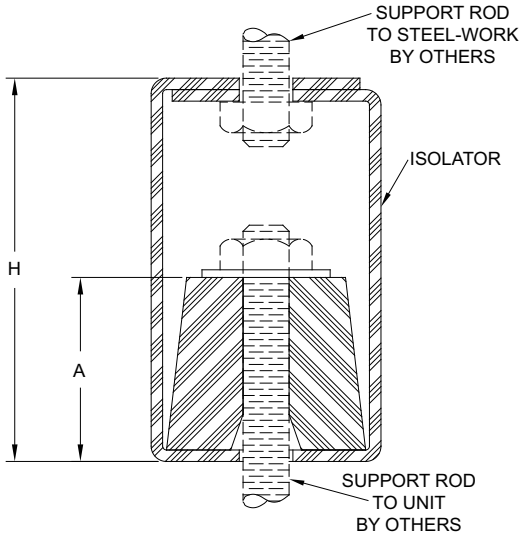
⚠ WARNING			
			
Crush Hazard	**Falling Hazard**	**Severe Injury Hazard**	**Cut/Pinch Hazard**
Use proper lifting equipment and practices.	**Use proper safety equipment and practices to avoid falling.**	**Use proper lifting practices and equipment.** **Equipment and accessories are heavy.**	**Wear protective gear during installation, operation and service.** **Edges are sharp.**
Failure to follow these instructions can result in death, injury or property damage.			

FIGURE 51: Suspended

TYPE	L	W	H	A	D
RH2	3	2 1/4	4 1/4	1 3/8	11/16
RH3	3 3/4	3 1/4	6 1/4	2	7/8
RH4	4 1/2	4	8 3/16	2	13/16

NOTE:
ALL DIMENSIONS AND WEIGHTS ARE SUBJECT TO CHANGE WITHOUT NOTICE AND SHOULD NOT BE USED FOR CONSTRUCTION UNLESS CERTIFIED.





SIZE	VENDOR #	ISOLATORS REQ'D FOR: AIR HANDLER	AIR HANDLER W/ SERVICE PLATFORM	AIR HANDLER (AM) W/ FILTER MIX BOX	AIR HANDLER (AM) W/ FILTER MIX BOX & SERVICE PLATFORM	
4024	RH – 2, GRAY	4	6	6	9	29875
4036	RH – 3, GREEN	4	6	6	9	20888
4040	RH – 3, GREEN	4	9	6	12	20888
4044	RH – 3, GRAY	4	9	6	12	20817
4049	RH – 3, GRAY	4	9	6	12	20817
4054	RH – 4, GREEN	6	9	8	12	46212
4060	RH – 4, GREEN	6	9	8	12	46212
4066	RH – 4, GREEN	6	9	8	12	46212
4073	RH – 4, GREEN	6	9	8	12	46212
4080	RH – 4, GREEN	6	9	8	12	46212
4089	RH – 4, GREEN	6	9	8	12	46212

FIGURE 52: Curb Mounted

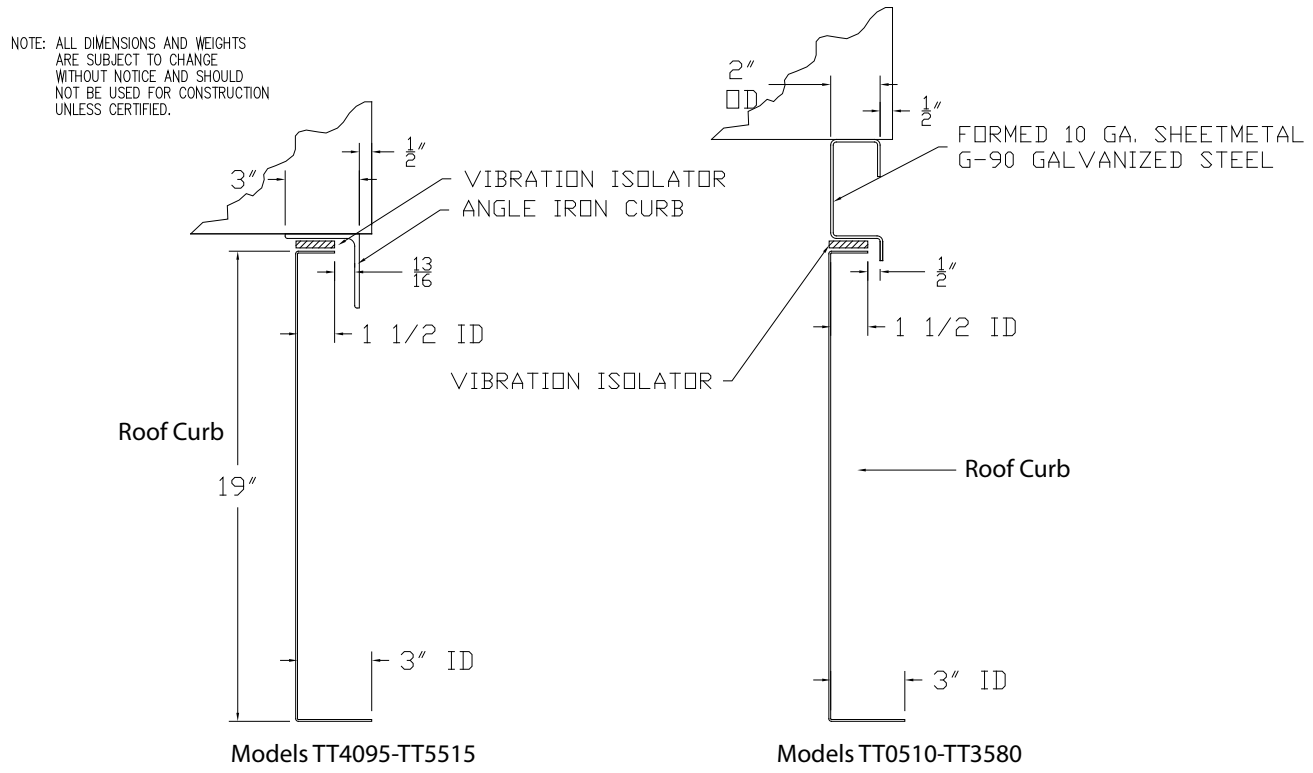


FIGURE 53: Platform Mounting on Vibration Isolators

NOTE:
ALL DIMENSIONS AND WEIGHTS ARE SUBJECT TO CHANGE WITHOUT NOTICE AND SHOULD NOT BE USED FOR CONSTRUCTION UNLESS CERTIFIED.

TYPE	A	B	C	D	E	H
R – 3	3 3/8	5 1/2	4 1/8	9/16	1/2	1 3/4
R – 4	4 1/4	6 1/2	5	9/16	5/8	1 3/4

MODEL	VENDOR #	ISOLATORS REQ'D FOR AIR HANDLER	ISOLATORS REQ'D FOR AIR HANDLER (AM) W/ FILTER
TT0510	R – 3, RED	4	6
TT1025	R – 3, GREEN	4	6
TT1530	R – 3, GREEN	4	6
TT2035	R – 3, GRAY	4	6
TT2545	R – 3, GRAY	4	6
TT3050	R – 4, BLACK	6	8
TT3060	R – 4, BLACK	6	8
TT3580	R – 4, BLACK	6	8
TT4095	R – 4, RED	6	8
TT5510	R – 4, RED	6	8
TT5515	R – 4, RED	6	8

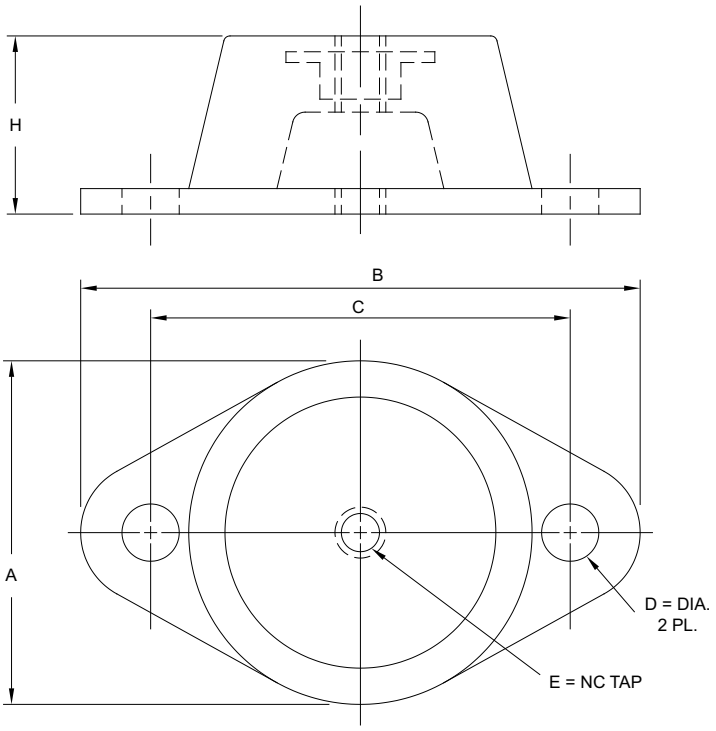
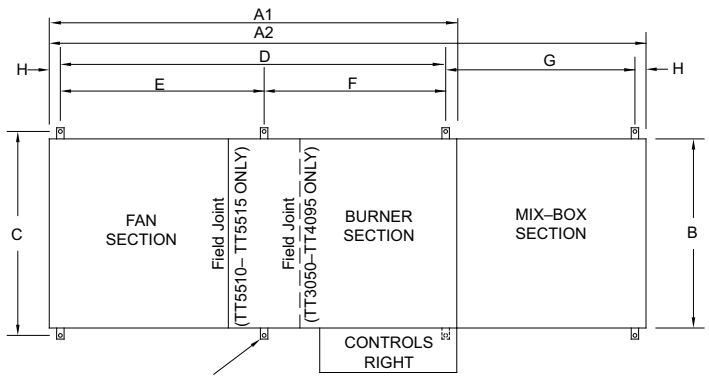
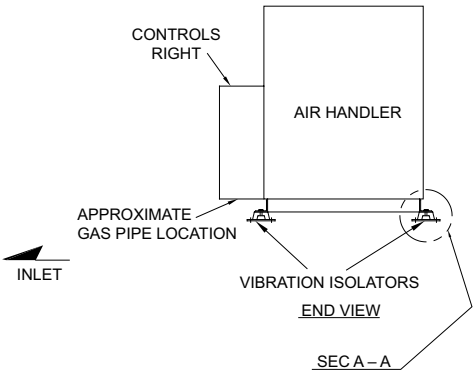


FIGURE 54: Vibration Isolation Platform Locations



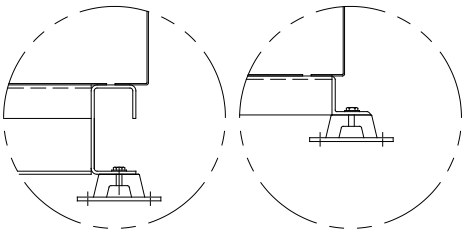
PLAN VIEW

CONTROLS RIGHT SHOWN



NOTE:
ALL DIMENSIONS AND WEIGHTS ARE SUBJECT TO CHANGE WITHOUT NOTICE AND SHOULD NOT BE USED FOR CONSTRUCTION UNLESS CERTIFIED.

NOTE:
FOR MUA, EXCLUDE MIX BOX



SECTION VIEW A – A
MODELS TT0510 – TT3580

SECTION VIEW A – A
MODELS TT4095– TT5515

MODEL	A1	A2	B	C	D	E	F	G	H
TT0510	109	171	40	37 3/8	103	-	-	62	3
TT1025	120	186	58	55 3/8	114	-	-	66	3
TT1530	130	198	63	60 3/8	124	-	-	68	3
TT2035	137	207	69	66 3/8	131	-	-	70	3
TT2545	140	212	76	73 3/8	134	-	-	72	3
TT3050	144	221	85	82 3/8	138	80	58	77	3
TT3060	154	231	94	91 3/8	148	84	64	77	3
TT3580	158	242	104	101 3/8	152	88	64	84	3
TT4095	163	247	112	114 1/2	157	88	69	84	3
TT5510	171	265	131	133 1/2	165	75	90	94	3
TT5515	177	271	131	133 1/2	171	81	90	94	3

SECTION 16: COOLING SPECIFICATIONS

16.1 Evaporative Cooling

Table 21: Formulas

Formulas	
1	Leaving Dry Bulb = ODB – [SE* x (ODB - OWB)]
2	Leaving Wet Bulb = Entering Wet Bulb (actually, it's slightly less than the entering wet bulb, but is normally considered equal.)
3	Wet Bulb Depression = ODB – OWB
4	Evaporation Rate (GPH) = CFM x WBD x SE/8050
5	Bleed-off Rate = approximately 20% of evaporation rate*
6	Recirculation Rate = approximately 3 times evaporation rate*

* Bleed-off and recirculation rates will vary with locale, water quality and chemical treatment program. These values are only for approximation.

NOTE: Refer to saturation efficiency table below.

Table 22: Abbreviations

Abbreviations	
CFM	Cubic Feet Per Minute
GPH	Gallons Per Hour
IDB	Indoor (Design) Dry Bulb Temperature
LDB	Leaving Dry Bulb Temperature
LWB	Leaving Wet Bulb Temperature
ODB	Outdoor (Design) Dry Bulb Temperature
OWB	Outdoor (Design) Wet Bulb Temperature
SE	Saturation Efficiency of the Evaporative Media
WBD	Wet Bulb Depression

Table 23: Evaporation Rate

Wet Bulb Depression (°F)	Gallons per Hour (GPH) Per 1,000 Cubic Feet per Minute (CFM) at Stated Saturation Efficiency									
	0.80	**0.82**	**0.84**	**0.86**	**0.88**	**0.90**	**0.92**	**0.94**	**0.96**	**0.98**
5	0.50	0.51	0.52	0.53	0.55	0.56	0.57	0.58	0.60	0.61
10	0.99	1.02	1.04	1.07	1.09	1.12	1.14	1.17	1.19	1.22
15	1.49	1.53	1.56	1.60	1.64	1.68	1.71	1.75	1.79	1.83
20	1.99	2.04	2.09	2.14	2.19	2.23	2.28	2.33	2.38	2.43
25	2.48	2.55	2.61	2.67	2.73	2.79	2.86	2.92	2.98	3.04
30	2.98	3.05	3.13	3.20	3.28	3.35	3.43	3.50	3.58	3.65
35	3.48	3.56	3.65	3.74	3.82	3.91	4.00	4.08	4.17	4.26
40	3.97	4.07	4.17	4.27	4.37	4.47	4.57	4.67	4.77	4.87
45	4.47	4.58	4.69	4.80	4.92	5.03	5.14	5.25	5.36	5.48

- Heat of vaporization = 1043 BTU/lb
- Weight of water = 8.34 lb./Gallon
- GPH = CFM x WBD x SE x 1.08/1043/8.34 = CFM x WBD x SE/8050

Table 24: Suggested Air Changes Per Hour (Air Change Method)

Leaving Air Temperature (°F DB)	Indoor Air Temperature Above Ambient (°F)*	Air Changes/Hour**
78°	20°	30 - 60
76° - 78°	15° - 20°	20 - 40
74° - 76°	10° - 15°	15 - 30
72° - 74°	5° - 15°	12 - 20
< 72°	< 10°	10 - 15

* For existing buildings: Average amount indoor temperature exceeds ambient outdoor temperature when evaporative cooling is not in use.

** Experience has shown that significant benefit can be achieved with 10-15 Air Changes per Hour (AC/Hr) through the lowest 12' of the facility. For a 24' high building, this would mean 5-6 Air Changes per Hour (AC/Hr) for the entire volume. This will vary by application.

Table 25: Saturation Efficiency at Stated Media Depth

Airflow Feet per Minute (FPM)	6"	8"	12"	18"	24"
400	0.71	0.81	0.90	0.98	0.99
500	0.68	0.79	0.89	0.98	0.99
600	0.66	0.77	0.88	0.97	0.99
700	0.64	0.75	0.87	0.97	0.98

Table 26: Static Pressure Drop (in wc) at Stated Media Depth

Airflow Feet per Minute (FPM)	6"	8"	12"	18"	24"
400	0.06	0.09	0.14	0.19	0.24
500	0.09	0.14	0.21	0.30	0.39
600	0.13	0.20	0.30	0.42	0.55
700	0.23	0.31	0.44	0.62	0.80

NOTE: Moisture limiter pressure drop is added for face velocities greater than 600 Feet per Minute (FPM). Weather-Rite LLC's standard media thickness equals 12".

SECTION 17: DUCT CONSIDERATIONS

⚠ WARNING	
	
Falling Hazard **Use proper safety equipment and practices to avoid falling.**	**Cut/Pinch Hazard** **Wear protective gear during installation, operation and service.** **Edges are sharp.**
Failure to follow these instructions can result in death, injury or property damage.	

The air handler has been designed to operate at the specific air volume and external static pressure that was originally specified. Static pressure is increased by any additional components that are added to the air handler (i.e. inlet hood, filter section, dampers, ductwork, discharge heads, etc) Additional static pressure beyond original intention (or time of order) will affect the performance of the air handler and reduce the air volume that can be delivered.
Proper engineering methods need to be employed when calculating duct and component static pressure (i.e. 2009 ASHRAE Handbook - Fundamentals, Chapter 21).
The system ductwork must comply with Sheet Metal and Air Conditioning Contractors Nationals Association (SMACNA) or any other recognized standards.
As a general rule, all ducting should have a straight run of at least 3 duct diameters immediately before and after the air handlers mechanical accessories. No duct fittings, elbows or transitions with restrictions can be placed within 3 duct diameters.

Duct diameter for round ducts (in inches):

Dh = d
Dh:diameter
d:round duct inside diameter

Duct diameter for rectangular ducts (in inches):

Dh = (2*H*W)/(H+W)
Dh:diameter
H:rectangular duct inside height
W:rectangular duct inside width

The air handler is not designed to support the weight of ductwork. Ductwork must be constructed in a fashion that is self-supporting. Ductwork should be straight, elbows should be minimal and any transitions should be gradual.
Depending on the options ordered with the air handler, flanges (either external or internal) may be provided to facilitate connection of ductwork. In cases where flanges are not provided, flat surfaces on the exterior skin of the air handler are provided to facilitate connection of ductwork.
Neither the flanges nor exterior skin of the air handler are capable of supporting the load of the ductwork. Ductwork support must come from the structure itself that the air handler is servicing. On horizontal runs, it is recommended that ductwork be supported every 6 ft (1.8 m) for ductwork that has a cross section of 10 ft (3 m) or less and every 4 ft (1.2 m) for ductwork which has a cross section of greater than 10 ft (3 m). On vertical runs, it is recommended that ductwork be supported every 10 ft (3.0 m). On both cases, supporting members should be sized to carry the weight load.

17.1 Inlet Air Duct

Inlet duct work height and width must be no smaller than the air handler inlet height and width and supply only uncontaminated air to the air handler. (*See Page 10, Section 5* for return air dimensions).

17.2 Return Air Duct

Return air duct work height and width must be no smaller than the air handler return air opening height and width. (*See Page 10, Section 5* for return air dimensions).

17.3 Supply Air Duct Work

Supply air duct work sizes should be determined by the application requirements of the system. Supply air ductwork must be smaller than supply air opening. *See Page 10, Section 5* for dimensions.

SECTION 18: GAS PIPING

⚠WARNING

Explosion Hazard

Leak test all components of gas piping before operation.

Gas can leak if piping is not installed properly.

Do not high pressure test gas piping with air handler connected.

Failure to follow these instructions can result in death, injury or property damage.

18.1 Gas Manifolds

All gas piping to the air handler must comply with:

United States: Refer to NFPA 54/ANSI Z223.1 - latest revision, National Fuel Gas Code.

Canada: Refer to CSA B149.1 - latest revision, Natural Gas and Propane Installation Code.

The air handlers are available with three gas manifold options.

- American National Standards Institute (ANSI) compliant manifold: (*See Page 71, Figure 55*).
- Factory Mutual (FM)-compliant manifold: (*See Page 72, Figure 56*).
- XL Insurance (former IRI)-compliant manifold: (*See Page 73, Figure 57*).

18.2 Gas Piping and Pressures

The air handler is equipped with a gas manifold suitable for connection to supply pressure of up to 5 p.s.i. maximum for all manifold types.

When gas supply exceeds the above-listed maximum gas pressures, an additional high pressure gas regulator will be required to assure that the correct gas pressure is supplied to the air handler.

Outlet pressure from the regulator / inlet pressure to air handler should be measured at the inlet of the air handler gas manifold.

Minimum gas pressure as indicated on data plate must be measured with the burner operating in high fire.

Minimum inlet gas pressure is determined by gas train size and BTU/h rating.

Table 27: Manifold Component Identification

Item	Component Identification
A	Leg Trap (by others)
B	Lockable Manual Shut-Off Valve (by others)
C	High Gas Pressure Regulator (by others) if gas pressure is over 5 P.S.I.
D	Pilot Gas Cock
E	Primary Safety Shut Off Valve and Actuator
F	Vent Valve and Piping
G	Block Valve and Actuator
H	Plug Cock
J	Modulator Valve / Gas Pressure Regulator
K	Low Gas Pressure Switch
L	Pilot Valve Solenoid (normally closed)
M	Pilot Regulator
N	High Gas Pressure Switch
P	Burner
Q	-
R	Union (by others)
S	¼" FPT Pressure Tap with Plug (by others)

NOTE: Items vary by manifold type. All items may not apply.

FIGURE 55: Standard Gas Manifold

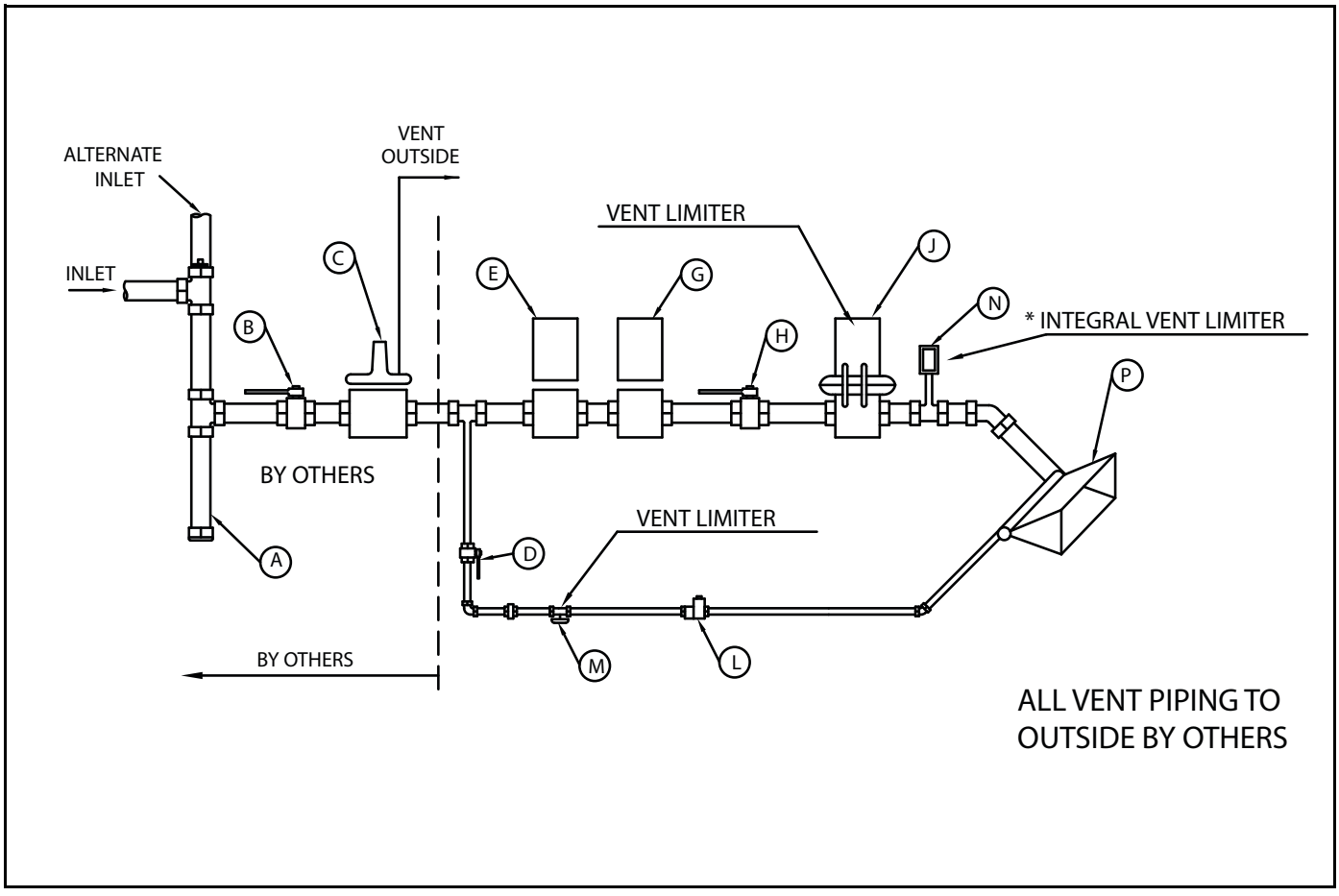


FIGURE 56: FM Gas Manifold

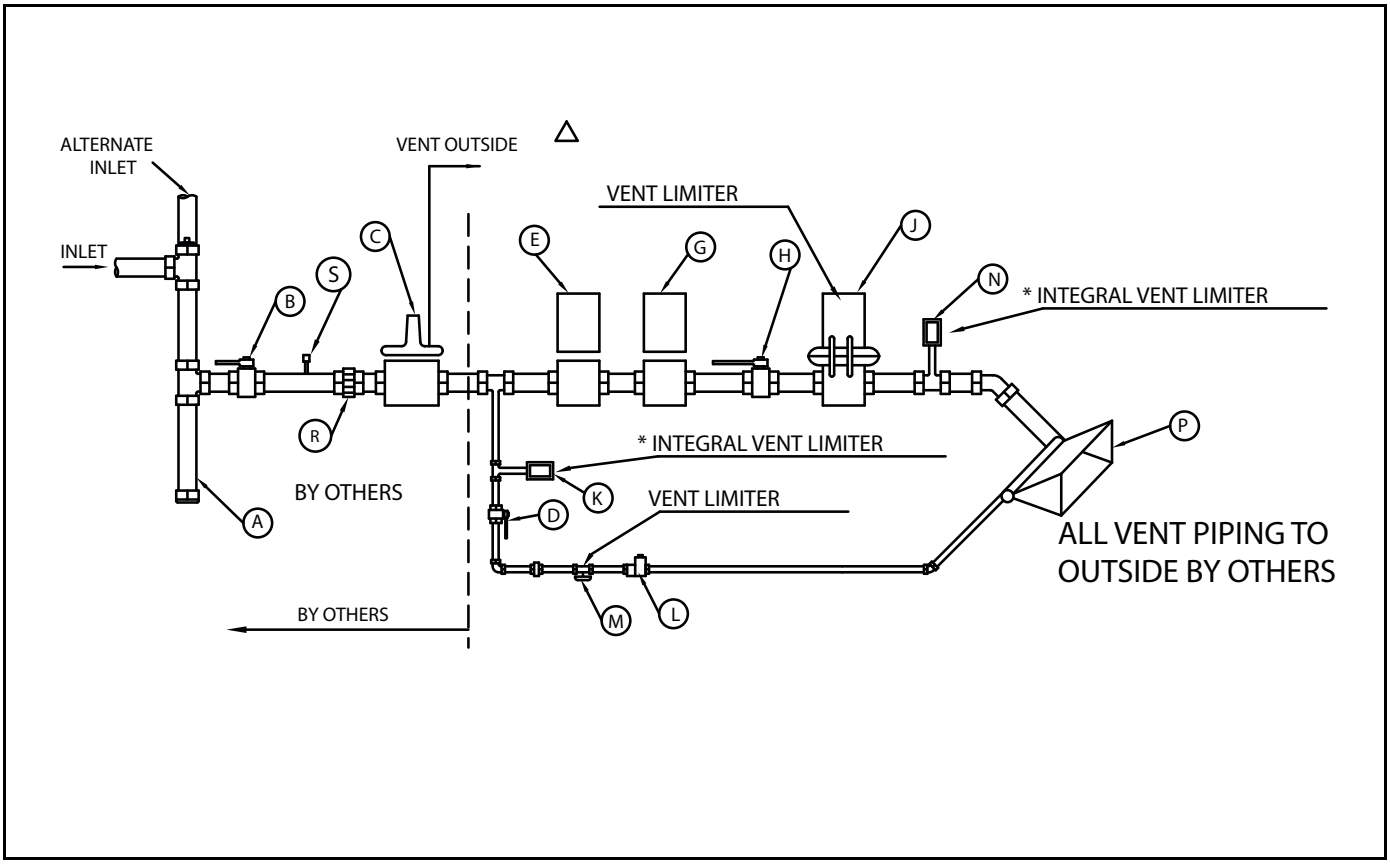
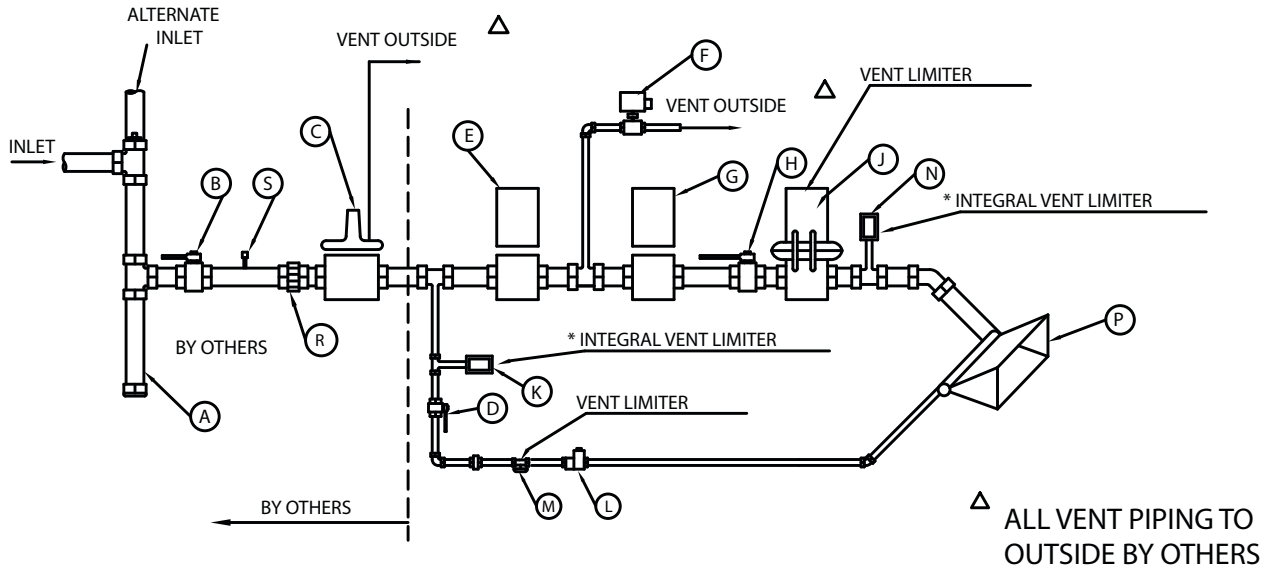


FIGURE 57: XL Insurance Gas Manifold



18.3 Gas Piping

The gas manifold connection extends through the side of the control enclosure for vertical equipment and through the bottom for horizontal equipment. The factory piping terminates with a male pipe connection in the primary gas valve. Be sure that the fuel supply pipe connected at this point is large enough to ensure the proper volume and line pressure at the inlet of the air handler. The piping must comply with:

United States: Refer to NFPA 54/ANSI Z223.1 - latest revision, National Fuel Gas Code.

Canada: Refer to CSA B149.1 - latest revision, Natural Gas and Propane Installation Code.

Gas supply piping must conform to best building practices and local codes. During installation of the gas piping, be sure that piping does not restrict accessibility to the air handler or its removable access doors.

Lockable manual shut-off valve must be added by the installer in compliance with Occupational Safety and Health Administration (OSHA) regulations.

18.4 Pressure Test Ports

There are 1/8"(3.2 mm) and 1/4"(6.4 mm) pressure test ports located on the manifold. The test ports are available to measure the manifold inlet gas pressure and the burner gas pressure during burner setup.

18.4.1 Manifold Inlet Gas Pressure

The pressure test port for measuring manifold inlet pressure is located on the inlet side of the first safety shutoff valve. Refer to the unit rating plate for the acceptable inlet gas pressure.

18.4.2 Burner Gas Pressure

A pressure tap is used to measure negative pressure at the burner (fan only, gas valves closed) and to set high fire gas pressure regulating (gas valves open). Air handlers are equipped with a modulating/ regulating valve (MRV). The pressure tap is located on the downstream side of the MRV.

SECTION 19: ELECTRICAL

⚠ DANGER

Electrical Shock Hazard

Disconnect electric before service.

More than one disconnect switch may be required to disconnect electric from equipment.

Equipment must be properly grounded.

Failure to follow these instructions can result in death or electrical shock.

Each air handler is equipped with a wiring diagram which will vary depending on the type of remote panel and/or options supplied.

Air handlers can also be supplied as building management system (BMS)-ready. In this case, a remote panel is not supplied.

Note: Spark testing or shorting of the control wires by any means will render the transformers inoperative.

Each unit is equipped with a fused rotary disconnect. The rotary disconnects are for copper wire only.

19.1 Disconnect Fuse Sizing

The fuse classification must be determined by the service disconnect rating plate and all applicable codes. Fuse sizing is determined by the motor size, control current and supply voltage. Fuses that are being replaced must be replaced with the same type, size and class of fuse that was supplied with the air handler. For additional information or to confirm original fuse specifications, consult the factory.

Table 28: Minimum and Maximum Fuse Size by Motor Size and Supply Voltage

	Electrical Characteristics				
Motor Size HP(kW)	**208/3/60**	**230/3/60**	**460/3/60**	**575/3/60**	**230/1/60**
2(1.5)	7.3-10.2	6.9-9.6	3.4-4.8	2.6-3.6	13.3-18.6
3(2.2)	10.1-14.2	9.3-13.0	4.6-6.5	3.7-5.2	17.3-24.2
5(3.7)	15.4-21.6	15.1-21.1	7.5-10.6	6.1-8.5	24.3-34.0
7.5(5.6)	23.1-32.4	21.3-29.8	10.6-14.9	8.3-11.6	32.3-45.2
10(7.5)	30.4-42.6	28.1-39.3	14.0-19.7	10.6-14.8	40.3-56.4
15(11.2)	42.4-59.4	39.3-55.0	19.6-27.5	16.8-23.5	-
20(14.9)	51.4-72.0	49.3-69.0	24.6-34.5	19.8-27.7	-
25(18.6)	66.4-93.0	61.3-85.8	30.6-42.9	24.5-34.3	-
30(22.4)	78.4-109.8	73.3-102.6	36.6-51.3	29.6-41.4	-
40(29.8)	-	-	47.6-66.7	38.0-52.6	-
50(37.3)	-	-	59.5-83.3	48.1-66.7	-

19.2 Wiring and Electrical Connections

All electrical wiring and connections, including electrical grounding, must comply with:

United States: Refer to National Electrical Code®, NFPA 70 - latest revision. Wiring must conform to the most current National Electrical Code®, local ordinances, and any special diagrams furnished.

Canada: Refer to Canadian Electrical Code, CSA C22.1 Part 1 - latest revision.

Check rating plate on air handler for supply voltage and current requirements.

If any of the original control wire supplied with the air handler must be replaced, replace it with type MTW 105°C, 600 V, 16 gauge wire or equivalent, except for temperature control wiring, which must be a minimum of 20 AWG Type Beldon 5401FE CMR 75C shielded or equivalent.

For all other wires, replace with the equivalent size and type of wire that was originally provided with the air handler.

NOTE: The controls referenced in this manual are applicable to non-DDC equipped air handlers. If your air handler is equipped with one of our DDC control options, please consult the separate DDC Control Operator's manual that accompanies this document.

19.3 Remote Panel

The remote panel must be wired as shown on the electrical schematic. For wire gauge sizes, *see Page 76, Table 29*. All power supply and motor wiring must be minimum type THWN with a 167° F (75° C) temperature rise.

19.3.1 Remote Panel Mounting Distance

If the interconnection wiring between the remote panel and the air handler control enclosure is run in a single conduit, the wire run can be as long as 100' (30 m). For longer wire runs, consult the factory. If the interconnection wiring between the remote panel and the air handler control enclosure is run in two conduits (separating the shielded cable and the 120 V power supply for the remote panel), the wire run can be as long as 200' (60 m). For longer wire runs, consult the factory. Care should be used to avoid running the interconnect wiring near large industrial loads or high voltage wire runs as that may further limit the length of the interconnect wire run.

Table 29: Control Voltage Wiring For All Control Systems

Volts	Wire Gauge	Max Wire
120	18	150' (45 m)
120	16	250' (75 m)
120	14	350' (106 m)

NOTE: Wiring for temperature controls must be run in shielded cable as indicated on the wiring diagram.

19.3.2 Low Voltage Control Wiring

Low voltage (24 V - AC/DC) control wiring in excess of 100' (30.5 m) in length should be in its own separate conduit run to prevent interference.

19.4 Motor Current Draw

For specific current requirements, see rating plate

located on the blower motor. Current draw may be adjusted downward by reducing blower rotations per minute (RPM) or by increasing external static pressure.

19.5 Control Current Draw

The maximum current draw for an air handler's controls and accessories is 3A.

19.6 Safety Systems

Safety systems are required for proper performance of the air handler. The air handler shall not be permitted to operate with any safety system disabled. If a fault is found in any of the safety systems, then the system shall be repaired only by a contractor qualified in the installation and service of gas fired heating equipment, using only components that are sold and supplied by Weather-Rite LLC. Refer to *Page 81,Table 31* for a brief description of each safety device, its location and its switching voltage.

Table 30: Safety Systems

Safety Controls	Location	Voltage
Manual Reset High-Temp Limit (All Models)	Blower Discharge	120
Pressure Switches (All Models)	Air Handler Control Enclosure	120
Flame Control (2010/2010B/2020/2030)	Air Handler Control Enclosure	120
Flame Control (2005)	Air Handler Control Enclosure	24
Discharge Temperature Monitor (All Models)	Blower Discharge	24
AM Resistor (AM/VAV Style)	Air Handler Control Enclosure	24

19.6.1 Manual Reset High Temperature Limit Switch

If for any reason, the temperature of the air at the discharge of the blower reaches the limit set point of 160° F (71.1° C), the high temperature limit switch will open the circuit to the burner system and discontinue all burner functions. Events that could result in excessive discharge air temperatures include if the burner modulation amplifier is defective (i.e. temperature sensor goes open circuit) or if a surge in gas pressure reaches the burner. Restarting of the burner can only be accomplished after the limit has cooled down and the reset button on the switch has been depressed. This switch is located on the blower housing inside the air handler.

19.6.2 Pressure Switches

The low airflow velocity pressure switch monitors the airflow (differential pressure) across the burner. When the airflow across the burner reaches the proper velocity (volume) for combustion, the switch closes. When the switch closes, it permits the flame safeguard relay to begin ignition. This switch is factory set at 0.32 in wc (0.8 mbar). The high velocity pressure switch will open if the airflow across the burner reaches its maximum allowable limit. This switch is factory set at 1.40 in wc (3.5 mbar). The pressure switch is a safety device, which cannot be field-adjusted or tampered with.

19.6.3 Gas Pressure Switches

Gas pressure switches are standard on certain models (FM compliant gas trains above 2,500 MBH and XL compliant gas trains) and are also available as an option on the others.

The function of the gas pressure switches is to protect against insufficient, lack of gas pressure and excessive pressure in the system.

On the low gas pressure switch side, this switch opens its internal switch which shuts the burner down and prevents its operation due to insufficient gas pressure.

On the high gas pressure switch side, its internal switch will open, shutting down the burner due to excessive gas pressure passing through the gas train.

The settings of the gas pressure switches are field adjustable. The one monitoring the incoming gas pressure is the low gas pressure switch. The low gas pressure switch must be set to the minimum required gas pressure as indicated on the data plate.

The high gas pressure switch must be set to 1 in w.c. (2.5 mbar) above high fire setting established during commissioning.

The switch will have to be reset manually, once the condition has been corrected.

19.6.4 Flame Control

This device will check for both pilot flame and main flame within the burner. When a flame signal from the pilot flame is available, it will allow the main gas valve to open.

Your air handler may equipped with either a flame rod or UV scanner type of flame detection. Consult your parts list / electrical diagram to confirm and for flame rod sensors *See Page 115 and Page 116*. For UV scanners *See Page 119 and Page 120*

If a pilot flame is not present, the electrical signal cannot be sent and the pilot burner gas valve will close. The relay is equipped with a 10-second trial for ignition. If ignition does not occur, the flame safeguard relay will lockout, it will reset upon power restoration. (See the Trouble-Shooting Guide - *Page 136, Section 24*)

19.6.5 Discharge Temperature Sensor

This device senses the discharge temperature of the air at the blower. The discharge temperature sensor reports the discharge temperature to the temperature control amplifier which modulates the burner to the temperature set on the remote panel selector. Should this system fail, the manual high temperature limit switch will turn the burner off. BMS-ready air handlers do not come equipped with this sensor and must be field-supplied.

Your WEATHER-RITE™ direct fired air handler was built custom to meet your needs. For details on interconnect wiring or any other wiring questions, please consult the specific wiring diagrams provided with your air handler.

NOTE: A laminated wiring diagram can be found permanently affixed inside the unit control enclosure.

19.7 Interlocks

19.7.1 Carbon Dioxide Interlocks

All air handlers that recirculate air from the heated space require either a control to limit the temperature rise in proportion to the amount of outdoor air or the use of a room carbon dioxide sensor. The carbon dioxide sensor is field provided and set to maintain a CO2 concentration below 5,000 ppm.

19.7.2 Carbon Monoxide Interlocks

Carbon Monoxide Detector is a ship loose sensor that monitors the CO levels in the space. It can either sound an alarm and/ or force the air handler into 100% outside air if its threshold set point is exceeded.

19.8 Control Options

19.8.1 Mild Weather Outside Air Stat

This option is designed to turn the burner off when the incoming outside air is at or above the temperature setpoint. The blower is allowed to run for continued ventilation. The mild weather outside air stat is located in the control enclosure. It has an adjustable setting between -20° F (-29° C) and 100° F (38° C).

19.8.2 Low Temperature Limit with Override Timer

This option is designed to turn the unit off when air is discharged below the temperature setpoint for a period in excess of timer setpoint. The low temperature limit switch is located in the air handler's control enclosure. The low temperature limit switch has an adjustable setting between -20° F (-29° C) and 100° F (38° C). The timer by-passes the low temperature limit switch for the first 5 minutes to allow the burner to establish a flame when the air handler is turned on. If the air handler's discharge temperature falls to the predetermined low temperature limit setpoint, after the 5 minute establishing period, the air handler's blower will be turned off. To reset the low temperature limit switch, set the fan switch to off and then on again. The air handler will return to the normal sequence of operations.

19.8.3 MUA / Exhaust Failsafe Interlock

This option incorporates the low temperature limit with override timer and an exhaust fan airflow switch monitor. The exhaust fan airflow switch is field provided and field wired as per the option sheet supplied with the unit. When the air handler is turned on there is a 5 minute establishing period for the low temperature limit switch and the exhaust fan interlock. If the air handler's discharge temperature falls to the predetermined low temperature limit setpoint, after the 5 minute establishing period, the air handler fan will be turned off. If there is a failure of the exhaust fan to activate the field supplied airflow switch, after the 5 minute establishing period, the air handler fan will be turned off. To reset the MUA/exhaust failsafe interlock, set the fan switch to off and then on again. The air handler will return to the normal sequence of operations.

19.8.4 Motorized Inlet Damper

The motorized inlet damper covers the outside air inlet of the air handler. When the air handler blower is turned on, the damper motor is energized and opens the damper. The damper motor has an auxiliary switch that prevents the blower from starting until that damper has opened sufficiently to allow the required air volume to pass through the air handler.

19.8.5 Motorized Discharge Damper

The motorized discharge damper is mounted in the duct downstream from the discharge opening of the air handler. When the air handler fan is turned on the damper motor is energized and opens the damper. The damper motor has an auxiliary switch that prevents the blower from starting until that damper has opened sufficiently to allow the required air volume to pass through the air handler.

19.8.6 Control Enclosure Heater

The control enclosure heater is an electric heater that keeps the temperature in the control enclosure within the range for the control components. This option is intended for extremely cold climates, but recommended for installations below 15° F (-9° C). The air handler controls are rated to perform at temperatures as low as -30° F (-34° C). In environments where the air handler may be exposed to lower temperatures, a control enclosure heater may be required.

19.8.7 Auxiliary Relay

An auxiliary relay may be added to an air handler for either an interlock or a customer defined purpose. Refer to the option sheet supplied with the air handler to indicate whether the relay is wired for an intended purpose or left unwired for a future interface. Each relay will be double pole double throw (DPDT) type. Maximum switching capacity on the normally open contact is 8A, and for the booth light relay, 15A.

19.8.8 Smoke Detector

A smoke detector interlock allows for the air handler to operate (either off or on) based on signal input from the fire alarm.

19.8.9 Service Receptacle Powered by Others (Wired)

This option provides a service receptacle. It includes ground-fault interrupter (GFI) receptacle mounted on the interior or exterior of the control enclosure. Power to the receptacle is supplied by the installer.

19.8.10 Room Override Stat

For use with Standard Discharge Control remote. This option provides additional thermostat capability based on room temperature. The thermostat senses room temperature, and resets the discharge air to a higher temperature whenever the temperature falls below settings indicated on the temperature selection dial (located on remote panel). Override temperature can be set 0° F to 40° F above the temperature selection dial on the remote panel.

19.9 Safety Systems

Safety systems are required for proper performance of the air handler. The air handler shall not be permitted to operate with any safety system disabled. If a fault is found in any of the safety systems, then the system shall be repaired only by a contractor qualified in the installation and service of gas fired heating equipment, using only components that are sold and supplied by Weather-Rite LLC. Refer to *Page 81,Table 31* for a brief description of each safety device, its location and its switching voltage.

Table 31: Safety Systems

Safety Controls	Location	Voltage
Manual Reset High-Temp Limit (All Models)	Blower Discharge	120
Pressure Switches (All Models)	Air Handler Control Enclosure	120
Flame Control (All Models)	Air Handler Control Enclosure	120
Supply Air Temperature Monitor (All Models)	Blower Discharge	24

19.10 Remote Panels

19.10.1 Basic Remote

FIGURE 58: Basic Remote

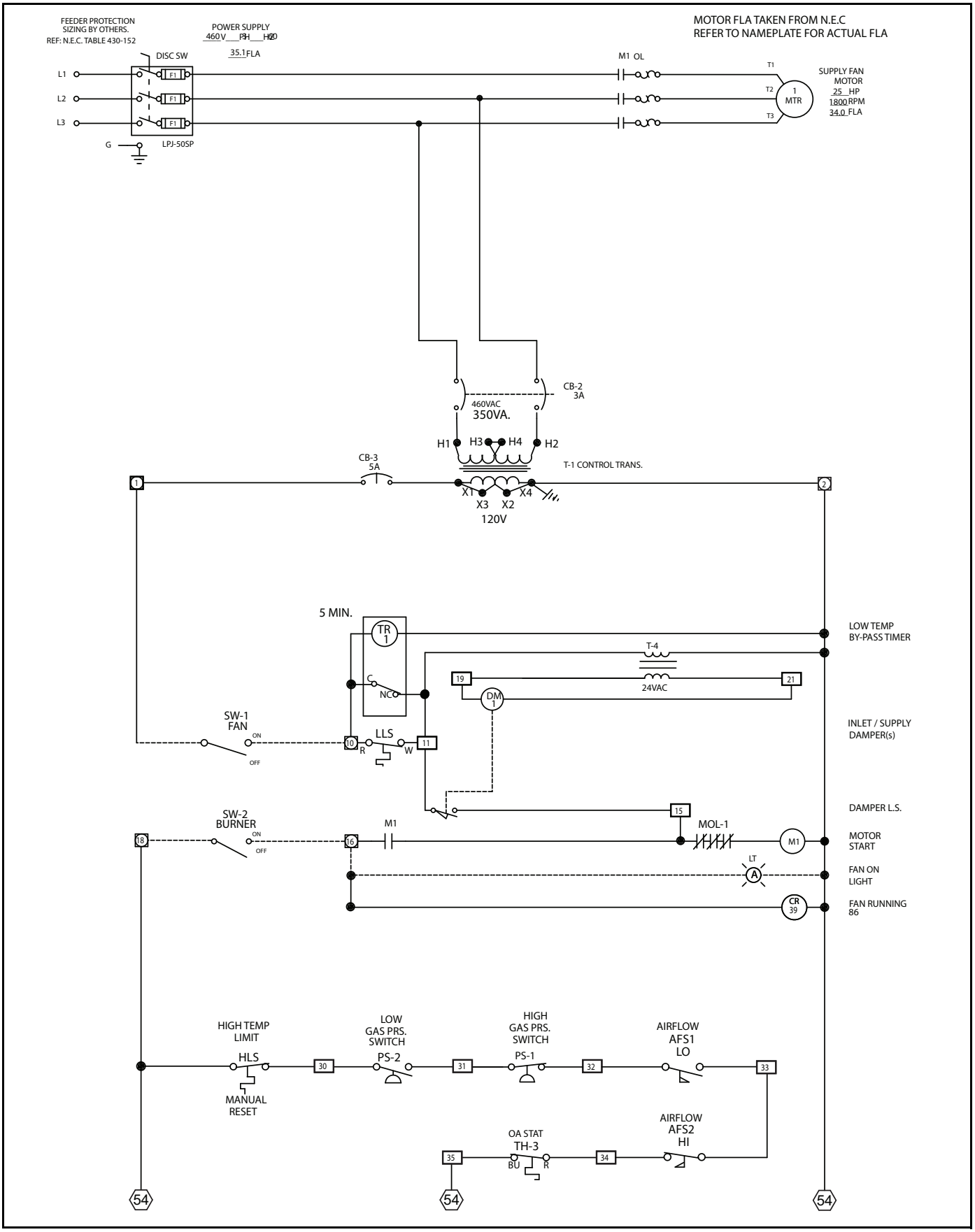
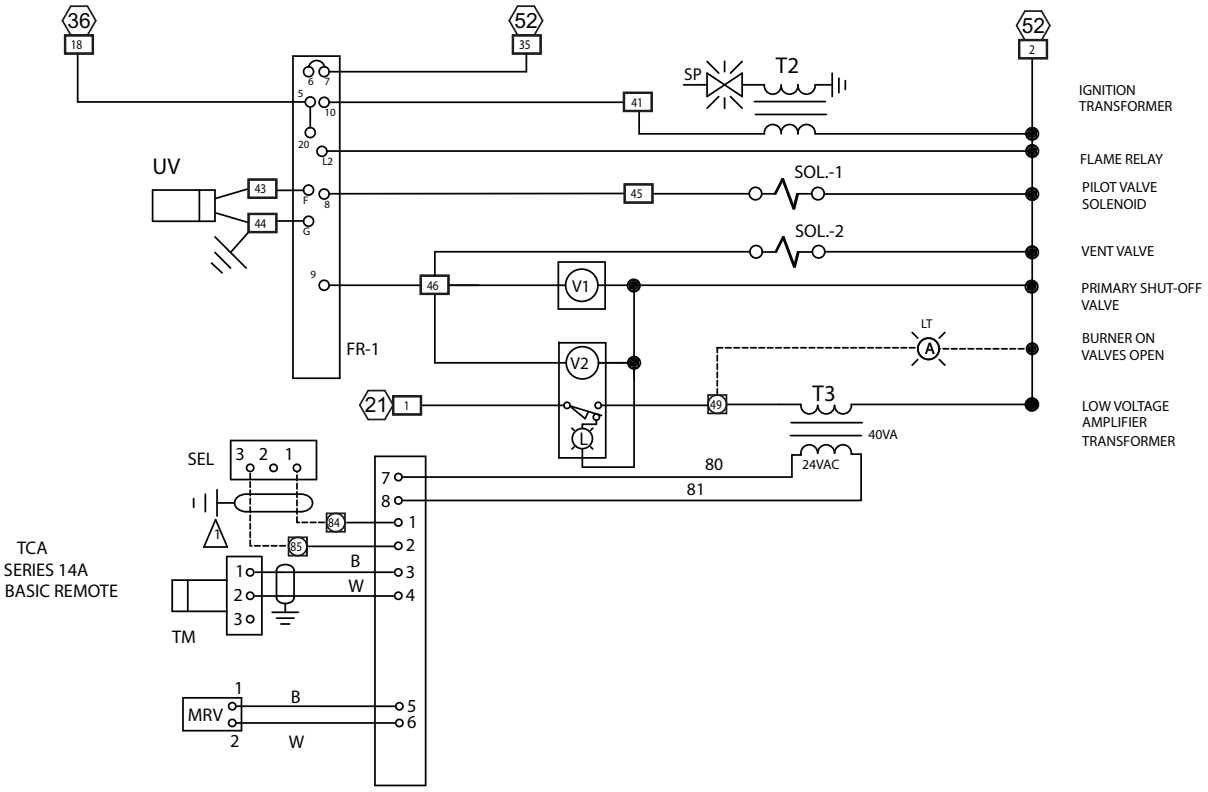


FIGURE 59: Basic Remote (Continued)



19.10.2 Standard Discharge Control Remote

FIGURE 60: Standard Discharge Remote

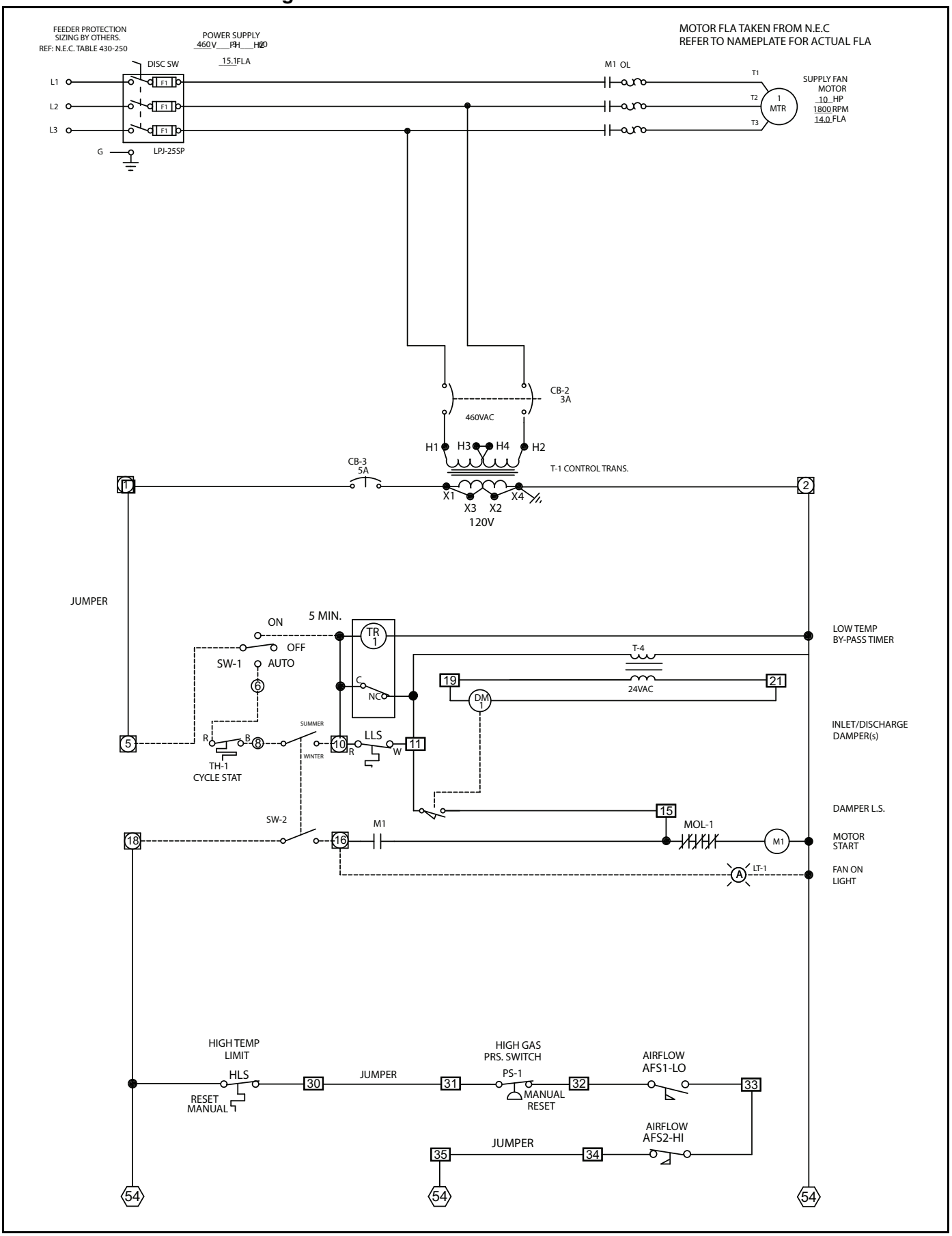
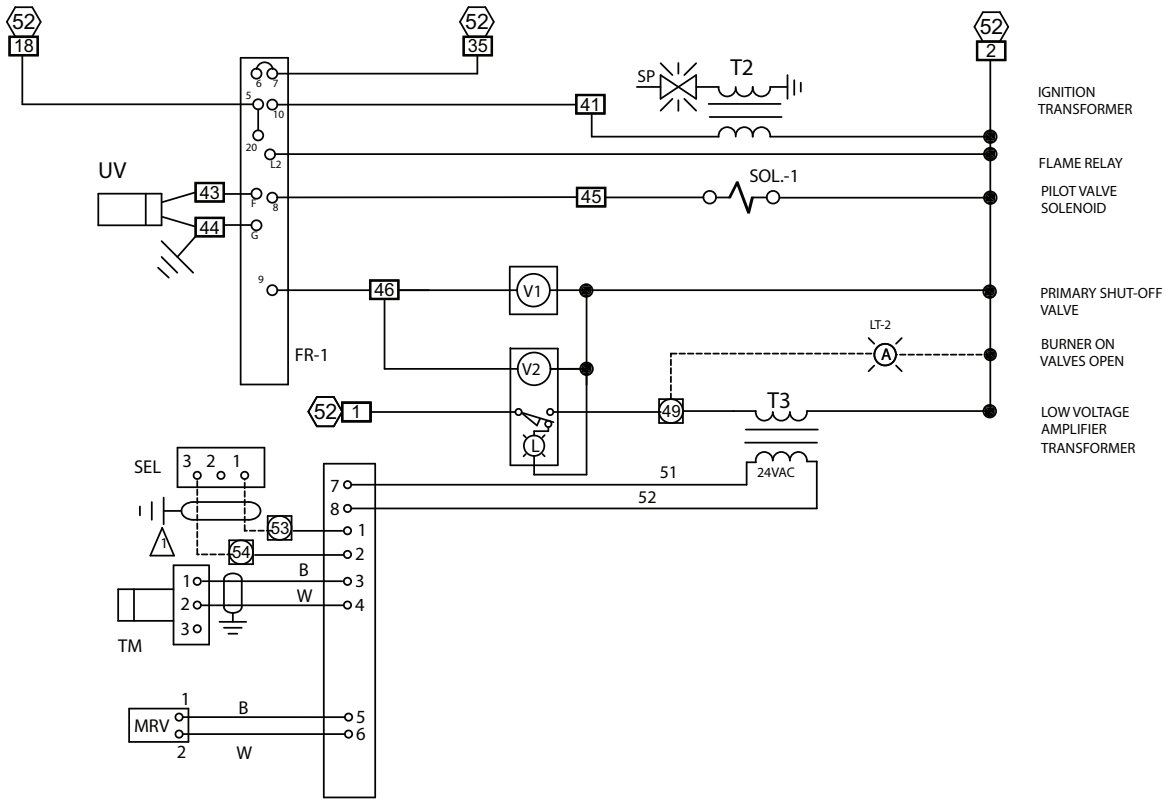


FIGURE 61: Standard Discharge Remote (Continued)



19.10.3 Deluxe Room Control Remote

FIGURE 62: Deluxe Room Control Remote

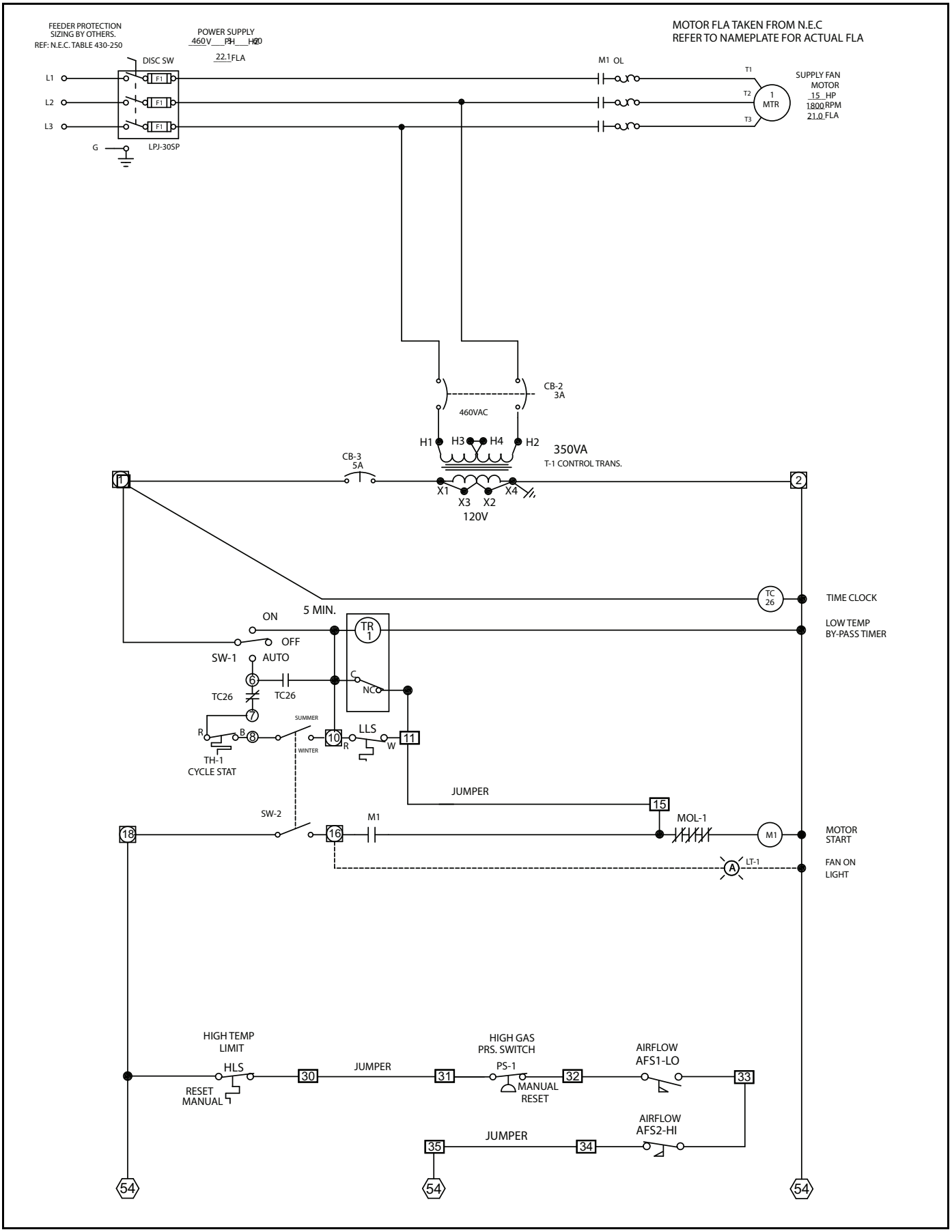
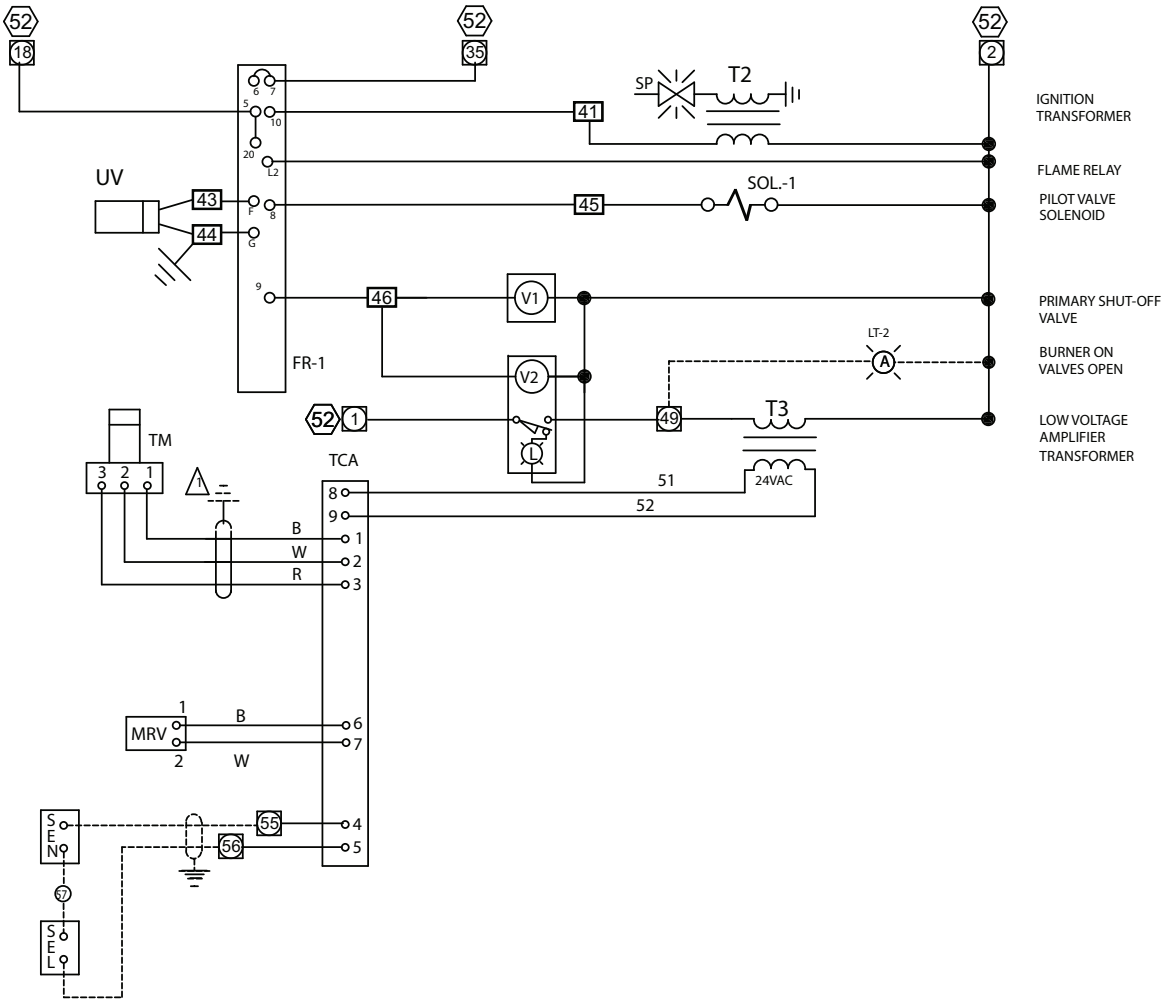


FIGURE 63: Deluxe Room Control Remote (Continued)



19.10.4 Standard Room Control Remote

FIGURE 64: Standard Room Control Remote

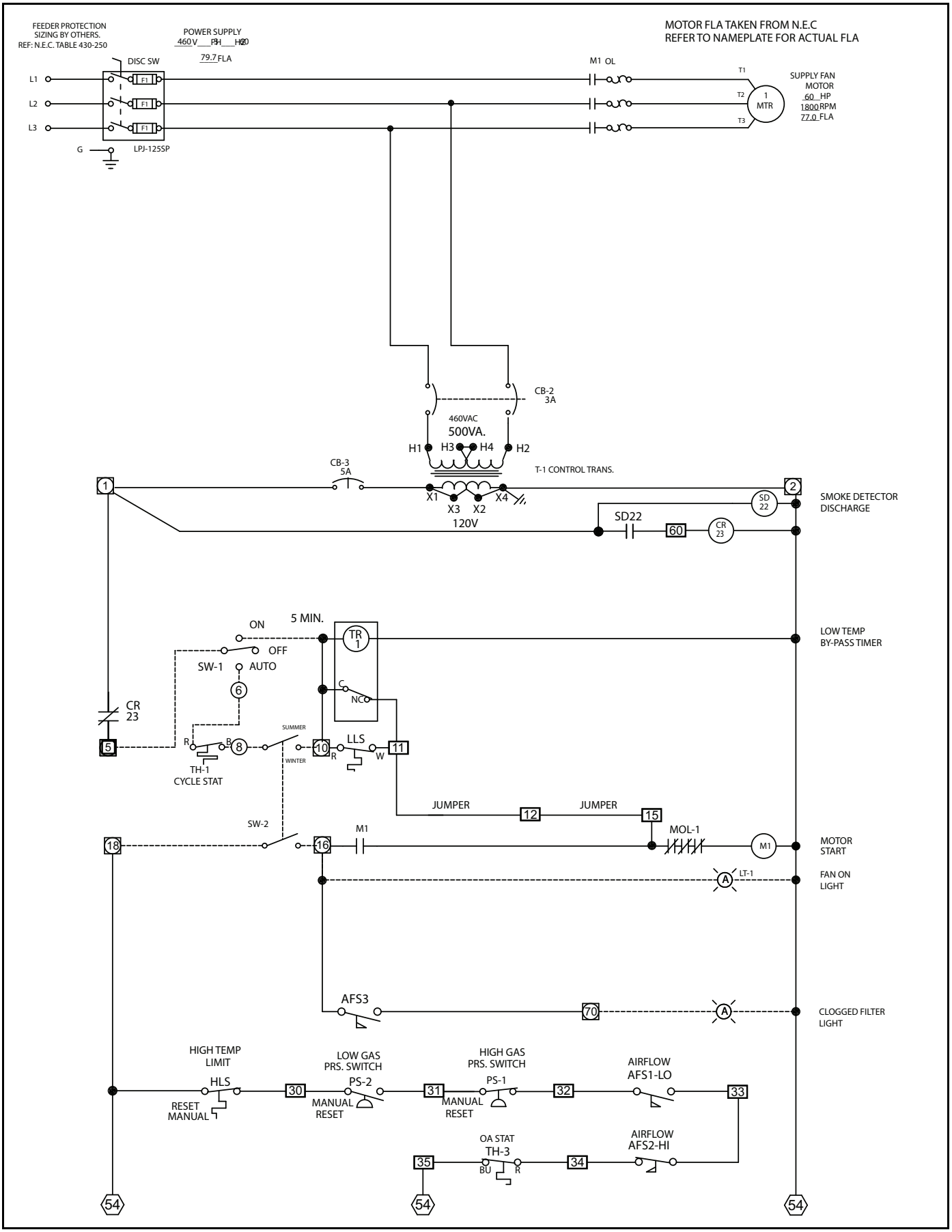
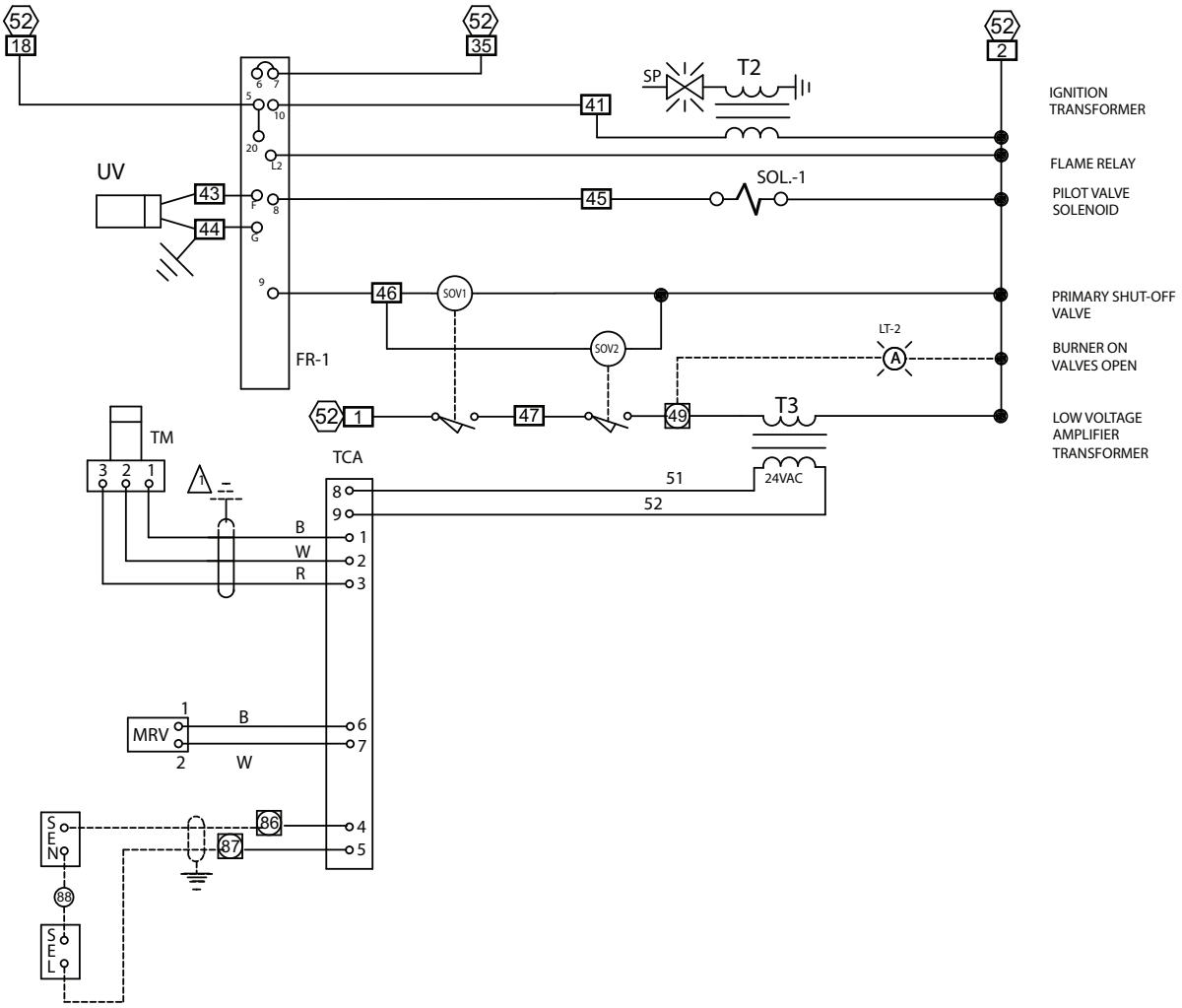


FIGURE 65: Standard Room Control Remote (Continued)



19.11 DDC-Ready Controls

FIGURE 66: DDC-Ready Controls

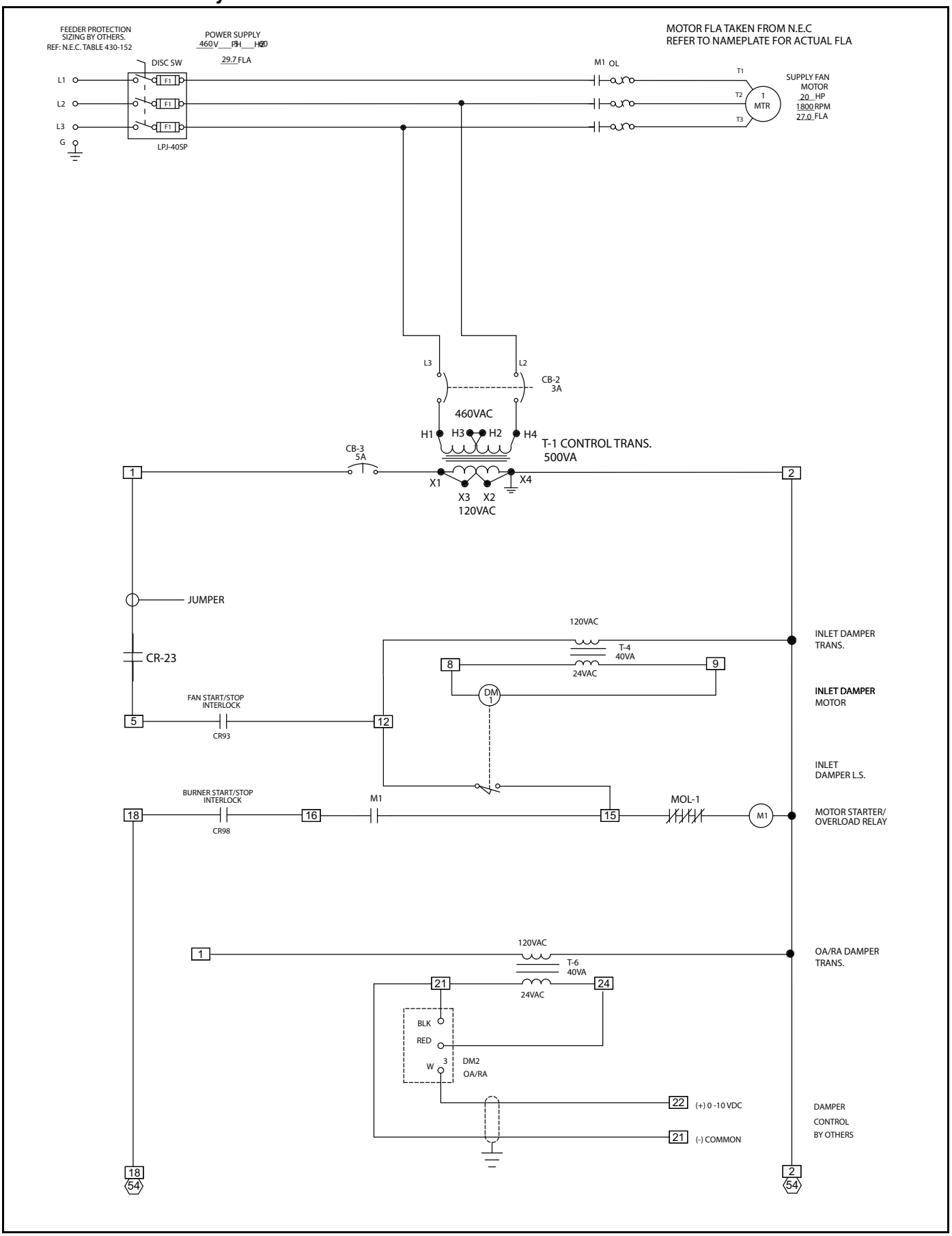
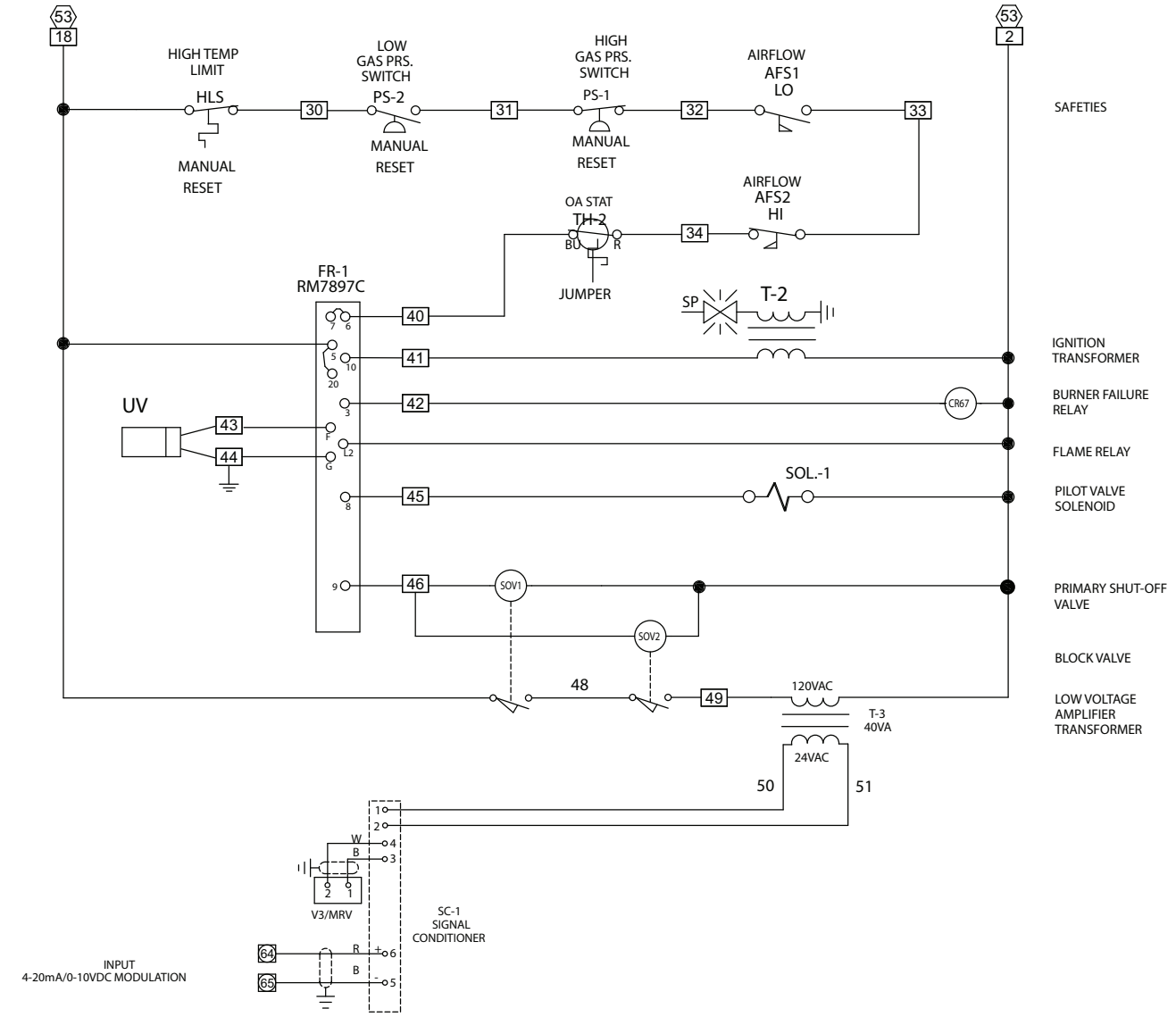
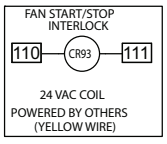
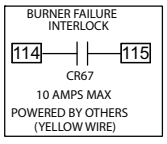
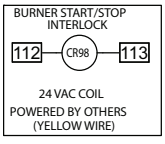


FIGURE 67: DDC-Ready Controls (Continued)









Your WEATHER-RITE™ Air Handler may be equipped with one of the following DDC control offerings. If so, a separate manual providing wiring, operation and trouble shooting information, specific to that control offering, will also accompany this document.

19.12 Intelligent Control Systems

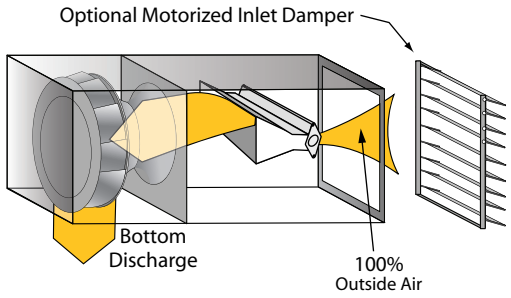
19.12.1 ICS II

19.12.2 ICS IV

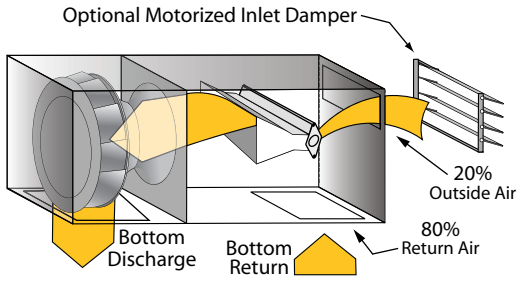
19.12.3 InfinityPro™

FIGURE 68: Air Handler Styles

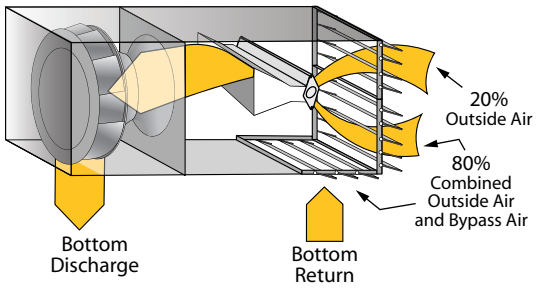
MUA - MAKE UP AIR (All Models)



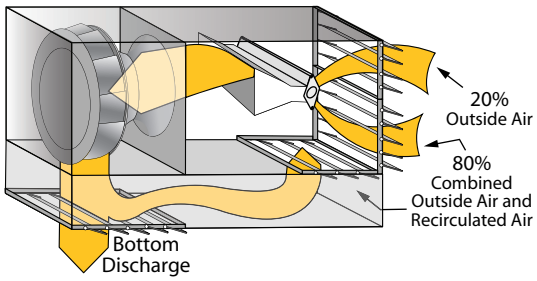
FR - FIXED RETURN (All Models)



AM -AIR MANAGEMENT (All Models)



VAV - VARIABLE AIR VOLUME (All Models)



19.13 HVAC Remote Panels and Panel Options

The remote panel should be mounted in the conditioned space in a convenient location for controlling the air handler. Do not locate a remote panel that contains temperature sensing equipment in an area directly affected by the air handler or another heat source as it may interfere with the operation of the air handler.

19.13.1 Standard Discharge Control (SDC) Remote

This control is typically used for air handlers providing space heating. The burner flame modulates to maintain a constant discharge air temperature as selected on the temperature selection dial. While in "auto" mode, a space temperature thermostat controls the operation of the air handler to maintain the desired space temperature.

AUTO/WINTER Mode:

The air handler (blower and burner) cycle on and off to maintain space temperature as selected on the room thermostat. When the air handler is operating, air is being discharged at the setpoint on the discharge temperature selection dial. The burner flame modulates to maintain a constant discharge air temperature as selected on the temperature selection dial. The discharge air temperature setting must be higher than the thermostat setting.

ON/WINTER Mode:

The air handler (blower and burner) operate continuously to provide heated air. When the air handler is operating, air is being discharged at the setpoint on the discharge temperature selection dial. The burner flame modulates to maintain a constant discharge air temperature as selected on the temperature selection dial. The unit disregards the thermostat setpoint while in this mode.

ON/SUMMER Mode:

Only the blower operates continuously to provide unheated air. The burner remains off regardless of temperatures on the temperature selection dial and thermostat.

FAN ON indicator:

Indicates that the air handler is supplying power to the blower motor via the M1 motor starter.

BURNER ON indicator:

Indicates that the air handler has supplied power to open the main gas safety shut off valve.

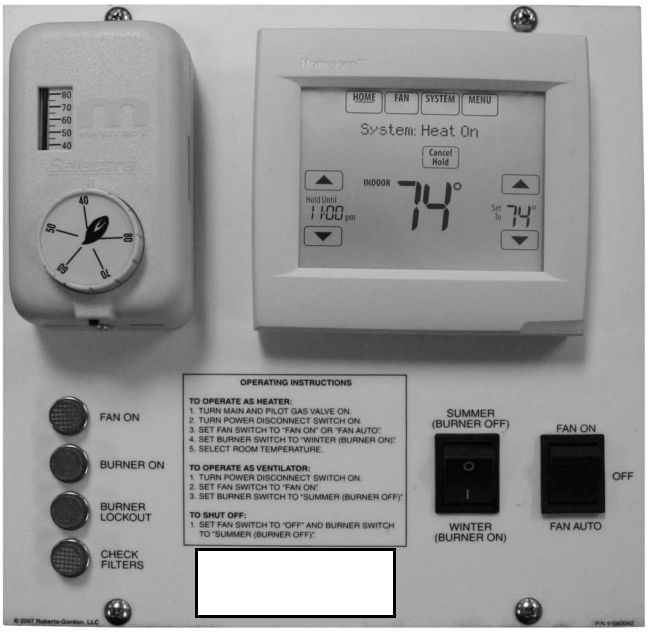
BURNER LOCKOUT indicator:

The burner control module has experienced a fault and will need to be reset. The burner control module must be reset at the air handler. Refer to *Page 129, Section 22* and *Page 136, Section 24* to determine the cause of the fault.

CHECK FILTER indicator:

The airflow in the unit is insufficient to activate the low pressure switch. This is most commonly caused by dirty filters, but could also indicate other obstructions in the air stream.

19.13.2 Deluxe Temperature Control (DTC) Remote



This control is typically used for providing automatic day/night space heating. The burner flame modulates and varies the discharge air temperature

to maintain the space temperature set on the Selectrastat dial. The 7-day programmable touchscreen thermostat provides nighttime setback for unoccupied space heating.

AUTO/WINTER Mode:

Occupied time: Blower and burner cycle operate continuously to maintain a constant space temperature as selected on the Selectrastat dial. The burner flame fully modulates and varies the discharge air temperature to maintain the space temperature.

Unoccupied time: Blower and burner cycle on and off to maintain space temperature as selected on the touchscreen thermostat (night setback).

ON/WINTER Mode:

Blower and burner operate continuously to maintain a constant space temperature as selected on the Selectrastat dial. The burner flame modulates and varies the discharge air temperature to maintain the space temperature.

ON/SUMMER Mode:

Only the blower operates continuously to provide unheated air. The burner remains off regardless of temperatures on the temperature selection dial and thermostat.

FAN ON indicator:

Indicates that the air handler is supplying power to the blower motor via the M1 motor starter.

BURNER ON indicator:

Indicates that the air handler has supplied power to open the main gas safety shut off valve.

BURNER LOCKOUT indicator:

The burner control module has experienced a fault and will need to be reset. The burner control module must be reset at the air handler. Refer to *Page 129, Section 22* and *Page 136, Section 24* to determine the cause of the fault.

CHECK FILTER indicator:

The airflow in the air handler is insufficient to activate the low pressure switch. This is most commonly caused by dirty filters but could also indicate other obstructions in the air stream.

Table 32: Factory Preset Schedule on TH8110 Thermostat

	Monday - Friday			Saturday - Sunday		
	Time	**Temperature**	**Fan Setting**	**Time**	**Temperature**	**Fan Setting**
Wake	6:00 AM	68° F	Fan On	6:00 AM	62° F	Fan Auto
	The air handler will run continuously. Temperature controlled by Maxitrol stat.			The air handler will run when the thermostat calls for heat.		
Leave	Unused			Unused		
Return	Unused			Unused		
Sleep	5:00 PM	62° F	Fan Auto	5:00 PM	62° F	Fan Auto
	The air handler will run when the thermostat calls for heat.			The air handler will run when the thermostat calls for heat.		

19.13.3 BMS-Ready Control Option

The BMS-ready option provides inputs to receive control signals from a customer determined control system. Each BMS input is capable of receiving a 4-20mA or 0 - 10VDC from the control system. On all air handlers, the burner modulation will be controlled by the control system. For AM/VAV style air handlers, the control system can also control the modulating damper.

On DDC/BMS-ready systems, no temperature control amplifier is installed. Discharge temperature monitoring and modulation valve adjustment are completed by the customer supplied control system. For optimum efficiency, Weather-Rite LLC suggests to limit the discharge temperature to 160 °F.

19.14 Basic Air Handler Sequence of Operation

While the control transformer is energized, the secondary side supplies 115 VAC to the control circuit. When the fan switch is in the "on" position, the M1 motor starter is energized and starts the blower motor. The M1 motor starter auxiliary contact supplies voltage to the burner switch and "Fan On" light. When the burner switch is in the "on"/"winter" position, power is supplied to the flame control module and the burner control circuit. The burner control circuit includes the high temperature limit switch and the low and high airflow pressure switches. Once the burner control circuit is satisfied, then the flame control module will execute the burner ignition sequence. Once the pilot flame is ignited and sensed by the UV scanner, the flame control module will open the safety shutoff valve to ignite the main flame. When the safety shutoff is opened, 115 VAC is applied to the "Burner On" light and T3 transformer, the secondary side supplies 24 VAC to the temperature control amplifier. The temperature control amplifier controls the modulating valve based on the discharge temperature monitor (and also the room temperature monitor, in the case of a DTC remote panel).

19.14.1 Flame Control

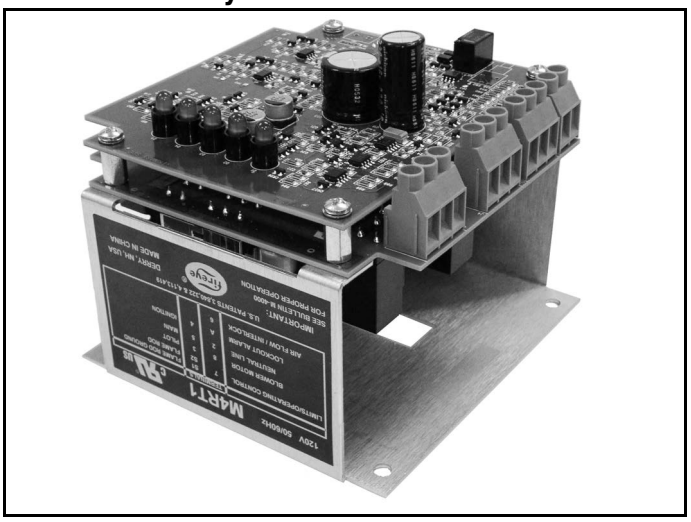
Your WEATHER-RITE™ direct fired air handler will be equipped with either a Fireye® or Honeywell® brand flame control.

The flame control is a safety device and not serviceable. *See Pages 51 through 53* for detailed sequence of operation.

19.14.2 Fireye® M4RT1 Flame Safeguard

This control is located in the center of the main control panel. **To reset this flame relay, power to it must be shut off and turned back on.**

FIGURE 69: Fireye® M4RT1



This is an exposed circuit board one piece control. It contains a fuse to protect itself from external shorts or overloads and on its exterior it has five lights which indicate the operating status of the control.

The functions of the indicator lights, which are located on the programmer module, are as follows. They are listed in the order you will find them on the flame safeguard and is also the order in which they will occur in the sequence. The indicators are actually a red colored light emitting diode or LED, this is how they will be referred to from now on.

1. **Operating Control** - This indicator is on when power is present at terminals #1 and #7 of the flame safeguard.
2. **Air Flow** - This indicator comes on at the same time as the one above. This is because the actual circuit is not used and is jumped out. It can be used as a troubleshooting guide, that power is present to terminals #6 and #8 in the flame safeguard.
3. **PTFI** - This acronym stands for Pilot Trial For Ignition. This indicator is on only during the trial for ignition period. It indicates that terminal #3 (pilot valve) and terminal #4 (ignition module), in the flame safeguard, have been turned on.
4. **Flame On** - This indicator comes on after the flame safeguard has proven out the flame signal. It also shows that the main valves have been activated in the equipment. On the safeguard control, terminal #5 is powered up.
5. **Alarm** - This indicates that a safety lockout has occurred, whether by loss of flame signal or failure to ignite.

19.14.2.1 Fireye® M4RT1 Flame Safeguard Operation (ANSI, FM < 2.5MBH and XL < 1MBH)

The following will describe the internal operation of a flame safeguard and the external functions that will take place. We will just trace the electromechanical steps and not the electronic network.

- All interlocks, control relays and safety limits are closed. Power is supplied to terminal #7 of the flame safeguard.
- The Operating Control LED illuminates.
- The electronic network is now powered up which illuminates the Air Flow LED.

NOTE: The airflow circuit of the safeguard control is not used and is jumped. This is why the Air Flow LED illuminates with the Operating Control LED.

- Following a short time delay period (purge cycle) determined by the jumpers, *See Page 98, Figure 70 and Page 98,Table 33*. The electronic network closes a contact that powers up terminal #3 and terminal #4 in the safeguard control.
- Terminal #3 powers up the equipment's pilot gas solenoid valve which opens allowing gas to flow.
- Terminal #4 powers up the ignition module creating the spark at the burner.
- This lasts for 10 seconds. This cycle is called trial for ignition. During this time period, the PTFI LED is illuminated.
- When the flame sensor detects a pilot flame, the signal is sent back to the safeguard control. The electronic network illuminates the FLAME LED.
- It closes a contact, which powers up terminal #5 in the control. This terminal powers up the main gas valves allowing the main burner to come on.
- At the same time the electronic network opens a contact which removes power from terminal #4. This shuts off the power to the ignition module, which stops the spark at the burner. The safeguard control at this point monitors the flame.

NOTE: If a pilot flame is not detected during the 10 second trial for ignition, the pilot gas solenoid valve and the ignition module are turned off. A safety lockout occurs which shuts down the electronic network. The only LED that will be illuminated at this time will be the OPERATING CONTROL. 30 seconds after the lockout occurs, the alarm circuit is powered up, illuminating the ALARM LED. Manual reset is now required. Wait 10 seconds before resetting the control to allow the lockout switch to cool down.

NOTE: If the flame signal is lost while the burner is on, the ignition module will be turned back on. A 10-second re-light trial for ignition is started. The PTFI LED will illuminate during this time.If a flame signal is detected, the main gas valves will turn back on and the ignition module will turn off. If a flame is not detected during this re-light trial, the pilot gas solenoid valve and ignition module will shut off. A safety lockout occurs which shuts down the electronic network. The only LED that will be illuminated at this time will be the OPERATING CONTROL. Thirty seconds after the alarm lockout happens the alarm circuit is powered up, illuminating the ALARM LED. Manual reset is now required. Wait 10 seconds before resetting the control to allow the lockout switch to cool down.

19.14.2.2 Fireye® M4RT1 Flame Safeguard (FM ≥ 2.5MBH and XL ≥ 1MBH)

If the equipment is ordered with a FM compliant Manifold equal or over 2.5M BTU or XL compliant equal to or over 1M BTU, certain sequences must be provided in the flame safeguard control. There is a specified time for pre-purge, trial for ignition, and non recycle.

1. **Timed pre-purge**
   This must be a separate purge from the rest of the system. The trial for ignition must be delayed by 7 seconds while the blower in the unit is running. This is to guarantee that there are no combustible gases or vapors present in the air stream during burner ignition and light off.
2. **Trial for ignition**
   The length of time must be fixed at 10 seconds. This is to prevent the ignition module from continuing activating the spark electrode if a hazardous malfunction takes place.
3. **Non recycle**
   This feature prevents the flame safeguard control from trying to re-light the burner if it should fail during the ignition cycle or firing cycle. Instead it goes directly to a lockout condition and the flame safeguard will need to be manually reset.

The M4RT1 has a series of 8 jumpers that are used to configure the Purge timing, Pilot Trial for Ignition (PTFI) timing, and recycle or non-recycle operation. *See Page 98, Figure 70*.

Purge Timing

- Jumpers JP1 through JP5 are used to select the purge timing for the M4RT1. The available purge timing selections are 5, 7, 30, 60, and 240 seconds and any additive combination of those times. Selecting two or more purge timing jumpers will result in a purge time period equal to the sum of the jumpers selected. Selection of a purge time is accomplished by cutting or not installing the associated jumper. The factory set, default purge time of 5 seconds (JP1 not installed) is always selected. *See Page 98, Table 33* lists all available purge times and how to select those by cutting jumpers JP2 through JP5.

FIGURE 70: Jumper Locations

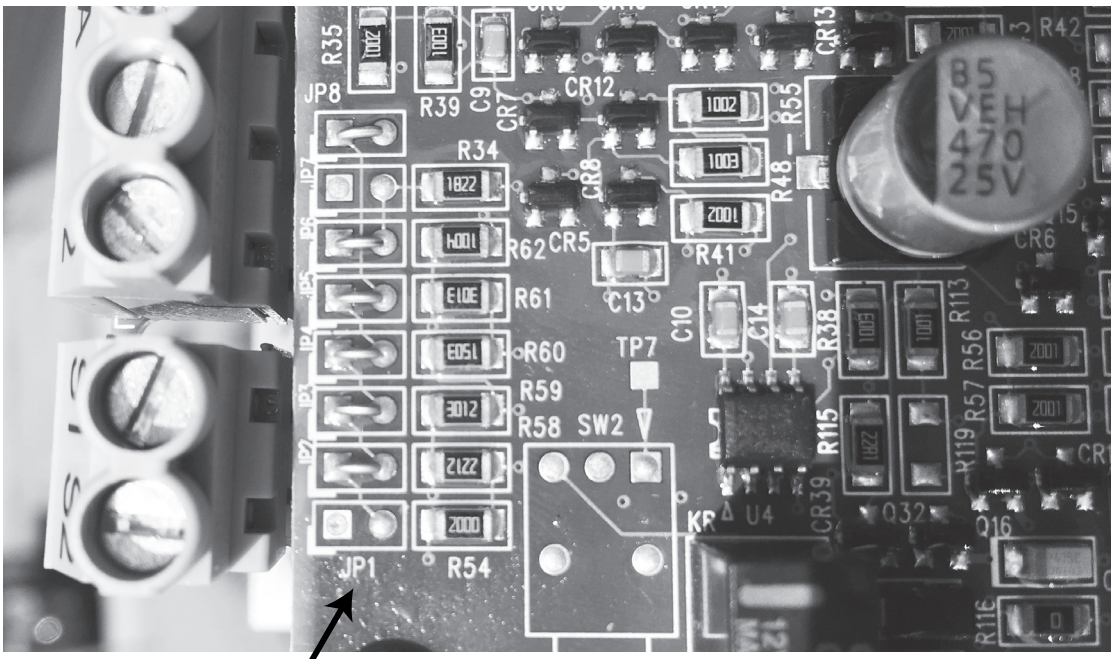


Table 33: Jumper Settings

Purge Time (seconds)	JP2	JPS	JP4	JP5
5	Installed	Installed	Installed	Installed
12	Cut	Installed	Installed	Installed
35	Installed	Cut	Installed	Installed
42	Cut	Cut	Installed	Installed
65	Installed	Installed	Cut	Installed

Pilot Trial for Ignition

- Jumpers JP6 and JP7 are used by the factory only to select the PTFI for the M4RT1. The factory set, default PTFI time is 10 seconds (JP6 installed, JP7 not installed). The PTFI time may only be set by the factory.

Recycle/Non-recycle Operation

- Jumper JP8 is used to select either Recycle or Non-Recycle operation of the M4RT1. The factory set, default is Recycle operation (JP8 installed). To select Non-Recycle operation, cut jumper JP8.

19.14.2.3 Fireye® M4RT1 Flame Safeguard Operation (FM ≥ 2.5MBH and XL ≥ 1MBH)

The following will describe the internal operation of a flame safeguard control (that has had its jumpers changed to comply with the agency requirements) and the external functions that will take place. Refer to the drawing below to follow the steps. We will just trace the electromechanical steps and not the electronic network.

- All interlocks, control relays and safety limits are closed. Power is supplied to terminal #7 of the flame safeguard.
- The Operating Control LED illuminates.
- The electronic network is now powered up which illuminates the Air Flow LED.
- Following a time delay period (purge cycle) 7 seconds. The electronic network closes a contact that powers up terminal #3 and terminal #4 in the safeguard control.
- Terminal #3 powers up the equipment's pilot gas solenoid valve which opens allowing gas to flow.
- Terminal #4 powers up the ignition module creating the spark at the burner.
- This lasts for 10 seconds. This cycle is called trial for ignition. During this time period, the PTFI LED is illuminated.
- When the flame sensor detects a pilot flame, the signal is sent back to the safeguard control. The electronic network illuminates the FLAME LED.
- It closes an internal contact, which powers up terminal #5 in the control. This terminal powers up the main gas valves allowing the main burner to come on.
- At the same time that the contact in step b closes, the electronic network opens a contact, which powers terminal #4. This shuts off the power to the ignition module, which stops the spark at the burner. The safeguard control at this point monitors the flame.

NOTE: If a pilot flame is not detected during the 10 second trial for ignition, the pilot gas solenoid valve and the ignition module are turned off. A safety lockout occurs which shuts down the electronic network. The only LED that will be illuminated at this time will be the OPERATING CONTROL. 30 seconds after the lockout has activated, the alarm circuit is powered up, illuminating the ALARM LED. Manual reset is now required. Wait 10 seconds before resetting the control to allow the lockout switch to cool down.

19.15 Honeywell® RM7890 Flame Safeguard

Sequence of Operation

The RM7890 has the following operating sequences, see Figs. 13 and 15.

INITIATE

The RM7890 enters the INITIATE sequence if the Relay Module verifies voltage fluctuations of +10/-15% or frequency fluctuations of +/- 10% during any part of the operating sequence. The INITIATE sequence lasts for ten seconds unless the voltage or frequency tolerances are not met. When the tolerances are not met, a hold condition will be initiated and will be displayed on the optional VFD for at least five seconds. When the tolerances are met, the INITIATE sequence will restart. If the condition is not corrected and the hold condition exists for four minutes, the RM7890 will lockout. Causes for hold conditions in the INITIATE sequence are:

- AC line dropout is detected.
- AC line frequency error caused by using a 60 Hz device on a 50 Hz line or vice versa.
- AC line noise that can prevent a sufficient reading of the line voltage inputs.
- Brownouts caused by a low line voltage.

STANDBY

The RM7890 is ready to start an operating sequence when the operating control input determines a *call for heat* is present. The burner switch, limits, operating limit control and all microcomputer monitored circuits must be in the correct state for the RM7890 to continue into the SAFE-START CHECK.

NORMAL START-UP SAFE-START CHECK (EXCEPT RM7890C)

The RM7890 verifies that a flame does not exist and proceeds into the Ignition Trial. If a flame is present, the RM7890 will recycle to the STANDBY period. If the critical loads are not in the correct state, a safety shutdown occurs.

IGNITION TRIALS

a. Pilot Flame Establishing Period (PFEP):
   1. The pilot valve and ignition transformer, terminals 8 and 10, are energized. The RM7890A,B has an intermittent pilot valve, terminal 8.
   2. Flame must be proven by the end of the 4 or 10 second PFEP (30 second for RM7890A1031) to allow the sequence to continue. If flame is not proven by the end of PFEP, a safety shutdown occurs.
   3. With flame proven, the ignition, terminal 10, is de-energized and the main valve, terminal 9, is energized.

RUN

The RM7890 is now in RUN and will remain in RUN until the controller input, terminal 6, opens, indicating that the demand is satisfied or a limit has opened.

SELECTABLE SITE-CONFIGURABLE JUMPERS

The RM7890 has two site-configurable jumper options, see Fig. 16 and Table 3. The site-configurable jumpers should be clipped with side cutters and the resistors removed from the Relay Module.

Fig. 13—RM7890A,B sequence.

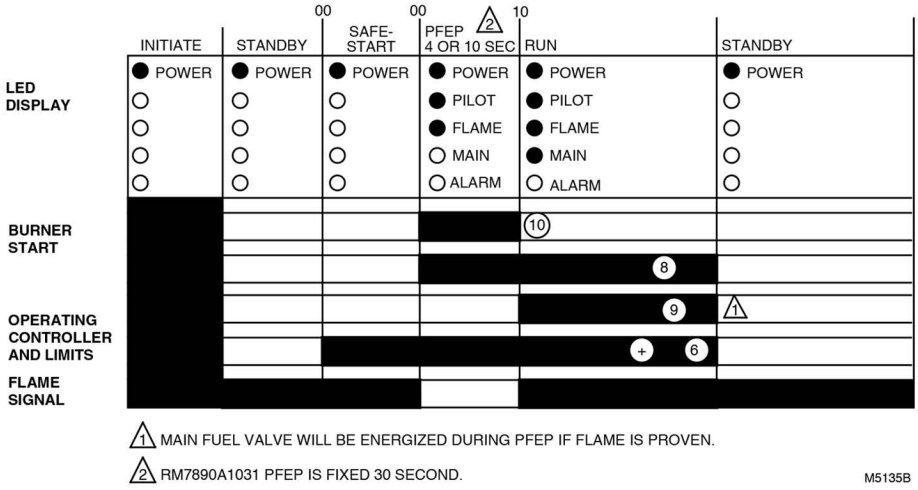


Fig. 14—Sequence status LEDs.

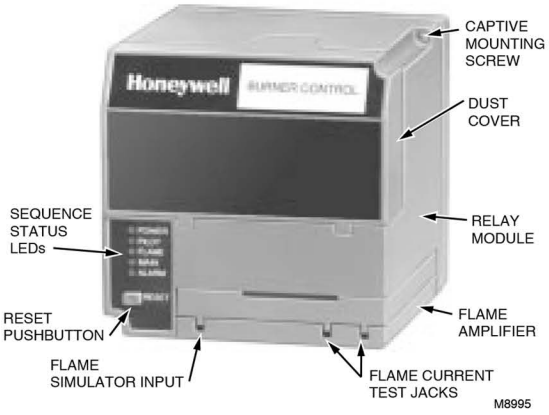


Fig. 15—Led sequence status display information (see Fig. 14).

INITIATE	STANDBY	STANDBY HOLD: F/G (FLAME DETECTED)	SAFE-START CHECK	PILOT IGNITION	RUN	RESET/ ALARM TEST
● POWER	● POWER	● POWER	● POWER	● POWER	● POWER	● POWER
○ PILOT	○ PILOT	○ PILOT	○ PILOT	● PILOT	● PILOT	○ PILOT
○ FLAME	○ FLAME	● FLAME	○ FLAME	● FLAME	● FLAME	○ FLAME
○ MAIN	○ MAIN	○ MAIN	○ MAIN	○ MAIN	● MAIN	○ MAIN
○ ALARM	○ ALARM	○ ALARM	○ ALARM	○ ALARM	○ ALARM	● ALARM

M3362

TABLE 3—SITE-CONFIGURABLE JUMPER OPTIONS

Jumper Number	Description	Intact	Clipped	RM7890 Type
JR1	Pilot Flame Establishing Period	10 seconds △4	4 seconds △4	(ALL) △2
JR2	Flame Failure Action	Relight △1	Lockout	(ALL) △3

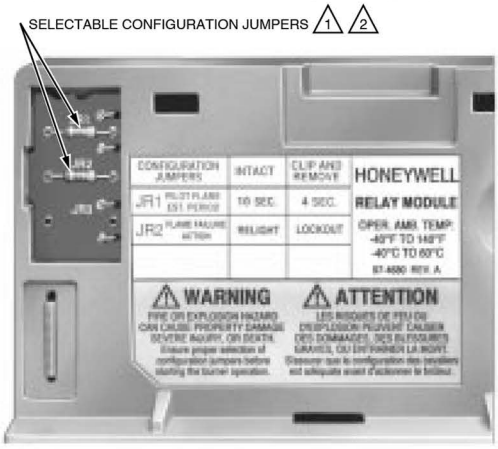
△1 The Relight feature (JR2 intact) requires a 0.8 sec FFRT Flame Amplifier. The RM7890 will lockout and indicate a Fault 46 if a 3.0 second FFRT is used and jumper JR2 (Lockout) is not clipped and removed.

△2 Not applicable for RM7890A1031 (30 second PFEP). JR1 removed.

△3 Not applicable for RM7890C (Standing Pilot).

△4 30 seconds for RM7890A1031.

Fig. 16—Selectable site-configurable jumpers.



1 JR1 REMOVED FROM 30 SECOND FIXED PFEP MODEL.
2 JR2 REMOVED FROM RM7890C.
3 RM7890A1031 PFEP IS 30 SECONDS.

M11589

SERVICE NOTE: Clipping and removing a site-configurable jumper enhances the level of safety. If using a 3-second amplifier, site-configurable jumper JR2 must be clipped and removed. If not removed, an F46 Lockout will occur.

Static Checkout

CAUTION

1. Use extreme care while testing the system. Line voltage is present on most terminal connections when power is on.
2. Open the master switch before installing or removing a jumper on the subbase.
3. Before continuing to the next test, be sure to remove the test jumper(s) used in the previous tests.
4. Replace all limits and interlocks not operating properly. Do not bypass limits and interlocks.
5. Close all manual fuel shutoff valve(s) before starting these tests.

EQUIPMENT RECOMMENDED

1. Voltmeter (20 kohm/volt minimum sensitivity) set on the 0-300 Vac scale.
2. Two jumper wires; no. 14 wire, insulated, 12 inches (304.8 mm) long, with insulated alligator clips at both ends.

GENERAL INSTRUCTIONS

1. Perform all applicable tests listed in Static Checkout, Table 4, in the order listed.
2. MAKE SURE THAT ALL MANUAL FUEL SHUTOFF VALVE(S) ARE CLOSED.
3. Perform only those tests designated for the specific RM7890 model being tested.
4. Raise the set point of the operating controller to simulate a *call for heat.*
5. For each test, open the master switch and install the jumper wire(s) between the subbase wiring terminals listed in the **Test Jumpers** column of Table 4.
6. Close the master switch before observing operation.
7. Read the voltage between the subbase wiring terminals listed in the **Voltmeter** column of Table 4.
8. If there is no voltage or the operation is abnormal, check the circuits and external devices as described in the last column.
9. Check all wiring for correct connections, tight terminal screws, correct wire, and proper wiring techniques. Replace all damaged or incorrectly sized wires.
10. Replace faulty controllers, limits, interlocks, actuators, valves, transformers, motors and other devices as required.
11. Obtain normal operation for each required test before continuing the checkout.
12. After completing each test, be sure to remove the test jumper(s).

TABLE 5—STATIC CHECKOUT.

Test No.	RM7890 Models	Test Jumpers	Voltmeter	Normal Operation	If Operation Is Abnormal, Check The Items Listed Below
⚠ ***WARNING*** Make sure all manual fuel shutoff valves are closed.					
IMPORTANT: *Low fuel pressure limits, if used, could be open. Bypass them with jumpers for the remaining Static tests (if required).*					
1	All	None	3-L2	Line voltage at terminal 3.	1. Master switch. 2. Power connected to the master switch. 3. Overload protection (fuse, circuit breaker) has not opened the power line.
2	All	None	6-L2	Line voltage at terminal 6.	1. Limits. 2. Burner controller.
3	All	3-10	—	Ignition spark (if ignition transformer is connected to terminal 10).	1. Watch for spark or listen for buzz. a. Ignition electrodes are clean. b. Ignition transformer is okay.
4	All	3-8	—	1. Ignition spark (if ignition transformer is connected to terminal 8). 2. Automatic pilot valve opens (if connected to terminal 8). NOTE: Refer to wiring diagram of system being tested.	1. Watch for spark or listen for buzz. a. Ignition electrodes are clean. b. Ignition transformer is okay. 2. Listen for click or feel head of valve for activation. a. Actuator if used. b. Pilot valve.
5	All	3-9	—	Automatic fuel valve(s) opens. If using direct spark ignition, check the first stage fuel valve(s) instead of the pilot valve.	Same as test no. 5. If using direct spark ignition, check the first stage fuel valve(s) instead of the pilot valve.
6	All	3-4	—	Alarm (if used) turns on.	1. Alarm
Final	All	⚠ ***CAUTION*** After completing these tests, open the master switch and remove all *test jumpers* from the subbase terminals. Also remove bypass jumpers from the low fuel pressure limits (if used).			

WARNING

Do not allow fuel to accumulate in the combustion chamber. If fuel is allowed to enter the chamber for longer than a few seconds without igniting, an explosive mixture could result. It is recommended that you limit the trial for pilot to ten seconds, and limit the attempt to light the main burner to two seconds from the time the fuel has reached the burner nozzle. In any case, do not exceed the nominal lightoff time specified by the equipment manufacturer. Close the manual fuel shutoff valve(s) if the flame is not burning at the end of the specified time.

CAUTION

1. Use extreme care while testing the system. Line voltage is present on most terminal connections when power is on.
2. Open the master switch before removing or installing the RM7890.
3. Make sure all manual fuel shutoff valve(s) are closed before starting the initial lightoff check and the Pilot Turndown tests.
4. Do not put the system in service until you have satisfactorily completed all applicable tests in this section and any others required by the equipment manufacturer.

CAUTION

If an RM7890 is replaced with a lower or higher functioning 7800 SERIES Relay Module, the burner will not sequence unless wiring changes are made.

IMPORTANT:

1. *If the system fails to perform properly, refer to 7800 SERIES System Annunciation Diagnostics and Troubleshooting, form 65-0118.*
2. *Repeat ALL required Checkout tests after all adjustments are made. ALL tests must be satisfied with the flame detector(s) in its FINAL position.*

EQUIPMENT RECOMMENDED

Volt-ohmmeter (20 kohm/volt minimum sensitivity).

- 0-300 Vac capability.
- 0-6000 ohm capability.
- 0-10 Vdc capability.

CHECKOUT SUMMARY

- Preliminary inspection—all installations.
- Flame signal measurement—all installations.
- Initial lightoff check for proved pilot—all installations using a pilot.
- Initial lightoff check for direct spark ignition of oil—all burners using DSI.
- Pilot turndown test—all installations using a pilot.
- Hot refractory saturation test—all installations using Infrared (lead sulfide) Flame Detectors.
- Hot refractory hold-in test—all installations.
- Ignition interference test—all installations using flame rods.
- Ignition spark pickup—all installations using Ultraviolet Flame Detectors.
- Response to other ultraviolet sources—all installations using Ultraviolet Flame Detectors.
- Flame signal with hot combustion chamber—all installations.
- Safety shutdown tests—all installations.

See Fig. 14 for location of component parts and, see Fig. 7 or Q7800 Specifications for terminal locations.

PRELIMINARY INSPECTION

Perform the following inspections to avoid common problems. Make certain that:

1. Wiring connections are correct and all terminal screws are tight.
2. Flame detector(s) is clean, installed and positioned properly. Consult the applicable Instructions.
3. Correct combination of amplifier and flame detector(s) is used. See Table 2 in the Specifications.
4. Plug-in amplifier is securely in place.
5. Burner is completely installed and ready to fire; consult equipment manufacturer instructions. Fuel lines are purged of air.
6. Combustion chamber and flues are clear of fuel and fuel vapor.
7. Power is connected to the system disconnect switch (master switch).
8. Lockout switch is reset (push in reset pushbutton) only if the RM7890 is powered, see Figs. 1 and 2.
9. System is in the STANDBY condition. POWER LED is energized.
10. All limits and interlocks are reset.

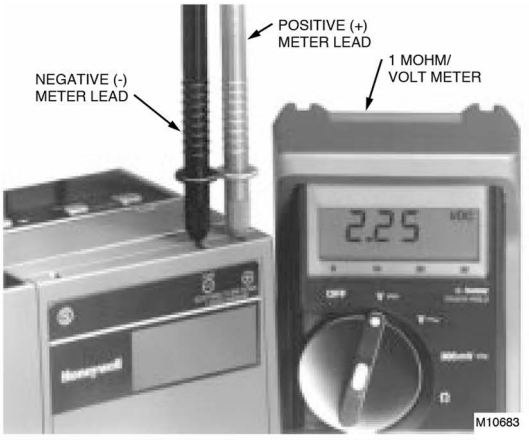
TABLE 5—FLAME SIGNAL (see Fig. 17).

Flame Detector	Flame Signal Amplifier	Minimum Acceptable Steady dc Voltage[a]	Maximum Expected dc Voltage
Flame Rod Photocell C7012A,C	R7847A,B[c]	1.25 Vdc	5.0 Vdc at the Keyboard Display Module. or 5.0 Vdc at a 20 kohm/voltmeter.
C7012E,F	R7847C[b]		
C7015A	R7848A,B[c]		
C7027A C7035A C7044A	R7849A,B[c]		
C7076A,D	R7886A		

[a]This minimum or a stronger signal should easily be obtained if the detector is correctly installed and positioned to properly sense the flame. This voltage must be obtained before completing checkout.
[b]The flame signal amplifier circuitry is tested one-half second every five seconds during burner operation and shuts down the burner if the amplifier fails (all installations).
[c]The flame amplifiers are AMPLI-CHECK™ type.

FLAME SIGNAL MEASUREMENT

Fig. 17—Flame signal measurement.



Measure the flame signal at the appropriate times defined in the following checkout tests. Read the flame signal volts dc at the flame amplifier test jacks + and - (Com).

1. Use a 20 kohm/voltmeter with a 0 to 10 Vdc capability.
2. Set the 20 kohm/voltmeter to the 0 to 10 Vdc range.
3. Insert the positive (red) probe into the + jack of the flame amplifier. Insert the negative (black) probe into the - (Com) jack of the flame amplifier (see Fig. 17).
4. Allow a few seconds for the meter reading to stabilize.
5. If using AMPLI-CHECK™ or shutter check amplifiers, read the average stable voltage, disregarding the peaks and valleys caused by the self-checking operation.
6. The meter reading must be as specified in Table 5 after all tests are completed and all adjustments are made.

As an option, the flame signal can be checked by using the optional Keyboard Display Module.

If the signal is unstable or less than the minimum acceptable voltage, check the flame detector installation and circuitry.

1. Check the supply voltages at terminals 3 (L1) and L2 (N). Make sure the master switch is closed, connections are correct, and the power supply is of the correct voltage, frequency and is sinusoidal.
2. Check the detector wiring for defects including:
   - Deteriorated wire.
   - Incorrect connections.
   - Leakage paths caused by moisture, soot or accumulated dirt.
   - Open circuits.
   - Short circuits.
   - Wrong type of wire.
3. For a flame rod, make sure:
   - Flame rod is properly located in the flame.
   - Ground area is large enough.
   - Temperature at the flame rod insulator is no greater than 500° F [260° C].
4. For all optical detectors, clean the detector viewing window and inside of the sight pipe as applicable.
5. With the burner running, check the temperature at the detector. If it exceeds the detector maximum rated temperature:
   - Add a heat block to stop conducted heat traveling up the sight pipe.
   - Add a shield or screen to reflect radiated heat.
   - Add cooling (refer to sight pipe ventilation in the detector Instructions).
6. Make sure that the flame adjustment is not too lean.
7. Make sure that the detector is properly sighting the flame.
8. If necessary, resight or reposition the detector.

INITIAL LIGHTOFF CHECK FOR PROVED PILOT

Perform this check on all installations that use a pilot. It should immediately follow the preliminary inspection.

NOTE: Low fuel pressure limits, if used, could be open. If so, bypass them with jumpers during this check.

1. Open the master switch.
2. Make sure that the manual main fuel shutoff valve(s) is closed. Open the manual pilot shutoff valve. If the pilot takeoff is downstream from the manual main fuel shutoff valve(s), slightly open the manual main valve to supply pilot gas flow. Make sure the main fuel is shut off just upstream from the burner inlet, or disconnect power from the automatic main fuel valve(s).
3. Close the master switch and start the system with a *call for heat* by raising the set point of the operating controller, see Fig. 13 or RM7890 sequence. The primary sequence should start the SAFE-START CHECK sequence (except RM7890C).
4. Let the sequence advance through STANDBY and SAFE-START CHECK. Ignition spark should occur and the pilot should light. If the pilot ignites, the FLAME LED will be energized. Proceed to step 7.
5. If the pilot flame is not established in four or ten seconds (30 seconds for RM7890A1031), safety shutdown occurs. Let the sequence complete its cycle. Consult the equipment operating manual for further information.
6. Push the reset pushbutton, and let the system recycle once. If the pilot still does not ignite, make the following ignition/pilot adjustments:
    a. Open the master switch and remove the RM7890 from the subbase.
    b. On the subbase, jumper terminal 3 to ignition terminals 8 or 10; refer to the appropriate wiring diagram to determine the proper terminal. Disconnect the leadwire to the pilot valve if it is connected to the same terminal.
    c. Close the master switch to energize only the ignition transformer.
    d. If the ignition spark is not strong and continuous, open the master switch and adjust the ignition electrode spark gap setting to the manufacturer recommendations.
    e. Make sure the ignition electrodes are clean.
    f. Close the master switch and observe the spark.
    g. After a continuous spark is obtained, open the master switch and add a jumper on the subbase from terminal 3 (L1) to the pilot terminal 8. Reconnect the leadwire from the pilot valve if it was disconnected in step b.
    h. Close the master switch to energize both the ignition transformer and the pilot valve.
    i. If the pilot does not ignite and if the ignition spark is still continuous, adjust the pressure regulator until a pilot is established.
    j. When the pilot ignites properly and stays ignited, open the master switch and remove the jumper(s) from terminals 3 - 8 or 3 - 10 of the subbase.
    k. Check for adequate bleeding of the fuel line.
    l. Reinstall the RM7890 on the subbase and close the master switch and return to step 4.
7. When the pilot ignites, measure the flame signal. If the pilot flame signal is unsteady or approaching the 1.25 Vdc minimum value, adjust the pilot flame size or detector sighting to provide a maximum and steady flame signal.
8. Recycle the system to recheck lightoff and pilot flame signal.
9. When the RUN period is displayed by the MAIN LED, make sure the automatic main fuel valve is open; then smoothly open the manual main fuel shutoff valve(s) and watch for main burner flame ignition. When the main burner flame is established, proceed to step 16.
10. If the main burner flame is not established within five seconds or the normal lightoff time specified by the equipment manufacturer, close the manual main fuel shutoff valve(s).
11. Recycle the system to recheck lightoff and pilot flame signal.
12. Let the RM7890 recycle to the RUN period. Smoothly open the manual fuel shutoff valve(s) and try lightoff again. (The first attempt may have been required to purge the lines and bring sufficient fuel to the burner.)
13. If the main burner flame is not established within five seconds or the normal lightoff time specified by the equipment manufacturer, close the manual main fuel shutoff valves(s). Check all burner adjustments.
14. If the main burner flame is not established after two attempts:
    a. Check for improper pilot size.
    b. Check for excess combustion air.
    c. Check for adequate fuel flow.
    d. Check for proper gas supply pressure.
    e. Check for proper valve operation.
    f. Check for proper pilot flame positioning.
15. Repeat steps 10 through 14 to establish the main burner flame, then proceed to step 16.
16. With the sequence in RUN, make burner adjustments for flame stability and BTU input rating.
17. Shut down the system by opening the burner switch or by lowering the set point of the operating controller. Make sure the main flame goes out. There may be a delay due to gas trapped between the valve(s) and the burner. Make sure all automatic fuel valve(s) close.
18. Restart the system by closing the burner switch and/or raising the set point of the operating controller. Observe that the pilot is established during PILOT IGN and the main burner flame is established during RUN within the normal lightoff time.
19. Measure the flame signal. Continue to check for the proper signal, see Table 5, through the RUN period.
20. Run the burner through another sequence, observing the flame signal for:
    a. Pilot flame alone (unless using direct spark ignition).
    b. Pilot and main flame together.
    c. Main flame alone (unless monitoring an intermittent pilot).

    Also observe the time it takes to light the main flame. Ignition of main flame should be smooth.
21. Return the system to normal operation.
22. Make sure all readings are in the required ranges before proceeding.

NOTE: Upon completing these tests, open the master switch and remove all test jumpers from the subbase terminals, limits/controls or switches.

INITIAL LIGHTOFF CHECK FOR DIRECT SPARK IGNITION

This check applies for gas and oil burners that do not use a pilot. It should immediately follow the preliminary inspection. Refer to the appropriate sample block diagram of field wiring for the ignition transformer and fuel valve(s) hookup.

NOTE: Low fuel pressure limits, if used, could be open. If so, bypass them with jumpers during this check.

1. Open the master switch.
2. Complete the normal checkout of the fuel supply and equipment as recommended by the equipment manufacturer.
3. Close all manual main fuel shutoff valve(s). Check that the automatic fuel valve(s) are closed. Make sure fuel is not entering the combustion chamber.
4. Close the master switch and start the system with a *call for heat* by raising the set point of the operating controller, see Fig. 13 or RM7890 sequencing. The primary sequence should start with the SAFE-START CHECK sequence.
5. Let the sequence advance through STANDBY and SAFE-START CHECK to Ignition Trial. Ignition spark should occur. Listen for the click of the first stage fuel solenoid valve(s).
6. Let the program sequence complete its cycle.
7. Open the manual fuel shutoff valve(s).
8. Push the reset pushbutton and recycle the program sequence through STANDBY and SAFE-START CHECK.
9. Watch for the FLAME LED to help determine when the first stage burner flame is established. If it is established, proceed to step 15.
10. If the first stage burner flame is not established within four seconds, or within the normal lightoff time specified by the equipment manufacturer, close the manual fuel shutoff valve(s), and open the master switch.
11. Check all burner adjustments.
12. Wait about three minutes. Close the master switch, open the manual fuel shutoff valve(s), and try again to light off the burner. The first attempt may have been required to purge the lines and bring sufficient fuel to the burner.
13. If the first stage burner flame is not established within four seconds, or within the normal lightoff time specified by the equipment manufacturer, close the manual fuel shutoff valve(s) and open the master switch.
14. If necessary, repeat steps 11 through 13 to establish the first stage burner flame. Then proceed to step 15.
15. When the first stage burner flame is established, the sequence will advance to RUN. Make burner adjustments for flame stability and input rating. If a second stage is used, proceed to step 18.
16. Shut down the system by opening the burner switch or by lowering the set point of the operating controller. Make sure the burner flame goes out and make sure all automatic fuel valve(s) close.
17. If used, remove the bypass jumpers from the low fuel pressure limit and subbase.
18. If a second stage is used, make sure the automatic second stage fuel valve(s) has opened, check the lightoff as follows. Otherwise proceed to step 19:
    a. Open the manual second stage fuel valve(s).
    b. Restart the system by raising the set point of the operating controller.
    c. When the first stage burner flame is established, watch for the automatic second stage fuel valve(s) to open. Observe that the second stage lights off properly.
    d. Make burner adjustments for flame stability and input rating.
    e. Shut down the system by lowering the set point of the operating controller. Make sure the burner flame goes out and all automatic fuel valve(s) close.
19. Restart the system by closing the burner switch and/or raising the set point of the operating controller. Observe that the burner flame is established during PILOT IGN, within the normal lightoff time specified by the equipment manufacturer.
20. Measure the flame signal. Continue to check for the proper signal, see Table 5, through the RUN period. Any pulsating or unsteady readings will require further attention.
21. Make sure all readings are in the required ranges before proceeding.

NOTE: Upon completing these tests, open the master switch and remove all test jumpers from the subbase terminals, limits/controls or switches.

22. Return the system to normal operation.

PILOT TURNDOWN TEST (ALL INSTALLATIONS USING A PILOT)

Perform this check on all installations that use a pilot. The purpose of this test is to verify that the main burner can be lit by the smallest pilot flame that will hold in the flame amplifier and energize the FLAME LED. Clean the flame detector(s) to make sure that it will detect the smallest acceptable pilot flame. If using AMPLI-CHECK™ or Self-Checking Amplifier and 20 kohm/voltmeter, the flame signal will fluctuate every time the amplifier does a self-check or a shutter check.

NOTE: Low fuel pressure limits, if used, could be open. If so, bypass them with jumpers during this test.

1. Open the master switch.
2. Close the manual main fuel shutoff valve(s).
3. Connect a manometer (or pressure gauge) to measure pilot gas pressure during the turndown test.
4. Open the manual pilot shutoff valve(s).
5. Close the master switch and start the system with a *call for heat* by raising the set point of the operating controller. The primary sequence should start and PILOT IGNITION should begin.
6. After the sequence has entered the normal burner run period, turn the pilot gas pressure down very slowly, reading the manometer (or gauge) as the pressure drops. Stop immediately when the FLAME LED goes out. Note the pressure at this point.

NOTE: If there is not flame present for the selected Flame Failure Response Test (FFRT), the RM7890 will lock-out.

a. If the Flame Failure Action jumper (see Table 3, JR2) *is not clipped*: allow the RM7890A,B to recycle to PILOT IGNITION. If the Flame Failure Action jumper *is clipped*: push the reset pushbutton and allow the RM7890A,B to recycle to PILOT IGNITION.

b. As the control attempts to relight the pilot, increase the pilot pressure immediately until the FLAME LED comes on, and then turn it down slowly to obtain a pressure reading just above the dropout point or until the flame signal increases to approximately 1.25 Vdc. This step must be completed within four or ten seconds, depending on the selected PFEP, or lockout will occur.

c. Turn the pilot back down slightly but not enough to cause the FLAME LED to go out. (Keep the pilot gas pressure just above the reading noted in step 6 above.)

NOTE: Step d requires two people, one to open the manual main fuel valve(s) and one to watch for ignition.

d. With the sequence in the normal burner run mode, make sure that the automatic main fuel valve(s) is open. Smoothly open the manual main fuel shutoff valve(s) and watch for main burner lightoff.

e. If the main flame is not established within five seconds or the normal lightoff period specified by the burner manufacturer, close the manual main fuel shutoff valve(s) and open the master switch. Then return to step 6a. If the burner flame is established in the normal lightoff period, proceed to step 10.

7. Recycle the burner and let the sequence advance to the PILOT IGN period.

8. Increase the pilot flame size by increasing its fuel flow until a smooth main flame is accomplished.

9. Reposition the flame scanner sight tube or use orifices until the pilot flame signal voltage is approximately 1.25 - 1.50 Vdc.

10. When the main burner lights reliably with the pilot at turndown, disconnect the manometer (or pressure gauge) and turn the pilot gas flow up to that recommended by the equipment manufacturer.

11. If used, remove the bypass jumpers from the subbase terminals, limits/control or switches.

12. Run the system through another cycle to check for normal operation.

13. Return the system to normal operation.

IGNITION INTERFERENCE TEST (ALL FLAME RODS)

Test to be sure that a false signal from a spark ignition system is not superimposed on the flame signal.

Ignition interference can subtract from (decrease) or add to (increase) the flame signal. If it decreases the flame signal enough, it will cause a safety shutdown. If it increases the flame signal, it could cause the FLAME LED to come on when the true flame signal is below the minimum acceptable value.

Start the burner and measure the flame signal with both ignition and pilot (or main burner) on, and then with only the pilot (or main burner) on. Any significant difference (greater than .5 Vdc) indicates ignition interference.

TO ELIMINATE IGNITION INTERFERENCE

1. Make sure there is enough ground area.
2. Be sure the ignition electrode and the flame rod are on opposite sides of the ground area.
3. Check for correct spacing on the ignition electrode:
   a. 6,000V systems - 1/16 to 3/32 in. (1.6 to 2.4 mm).
   b. 10,000V systems - 1/8 in. (3.2 mm).
4. Make sure the leadwires from the flame rod and ignition electrode are not too close together.
5. Replace any deteriorated leadwires.
6. If the problem cannot be eliminated, the system may have to be changed to an ultraviolet or infrared flame detection system.

HOT REFRACTORY SATURATION TEST (ALL INFRARED DETECTORS)

Test to be sure that radiation from hot refractory does not mask the flickering radiation of the flame itself.

Start the burner and monitor the flame signal during the warm-up period. A decrease in signal strength as the refractory heats up indicates hot refractory saturation. If saturation is extreme, the flame signal will drop below 1.25 Vdc and the system will shut down as though a flame failure has occurred.

If hot refractory saturation occurs, the condition must be corrected. Add an orifice plate in front of the cell to restrict the viewing area; try to lengthen the sight pipe or decrease the pipe size (diameter). Continue adjustments until hot refractory saturation is eliminated.

HOT REFRACTORY HOLD-IN TEST (RECTIFYING PHOTOCELL OR ALL INFRARED DETECTORS)

Test to be sure hot refractory will not delay the flame detection system response to a flameout. This condition can delay response to flame failure and also can prevent a system restart as long as hot refractory is detected.

To check rectifying photocells for hot refractory hold-in, operate the burner until the refractory reaches its maximum temperature. Then terminate the firing cycle by lowering the set point of the operating controller or setting the Fuel Selector Switch to OFF. Do not open the master switch. Visually observe when the burner flame goes out. If the FLAME LED is on longer than .8 or 3 seconds (depending on the FFRT of the amplifier), the photocell is sensing hot refractory. This condition must be corrected as described in the last paragraph of this test.

Infrared (lead sulfide) detectors can respond to infrared rays emitted by a hot refractory, even when the refractory has

visibly ceased to glow. Infrared radiation from a hot refractory is steady, but radiation from a flame has a flickering characteristic. The infrared detection system responds only to flickering infrared radiation; it can reject a steady signal from hot refractory. The refractory steady signal can be made to fluctuate if it is reflected, bent or blocked by smoke or fuel mist within the combustion chamber. Be careful when applying an infrared system to verify its response to flame only.

To check infrared (lead sulfide) detectors for hot refractory hold-in, operate the burner until the refractory reaches its maximum temperature. If the installation has a multi-fuel burner, burn the heaviest fuel that is most likely to reflect, bend or obscure the hot refractory steady infrared radiation. When the maximum refractory temperature is reached, close all manual fuel shutoff valve(s) or open the electrical circuits of all automatic fuel valve(s). Visually observe when the burner flame or FLAME LED goes out. If this takes longer than three seconds, the infrared detector is sensing hot refractory. Immediately terminate the firing cycle. Lower the set point to the operating controller, or set the Fuel Selector Switch to OFF. Do not open the master switch.

NOTE: Some burners continue to purge oil lines between the valve(s) and nozzle(s) even though the fuel valve(s) is closed. Terminating the firing cycle (instead of opening the master switch) will allow purging of the combustion chamber. This will reduce a buildup of fuel vapors in the combustion chamber caused by oil line purging.

If the detector is sensing hot refractory, the condition must be corrected. Add an orifice plate in front of the cell to restrict the viewing area of the detector. If this does not correct the problem, resight the detector at a cooler, more distant part of the combustion chamber. While resighting the detector, be aware that it must also properly sight the flame. When using an infrared detector, try lengthening the sight pipe or decreasing the pipe size (diameter). For details, refer to the detector Instructions and the equipment Operating Manual. Continue adjustments until hot refractory hold-in is eliminated.

ULTRAVIOLET SENSOR, IGNITION SPARK RESPONSE TEST (ALL ULTRAVIOLET DETECTORS)

Test to be sure that the ignition spark is not actuating the FLAME LED:

1. Close the pilot and main burner manual fuel shutoff valve(s).
2. Start the burner and run through the PILOT IGN period. Ignition spark should occur, but the flame signal should not be more than 0.5 Vdc and the FLAME LED should not turn on.
3. If the flame signal is higher than 0.5 Vdc and the FLAME LED does come on, consult the equipment Operating Manual and resight the detector further out from the spark, or away from possible reflection. It may be necessary to construct a barrier to block the ignition spark from the detector view. Continue adjustments until the flame signal due to ignition spark is less than 0.5 Vdc.

NOTE: The Honeywell Q624A Solid State Spark Generator will prevent detection of ignition spark when properly applied with the C7027, C7035 or C7044 Minipeeper Ultraviolet Flame Detectors. The Q624A is only for use with gas pilots.

RESPONSE TO OTHER ULTRAVIOLET SOURCES

Under certain conditions, an ultraviolet detector will respond to other ultraviolet sources as if it is sensing a flame. These ultraviolet sources include artificial light, such as incandescent or fluorescent bulbs, mercury and sodium vapor lamps or daylight. To check for proper detector operation, check the Flame Failure Response Time (FFRT) and conduct Safety Shutdown tests under all operating conditions.

FLAME SIGNAL WITH HOT COMBUSTION CHAMBER (ALL INSTALLATIONS)

After all initial start-up tests and burner adjustments are completed, operate the burner until the combustion chamber is at the maximum expected temperature. Observe the equipment manufacturer warm-up instructions. Recycle the burner under these hot conditions and measure the flame signal. Check the pilot alone for non-DSI applications or the main burner flame for DSI applications.

Check the FFRT of the Flame Amplifier. Lower the set point of the operating controller and observe the time it takes for the burner flame to go out. This should be within .8 or 3 seconds maximum depending on the amplifier selected.

If the flame signal is too low or unsteady, check the flame detector temperature. Relocate the detector if the temperature is too high. If necessary, realign the sighting to obtain the proper signal and response time. If the response time is still too slow, replace the Plug-in Flame Signal Amplifier. If the detector is relocated or resighted, or the amplifier is replaced, repeat all required Checkout tests.

SAFETY SHUTDOWN TESTS (ALL INSTALLATIONS)

Perform these tests at the end of Checkout after all other tests have been completed. If used, the external alarm should turn on. Press the RM7890 reset pushbutton to restart the system.

1. Detect flame 40 seconds after entry to STANDBY.
   a. Simulate a flame to cause the flame signal voltage level to be at least 1.25 Vdc for 30 seconds after the intial 40 second entry into STANDBY.
   b. Safety shutdown will occur.
2. Failure to ignite pilot.
   a. Close the pilot and main fuel manual shutoff valve(s).
   b. Depress the reset pushbutton.
   c. Start the system.
   d. Automatic pilot valve(s) should be energized but the pilot cannot ignite.
   e. Safety shutdown will occur.
3. Loss of flame during RUN (if Flame Failure Action configuration jumper, JR2, is selected for Lockout).
   a. Open the main fuel manual shutoff valve(s). The manual pilot shutoff valve(s) must also be opened.
   b. Depress the reset pushbutton.

c. Start the system. Startup should be normal and the main burner should light normally.
d. After the sequence is in the normal RUN period for at least ten seconds with the main burner firing, close the manual main and pilot fuel shutoff valve(s) to extinguish the main burner flame.
e. The flame signal should drop below 1.25 Vdc within .8 or 3 seconds (depending on the FFRT of the amplifier) after the main flame goes out.
f. Safety shutdown will occur.

IMPORTANT:

1. *If the RM7890 fails to shut down on any of these tests, take corrective action (refer to Troubleshooting, RM7890 diagnostics and return to the beginning of all Checkout tests).*
2. *When all Checkout tests have been completed, reset all switches to original states.*

Troubleshooting

RM7890 SYSTEM DIAGNOSTICS

Troubleshooting control system equipment failures is easier with the RM7890 self-diagnostics and first-out annunciation. In addition to an isolated spst alarm relay (audible annunciation), the RM7890 provides visual annunciation by displaying the ALARM LED.

Self-diagnostics of the RM7890 enable it to detect and annunciate both external and internal system problems. External faults such as flame failures and false flame signals are annunciated by a lockout of the RM7890 that energizes the ALARM LED by using the optional Keyboard Display Module or 7800 SERIES System Annunciation Diagnostics and Troubleshooting, form 65-0118.

The RM7890 provides diagnostic information to aid the service mechanic to obtain information when troubleshooting the system, see Table 6.

The optional Keyboard Display Module displays sequence status messages indicating: INITIATE, STANDBY, SAFE-START CHECK, PILOT IGN and RUN. The selectable messages also provide visual indication, current status and historical status of the equipment such as: Flame Signal, Total Cycles, Total Hours, Fault History, Diagnostic Information and Expanded Annunciator Terminal Status (if used). With this information most problems can be diagnosed without extensive trial and error testing. Information available in the Diagnostic Information file includes: Device Type, Device Suffix, Software Revision, Manufacturing Code, Flame Amplifier Type, Flame Failure Response Time, Selectable Jumper Configuration Status and Terminal Status.

Diagnostic Information Index

The RM7890 with the optional Keyboard Display Module can monitor input/output terminals and can display the status of the terminal at the VFD (e.g. Pilot Valve T8 ON<), see S7800A1001 Keyboard Display Module Specifications. A complete terminal description and terminal number are provided. The display will show the actual status of the terminal. If voltage is detected at the terminal, ON is displayed; but if voltage is not present at the terminal, OFF is displayed.

Historical Information Index

The RM7890 has nonvolatile memory that allows the Relay Module to retain Historical Information for the six most recent lockouts. Each of the six lockout files retains the cycle when the fault occurred, the hour of operation when the fault occurred, and the fault message and burner status when the fault occurred. The Historical Information can be viewed by the optional S7800A1001 Keyboard Display Module.

SERVICE NOTE: A restart of an RM7890 can be accomplished by pressing the reset pushbutton on the RM7890, or by pressing a remote reset pushbutton wired through an optional Keyboard Display Module, DATA CONTROLBUS MODULE™, Extension Cable Assembly, or Remote Reset Module. A power-up reset will cause an electrical reset of the RM7890 but will not reset a lockout condition.

SERVICE NOTE: Remove the access slot covers on the sides of the Q7800A,B to check voltages.

CAUTION

Reinstall access slot covers on the Q7800A,B Subbase after performing voltage checks.

SERVICE NOTE: Maximum ambient operating temperature of a C7012E,F Series 1 through 6 will be reduced to 125° F because of the duty cycle operation of the RM7890B Relay Module.

TABLE 6—SEQUENCE AND STATUS HOLD INFORMATION.

NOTE: **Normal sequences** are in **bold type**, while abnormal sequences are not in bold type.

Sequence	Information
INITIATE	The LED indicates the burner status, POWER, which is a stabilization period for the RM7890 to check for any fluctuations in AC line voltage inputs or control input on power-up or during normal operation. The timing of the INITIATE period is ten seconds before entering STANDBY.
If the RM7890 is in a HOLD status, the following conditions could exist:	
INITIATE HOLD: (AC Frequency/Noise)	The LED indicates the burner status, POWER, and that the RM7890 is waiting for excess line noise to clear up. The burner sequence will not advance into STANDBY until the excess line noise, which prevents sufficient reading of the line voltage inputs, ceases or a line frequency error is corrected (perhaps caused by using a 60 Hz device on a 50 Hz line, or vice versa).
INITIATE HOLD: (AC Line Dropout)	The LED indicates the burner status, POWER, and that AC line power has momentarily dropped out. The burner sequence will not advance into STANDBY until the AC Line voltage has stabilized throughout the INITIATE sequence.
INITIATE HOLD: (AC Frequency)	The LED indicates the burner status, POWER, and that line frequency is faster than the expected value. The burner sequence will not advance into STANDBY until the line frequency returns to the proper value (perhaps caused by using a 50 Hz device on a 60 Hz line).
INITIATE HOLD: (Low Line Voltage)	The LED indicates the burner status, POWER, and that low line voltage has occurred. The burner sequence will not advance into STANDBY until the line voltage is at a sufficient level for proper operating parameters.
STANDBY	The LED indicates the burner status, POWER. The burner can be placed in STANDBY by opening the burner switch or if the operating controller indicates its set point has been satisfied. If a demand is present for burner operation, the burner sequence will not advance from STANDBY to SAFE START CHECK until the recycle limits close.
If the RM7890 is in a HOLD status, the following conditions could exist:	
STANDBY HOLD: F/G (Flame Detected)	The LEDs indicate the burner status, POWER and FLAME, and that a flame is detected. A demand is present for burner operation. The burner sequence will not advance to SAFE START CHECK because a flame is detected as being present. The sequence will not advance to SAFE START CHECK until the flame signal clears. If the flame signal does not clear within 40 seconds, the RM7890 will lockout.
SAFE START CHECK	The LED indicates the burner status, POWER, which is the period of time after STANDBY. The RM7890 is verifying that a flame is not present before the start of Ignition Trials. If a flame is present, the RM7890 will recycle to STANDBY.
PILOT IGN	The LEDs indicate the burner status, POWER, PILOT and FLAME, which is the period of time the RM7890 permits the pilot valve and ignition to be energized and the pilot flame to be established.
RUN	The LEDs indicate the burner status, POWER, PILOT, FLAME and MAIN, which is the period of time after the Ignition Trials and before the operating controller set point is reached. During this time, the burner is firing under the control of the operating controller.
RESET/ALARM TEST	The LED indicates the burner status, POWER and ALARM. This condition indicates that the reset pushbutton is pressed. If it is held for more than four seconds, the alarm output is energized. The alarm output will be de-energized after the reset pushbutton is released.

SECTION 20: DIRECT FIRED BURNER

⚠ DANGER	⚠ WARNING		
			
Electrical Shock Hazard **Disconnect electric before service.** **More than one disconnect switch may be required to disconnect electric from heater.** **Heater must be connected to a properly grounded electrical source.**	**Explosion Hazard** **Leak test all components of gas piping before operation.** **Gas can leak if piping is not installed properly.** **Do not high pressure test gas piping with equipment connected.**	**Carbon Monoxide Hazard** **Heaters installed unvented must be interlocked with sufficient building exhaust.** **Heaters must be installed according to the installation manual.**	**Burn Hazard** **Allow heater to cool before service.** **Tubing may still be hot after operation.**
Failure to follow these instructions can result in death, electric shock, injury or property damage.			

Your unit will be equipped with a direct fired burner manufactured by either Midco International or Maxon Corporation. Please consult the specification sheet provided with your air handler to confirm the manufacturer of the burner supplied with it.

Manufactured by Midco International®, Inc., the HMA-2A is used for natural gas and propane (LP). The burner combines the two main ingredients needed for proper combustion air (oxygen) and fuel (gas whether natural or manufactured). In this burner raw gas is delivered to the burner ports at low pressure. The air passing across the burner is maintained between 2,500 and 3,200 feet per minute. The arrangement and shape of the air holes in the baffles that surround the burner provide the proper amount of air for proper combustion for all of the firing rates.

FIGURE 71: Midco HMA-2A Burner

Service Bulletin

Direct Gas-Fired Heater Burner Maintenance

CAUTION: Read and understand this service bulletin thoroughly before starting. Only a trained, experienced service technician should attempt this service procedure.

Basic Instructions:
1. Clean the burner plates
2. Clear the burner gas and air ports
3. Inspect the spark rod igniter and replace if required
4. Insure the flame sensor is in good condition.

To clean the burner plates use a stiff wire brush. Scrub both sides of the stainless steel burner plates to remove any soot or other crud, which may be on the burner. All of the burner plate holes must be clear so air can pass through them unrestricted. The holes in the burner plate allow air to mix with the gas in increasing amounts, as the flame gets longer. After the burner plates have been cleaned, inspect them for cracking. Cracks occurring between one or two holes are normal and should be of no concern. If the cracking is more extensive, the affected plates should be replaced. With brush in hand, scrub the rust, soot and other foreign material from the burner orifice area. Clean the burner gas and air ports using a drill bit or piece of wire of the appropriate size. See the chart below for drill size. After the orifices are drilled to the correct size and using compressed air or a vacuum, remove any debris from the manifold. Debris left in the manifold will prematurely clog the orifices in the future.

		Gas Port Drill Size		Air Port Drill Size	
Burner Sections		Wire Gauge	Decimal	Wire Gauge	Decimal
HMA-1					
Straight, 1 row	Natural Gas	31	.120	42	.093
	Propane Gas	45	.082	42	.093
HMA-2	Natural / Propane	1/8″	.125	43	.089
HMA-2A	Natural / Propane	1/8″	.125	42	.093

After the burner plates and orifices have been cleaned inspect the spark rod. The tip should be clean and free of dirt and carbon. The porcelain must be intact. If it's cracked, replace it. While the spark rod is out pull the flame rod or ultraviolet scanner out as well. If the flame sensor is a scanner, clean the lens with a clean damp soft rag. A flame rod's metal rod should be clean and free of dirt and carbon. Like the spark rod igniter, the porcelain on the flame rod must be intact as well. Replace it if it's cracked.

Questions regarding this bulletin or burner servicing should be directed to the Sales Engineering Department of Midco International Inc. We can be reached by phone at 773 604-8700 or by fax at 773- 604-5355.

Midco® International Inc.
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Chicago, Illinois 60646
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fax 773.604.4070
web www.midcointernational.com
e-mail sales@midcointernational.com

AVOID ERROR IN PARTS SELECTION. When ordering use complete MIDCO Part Number and Description. Furnish Burner Model Number, if available.

IMPORTANT: Availability of parts as well as specifications are subject to change without notice. Please consult factory for item availability.

SAFETY INFORMATION TERMS: The following terms are used to identify hazards, safety precaution of special notations and have standard meanings throughout this manual. They are printed in all capital letters using a bold type face as shown below, and preceded by the exclamation mark symbol. When you see the safety alert symbol and one of the safety information terms as shown below, be aware of the hazard potential.

DANGER: Identifies the most serious hazards which will result in severe personal injury or death.
WARNING: Signifies a hazard that could result in personal injury or death.
CAUTION: Identifies unsafe practices which would result in minor personal injury or product and property damage.

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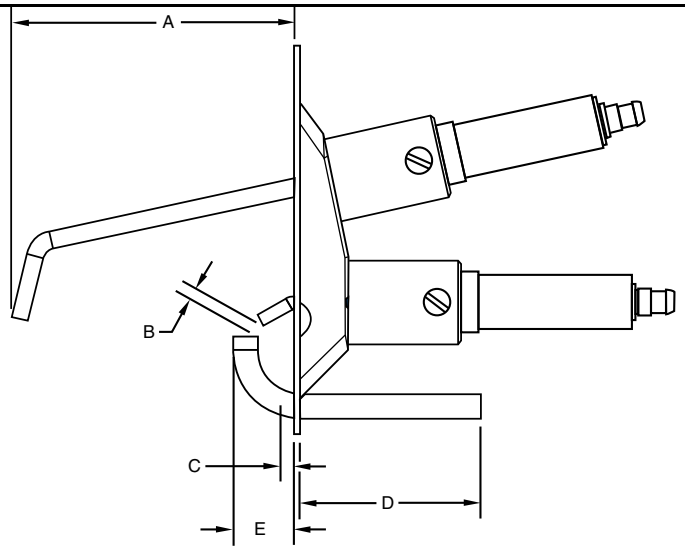
Quality Designed for Proven Performance

20.1 Direct Fired Burner Ignition

The burner that is used in the Weather-Rite LLC unit is equipped with a pilot assembly. The pilot assembly consists of a pilot gas tube, spark electrode or rod and a flame rod with grounding assembly. For proper ignition the spark rod must be adjusted correctly. A high voltage arc is generated between the spark rod and the pilot gas tube. The gas flowing out the ports in the pilot gas tube is ignited by this arc. The arc will be a brilliant electric blue in color. *See Page 115, Figure 72*.

FIGURE 72: Spark Rod Dimensions



	A	B	C	D	E
in	2.940	0.125	0.125	1.881	0.633
cm	7.468	0.318	0.318	4.778	1.608

WARNING: the ignition system on the air handler generates between 6,000 to 10,000 volts.

The gas supplied to the pilot gas tube should be 3 1/2" wc for natural gas and between 9 to 11" wc for propane or LP. The difference between the two fuels is that a restricting orifice is installed in the propane or LP pilot gas tube. The pilot assembly can be used on propane or LP without an orifice, if this is the case then the pressure for LP is 2.0"w.c. Ignition will take place with the introduction of gas to the pilot gas tube. The pilot flame will be mostly blue in color with streaks of yellow. The flame size will be roughly 2" in diameter. The flame must be steady and consistent in size.

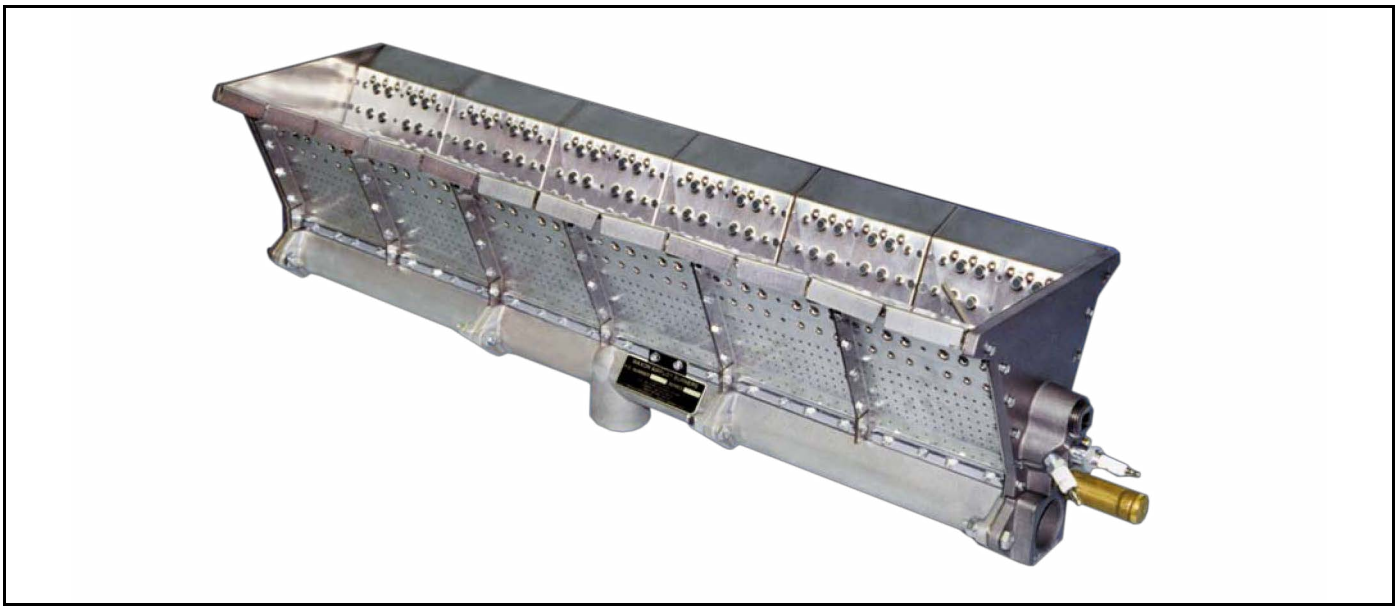
20.2 Direct Fired Burner Flame Proving (Flame Rod)

The flame rod in the burner is constructed of a material that produces a signal when heated. This signal is measured as a direct current micro amp. The path of the signal is from the flame rod to the burner. From the burner, which is mechanically grounded to the unit casing, the signal continues to the grounded side of the flame rectification module in the flame safeguard control. The signal continues out of the module to the flame rod where it completes the loop. The length the flame rod extends into the burner is determined by, the insulator surrounding the rod. This insulator must not be exposed more than 1/8" into the burner and not recessed more than 1/8". At this setting the flame rod will be enveloped by the pilot or main flame. It will be glowing bright red along at least 50% of its length. *See Page 115, Figure 72*.

NOTE: For the flame rod to produce this signal its position in relation to the grounding rod, pilot and main flame is critical.

The flame rectification module of the flame safeguard control converts this signal to a D.C. voltage. This voltage is the value that is used to monitor the pilot and the main flame of the burner. For the flame safeguard control to recognize this signal the value of the voltage must be between 6 to 18 volts D.C. and it must be steady. This signal is measured at the flame relay, on the rectification module's test jacks; S1 (colored red) and S2 (colored black). Upon receiving the correct signal, the flame relay will accept this as proof that the burner is functioning correctly and will proceed with its functions.

FIGURE 73: Maxon NPLE Burner



MAINTENANCE INSTRUCTIONS

Periodic maintenance will insure continued trouble-free operation of your Series NP-LE AIRFLO® burner system.

At least a yearly inspection is recommended for make-up air heating installations and more frequently for process applications in year-round operation. Your own experience is the best guide in determining frequency of inspection. As a minimum, the following procedure should be followed:

- Shut the system down totally. Disconnect or lock out power supply so there can be no accidental start-up during inspection.
- Inspect the burners carefully, including upstream and downstream sides of mixing plates as well as burner body face. Any accumulation of scale or foreign material on either side of the mixing plates should be removed with a wire brush. Check visually that no holes in the mixing plates are blocked. See page 4-21.6-35 for inspection and maintenance instructions for gas ports.

⚠ WARNING
Do not enlarge burner ports or performance may be drastically affected.

- If any mixing plates are loose or missing fasteners, tighten/replace as necessary. Always use zinc plated or stainless metric fasteners.
- Put system back into operation and, if possible, view from downstream side while cycling burner through full firing range. This will give a visual check for blocked burner ports.
- Observe flame pattern and, if necessary, take steps to correct velocity and/or air distribution problems.

Repair/replacement procedures

If adverse operating conditions or accidental damage make it necessary to replace either individual mixing plates or complete burner sections, follow this procedure:

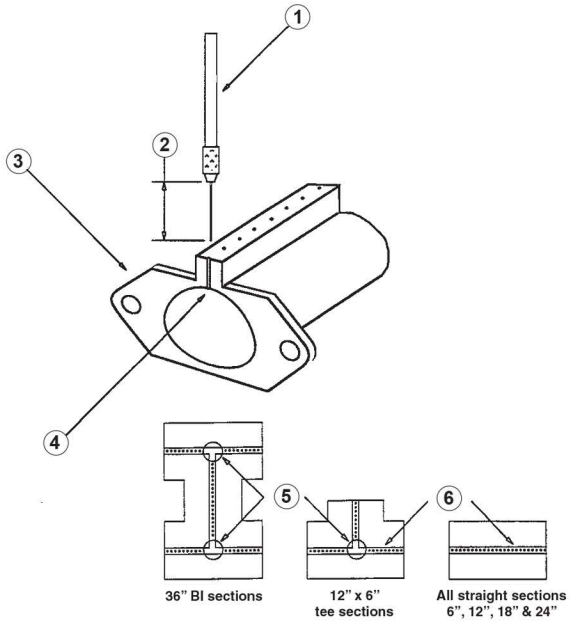
- Identify necessary replacement parts from component identification drawings on the following pages, then order required quantities of each. Consider carefully the economics of installing a complete replacement burner instead of replacing individual parts. Once exposed to actual flame temperatures, burner castings harden and the removal and replacing of fasteners can be time consuming and difficult. Accessibility may also be severely limited requiring removal of complete assembly in any case.
- When necessary parts have been received, remove damaged mixing plates or burner sections, taking care not to damage remaining portion of burner. If new burner bodies are being installed, place body gasket on the mating flanges of loose cast iron bodies. (This is necessary to provide a gas-tight seal after assembly.) Insert new section into place, making sure that both flanges are square and flush, then bolt sections together.
- Install new mixing plates, back up bars and plate support brackets to the new body castings.
- If end plate sets must be installed, put in position between mixing plates and insert fasteners loosely. Do not tighten at this time.
- Tighten burner body bolts making sure that mating cast iron flanges remain square and flush.
- Align mixing plates and check that body gaskets are in position and properly aligned. Tighten all mixing plate mounting screws and bolts.
- Double check that all fasteners are secure.
- Return burner to operation, observing flame carefully at all firing rates.

Inspection and maintenance of gas ports

- Conduct initial inspection within the first month after commissioning. Visually check the gas ports of new burner assemblies for any piping scale or debris. Use pin vise with drill bit to remove.
- Annual inspections are normally adequate once the initial piping debris is removed. The operating conditions of the burner will determine how frequently maintenance is actually required.
- Use of an electric drill motor is not suggested unless both pin vise and drill (as shown below) can be chucked up in a vari-speed drill unit. Use caution, because it is easy to snap the bits off in a port when using a drill motor. Removal of broken bits from the gas ports is difficult.
- Contact your MAXON representative to answer questions or address any problems.

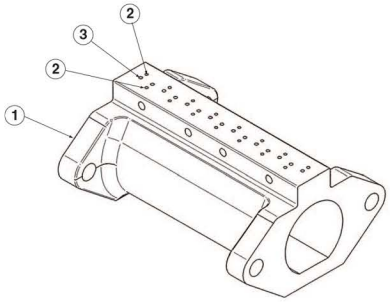
NP1-LE & NP2-LE AIRFLO® burner gas ports

1) Pin vise
2) 1 inch
3) NP-LE AIRFLO® burner body (mixing plates not shown)
4) Gas ports - all are #43 drill size (exception is several #47 holes at the intersection of 12x6 tee's and 36 BI's)
5) #47 holes here
6) #43 holes



NP2-LE AL AIRFLO® gas ports

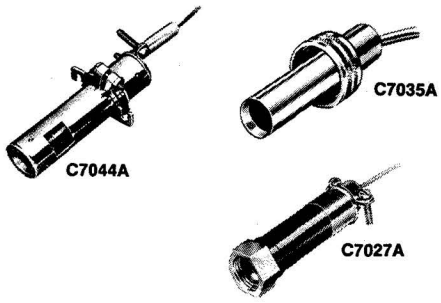
1) NP2-LE AL AIRFLO® burner body (mixing plates not shown)
2) Outside rows - #47 holes
3) Inside row - #43 holes



20.3 Honeywell UV Flame Detector

Honeywell

C7027A, C7035A, C7044A MINIPEEPER ULTRAVIOLET FLAME DETECTOR



THE **C7027A, C7035A,** AND **C7044A** DETECT ULTRAVIOLET RADIATION EMITTED FROM ALL FLAMES. THEY ARE USED WITH FLAME SAFEGUARD CONTROLS TO PROVIDE SUPERVISION FOR GAS, OIL, OR COMBINATION GAS-OIL BURNERS.

❑ **C7027A** ☐ **C7035A** ☐ **C7044A**

- The **C7027A, C7035A,** and **C7044A** are used with the following:
  - -Flame Safeguard Programmers/ Amplifiers
    R4126 and **R4127/R7255B**
    R4140/R7249A
    R4150/R7259A
    R4795/R7290
  - -Flame Safeguard Primary Controls/ Amplifiers
    R4075C,D,E/R7249A
    R4138C,D/R7249A
  - —**RA890G** Protectorelay Primary Control
  - —**R7023C** Flame Detector Relay.
- The **C7044A** is also used with the following 50' Hz Flame Safeguard Controls/ Amplifiers:
  R4341/R7323
  R4343/R7323
  R4344/R7323
- The **C7027A** mounts on a 1 /2 in. sighting pipe by means of an integral collar.
- The **C7035A** mounts on a 1 in. sighting pipe by means of an integral collar. A shield protects the sensing tube.
- The **C7035A** meets outdoor raintight requirements of Underwriters Laboratories Inc., NEMA 3, and NEMA 4.
- The **C7044A** mounts with a simple, l-screw bracket. Sensing tube enclosed in stainless steel housing.
- The **C7044A** is suitable for side or end viewing.
- Compact size makes the **C7027A** and **C7044A** particularly useful for blast tube mounting.
- Properly installed, the **C7027A** and **C7035A** are sealed against pressures as high as 5 psi **[34.5 kPa].**
- The **C7035A** ultraviolet sensing tube is field replaceable. The **C7027A** and **C7044A** sensing tubes are not field **replaceable—** use on an economical, throwaway basis.
- Two Minipeeper detectors can be wired in parallel for difficult sighting applications.

SPECIFICATIONS

STANDARD MODELS

C7027A MINIPEEPER ULTRAVIOLET FLAME DETECTOR
DETECTION: Detects ultraviolet radiation only.
AMBIENT OPERATING TEMPERATURE RATINGS: 0 F to +215 F [-18 C to +102 C], or -40 F to +215 F [−40 C to +102 C], depending on the model.
MAXIMUM PRESSURE RATING: 5 psi [34.5 kPa].
MOUNTING: Collar with standard 1/2 in. internal threads for mounting on a 1/2 in. sighting pipe.
WIRING CONNECTIONS: Two, 6 ft [1.83 m], color-coded, NEC Class 1 leadwires. (One model is available with 24 ft [7.32 m] leadwires.) Rear of detector has a clamp type connector for 1/2 in. flexible metallic conduit. (Models are available with 1/2 in. internally threaded spud connector instead of the clamp.)
DIMENSIONS: See Fig. 1.
REPLACEMENT PART: 129685 Flange Gasket NOTE: The UV sensing tube is not field replaceable.

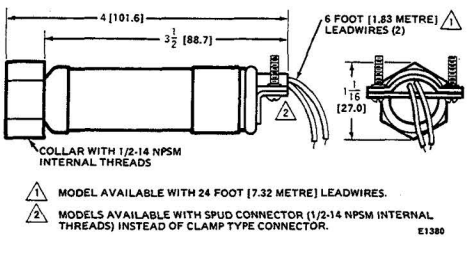


FIG. I- INSTALLATION DIMENSIONS OF THE **C7027A,** IN in. [mm IN BRACKETS].

C7035A MINIPEEPER ULTRAVIOLET FLAME DETECTOR
DETECTION: Detects ultraviolet radiation only.
AMBIENT OPERATING TEMPERATURE RATINGS: 0 F to 250 F [-18 C to +121 C], or -40 F to +250 F [−40 C to +121 Cl, depending on the model.
MAXIMUM PRESSURE RATING: 5 psi [34.5 kPa].
MOUNTING: Collarwith standard 1 in. internal threadsfor mounting on a 1 in. sighting pipe. (The DIN approved C7035A1064 has l-1 1 BSP.P1 threads.)
WIRING CONNECTIONS: Two, 6 ft [1.83 m], color-coded, NEC Class 1 leadwires. (One model is available with leadwires rated for 400 F [204.4 C], and one model is available with 12 ft [3.66 m] leadwires.) Rear of detector has 1/2-14 NPSM internal threads for connecting to a conduit. (The DIN approved C7035A1064 has 1/2-14 BSP-F threads.)
DIMENSIONS: See Fig. 2.
WEIGHT: 6 oz [0.17 kg].
REPLACEMENT PARTS:
129808 Flange Gasket.
129464M Ultraviolet Sensing Tube, 0 F to250 F [−18 C to+121 C].
129464N Ultraviolet Sensing Tube, -40 F to +250 F [-40 C to +121 C].

C7027A AND **C7035A**
APPROVALS:
UNDERWRITERS LABORATORIES INC. LISTED: File No. MP268; Guide No. MCCZ.
CANADIAN STANDARDS ASSOCIATION CERTIFIED: File No. LR1620; Guide No. 140-A-2.
FACTORY MUTUAL APPROVED.
DIN APPROVED MODELS: C7027A1056, C7035A1049, and C7035A1064.

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20.4 Honeywell UV Flame Detector (Continued)

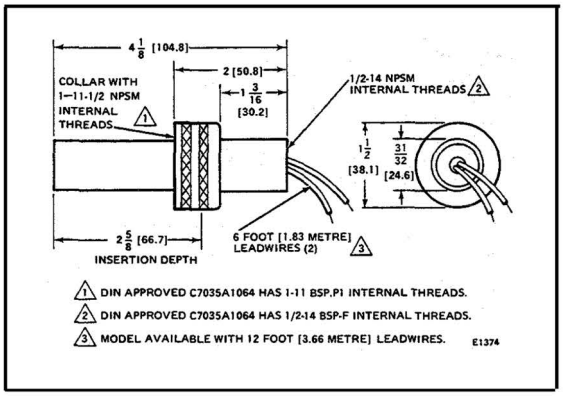


FIG. 2— INSTALLATION DIMENSIONS OF THE C7035A, IN in. [mm IN BRACKETS].

C7044A MINIPEEPER ULTRAVIOLET FLAME DETECTOR

DETECTION: Detects ultraviolet radiation only. Housing has 2 openings to permit viewing from either its end or its side. Side viewing is 1/ 8 as sensitive as end viewing.

AMBIENT OPERATING TEMPERATURE RATINGS: 0 F to 215 F [–18 c to +102 C].

MOUNTING: Bracket (included in 4074 BVK Bag Assembly), secured by two 8-32 RHIS (European M-4) screws (not included).

WIRING CONNECTIONS: Two, 6 ft [1.83 m], color-coded, NEC Class 1 leadwires. Rear of detector has a clamp type connector for 1/2 inch flexible metallic conduit.

DIMENSIONS: See Fig. 3.

WEIGHT: 10 oz [0.28 kg].

TABLE I-FLAME SIGNAL

FLAME DETECTOR	PLUG-IN FLAME SIGNAL AMPLIFIER (purple)	FLAME SAFEGUARD CONTROL(S)	MINIMUM ACCEPTABLE STEADY CURRENT (microamp)	MAXIMUM CURRENT EXPECTED (microamp)
C7027A C7035A, or C7044A	R7249A	R4075C,D,E; R4138C,D; R4140	3-1/2	7-1/2
	R7255B	R4126, R4127	4	a
	R7259A	R4150	4	a
	R7290A	R4795A.D	I-112	2-114
	None	RA890G, R7023C	1-1/2	2-1/4

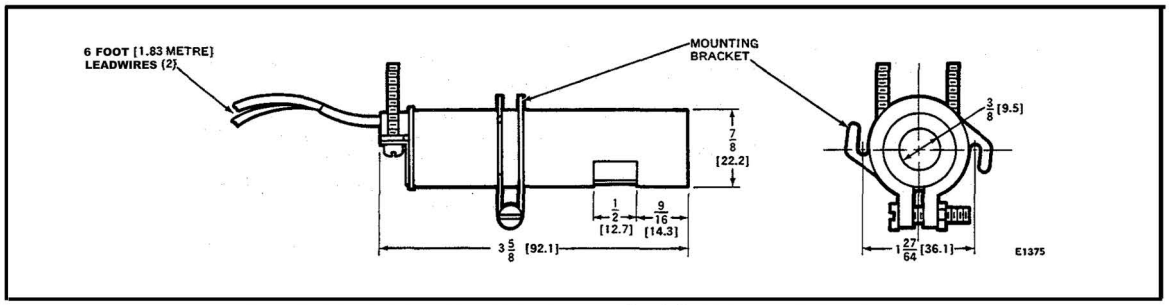
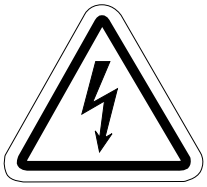


FIG. 3-INSTALLATION DIMENSIONS OF THE C7044A, IN in. [mm IN BRACKETS].

SECTION 21: START-UP PROCEDURES

⚠ DANGER	
	
Electrical Shock Hazard **Disconnect electric before service.** **More than one disconnect switch may be required to disconnect electric from equipment.** **Equipment must be properly grounded.**	**Severe Injury Hazard** **Do not enter equipment while in operation.** **Equipment may start automatically.** **Do not operate with door open.** **Installation, operation and service must be done by a trained technician only.**
Failure to follow these instructions can result in death, electrical shock or injury.	

⚠ WARNING			
			
Explosion Hazard **Leak test all components of equipment gas piping before operation.** **Gas can leak if piping is not installed properly.** **Do not high pressure test gas piping with equipment connected.**	**Carbon Monoxide Hazard** **Do not recirculate air from the heated space over burner.** **Air supply to burner must be from outside.**	**Falling Hazard** **Use proper safety equipment and practices to avoid falling.** **Do not use any part of equipment as support.**	**Burn Hazard** **Allow equipment to cool before service.** **Internal components of equipment may still be hot after operation.**
Failure to follow these instructions can result in death, injury or property damage.			

Installation Code and Annual Inspections:
All installation and service of WEATHER-RITE™ equipment must be performed by a contractor qualified in the installation and service of equipment sold and supplied by Weather-Rite LLC and conform to all requirements set forth in the WEATHER-RITE™ manuals and all applicable governmental authorities pertaining to the installation, service, labeling and operation of the equipment.
To help facilitate optimum performance and safety, Weather-Rite LLC recommends that a qualified contractor conduct, at a minimum, annual inspections of your WEATHER-RITE™ equipment and perform service where necessary, using only replacement parts sold and supplied by Weather-Rite LLC.

Check installation site to ensure all codes and engineering specifications are correct. This section of the manual is intended to be used as an instructional guide to the commissioning of the direct fired air handler. Fill out the start up sheet located at the back of the manual as each step of the procedure is performed. This procedure must be completed by the commissioning contractor and returned to Weather-Rite LLC. If the document is not returned, the manufacturing date will be used as the warranty start date.
All components have been checked at initial factory startup. During transit components may have loosened/shifted, check all wiring before initial startup.

21.1 Installation of Recirculating Air Handler

Every direct-fired air handler which recirculates room air (i.e., AM and FR styles) must utilize either a control system which limits temperature rise in proportion to the amount of outdoor air, or a room carbon dioxide sensor, installed per the manufacturer's recommendations. The normally-closed contacts of this sensor must be wired in as per the CO_2 interlock diagram, maintaining the room concentration of CO_2 below 5,000 ppm. Select the CO_2 interlock diagram based on air handler configuration and model. *See Page 78, Figure* .

With the AM and VAV package, a temperature rise limiting resistor comes prewired. When the air handler goes into full recirculation, the resistor is activated, lowering the maximum temperature rise to comply with government standards. For the FR package, the gas valve is preset to the proper temperature rise. *See Page 126, Table 38*.

21.2 Mechanical

This piece of equipment requires at least 4 CFM (6.8m³/h) of outside air per 1,000 Btu/h (0.293 kW).

Before installation, check that the local distribution condition, nature of gas and pressure, and the current state of adjustment of the equipment are compatible.

If filters are not installed (via inlet hood or filter section), an air strainer must be installed on the inlet of the air handler with openings less than or equal to 5/8" (16 mm) in diameter.

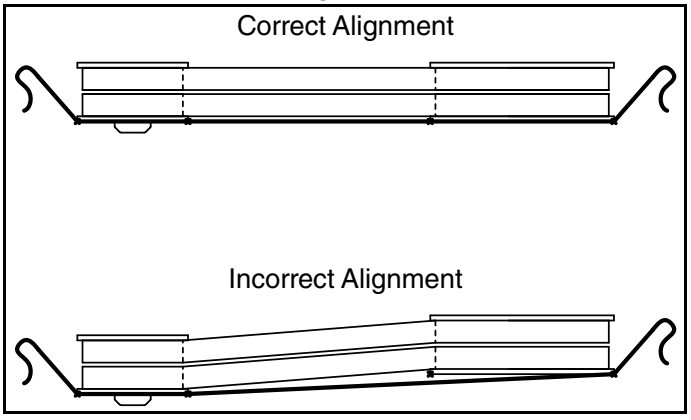
Air inlets must be installed with the lowest edge 19" (500 mm) above any surface. This applies to roof curbs, upright stands and suspended air handlers.

21.2.1 Sheave Alignment

Sheaves are factory aligned. On all air handlers, check sheave alignment as follows.

1. Attach a string to the vertical surface next to the blower shaft bearing. (*See Page 122, Figure 74*)
2. Wrap the string around the blower sheave and across both sheave surfaces as shown.
3. Adjust until all four contact points (triangle) touch the sheave surfaces. "IN" or "OUT" adjustment of the motor sheave and/or motor adjustment may be required.
4. Pull the string away from the motor sheave and then move it slowly back towards the sheave, making sure the string remains straight while touching all contact points.
5. Remove string before turning air handler on.

FIGURE 74: Sheave Alignment



21.2.2 Belt Tension

- Belt tension should be checked with a belt-tension gauge when one is available. Follow the belt tension gauge instructions.
- When a tension gauge is not available, measure the belt span of the belts (*See Page 123, Figure 75*).
- Allow for 1/64" (0.40 cm) of deflection for each inch of center distance length for the charted pounds of force. Check *Page 123, Table 34* for proper deflection force.
    - EXAMPLE: A 40" (101.6 cm) shaft center distance would dictate 40"/64" or 5/8" (1.59 cm) of deflection. With a standard B-belt and a motor sheave measuring between 5.8" (14.7 cm) and 8.6" (21.84 cm), the belt will have proper tension if a 5/8" deflection can be achieved with a minimum of 6-3/8 lbs. and a maximum of 8-3/4 lbs. of pressure as measured with a belt tensioning gauge.

FIGURE 75: Belt Tension

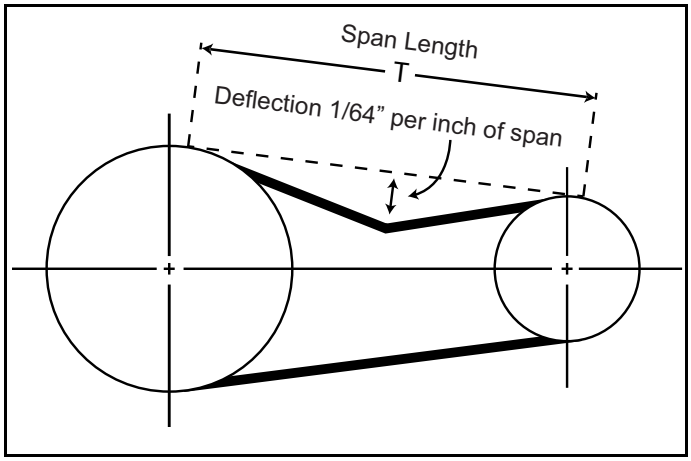


Table 34: Deflection Force B and BX Belts (in lbs)

Belt Cross-Section	Motor Sheave Dimension Range in - cm	TYPE B		TYPE B-X (High HP)	
		Min.	Max.	Min.	Max.
B	3.4-4.2	4	5 1/2	5 3/4	8
	4.4-5.6	5 1/8	7 1/8	6 1/2	9 1/8
	5.8-8.6	6 3/8	8 3/4	7 3/8	10 1/8

NOTE: If drive belts squeal during start-up, increase belt tension to the highest allowed value. Re-check tension during each inspection. See Page 129, Section 22 for additional information.

21.2.3 Air Temperature Sensing

The sensing probe is factory mounted in the blower housing (Not included if customer orders BMS-ready).

21.3 Electrical

1. Check motor starter for proper overload settings. The overload setting should meet full load amps (FLA) of motor.
2. Measure the supply voltage with the air handler off and then on. For a system that is powered with three phase power, measure the voltage of each phase.
3. Verify correct blower rotation.
4. While the blower is running and the burner is off, measure the total system current draw with an ammeter. Measure the system current draw again after the burner adjustments are made and with the burner and blower both on.
5. If applicable, compare all variable frequency drive (VFD) programming parameters with specifications provided on electrical drawing.

21.4 Airflow

The air flow switches are factory calibrated safety devices for burner air flow. If an air flow switch does not close, the problem may not be the air flow switch. It could be an indication of an air flow problem (incorrect blower rotation, duct restrictions, etc.).

21.4.1 Differential Pressure

In order to verify proper airflow across the burner, the differential pressure across the profile plate needs to be measured. Attach a manometer to the pressure test ports where the pressure switch is attached and measure the differential pressure with a manometer. This reading must be 0.9 in wc +/- 0.1 in wc. (2.24 mbar +/- 0.25 mbar)

To adjust the differential pressure that was measured in the step above, use the adjustable sheave. To decrease the speed of the blower and the differential pressure, turn the adjustable half of the sheave outward (decrease diameter). To increase the speed of the blower and the differential pressure measured at the burner, rotate the adjustable half of the sheave inward (increase diameter). Both sides of the sheave must be turned equal, multiple grooves must be adjusted equal.

After any adjustment, it is necessary to re-check the alignment, belt tensions and verify that all sheave set screws are tightened to the specified torque value before engaging the blower. *See Page 124, Table 35 and Table 36*. Typically, all sheaves have two set screws to secure the sheave to the motor shaft. Some sheaves may be press fit onto the motor shaft. On the two belt sheaves, there are four setscrews that hold the size adjustment. On the single belt sheaves, there are two set screws to hold the size

adjustment.

Table 35: Motor Sheave Drive Torque Specifications

Setscrew Size	Allen Wrench	Torque Settings	
		in•Lbs	ft•Lbs
1/4"	1/8"	87	7.3
5/16"	5/32"	120	10.0
3/8"	3/16"	290	24.2

Table 36: Motor and Blower Bushing Torque Specifications

Bolt Size (on Bushing)	Torque Settings	
	in•Lbs	ft•Lbs
#10	60	5
1/4"	108	9
5/16"	192	16
3/8"	360	30
1/2"	720	60

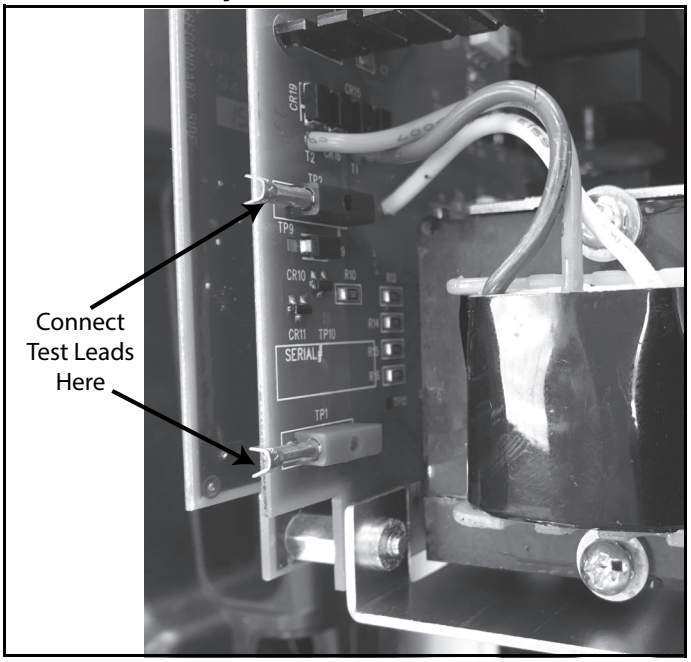
21.4.2 Burner Pressure

1. A pressure tap is used to measure differential at the burner and to set high fire gas pressure. The pressure tap could be located on the downstream side of the MR212 valve, on a T-fitting coming off the outlet pressure tap on the MR212 valve or between the MR212 valve and the burner. *See Page 71 through Page 73*, *Figures 55 - Figure 57 and Page 127, Figure 77*.
2. Measure the burner pressure with the inlet manual gas valve off.
   - Open the manual shut off located between the modulating valve and the burner.
   - Turn the blower on and record the negative pressure on a u-tube manometer or gas pressure gauge. This reading is used for high fire burner pressure adjustment.
3. After taking the burner pressure reading, temporarily leave the manometer attached to the 1/8" tap. It will be used later to check high fire gas pressure.

21.5 Gas Piping and Initial Pressure Settings

1. Perform a pressure test on all gas supply lines to the air handler per applicable codes. **Make sure to isolate all gas controls before pressure testing the system.**
2. Verify supply pressure does not exceed maximum rated gas pressure as stated on the rating plate.
3. Set the supply gas pressure at the step down regulator (normally outside of the enclosure if one is installed) according to the nameplate rating inlet gas pressure specifications.
4. Only after performing steps 1-3 (above), verify pilot pressure.
   - Place a u-tube manometer or gas pressure gauge on the tee at the downstream side of the pilot pressure regulator.
   - Open the main gas valve and close the gas valve downstream of the MR valve.
   - Set the burner switch to "on" and adjust the pilot pressure regulator to 1.0 in wc for natural gas or 0.5 in wc for LPG.
   - Verify that the burner flame control has a flame signal of 6-8 Vdc. *See Page 124, Figure 76*.

FIGURE 76: Fireye Flame Module



5. Adjust air handler high fire gas pressure.
   - Determine the high fire gas pressure by adding the manifold pressure for maximum input (from the rating plate) and the burner negative pressure (from the measurement made in the burner pressure section of this procedure). Record this value for use in adjustment step.

For example:

Differential pressure= -1.0 in wc

Maximum manifold pressure (from rating plate)= 2.0 in wc

High fire gas pressure= 2.0 + (-1.0) in wc

High fire gas pressure= 1.0 in wc

   - Force the burner into high fire. Refer to the burner mode setting chart *on Page 125, Table 37*, for the specific amplifier and action
   - Set the pressure at the burner side of the modulating valve to the calculated value (from the begining of this step), by removing high fire adjustment cap and rotating the regulator adjustment screw. A clockwise rotation increases manifold pressure. Temperature rise should not exceed maximum as listed *on Page 126,Table 38*. For under a million BTU input, the high fire gas pressure is set by adjusting the regulator upstream of the M611 valve. *See Page 128, Figure 79*.
   - Reconnect any wires that were used for adjustment.
6. Adjust recirculating mode or reduced air volume high fire gas pressure
   - This adjustment is required for and only applies to AM and VAV style units.
   - Force the unit into high fire and maximum recirculation for AM style or minimum air volume for VAV style. Refer to the burner mode setting chart *on Page 125,Table 37* for specific amplifier and action required to place it into high fire.
   - Measure the recirculation temperature rise and compare it to *Page 126,Table 38*.
   - The resistor on the reduced flow switch (mounted inside the control enclosure) may need adjustment until recirculation temperature rise is obtained.
   - Return unit to normal operating conditions.
   - Reconnect any wires that were removed for adjustment.
7. Maximum discharge temperature is 160° F (71° C) for models approved to Z83.4 and Z83.18 (see ETL Standard). For models approved Z83.25 (see ETL Standard), the maximum discharge temperature is 200° F (93° C).
8. Low fire adjustment
   - **NOTE:** High fire gas pressure must be set BEFORE adjusting low fire. There are three critical items to consider before adjusting low fire:
     A. Low fire adjustment does not regulate gas pressure.
     B. If the low fire adjustment screw is set to maximum, high fire regulation problems will occur.
     C. The burner control system must be forced into low fire per the "Burner Mode by Amplifier Type" table. *See Page 125, Table 37*.
   - Low fire is set at the MR212 valve using the adjustment screw under the low fire adjustment cap screw (loosen locking screw before adjustment), *See Page 127, Figure 77*, or on the M611 valve using the brass adjusting screw on the front side, *See Page 129, Figure 22*. The burner must be forced into low fire first. Then rotate the adjustment screw until there is a continuous blue ribbon across the entire burner. A counter clockwise rotation increases the flame size. Low fire temperature rise must not exceed 12° F (7° C). Tighten locking screw when finished.
   - Reconnect any wires that were removed for adjustment.
9. Once gas pressure and high/low fire adjustments are made, the gas setup is completed. All taps and instruments must be removed and all caps and plugs must be replaced.

Table 37: Burner Mode by Amplifier Type

Amplifier Type	High Fire Mode	Low Fire Mode
Series 14	Remove wire from terminal #4 on the amplifier	Remove wire from terminal #8 on the amplifier
Series 44	Remove wires from terminals #2 and #4 on the amplifier	Remove from terminal #9 on the amplifier

SC11 Signal Conditioner	Set BMS to max fire or remove input wires from terminals #6 and #5 and connect a 9VDC battery to the signal conditioner	Remove from terminal #1 on the signal conditioner
Series 94	Disconnect selector ribbon cable from the amplifier.	Remove wire from terminal #2 on the amplifier
Series MP2	Set system to maximum temperature	Remove wire from terminal #2 on the amplifer

21.6 Safety Shut Off Valve Check

After the initial start up and gas pressure adjustment, verify gas soundness of each SSOV (Safety Shut Off Valve). This check must be repeated after the first 100 hours of operation.

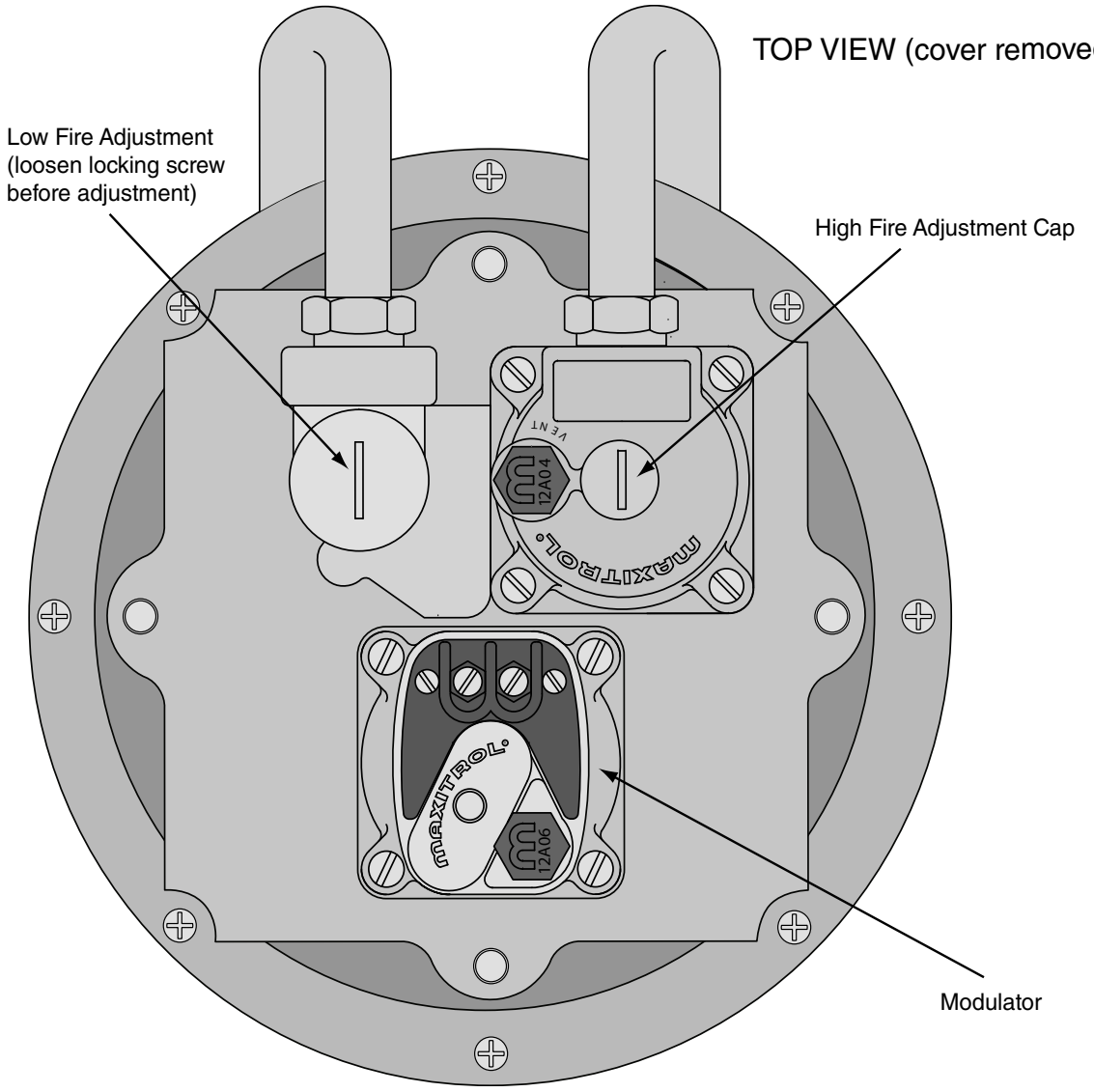
21.7 Temperature Control System Calibration

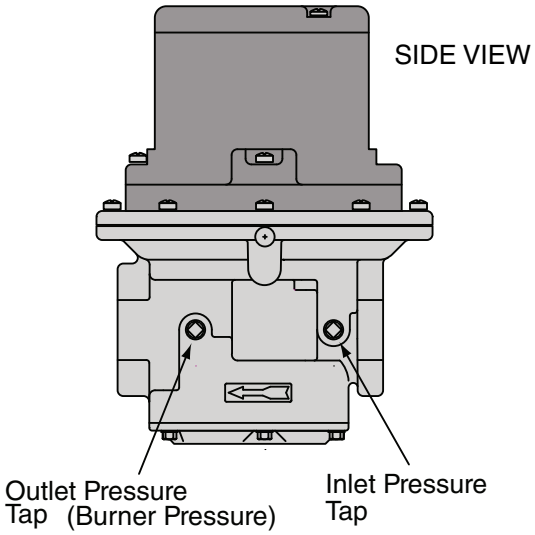
The temperature control system components are factory calibrated to a base resistance so that component replacement will not upset the system calibration. If the temperature control system should require field calibration, refer to the provided temperature control amplifier product information sheet.

Table 38: Maximum Temperature Rise

Model	Natural Gas		LPG	
	°F	°C	°F	°C
2005	90	50	80	44.5
2010 - 2030	110	61.1	90	50

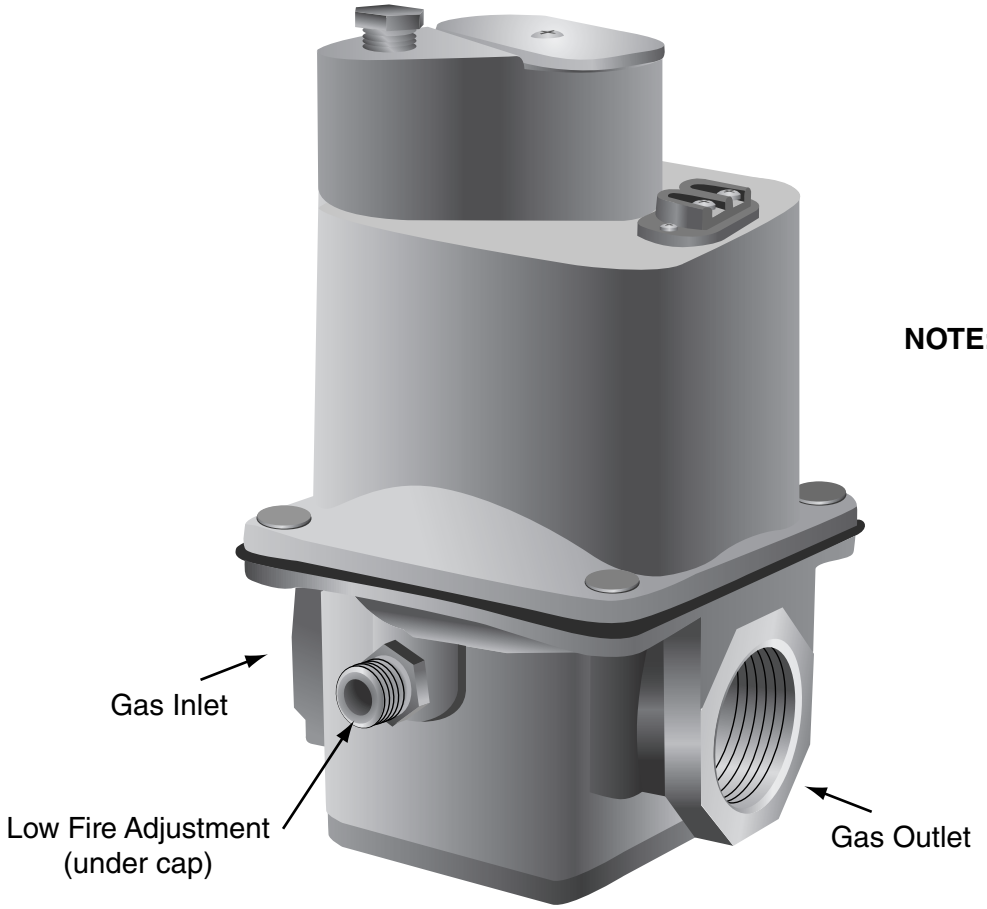
FIGURE 77: MR 212 Valve





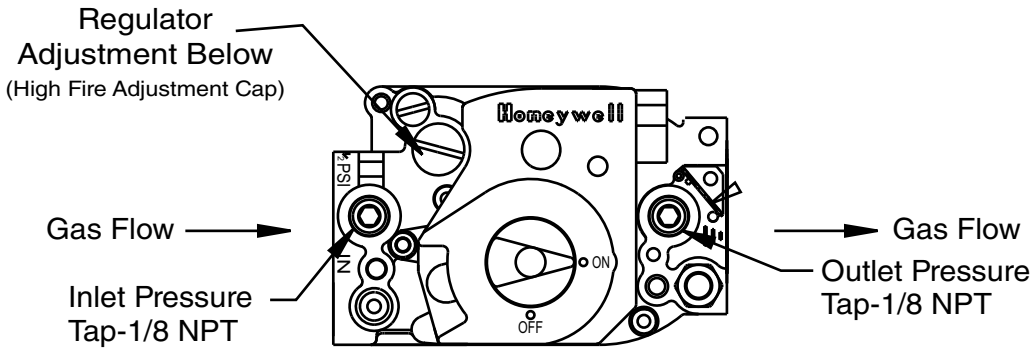
NOTE: For high fire adjustment, turn clockwise to increase manifold pressure; turn counter clockwise to decrease manifold pressure.

FIGURE 78: M611 Valve



NOTE: Modulating only.

FIGURE 79: Regulator (2005)



SECTION 22: MAINTENANCE

⚠ DANGER	
	
Electrical Shock Hazard **Disconnect electric before service.** **More than one disconnect switch may be required to disconnect electric from equipment.** **Equipment must be properly grounded.**	**Severe Injury Hazard** **Do not enter equipment while in operation.** **Equipment may start automatically.** **Do not operate with door open.** **Installation, operation and service must be done by a trained technician only.**
Failure to follow these instructions can result in death, injury or property damage.	

⚠ WARNING		
		
Explosion Hazard **Leak test all components of equipment gas piping before operation.** **Gas can leak if piping is not installed properly.** **Do not high pressure test gas piping with equipment connected.**	**Falling Hazard** **Use proper safety equipment and practices to avoid falling.** **Do not use any part of equipment as support.**	**Burn Hazard** **Allow equipment to cool before service.** **Internal components of equipment may still be hot after operation.**
Failure to follow these instructions can result in death, injury or property damage.		

Prior to any maintenance or service of the air handler, shut off, lockout and tagout the electrical disconnect and gas valve that supplies the unit in accordance with OSHA regulations and allow ample time for the air handler to cool. After maintenance is performed or air handler is serviced, the air handler shall be re-commissioned to the start-up procedure as outlined on *Page 121, Section 21*.

Installation Code and Annual Inspections:
All installation and service of WEATHER-RITE™ equipment must be performed by a contractor qualified in the installation and service of equipment sold and supplied by Weather-Rite LLC and conform to all requirements set forth in the WEATHER-RITE™ manuals and all applicable governmental authorities pertaining to the installation, service and operation and labeling of the equipment.
To help facilitate optimum performance and safety, Weather-Rite LLC recommends that a qualified contractor conduct, at a minimum, annual inspections of your WEATHER-RITE™ equipment and perform service where necessary, using only replacement parts sold and supplied by Weather-Rite LLC.

22.1 General

First 8 Hours of Operation	Check belts and adjust as required (*See Page 123, Section 21.2.2*). Though belts were properly adjusted at the factory, they will stretch after the first few hours of operation.
First 100 Hours of Operation	Re-check belt tension and adjust if necessary.
Annual Fall Start-Up	Follow entire start-up procedure at this time and check control settings and operation. *See Page 121, Section 21*.

22.2 Unit Exterior

Cabinet Exterior	After installation, touch up scratches. Periodic painting should be done thereafter as required. The caulk around weather enclosures and over field joints should be inspected annually. Re-apply caulk as needed to maintain integrity. Warning labels and logo labels should be legible and accurate. Please contact Weather-Rite LLC or WEATHER-RITE™ independent distributor if you need replacement warning labels or logo labels.
Unit Location	Verify that no flammable objects, liquids or vapors are present near the air handler. Do not hang anything from or place anything on the air handler. Keep the area under and around the air handler free of all objects. *See Page 8, Section 3* for Clearances to Combustibles.

22.3 Blower Section

Blower Wheel	Inspect blower wheel and clean as necessary. A small build up of dust can cause a significant decrease in blower performance. Check for excessive vibration, repair as required. Critical labels are located on or near the blower housing. Contact Weather-Rite LLC or WEATHER-RITE™ independent distributor if you need replacement labels.

Drive Belts and Sheaves

Check for belt ride in the groove. In multiple groove drives, belt ride should be uniform. Check groove wear area for wear. Side wall of groove should be straight, not dished out. Bottom of groove should show no signs of belt contact.

Sheave alignment, set screw torque and belt tension should be checked after 8, 24, and 100 hours of initial start-up. Visually inspect belts and sheaves for excessive wear. If belts have a slick, glazed look, the belts are slipping. Check drive capacity and belt tension. Never replace only one belt in a used set, as used belts will elongate. Replace the entire set if replacement is necessary.

See Page 122, Section 21.2.1 and Page 123, Section 21.2.2.

Blower Bearing Lubrication

Blowers with spider bracket bearings are pre-lubricated and do not require any re-lubrication during their entire service life. Blowers that use pillow block bearings; should be re-lubricated per the chart below. The recommended lubricant is Shell Alvania #2 or S3 grease. To re-lubricate the blower pillow block bearings, be sure that the grease fittings on the bearing housing (or air handler cabinet wall in the case of extended grease lines) are clean. Apply the recommended grease to the fitting with a low-pressure grease gun and add slowly while the shaft is spun by hand. Do not over-grease. Over-greasing will reduce the service life of the bearings. Consult the blower manufacturer for grease capacity recommendations as capacities vary by model.

Lubrication Schedule			
Use a No.2 Lithium complex base grease or equivalent			
Hours Run Per Day	Suggested Lubrication Period in Weeks		
	251 to 500 RPM	501 to 750 RPM	751 to 1000 RPM
8	12	10	7
16	7	5	4

22.4 Manifold and Controls

Manifold	Periodically check gas control assembly and internal and external piping for leaks. Relief vent lines to outdoors on gas controls should be checked to ensure against blockage caused by insects or any other substance. Clean as required. All gas piping to the air handler must comply with the National Fuel Gas Code - NFPA54, latest edition and all local codes. Verify gas soundness of each SSOV (Safety Shut Off Valve). This test must be repeated after the first 100 hours of operation. *See Page 71 through Page 73*, *Figures 55 - Figure 57*
Air Flow Switch	An annual check of the tubes attached to the air flow switch should be made to ensure against blockage caused by insects or any other substance. Clean as required. *See Page 123, Section 21.4*.
Electric Components	Check for physical damage on any of the electric components and verify all electrical connections are secure. Ensure equipment is properly grounded.
Temperature Sensors	Calibrate space, outdoor air, and discharge air sensors as required. *See Page 123, Section 21.2.3*.

22.5 Burner

An annual inspection of the burner and components must be made to ensure proper and safe operation. For the most part, the burner is self cleaning. However, if the application is extremely dirty or dusty, it may become necessary to periodically clean the burner. Inspect and clean the burner in accordance with the following recommended procedures:

1. To avoid damaging the valves, disconnect the burner piping from the manifold, at the union, and cover the exposed end of the manifold. *See Page 71 through Page 73*, *Figures 55 - Figure 57*
2. Remove the pilot assembly. *See Page 78, Section 19.6.4*.
3. Remove the ignition cable from the igniter on the side of the burner, and then remove the spark igniter. Clean the igniter contacts with a wire brush. Set the gap to 0.125" (3.17 mm).
4. Inspect each of the stainless steel mixing plates to see that all of the air holes are free of debris. Clean with a wire brush as necessary.
5. The burner orifices may need to be drilled to unplug any closed orifices. Use a pin vise with the appropriate drill to clean debris from the orifices. An electric drill is not suggested because it is easy to snap drill bits off in the orifices.
6. Reinstall the pilot assembly. Reconnect the burner piping to the manifold at the union.

Motors

Inspection:

1. Inspect motor every 3 months or 500 hours of operation, which ever occurs first. Keep the motor clean and vent openings clear.

Lubrication:

1. Motors with grease fittings must be lubricated based on the table below.

Table 39: Motor Lubrication Intervals

NEMA Frame Size (Motor HP)	Rated at 1800 RPM
Up to 210 incl. (3 - 5 HP)	6,000 hrs
Over 210 to 280 incl. (7.5 - 20 HP)	4,750 hrs
Over 280 to 360 incl. (25 - 30 HP)	3,700 hrs

NOTE: *These intervals are based on severe duty. Over lubricating bearings could result in reduced motor life.*

2. A high grade ball or roller bearing grease must be used. Recommended grease for standard service is Polyrex EM (Exxon Mobil). Other compatible greases include; Texaco Polystar, Rykon Premium #2, Pennzoil Pen 2 Lube and Chevron SRI.
3. Motors without grease fittings are sealed for life and do not require re-lubrication.

Instructions for Lubricating

Before greasing, be sure fittings are clean and free from dirt. Remove grease relief plug or plate and, using a low-pressure grease gun, pump in the required grease. Do not overgrease. Overgreasing will reduce the service life of the motor. Consult the motor manufacturer for grease capacity recommendations as capacities vary by motor. Relubrication intervals are specified in the table above. After relubricating, allow motor to run for 10 minutes before replacing relief hardware.

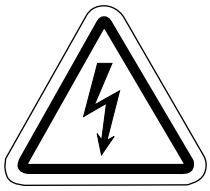
NOTE: In general it is not recommended to mix greases of different brands. The mixing of different types of thickeners may destroy the composition and physical properties of the grease. In the event that a different grease is required by the end user, the following steps can be taken. Using the instructions for lubrication, open grease outlet and purge the system as much as possible of the old or unwanted grease. Repeat this same operation after 1 week of service. Consult Weather-Rite LLC or the motor manufacturer for further recommendations on grease compatibility.

22.6 Optional Equipment

Dampers	Check linkage when applicable and tighten set screws as required. All moving parts of dampers should be cleaned and then thoroughly lubricated with a light molybdenum oil in aerosol can. Dampers furnished with stainless steel side seals should also have the seals lubricated generously. Dampers should then be manually operated several times until linkages and blades operate freely. Reconnect linkages and check dampers for proper operation. *See Page 93, Figure 68*.
Filters	Filters should be checked for dirt restriction on a monthly basis (or as required). Replace filters with filters of equal specification when they appear dirty. **NOTE:** When using Weather-Rite LLC supplied disposable polyester filters, they must be inserted with the white media side facing the inlet of filter section. When using Weather-Rite LLC supplied permanent aluminum mesh or disposable filters, they must be inserted with the arrow on the filter pointing in the direction of airflow (toward the air handler) and (for disposable pleated types) have the pleats oriented with the air flow. Aligning the pleats parallel to the support rails greatly increases the chances of pull through as the filter loads up with dirt. See inlet hood or filter section for filters. *See Page 51, Section 11 and See Page 53, Figure 41*

SECTION 23: REPLACEMENT PARTS

⚠ DANGER | **⚠ AVERTISSEMENT**




Risque de choc électrique	Risque d'explosion	Risque d'incendie	Risque de présence de monoxyde de carbone

Utiliser uniquement des pièces de rechange WEATHER-RITE™ authentiques comme indiqué dans ce manuel d'installation, d'utilisation et d'entretien.

Le non respect de ces instructions peut entraîner la mort, un choc électrique, des blessures corporelles ou des dommages matériels.

⚠ WARNING

Severe Injury Hazard

Use proper lifting practices and equipment.

Equipment and accessories are heavy.

Failure to follow these instructions can result in death, injury or property damage.

⚠ WARNING

Cut/Pinch Hazard

Wear protective gear during installation, operation and service.

Edges are sharp.

Failure to follow these instructions can result in injury.

A list of replacement parts specific to your air handler is / was included in the customer support documentation which accompanied your air handler. For your convenience, when ordering any replacement parts, please refer to that list for factory part numbers.

SECTION 24: TROUBLESHOOTING

⚠ DANGER

	
Electrical Shock Hazard	**Severe Injury Hazard**
Disconnect electric before service. **More than one disconnect switch may be required to disconnect electric from equipment.** **Equipment must be properly grounded.**	**Do not enter equipment while in operation.** **Equipment may start automatically.** **Do not operate with door open.** **Installation, operation and service must be done by a trained technician only.**

Failure to follow these instructions can result in death, electrical shock or injury.

⚠ WARNING

				
Explosion Hazard	**Fire Hazard**	**Falling Hazard**	**Burn Hazard**	**Cut/Pinch Hazard**
Turn off gas supply to equipment before service.	**Keep all flammable objects, liquids and vapors the minimum required clearances to combustibles away from equipment.** **Some objects will catch fire or explode when placed close to equipment.**	**Use proper safety equipment and practices to avoid falling.** **Do not use any part of equipment as support.**	**Allow equipment to cool before service.** **Internal components of equipment may still be hot after operation.**	**Wear protective gear during installation, operation and service.** **Edges are sharp.**

Failure to follow these instructions can result in death, injury or property damage.

24.1 Initial Checks

When encountering any abnormal operation or fault conditions of the equipment, all troubleshooting should start with the following initial checks. If a problem is discovered in these initial checks it must be corrected before moving on in the trouble shooting.

1. Compare voltage and phase of supply power on site with rating plate information.
2. Review wiring between remote panel and control panel. Do the electrical connections match the supplied wiring diagram?
3. Compare gas type and supply pressure on site with rating plate information.
4. Check for proper blower rotation on air handler and any exhaust blowers.
   - Blowers powered with a three phase motor can be reversed by swapping any two incoming power legs. For blowers powered by a single phase motor refer to the motor rating plate for reversing instructions.

24.2 Motor and Blower

PROBLEM	POSSIBLE CAUSE	SOLUTION
Motor does not operate	Main disconnect switch is OFF	Turn disconnect to ON
	Blown fuse(s) in disconnect	Replace fuse(s)
	Blown fuse(s)/breaker tripped in control transformer	Replace fuse(s)/reset breaker (with disconnect off)
	Fan switch on	Check wiring between remote panel and air handler. Replace switch.
	Optional: Damper does not open	Check that damper is not obstructed Check that linkage is tight and secure Replace damper actuator
	Motor starter (contactor) does not operate.	Replace starter
	Tripped motor overload. Power out to MUA motor when motor starter is energized?	Reset Check for proper FLA setting Replace overload If applicable: Tighten screws on heater packs or overload.
	Optional: Low limit switch set to high	Re-adjust low limit switch setting
Blower does not operate	Belts broken or loose?	Replace/tighten belts
	Loose motor or blower sheaves (pulleys)	Reinstall and properly torque set-screws
	Blower bearings, do they turn freely?	Replace bearing(s)

24.3 Burner

PROBLEM	POSSIBLE CAUSE	SOLUTION
Flame control does not try for ignition	Auxiliary contact not closed.	Properly mount contact or replace
	Burner/winter switch closed?	Replace switch
	High temp limit switch tripped?	Manually reset or replace
	Low airflow pressure switch contacts not made.	Check blower operation Reconnect tubes to pressure switch Clean pressure test tubes Check filters/duct work for restrictions
	High airflow pressure switch contacts not made.	Check blower FLA and compare to data plate. Cabinet pressure too high check system setup and for restrictions down stream of blower.
	Optional: Mild weather stat, dial set to low	Set dial higher Replace stat
	Optional: High gas pressure switch	Manual reset Verify gas pressure
	Optional: Low gas pressure switch	Manual reset Verify gas pressure
	Flame control defect	Replace
Burner Lockout	Failure to ignite pilot or main flame Flame control failure	Reset the flame control module at the unit and proceed to the next step, observing the unit to indicate at which step lockout condition occurs.
No PILOT flame	No spark	Check wiring from burner control to ignition transformer. Check high tension wire to spark plug. Replace ignition transformer.
	No gas	Open manual gas shut off valves. Check wiring from burner control to pilot gas valve. Verify inlet gas pressure. Adjust pilot gas pressure. Replace pilot gas valve. Check burner pilot opening for obstruction.
Pilot flame does not stay lit	Improper pilot gas pressure	Adjust pilot gas pressure.
	Flame rod does not detect flame, Is there 5VDC on Flame signal at flame safeguard?	Replace flame rod Replace flame rod
	Flame rod dirty	Clean flame rod

Burner (continued)

PROBLEM	POSSIBLE CAUSE	SOLUTION
No main flame	Manual shut off valve closed	Open manual shut off valve
	Safety Shut Off Valve not operating. Is there positive gas pressure downstream of SSOV?	Check wiring from burner control to SSOV Verify inlet gas pressure Replace SSOV
	Minimum gas supply pressure	Verify minimum gas supply pressure as per data plate is available
	Burner openings obstructed	Remove obstruction Clean burner orifices holes
	Improper burner lower fire adjustment on modulating valve	Adjust low fire as per the relevant Maxitrol temperature control instructions

24.4 Temperature Controls

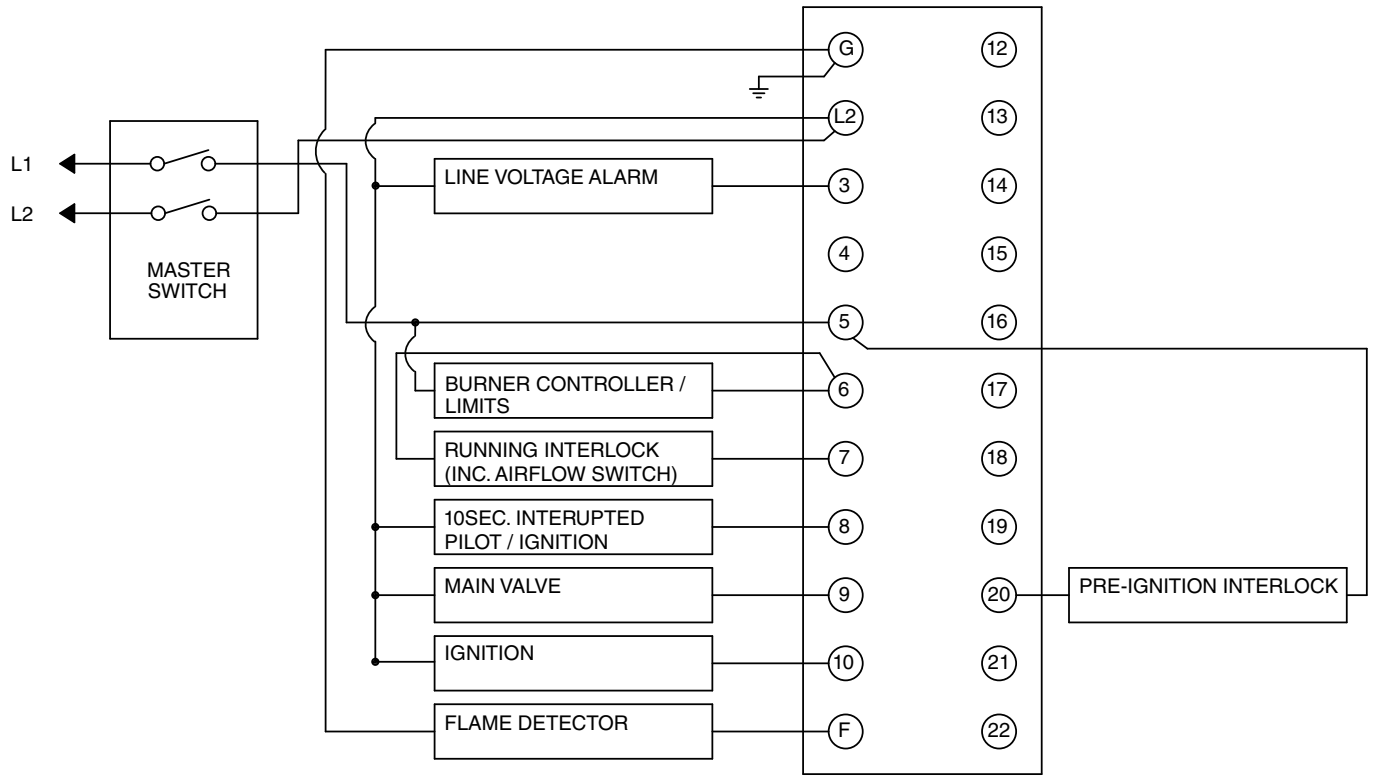
If temperature control problems occur and are not remidied in the troubleshooting procedure, refer to the trouble shooting table for the unit specific temperature control amplifier.
For units with the Maxitrol® series 14 temperature control amplifier, refer to the Field Service Check List for Series A1014 Amplifiers. Series 14 Amplifiers are supplied on units equipped with Basic and SDC style remote panels.
For units with the Maxitrol® series 44 temperature control amplifier, refer to the Field Service Check List for Series A 1044 Amplifiers. Series 44 Amplifiers are supplied on units equipped with DTC remote panels.
If problems persist after performing the troubleshooting procedure and the temperature control amplifier troubleshooting procedure contract the factory.

24.5 A1014 Amplifier - Field Checklist

SYMPTOM		POSSIBLE CAUSE
A.	No Gas Flow	1. Modulating valve improperly installed.
B.	Continuous Low Fire (electronics problem).	2. Short circuit or no voltage to the amplifier. 3. Open circuit in TD114. Remote Temperature Selector circuit or wiring. 4. Short circuit in TS114, Discharge Air Sensor circuit or wiring. 5. Faulty amplifier.
C.	Continuous Low Fire (electronics ok)	6. Short circuit or open circuit in Modulator Coil. 7. Plunger missing, jammed or improperly installed.
D.	Incorrect Minimum Fire Erratic or Pulsating Flame.	8. Incorrect by-pass metering valve adjustment. 9. Excessive negative burner pressure.
E.	Continuous High Fire (electronics problem).	10. Short circuit in TD114 Remote Temperature Selector circuit or wiring. 11. Open circuit in TS114/TS10765. Discharge or Inlet Air Sensor Circuit or wirir 12. Jumper not connected across amplifier terminals 2 and 3.
F.	Continuous High Fire (electronics ok).	13. Foreign object holding valve open. 14. Plunger jammed.
G.	Incorrect Maximum Fire.	15. Inlet pressure too low. 16. Incorrect outlet pressure adjustment of Pressure Regulator.
H.	Erratic or Pulsating Flame.	17. Hunting 18. Erratic air patterns or improper TS114 location. 19. Wiring is run next to high voltage switching circuits causing induced voltages 20. Faulty Amplifier or erratic voltage supply.
I.	Incorrect Discharge Air Temperature	21. Inlet Air Sensor is used. 22. Incorrect Wiring. 23. System out of calibration. 24. Improper TS114 location. 25. Room Override Thermostat circuit closed.
J.	Burned out Transformer.	26. Short circuit in modulator coil. 27. Short circuit between amplifier and modulator valve.
K.	Discharge Air Temperature too Low when T115 is Operative	28. Too low an Override Temperature setting. 29. Burner capacity may be insufficient.

FIELD TEST	REMEDY
1. Arrow on side of Valve should point in direction of gas flow.	1. Install properly.
2. Check for 24VAC at amplifier terminals 7 & 8. 3. Inspect for loose or broken wires between amplifier terminals 1 & 2, and TD114 terminals 1 & 2, and TD114 terminals 1 & 3. 4. Connect test resistor as described in Preliminary Circuit Analysis, in Maxitrol product information sheet. Follow procedure outlined. 5. Check items 2, 3, and 4.	2. Prove the power source. 3. Tighten connections or replace wiring. 4. If modulating voltages are obtained, Check TS114 circuit for sho Replace TS114 if necessary. 5. If items 2, 3, and 4 check out and modulating voltages are still n obtained, amplifier may be assumed faulty. Replace.
6. Measure resistance across modulator terminals with connecting wires detached. 7. Inspect. Plunger should be installed per diagrams in Maxitrol information sheet and operate freely in solenoid sleeve.	6. Replace modulator head if not approximately 45-55 ohms for M6 Valve and 60-80 ohms for MR212 Valve. 7. Clean or replace plunger if necessary. Install per Maxitrol produc information sheet.
8. See valve adjustments in Section 19.5. 9. Measure manifold pressure as outlined in Section 19.4.	8. Adjust to proper minimum fire. 9. If reading is greater than 1.0 in wc negative pressure, check for clogged filters or other inlet air restrictions. Consult factory for othe solutions.
10. Inspect for shorts at or between Amplifier terminals 1 & 2 or TD114 terminals 1 & 3. 11. Check TS114/TS10765 for open internal circuit. Connect test resistor as described in Preliminary Circuit Analysis, in Maxitrol product information sheet. Follow procedure outlined. 12. Inspect	10. Correct wiring if shorts exist. 11. If modulating voltages are obtained, check TS114/TS10765 for c circuits. Replace TS114/TS10765. 12. Correct the wiring.
13. Remove button plate and inspect valve and seat. 14. Inspect. Plunger should be smooth, clean, and operate freely in solenoid sleeve.	13. Clean seat. Clean valve or replace if necessary. 14. Clean, or if necessary, replace plunger.
15. Read pressure at inlet to modulating valve using a manometer with unit operating at full fire. Pressure should be equal to the sum of outlet pressure setting plus pressure drop of the valve (see Maxitrol capacity chart). 16. Read manifold pressure using manometer and compare with recommendation of equipment manufacturer.	15. Increase inlet pressure if possible. 16. See valve adjustments in Section 19.5.
17. Adjust sensitivity control counter-clockwise. 18. Connect test resistor as described in Preliminary Circuit Analysis, in Maxitrol product information sheet. Turn TD114 selector dial so heater goes through its entire modulating range. 19. Temporarily wire each of TD114, TS114, and MR212 externally and observe heater/equipment operation. 20. With test resistor connected (per item #18) and TD114 locally connected (per item #19), turn TD114 selector dial through entire modulating range. Observe D.C. voltage across modulator terminals.	17. If flame stabilizes, adjust sensitivity control to maintain an even flame. 18. If the flame is steady throughout the entire modulating range, th TS114 must be moved. 19. If smooth operation results, isolate effected wiring from source induced voltage. 20. If erratic or unstable DC voltages are obtained throughout the modulating range, the amplifier may be assumed faulty. Replace. I erratic operation is noted only over a small range of 2 or 3 volts, the age source may contain surges. Consult factory.
21. Inlet Air Sensor changes 1°, for each 3.5°, 5°, or 8° outside temperature change from 60° (pre-determined - turndown varies with model used). 22. Check wiring diagrams per maxitrol product.* 23. Sensed temperature (thermometer next to TS114) does not correspond to TD114 setting. 24. Sensed temperature (thermometer next to TS114) does not represent average discharge air temperature. 25. Remove Override Thermostat lead from terminal 2 of TD114. *information sheet	21. Sensed temperature will vary from TD114 dial settings. This is intentional. 22. Correct wiring. 23. See calibration procedure. 24. Move TS114 to location where average representative tempera can be sensed. 25. TD114 dial setting, then check thermostat setting and/or check ing for shorts.
26. Measure resistance across modulator terminals with red lead wires disconnected. 27. Inspect wiring.	26. Replace modulator head if less than 40 ohms. 27. Correct wiring if short is found.
28. Check “Override Temperature Selector” of TD114. 29. Check for high fire (Maximum manifold pressure specified for heater).	28. Reset to correct temperature. 29. If on high fire, control can do no more. Heater unable to furnish ditional heat to raise temperature.

FIGURE 80: RM7897C Flame Control



	Initiate (Initial Powerup only)	Standby	Prepurge (7 Sec)	Pilot Flame Establishing Period (10 Sec)	Main Flame Establishing Period	Run	Postpurge	Standby
LED Display	● Power ❍ ❍ ❍ ❍	● Power ❍ ❍ ❍ ❍	● Power ❍ Pilot ❍ Flame ❍ Main ❍ Alarm	● Power ● Pilot ● Flame ❍ Main ❍ Alarm	● Power ● Pilot ● Flame ● Main ❍ Alarm	● Power ❍ Pilot ● Flame ● Main ❍ Alarm	● Power ❍ ❍ ❍ ❍	● Power ❍ ❍ ❍ ❍
Burner			Burner/Blower Motor ⑤					
				⑩Ignition				
				Interrupt/Pilot ⑧				
					Main Valve »⑨			
Operating Controls and Interlocks			Limits and Burner Controller Closed Ⓛ to ⑨					
				Running Interlock ⑥ to ⑦				
		Preignition Interlock Closed		⑤ to ⑳				PII
Flame Signal		Safe Start Check			Flame Proving			SSC

SECTION 25: WEATHER-RITE™ TT-SERIES START-UP PROCEDURES

Customer: _____ Date: _____

Technician: _____ Model Number: _____

Start-Up Co: _____ Serial Number: _____

Field start-up should be performed by a qualified technician. The technician is responsible for assuring that all of the items on this checklist are properly installed and operating. Upon completion, a copy of this form should be returned to Weather-Rite LLC using the contact information listed in the header.

⚠ WARNING

		
Explosion Hazard	**Falling Hazard**	**Burn Hazard**
Leak test all components of gas piping before operation. **Gas can leak if piping is not installed properly.** **Do not high pressure test gas piping with air handler connected.**	**Use proper safety equipment and practices to avoid falling.** **Do not use any part of equipment as support.**	**Allow equipment to cool before service.** **Internal components of equipment may still be hot after operation.**
Failure to follow these instructions can result in death, injury or property damage.		

⚠ DANGER

	
Electrical Shock Hazard	**Severe Injury Hazard**
Disconnect electric before service or maintenance. **More than one disconnect switch may be required to disconnect electric from air handler.** **Air handler must be connected to a properly grounded electrical source.** **Protect electric system from water.**	**Do not enter air handler while in operation.** **Air Handler may start automatically.** **Do not operate with door open.** **Installation, operation and service must be done by a trained technician only.**
Failure to follow these instructions can result in death, electrical shock or injury.	

A. General Inspection- Fan and Motor Sheaves

__ Fan and motor sheaves secured tightly to the shaft.

__ Sheaves are properly aligned.

__ Belts are tensioned correctly.

__ Fan set bolts are tight.

__ Bearing set screws are tight.

__ Bearing mounting bolts are tight.

Comments _____

B. General Inspection- Gas and Electric Services

__ Wires at terminal strips are tight.

__ The gas piping has been purged of debris.

__ Fuel is: (circle one) Natural Gas Propane

__ For indoor air handlers only, the vent lines are piped outdoors.

__ All vent caps are installed. (Vent line must be run separately. Do not combine with other vent lines.)

Comments _____

C. General Inspection- Burner Inspection

__ No obstructions to the burner.

__ Spark igniter is secured and tight.

__ UV scanner is secured and finger tight.

Comments _____

D. General Inspection- Temperature Control Operation

__ For conventional controls, temperature sensor wiring is shielded cable or standard wiring in a separate circuit.

__ For Intelligent Controls, sensor and network cables are provided and terminated per cabling specifications.

Cable Type _____

E. General Inspection- Miscellaneous Items (Visually inspect air handler and note any relevant observations.)

__ Unit properly weather-sealed.

__ All hardware is tight and secure.

__ All damper linkage is tight.

__ Filters are installed properly. (Aluminum mesh w/arrow in the direction of the airflow. Polyester w/the white side upstream.)

__ For an indoor unit, pressure sensor "low" tap is run outdoors.

__ For an outdoor unit, pressure sensor "high" tap is run indoors.

Visible Damage _____

Comments _____

F. Operational Checks- General Information

CFM _____

Design ESP _____

Motor HP _____

Motor FLA _____

Comments _____

G. Operational Checks- Fan Operation

__ Fan rotation is correct. (See rotation sticker in the unit.)

__ Check and record the following:

Volts (Fan Off) Phase 1-2 ___ Phase 2-3 ___ Phase 1-3 ___

Volts (Fan On) Phase 1-2 ___ Phase 2-3 ___ Phase 1-3 ___

Running Amps Phase 1 ___ Phase 2 ___ Phase 3 ___

Differential pressure drop across burner. (Measured at AFS tubing test ports.) 20% OA ___ 100% OA ___

H. Operational Checks- Burner Operation

Inlet Standing Gas Pressure (in. w.c.) _____

___ Pilot is approximately the size of a baseball.

Pilot Line Pressure (in. w.c.) _____

Flame Signal Relay (VDC) _____

___ Low re gas pressure produces a minimum continuous ribbon of flame.

Burner High Fire Gas Pressure (in. w.c.) _____

Forced High Fire Inlet Gas Pressure (in. w.c.) _____

Forced High Fire Mod. Gas Valve Volts (VDC) _____

High Fire Burner Flame Length (in.) _____

Flame Color _____

___ Low airflow switch opens on pressure drop. (Setpoint at .2" w.c.)

___ High airflow switch opens on pressure rise. (Setpoint at 1.35" w.c.)

___ High temperature limit switch opens on temperature rise.

___ Low gas pressure limit switch opens on pressure fall.

___ High gas pressure limit switch opens on pressure rise.

___ Manifold gas leak test.

___ Burner responds properly to room temperature setpoint changes.

I. Operational Checks: Temperature Control Operation, Conventional Controls

Minimum discharge air temp setpoint (°F) _____

Maximum discharge air temp setpoint (°F) _____

___ Low temperature limit switch opens.

___ All circuit check lights illuminate properly.

___ The time clock controls operate properly (if applicable).

___ The cycle/cooldown stat operates properly (if applicable).

J. Operational Checks: Temperature Control Operation, Intelligent Controls

___ Check and record the following:

Room Sensor Measured Temperature _____ Temp on PC after calibration _____

Outdoor Air Measured Temperature _____ Temp on PC after calibration _____

Discharge Air Measured Temperature _____ Temp on PC after calibration _____

Minimum discharge air temp setpoint (°F) _____

Maximum discharge air temp setpoint (°F) _____

Comments _____

K. Operational Checks: Damper Control (Check options which apply.)

___ Burner supply air damper operates properly.

___ Building pressure transducer output between Vout and Com at 0" w.c. is 2.50 VDC.

___ Building pressure control setpoint is at (factory-recommended) .01" w.c. positive.

___ Outside air/return air dampers respond properly to pressure controls, manual damper control and/or summer ventilation thermostat.

___ Discharge dampers

___ Exhaust dampers

Comments _____

L. Operational Checks: Special Controls (List any other special controls specific to this air handler.)

Comments _____

M. Operational Checks: Miscellaneous

___ Documentation (Installation, Operation and Service Manual and electrical prints) inside the main control panel.

___ There is no noticeable vibration.

___ Remote Control Station(s) operate(s) properly.

___ Connected network hardware and software operate properly.

___ Explained the unit operation, location of reset buttons and remote control to customer.

Mounting Method _____

N. Comments (Describe the overall project [looks, performance, installation, etc.]
Note any problems that have occurred or might aect the operation of the equipment.

O. Follow-Up (Describe any follow-work to completed by the technician.)

SECTION 26: WEATHER-RITE™ TT-SERIES START-UP PROCEDURES: EVAPORATIVE COOLER

Customer: _____ Date: _____

Technician: _____ Model Number: _____

Start-Up Co: _____ Serial Number: _____

Field start-up should be performed by a qualified technician. The technician is responsible for assuring that all of the items on this checklist are properly installed and operating. Upon completion, a copy of this form should be returned to Weather-Rite LLC using the contact information listed in the header

⚠ WARNING

Falling Hazard

Use proper safety equipment and practices to avoid falling.

Do not use any part of equipment as support.

Failure to follow these instructions can result in death, injury or property damage.

⚠ DANGER

Electrical Shock Hazard

Disconnect electric before service.

More than one disconnect switch may be required to disconnect electric from equipment

Equipment must be properly grounded.

Failure to follow these instructions can result in death or electrical shock.

⚠ WARNING

Cut/Pinch Hazard

Wear protective gear during installation, operation and service.

Edges are sharp.

Failure to follow these instructions can result in injury.

A. Piping

___ Water supply piped to proper location on evaporative cooler.
___ Water supply line drain solenoid (normally open) installed and piped to a drain inside the building.
___ Fill valve solenoid (normally closed) installed in the water supply line inside the building.
___ Sump overow is piped to a drain.
___ Sump drain is piped and the sump drain valve is installed.
___ Trap installed in sump drain pipe per local code.
___ Sump drain ball valve is wired properly.

B. Electrical

___ Electrical connections are made at junction box on air handler.
___ Water supply line drain solenoid (normally open) is wired properly.
___ Fill valve solenoid (normally closed) is wired properly.

C. Basic Operation (Control Package #1- Items apply to all evaporative coolers.)

___ Evap enable relay (located in main electrical panel) energizes evaporative cooler. The fill valve energizes and sump begins filling.
___ The outside air freeze stat is set at 45° F.
___ When the outside air is below the freeze stat setpoint, the stat opens and the sump drains.
___ The water level is below the cardboard media support. The media should never sit in the water. Adjustment of the float may be required depending on how level the air handler was installed.
___ Flow of water over the media is adjusted properly. Proper ow is achieved by adjusting (if needed) the water flow adjustment valve so that the media completely saturates without getting droplets of water projecting o media in direction of airflow. It may take up to 2 hours for the media to properly saturate. Final ow adjustments should be made then.
___ Adjusted bleed-o rate to approximately 20% of the evaporation rate. Please refer to the Evaporative Cooler Maintenance Section of the Installation, Operation and Service Manual for further information.

D. Conductivity Control (Control Package #2)

A conductivity controller monitors the electrical conductance of the cooling water. If the conductivity of the cooling water exceeds the front panel setpoint, the controller activates a "blowdown" process. During this process, some of the highly conductive water is drained from the sump and fresh water is added to dilute the concentrated water. When the conductivity level falls below the setpoint, the controller shuts down the "blowdown" process. Refer to the calibration procedure in the Conductivity Controller Installation, Operation and Service Manual.

___ Conductivity controls work properly. Operation can be simulated by depressing and holding the "simulator" button on the conductivity controller while the evaporative cooler is in operation. This will open the "blowdown" contact, de-energizing the timer and open the sump drain valve. When the "simulator" button is released, the "blowdown" contact closes. This energizes the time clock for five minutes. After five minutes, the drain valve closes.

E. Auto Flush Control (Control Package #3)

___ Water supply line and flush valve solenoid (normally closed) are installed in the proper location at the top of the evaporative cooler. (See mechanical drawing #40085830.)
___ Flush valve solenoid is wired properly.
___ The time clock schedule is set to desired auto flush interval and length of auto flush.
___ Auto flush circuit works properly. When time clock initiates auto flush sequence, the flush valve solenoid (normally closed) open and supplies fresh water over the media. At the same time, the pump motor de-energizes and the sump drain valve opens to drain sump.

F. Comments

APPENDIX I: BURNER FIRING RATE CALIBRATION

High fire adjustments

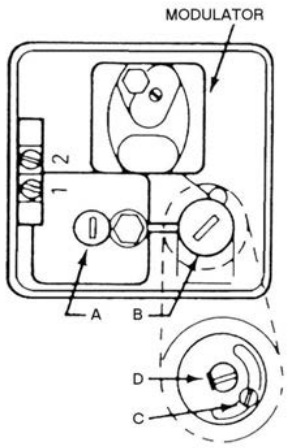
NOTE: THE MODULATING/REGULATOR VALVE IS LOCATED ON THE GAS TRAIN. SEE GAS TRAIN DRAWING FOR LOCATION OF VALVE.

In order to set the High Fire gas pressure correctly, three terms must be understood. They are:

1. Differential Gas Pressure: This is the difference between the burner negative and the high fire gas pressure. The maximum differential gas pressure is shown on the rating tag located on the weather enclosure door. A typical setting is 8.0" W.C. for natural gas.

2. Burner Negative: Is measured with the fan **ON**, and the burner **OFF**. External ductwork and filters can affect burner negative. This should be checked **after** the installation is complete. Using a manometer measure the negative pressure at the gas piping downstream of the modulating regulator valve; normally at the high gas pressure switch.

3. High Fire Gas Pressure: Is measured with a manometer connected in the same place as above. The fan must be ON and the burner forced to high fire. The desired high fire gas pressure, being adjusted in Step 3 below, is the difference between the burner negative and the differential gas pressure.



1.Force the burner into high fire. This will place approximately 20VDC at the modulating gas valve coil.
2.Remove the seal cap (A) on the Regulator to adjust the high fire setting.
3.Turn the Regulator adjusting screw inside to achieve the pressure called for on the rating tag.

Clockwise rotation increases pressure.

Example:

Differential gas pressure	8.0" w.c.
Burner negative pressure	-1.0" w.c. (must be measured)
High fire gas pressure	7.0" w.c.

4. Replace the seal cap (A).

Low fire adjustments

1. Force the burner into low fire
2. Remove the seal cap (B) on the low fire setting.
3. Loosen the lock screw (C) inside and then adjust the screw (D) until achieving a continuous ribbon of flame across the entire burner. Clockwise rotation reduces the minimum flow rate.
4. Tighten the set screw (C).
5. Replace the seal cap (B).

SECTION 27: THE WEATHER-RITE™ TT-SERIES WARRANTY

WEATHER-RITE LLC WILL PAY FOR:

Within 24 months from date of purchase by buyer or 27 months from date of shipment by Weather-Rite LLC (whichever occurs first), replacement parts will be provided free of charge for any part of the product which fails due to a manufacturing or material defect.

Weather-Rite LLC will require the part in question to be returned to the factory. Weather-Rite LLC will, at its sole discretion, repair or replace after determining the nature of the defect and disposition of part in question.

WEATHER-RITE™ Replacement Parts are warranted for a period of 12 months from date of shipment from Weather-Rite LLC or the remaining WEATHER-RITE™ TT-Series warranty.

WEATHER-RITE LLC WILL NOT PAY FOR:

Service trips, service calls and labor charges.

Shipment of replacement parts.

Claims where the total price of the goods have not been paid.

Damage due to:

- Improper installation, operation or maintenance.
- Misuse, abuse, neglect, or modification of the WEATHER-RITE™ TT-Series in any way.
- Use of the WEATHER-RITE™ TT-Series for other than its intended purpose.
- Incorrect gas or electrical supply, accident, fire, floods, acts of God, war, terrorism, or other casualty.
- Improper service, use of replacement parts or accessories not specified by Weather-Rite LLC
- Failure to install or maintain the WEATHER-RITE™ TT-Series as directed in the Installation, Operation and Service Manual.
- Relocation of the WEATHER-RITE™ TT-Series after initial installation
- Use of the WEATHER-RITE™ TT-Series in a corrosive atmosphere containing contaminants.
- Use of the WEATHER-RITE™ TT-Series in the vicinity of a combustible or explosive material.
- Any defect in the WEATHER-RITE™ TT-Series arising from a drawing, design, or specification supplied by or on behalf of the consumer.
- Damage incurred during shipment. Claim must be filed with carrier.

WARRANTY IS VOID IF:

The WEATHER-RITE™ TT-Series is not installed by an contractor qualified in the installation and service of gas fired heating equipment.

You cannot prove original purchase date and required annual maintenance history.

The data plate and/or serial number are removed, defaced, modified or altered in any way.

The ownership of the WEATHER-RITE™ TT-Series is moved or transferred. This warranty is non-transferable.

Weather-Rite LLC is not permitted to inspect the damaged equipment and/or component parts.

READ YOUR INSTALLATION, OPERATION AND SERVICE MANUAL.

If you have questions about your equipment, contact your installing professional. Should you need Replacement Parts or have additional questions, call or write:

Weather-Rite LLC
1100 Seven Mile Road NW
Comstock Park, MI 49321
Telephone: +1.616.784.0500
Fax: +1.616.784.0435

www.weather-rite.com

Weather-Rite LLC's liability, and your exclusive remedy, under this warranty or any implied warranty (including the implied warranties of merchantability and fitness for a particular purpose) is limited to providing replacement parts during the term of this warranty. Some jurisdictions do not allow limitations on how long an implied warranty lasts, so this limitation may not apply to you. There are no rights, warranties or conditions, expressed or implied, statutory or otherwise, other than those contained in this warranty.

Weather-Rite LLC shall in no event be responsible for incidental or consequential damages or incur liability for damages in excess of the amount paid by you for the WEATHER-RITE™ TT-Series. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so this limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from jurisdiction to jurisdiction.

Weather-Rite LLC shall not be responsible for failure to perform under the terms of this warranty if caused by circumstances out of its control, including but not limited to war, fire, flood, strike, government or court orders, acts of God, terrorism, unavailability of supplies, parts or power. No person is authorized to assume for Weather-Rite LLC any other warranty, obligation or liability.

LIMITATIONS ON AUTHORITY OF REPRESENTATIVES:

No representative of Weather-Rite LLC, other than an Executive Officer, has authority to change or extend these provisions. Changes or extensions shall be binding only if confirmed in writing by Weather-Rite LLC's duly authorized Executive Officer.

Attach this information to the wall near the WEATHER-RITE™ remote panel or equipment controls.

Weather-Rite LLC

Read the Installation, Operation and Service Manual thoroughly before installation, operation or service.

OPERATING INSTRUCTIONS

1. Stop! Read all safety instructions on this information sheet.
2. Open the manual gas valve in the air handler supply line.
3. Turn on electric to the air handler.
4. Set temperature selector and, if equipped, thermostat, to desired setting.
5. Set FAN switch to "ON".
6. Set BURNER switch to "ON".

TO OPERATE AS VENTILATOR

1. Stop! Read all safety instructions on this information sheet.
2. Turn on electric to the air handler.
3. Set FAN switch to "ON".

TO TURN OFF THE AIR HANDLER

1. If equipped, set the thermostat to the lowest setting.
2. Set BURNER switch to "OFF".
3. Set FAN switch to "OFF".

IF THE AIR HANDLER WILL NOT OPERATE, FOLLOW THESE INSTRUCTIONS, TO HELP ENSURE YOUR SAFETY

1. If equipped, set the thermostat to the lowest setting.
2. Set BURNER switch to "OFF".
3. Set FAN switch to "OFF".
4. Turn off electric to the air handler.
5. Close the manual gas valve in the air handler supply line.
6. Call your registered contractor qualified in the installation and service of gas-fired heating equipment.

⚠WARNING

Fire Hazard

Keep all flammable objects, liquids and vapors the required clearances to combustibles away from equipment.

Some objects can catch fire or explode when placed close to equipment.

Failure to follow these instructions can result in death, injury or property damage.

CLEARANCES TO COMBUSTIBLES

Clearances to combustibles for all models are 6" (15.2 cm) on all surfaces.

Clearances to combustibles do not denote clearances for accessibility. Minimum clearance for access is 48" (122 cm) on all models. Minimum clearance for accessibility applies to the control enclosure, blower access panel and filter access panel (when equipped).

Weather-Rite LLC
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Installation Code and Annual Inspections: All installation and service of WEATHER-RITE™ equipment must be performed by a contractor qualified in the installation and service of equipment sold and supplied by Weather-Rite LLC and conform to all requirements set forth in the WEATHER-RITE™ manuals and all applicable governmental authorities pertaining to the installation, service, operation and labeling of the equipment. To help facilitate optimum performance and safety, Weather-Rite LLC recommends that a qualified contractor conduct, at a minimum, annual inspections of your WEATHER-RITE™ equipment and perform service where necessary, using only replacement parts sold and supplied by Weather-Rite LLC.

Air handlers are approved for installation up to 2000' (610 m).
For installations at elevations above 2000' (610 m), consult factory.

Further Information: Applications, engineering and detailed guidance on systems design, installation and equipment performance is available through WEATHER-RITE™ representatives. Please contact us for any further information you may require, including the Installation, Operation and Service Manual.

These products are not for residential use.

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