Indirect Fired Units w/ Packaged Cooling

Quick Select (Indirect Fired HTDM Type w/ Packaged Cooling) ……..……..T-1

Indirect Fired HTDM 200 ~ HTDM 1000 w/ Packaged Cooling.…….…...T-2

HTDM Type Typical Specifications …..……...T-6

HTDM Performance Specifications ..…… ……..……...T-12

Quick Select (Indirect Fired MTI Type w/ Packaged Cooling) ……..……..……..T-13

Indirect Fired MTI-11-200 ~ MTI-11-800 w/ Packaged Cooling ….……..…...T-14

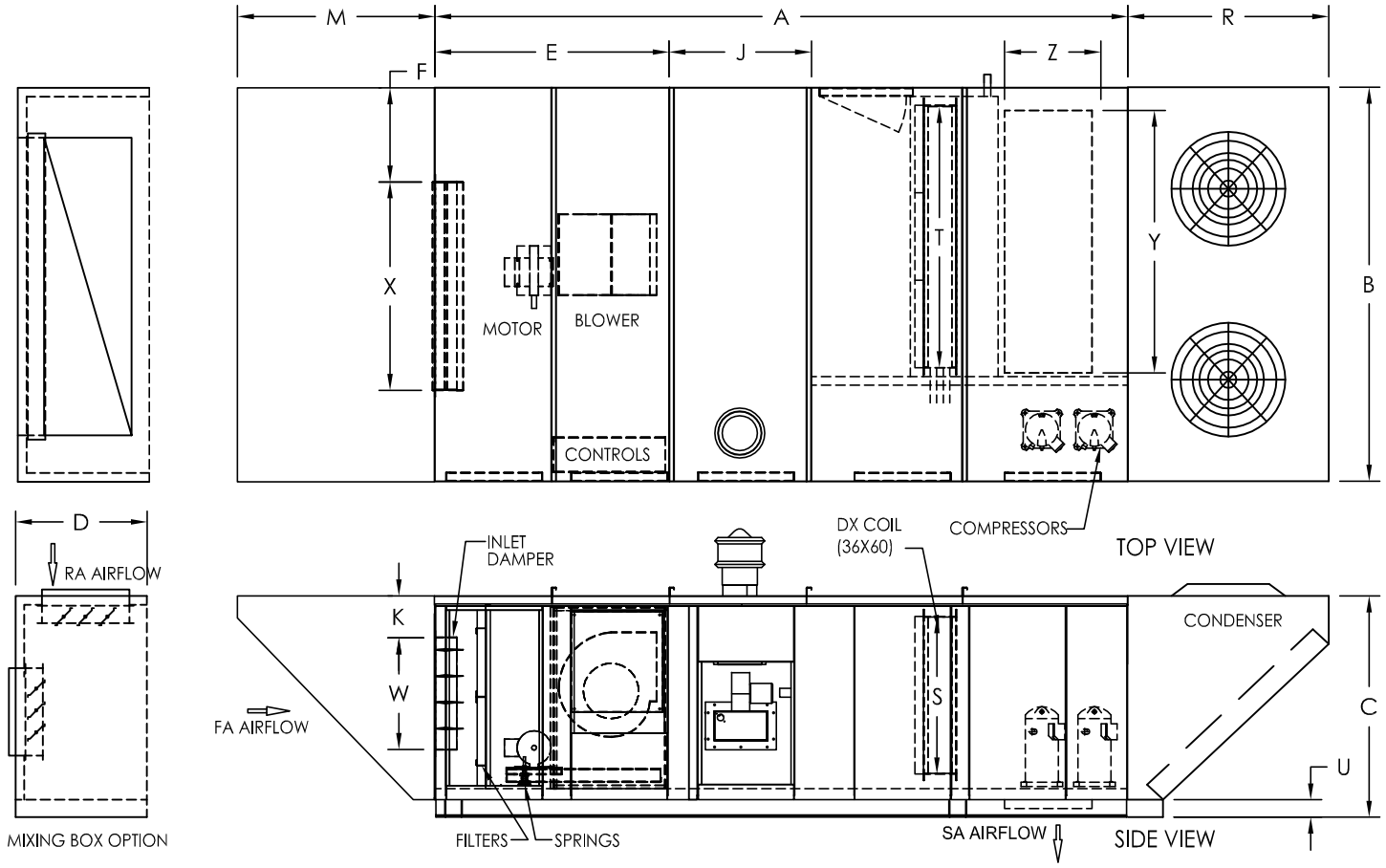
MTI Type Typical Specifications …..…….……...T-18

MTI Performance Specifications ..…….……..……...T-23

Quick Select (Indirect Fired GIDM Type w/ Packaged Cooling)……..……..T-24

Indirect Fired GIDM (15,000 CFM ~ 70,000 CFM) w/ Packaged Cooling ……...T-25

GIDM Type Typical Specifications …..……..……...T-35



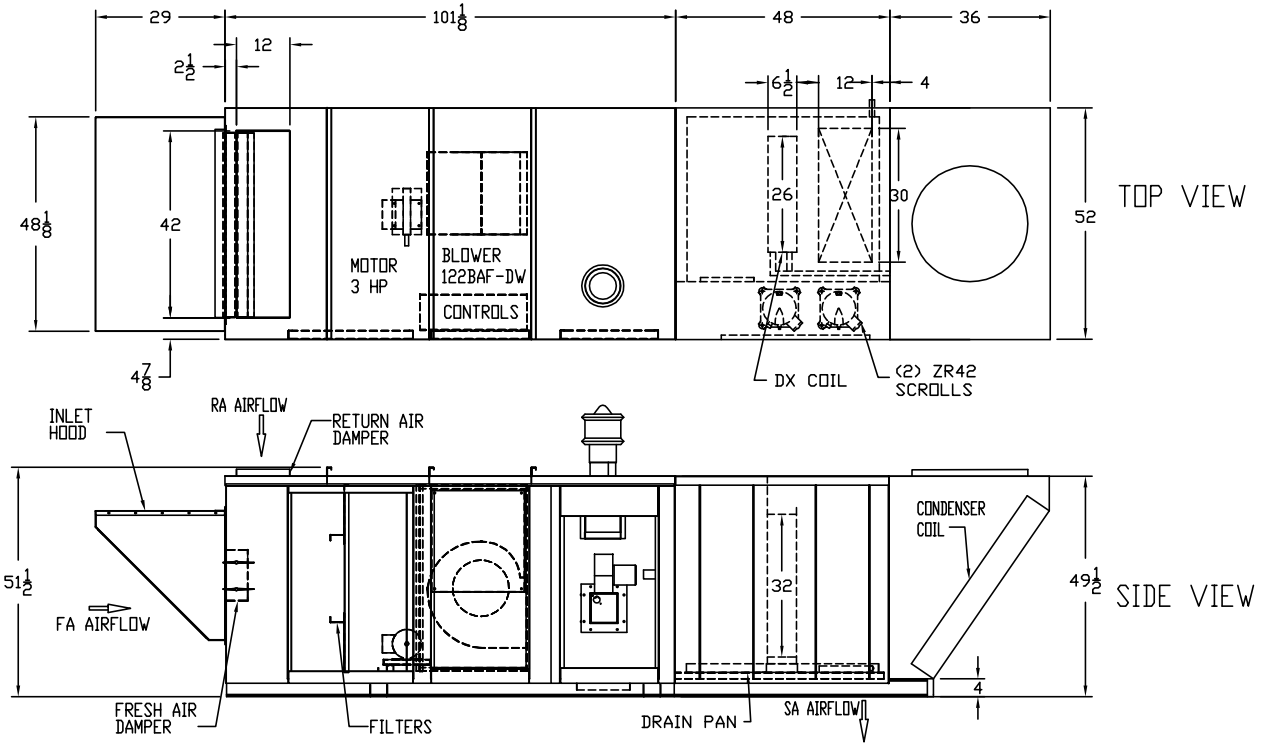
MODEL	CFM RANGE	NOMINAL TONNAGE RANGE	A	B	C	D	E	F	J	K	M	S	T	U	W	X	Y	Z	R
HTDM 200 DX	1400~2700	3 ~7	125	52	49-1/2	22	45	3	32	16	29	32	26	3 ~ 4	12	42	30	12	36
HTDM 400 DX	2700~5500	7 ~ 14	133	76	49-9/16	30	47	9	32	15	40	35-1/4	45	3 ~ 4	20	58	38	12	45-7/8
HTDM 600 DX	4100~7500	10 ~ 18	158-3/8	90	50-9/16	35	53-1/2	22	32	7	45	36	60	3 ~ 4	25	46	60	20	45-7/8
HTDM 1000 DX	6900~12000	17 ~ 30	209	110	71	52	75	21	50	13	58-1/4	56	72	3 ~ 4	42	50	66	20	45-7/8

Notes
1. Provide tight fitting inspection panels in duct down steam from the duct furnace. These panels should be 12x12.
2. Gas connection is 3/4 N.P.T unless otherwise specified
3. Vent cap to be installed without Alterations.

ICG
WESTERN
HTDM SERIES

TITLE
HTDM 200 ~ 1000 DX HORIZ DISCH.
WITH HOOD AND PACKAGED COOLING

DRAWN BY	ISSUED BY	SCALE	DRW. NO.	
JR				
CHK. BY	DATE		JOB NO.	PAGE T-1



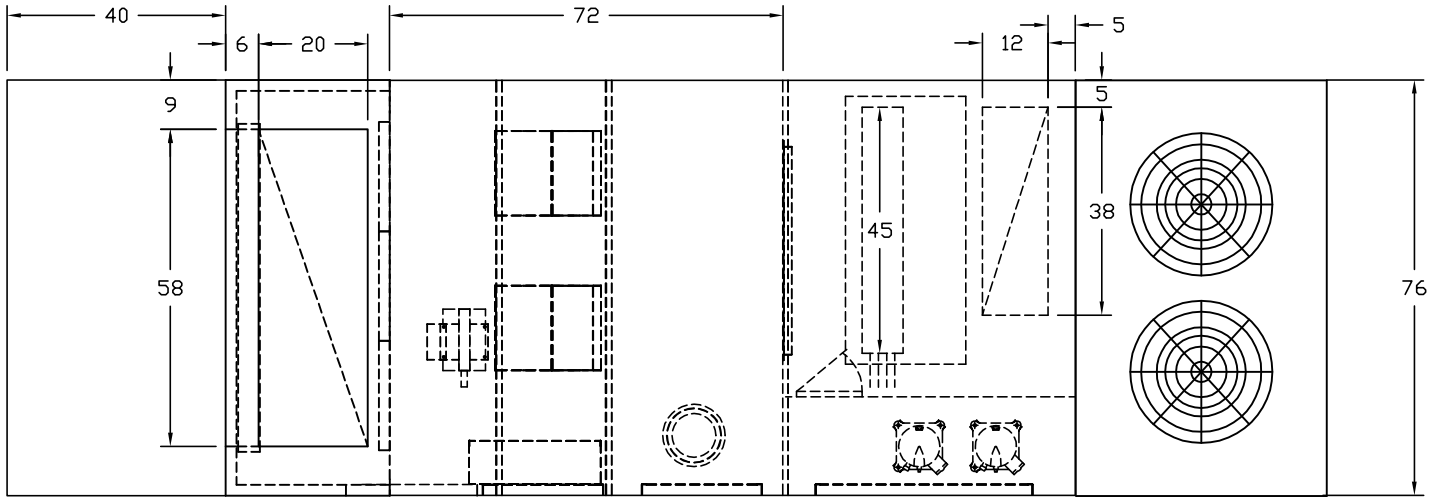
Notes
1. Provide tight fitting inspection panels in duct down steam from the duct furnace. These panels should be 12x12.
2. Gas connection is 3/4 N.P.T unless otherwise specified
3. Vent cap to be installed without Alterations.

Rev	By	Revision Description	Date

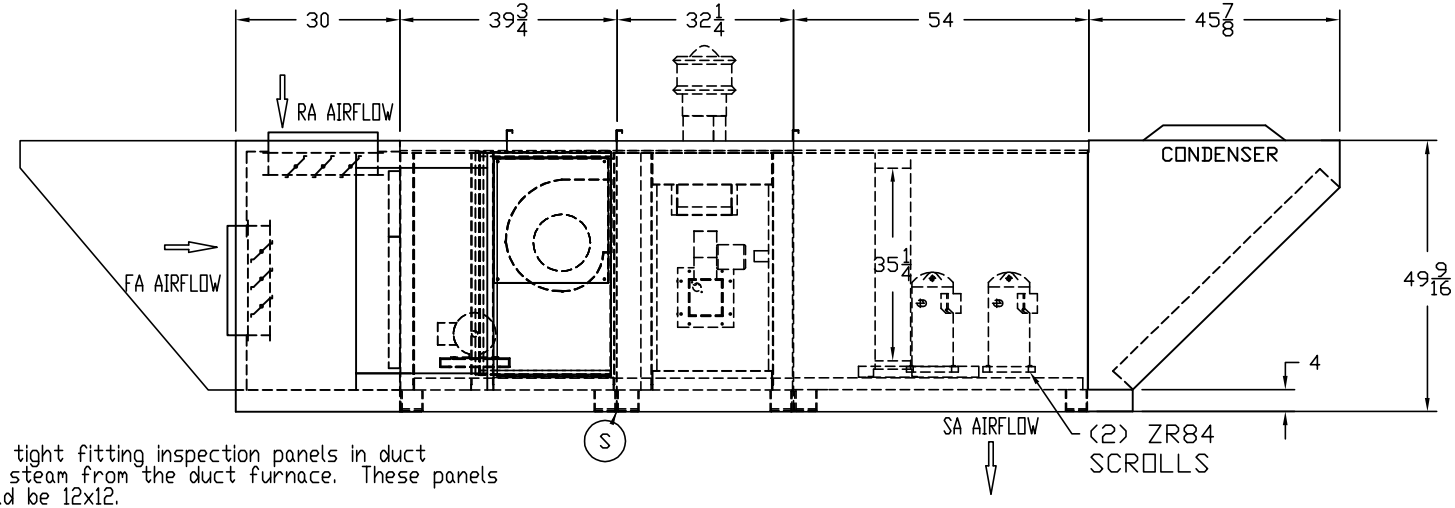
WESTERN
HTDM SERIES

TITLE
HTDM 200 DX 07 HORIZ DISCH.
WITH HOOD AND PACKAGED COOLING

DRAWN BY	ISSUED BY	SCALE	DRW. NO.	
JR		1:24	60-27349	
CHK. BY	DATE		JOB NO.	PAGE T-2



TOP VIEW



SIDE VIEW

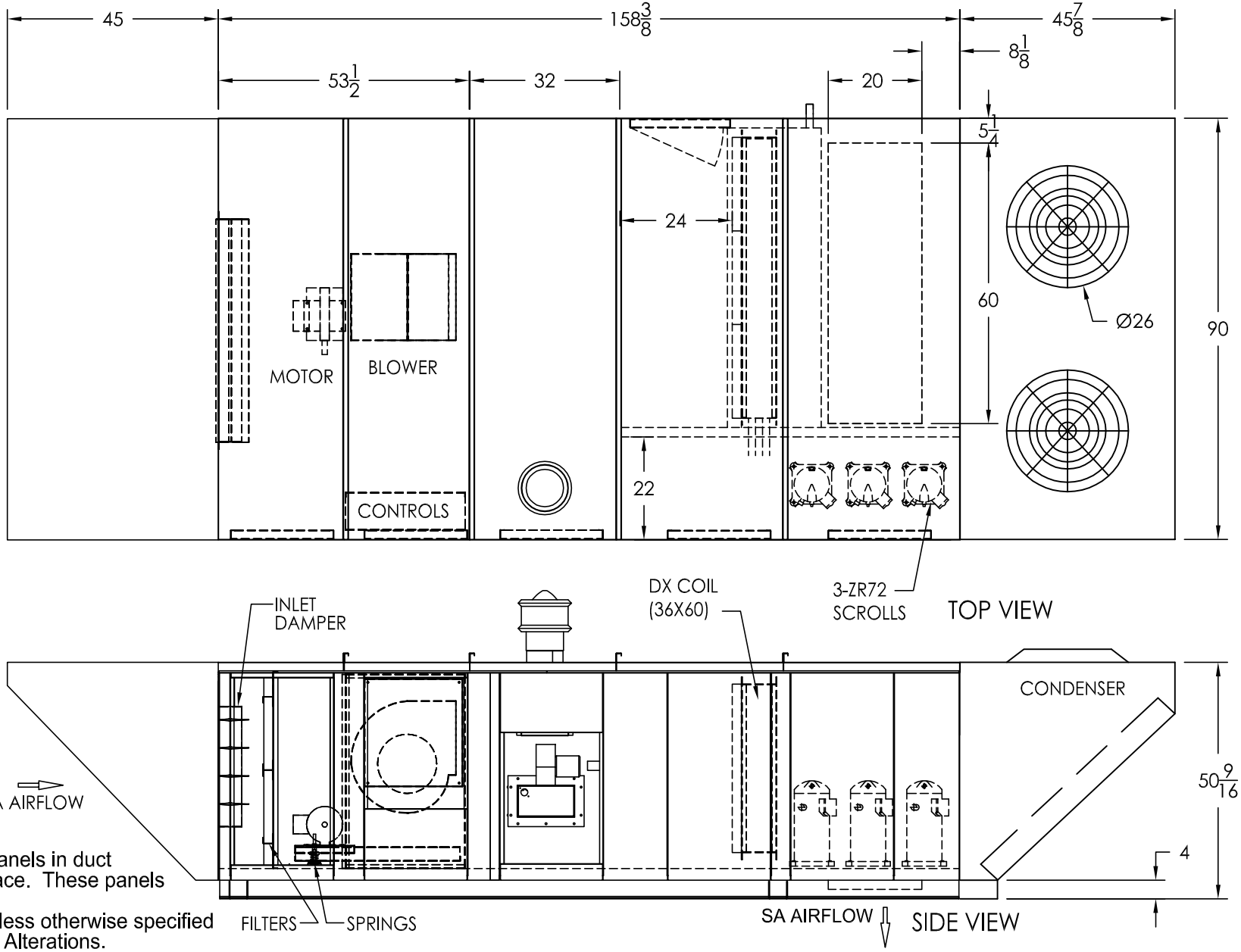
Notes
1. Provide tight fitting inspection panels in duct down steam from the duct furnace. These panels should be 12x12.
2. Gas connection is 3/4 N.P.T unless otherwise specified
3. Vent cap to be installed without Alterations.

Rev	By	Revision Description	Date

ICG WESTERN
HTDM SERIES

TITLE
HTDM 400 DX 14 HORIZ DISCH.
WITH HOOD AND PACKAGED COOLING

DRAWN BY	ISSUED BY	SCALE	DRW. NO.	
JR		1:24		
CHK. BY	DATE		JOB NO.	PAGE T-3



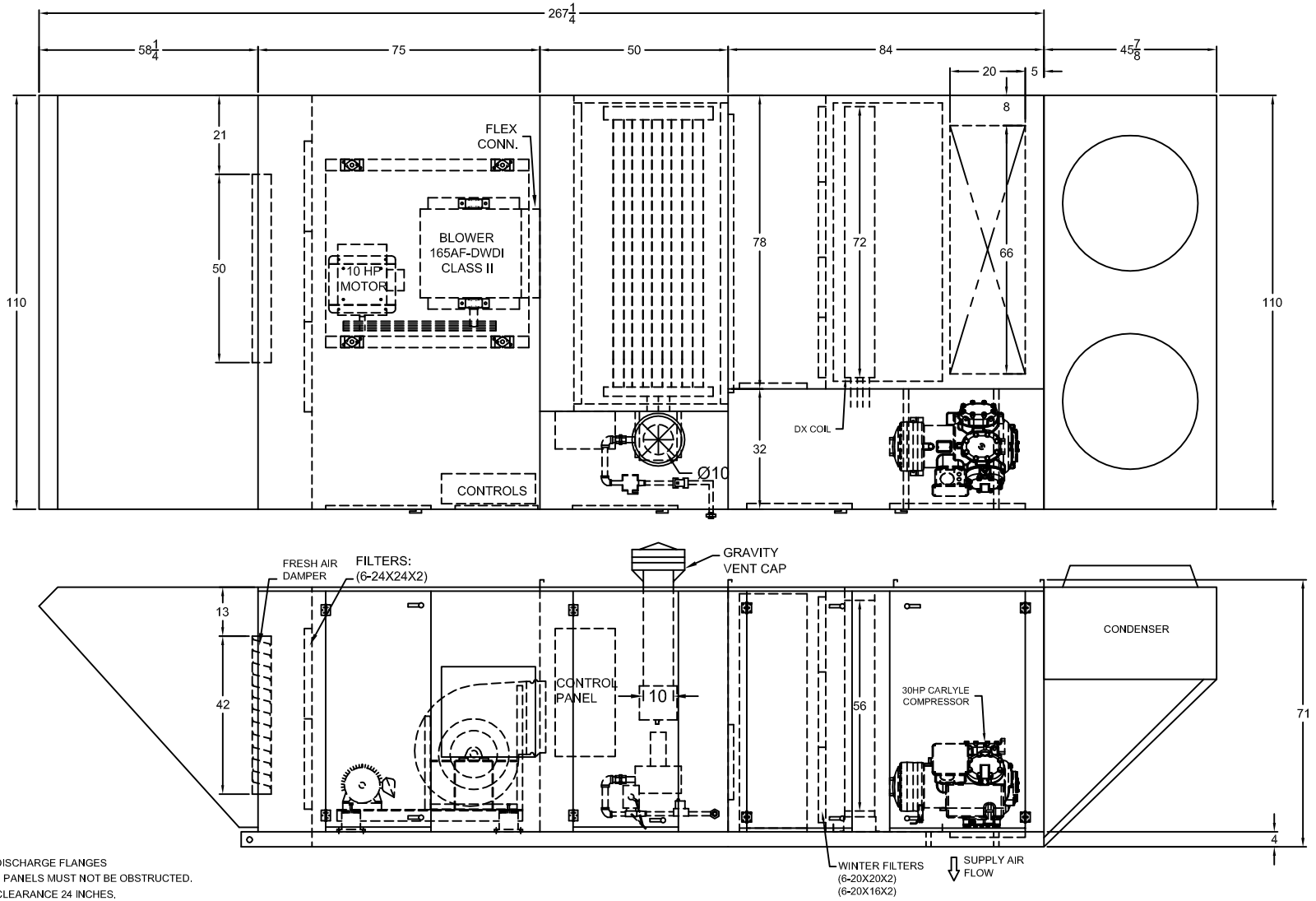
Notes
1. Provide tight fitting inspection panels in duct down steam from the duct furnace. These panels should be 12x12.
2. Gas connection is 3/4 N.P.T unless otherwise specified
3. Vent cap to be installed without Alterations.

Rev	By	Revision Description	Date

WESTERN
HTDM SERIES

TITLE
HTDM 600 DX 18 HORIZ DISCH.
WITH HOOD AND PACKAGED COOLING

DRAWN BY	ISSUED BY	SCALE	DRW. NO.	
JR		1:24		
CHK. BY	DATE		JOB NO.	PAGE T-4



NOTE:

1. 1 1/2" INLET AND DISCHARGE FLANGES
2. SERVICE ACCESS PANELS MUST NOT BE OBSTRUCTED. RECOMMENDED CLEARANCE 24 INCHES.

DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES.

Rev	By	Revision Description	Date

WESTERN
HTDM SERIES

TITLE

HTDM 1000 DX 30
HORIZONTAL CONFIGURATION SINGLE BLOWER
w/ PACKAGED COOLING

DRAWN BY	ISSUED BY	SCALE	DRW. NO.	
JR		1:42		
CHK. BY	DATE		JOB NO.	PAGE T-5

HTDM TYPE
TYPICAL SPECIFICATIONS

TYPE AND DESCRIPTION

Furnish an I.C.E HTDM DX Model indirect fired self-contained make-up air unit with packaged cooling in accordance with the following specifications. The unit shall be ETL and CETL certified.

The heater shall be designed to ensure a minimum efficiency of 80 - 85% at full firing rate and the power burner has a turndown capacity between 23:1 and 60:1 depending on the HTDM selection. The heat exchanger and blower shall be constructed so they can easily be disassembled and reassembled in the field if necessary. The unit shall be equipped to operate from a single point power connection. The heater shall be flame tested before shipment and the manufacturer shall keep a detailed flame test report on file. Factory testing shall be confirmed with a combustion analyzer and flow meter. The heater shall be shipped completely factory assembled and wired including all pre-piped manifold components and fuses, ready for immediate power and fuel connections.

CASING

The unit exterior casing shall be heavy gauge G90 rated bonderized steel. Unit roof shall feature standing seam construction. The entire unit casing shall be insulated with 1-in. thick 1.5-lb. (2-in. thick 1.5-lb.) fiberglass insulation with hard neoprene backing in a sandwich wall fashion (22-gauge solid liner). The unit exterior shall be finished with industrial enamel (catalyzed epoxy) paint. An integral welded iron channel frame shall support the unit casing. The structural iron frame shall be sandblasted, primed and finished with industrial enamel (catalyzed epoxy) paint.

BLOWER/MOTOR SECTION

The fan section and motor assembly shall be constructed in accordance with the requirements of the Air Moving and Conditioning Association (AMCA). The assembly shall be designed to house the fan(s), bearings, motor, and v-belts, which shall be selected for at least 50% above the rated motor capacity. The fan(s) and motor shall be mounted on a welded unitary base made of angle iron frame. The frame shall be sandblasted, primed and finished with industrial enamel (catalyzed epoxy) paint. The unitary base shall be provided with seismic spring vibration isolation. The blower section shall have a hinged access door with Ventlock handles to allow easy maintenance of filters and belts. The NEMA T-Frame motor shall be mounted on an adjustable base located within the fan section. The blower shall be a forward curve DWDI centrifugal blower. The blower wheel shall be statically and dynamically balanced, and mounted on a turned, ground and polished shaft with rigid bearing supports. The shaft shall be designed with a maximum operating speed not exceeding 75% of the first critical speed. The bearings shall be split taper lock ball bearing type L20 minimum life of 100,000 hours (L10 200 kHr).

Fan performance shall be based on tests conducted in accordance with AMCA Standard Test Code for Air moving Devices. (All fans shall have sharply rising pressure characteristic extending throughout the operating range and continuing to rise well beyond the efficiency peak to assure quiet and stable operation under all conditions. Horsepower characteristics shall be truly non-overloading and shall reach a peak in the normal selection area.) Fan manufacturer shall provide sound power ratings in the eight octave bands, which shall be based on AMCA Standard 300-67, test, setup number one. Sound power

ratings shall be referenced 10-12 watts. A factory dynamic balance shall be made on all fans after their assembly. An IRD or PMC analyzer shall be used to measure velocity, and the final reading shall not exceed 0.1 inches per second. The exact level of vibration shall be recorded on the fan as proof of the final dynamic balance at the factory.

HEAT EXCHANGER

The heat exchanger shall be of two-pass design, made up of at least 16-gauge stainless steel drum and tubes. The primary and secondary heat transfer surfaces shall be constructed of Type 409 series stainless steel, with internal stainless steel high efficiency enhancing baffles. The stainless steel tubes shall be continuously welded into the secondary front and rear header tube sheets to ensure an airtight seal. After welding, the heat exchanger shall be pressure tested to 20 psi to ensure that there are no leaks. Manufacturer shall provide complete pressure testing report with Installation Manual. Failure to provide this report will result in a 10% holdback. Units shall be provided with multiple condensate drains. The heat exchanger section shall have an internal radiation shield to maintain a jacket loss of less than 2% of rated output. All heat transfer surfaces, including headers and the front collector box, shall be inside the casing and in the airstream. The construction of the heat exchanger shall permit free, unrestricted lateral, vertical, and peripheral expansion during the heating and cooling cycle without damage or strain to any parts. The burner shall be constructed with at least 14-gauge stainless steel and with the air baffles being made up of 430 stainless steel to ensure high durability and life of the burner. The burner assembly shall be a blow through positive pressure type with an intermittent pilot ignition system. Flame supervision shall be with a solid state programmed flame relay complete with flame rod. The unit's burner motor and modulating gas valve must be electronically controlled to guarantee, to the customer, a highly efficient unit at all times and applications. The unit efficiency shall be a minimum of 80 - 85% through the entire operating range depending on which HTDM selection is used and shall be independently tested and verified by ETL. The main and pilot manifolds shall be completely factory pre-piped to the burner. This assembly must be factory wired and include the following minimum components: main and pilot manual shut-off valves, main and pilot regulators, main and pilot automatic shut-off valves and adequate union and test ports for unconstrained service. HTDM 200, 400 and 600 indoor units can be vented using type B vent without a draft hood. HTDM 1000 and 1500 indoor units can be vented using type B vent with a diverter to assure safety and guarantee that all combustible gases leave the unit. There must also be a means of collecting and disposal of condensate formed in the flue gas by means of a 409 stainless steel flue box with drain and heat exchanger drain. Drains shall be made of stainless steel tubing.

HEATING CONTROLS

Units must be controlled electronically to achieve a turndown of at least 23:1 and to guarantee the heat exchanger efficiencies of at least 80%. Unit controller must be a true proportional integral decay (PID) controller to maintain the turndown and unit efficiencies. The controller must be able to electronically adjust the burner blower and modulating gas valve to maintain ideal combustion levels and shall monitor the amount of combustion air available to guarantee proper emission standards. Unit control will consist of a highly accurate feedback control system. Corrective action in this system is taken only when the balance has been upset due to a change in the disturbance variable. Any other control that does not behave in this manner is unacceptable. The ICECON2 controller analyzes the process and calculates a control error from the measured values. Continuous cycling of the burner or blower is unacceptable. The proportional control in the ICECON2 controller will provide an output signal in proportion to the

size of the control error. If the control error persists, the output will continue to ramp in the correct direction, until the control error is eliminated.
The ICECON2 modulation controller is compatible with the following external inputs:
1) Discharge air sensor.
2) Discharge air sensor with space override thermostat.
3) Discharge air sensor with remote temperature selector and space override thermostat.
4) Discharge air sensor with high and low temperature remote temperature selector and space reset thermostat.
5) 0-10 volt dc signal from building management system.
6) 4-20 mA signal from building management system.

COOLING CONTROLS

Cooling control shall be achieved via a multi-stage sequencer. The sequencer shall be controlled with an analog signal provided by the discharge air thermostat. As the discharge air thermostat requires cooling the signal shall increase, thereby turning on the stages at specific set points. The set points shall be set with appropriate offset and differential to ensure accurate discharge temperature is maintained. The stages are to be sequenced without turning on and off of compressors to minimize unnecessary wear on the compressors. Upon sensing a call for cooling from the space, the compressors shall provide full cooling until the space sensor is satisfied, upon which time the cooling shall revert to discharge air control. A low discharge temperature set point with a large differential shall be set to prevent the compressor from cycling on and off. The compressor will remain on low setting until cooling is disabled manually or the ambient temperature falls below the minimum set point.

ELECTRICAL CONTROL EQUIPMENT

Electrical assembly and components shall be in strict accordance with the latest provisions and requirements of the Nation Electric Code. Control cabinet shall be designed and constructed to ETL specifications. A safety disconnect switch shall be mounted on the unit. The controls shall be located in a weatherproof cabinet. Provisions for service padlocking shall be provided. The following items shall be located within the cabinet: fuses, starters, control relays, timing and holding relays, resistors and numbered terminal strips. All components shall be labeled and cross-referenced to control and field wiring diagrams. The control circuit shall be 24V, single phase. Wiring shall be neatly run in "PANDUIT" wiring duct. Low and/or line voltage thermostats shall be furnished shipped loose for installation by others. Unit shall be equipped with automatic low limit freeze protection with bypass timer.

DAMPERS & FILTER SECTION

The dampers are to be galvanized steel (aluminum airfoil low leak) type (with seals). The dampers shall be equipped with 2-position (modulating) actuators. The filters shall be 2" pleated throwaway type with minimum of 85% arrestance and 30% efficiency. Filter access shall be through a latched and gasketed access doors located on both sides of the unit. (Final filters shall be 4 or 12 inch high efficiency cartridge filters.)

REMOTE CONTROL PANELS

Remote NEMA 1(12) locking control panel shall be equipped with summer/off/winter switch and blower on, burner on, flame failure and loaded filter lights. (A remote adjustment potentiometer shall control damper positioning.) (An LCD display shall provide system temperature and set points.)

EVAPORATOR COILS

Evaporator coils are intended for use with a wide range of applications and refrigerant types. Coils are to be designed to maximize performance under specified conditions with minimal air-side pressure drop.
Coils shall be UL recognized as Refrigerant Containing Component. Coils to be used with refrigerant R-410A shall have undergone cycle testing, and shall be safety listed with 750 psig rating.
Tubes and return bends shall be constructed from seamless UNS C12200 copper conforming to ASTM B224 and ASTM E527. Properties shall be O50 light annealed with a maximum grain size of 0.040 mm.
Tubes are to mechanically expanded into fins (secondary surface) for maximum heat transfer. Materials are to be 3/8" diameter x (0.014, 0.022) wall thickness, 1/2" diameter x (0.016, 0.025) wall thickness, or 5/8" diameter x (0.020, 0.025, 0.035, 0.049) wall thickness.
Secondary surface (fins) shall be of the plate-fin design using aluminum or copper, with die-formed collars. Fin design to be flat, waffle, or sine-wave in a staggered tube pattern to meet performance requirements.
Collars will hold fin spacing at specified density, and cover the entire tube surface. Aluminum properties are to be Alloy 1100 per ASTM B209, with O (soft) temper; copper is to be Alloy 11000 per ASTM B152-06 with soft (anneal) temper. Fins are to be free of oils and oxidation.
Headers are to be constructed of seamless UNS C12200, Type L (drawn) copper material sized to match specified connection size. Type K (drawn) copper headers shall be offered as optional material.
Die-formed copper end caps are brazed on the inside of the headers, unless spun-closed (for sized up to 1-3/8").
Evaporator coils shall be designed with brass liquid distributors (as required), and copper sweat suction connections. Distributors shall be capped using soft-solder for ease of cap removal; suction connections shall be capped.
Coil casing material shall be of G90 galvanized steel, 16 gauge minimum. Heavier material, stainless steel, copper, or aluminum casing are to be provided as required.
Intermediate tube supports are to be provided on all coils 48" and longer fin length. Coil casing on top and bottom of coils are to have double-flange construction, allowing for vertical stacking of coils.
All coils are to be brazed with minimum 5% silver content (BCup-3) filler material to insure joint integrity.
Coils shall be tested at 550 psig using dry nitrogen, submerged under water. Dual-operator verification shall determine that all coils are leak-free.
Coils shall be shipped with nitrogen charge to verify leak-free integrity, and to prevent moisture migration into coil.
Coils shall be certified to withstand 750 psig working pressure.

CONDENSER COILS

Condenser coils are intended for use with a wide range of applications and refrigerant types. Coils are to be designed to maximize performance under specified conditions with minimal air-side pressure drop.

Coils shall be UL recognized as Refrigerant Containing Component. Coils to be used with refrigerant R-410A shall have undergone cycle testing, and shall be safety listed with 750 psig rating.
Tubes and return bends shall be constructed from seamless UNS C12200 copper conforming to ASTM B224 and ASTM E527. Properties shall be O50 light annealed with a maximum grain size of 0.040 mm.
Tubes are to mechanically expanded into fins (secondary surface) for maximum heat transfer. Materials are to be 3/8" diameter x (0.014, 0.022) wall thickness, 1/2" diameter x (0.016, 0.025) wall thickness, or 5/8" diameter x (0.020, 0.025, 0.035, 0.049) wall thickness.
Internally enhanced rifled or cross-hatched tubes can be offered as an option.
Secondary surface (fins) shall be of the plate-fin design using aluminum or copper, with die-formed collars. Fin design to be flat, waffle, or sine-wave in a staggered tube pattern to meet performance requirements.
Collars will hold fin spacing at specified density, and cover the entire tube surface. Aluminum properties are to be Alloy 1100 per ASTM B209, with O (soft) temper; copper is to be Alloy 11000 per ASTM B152-06 with soft (anneal) temper. Fins are to be free of oils and oxidation.
Headers are to be constructed of seamless UNS C12200, Type L (drawn) copper material sized to match specified connection size. Type K (drawn) copper headers shall be offered as optional material.
Die-formed copper end caps are brazed on the inside of the headers, unless spun-closed (for sized up to 1-3/8").
Condenser coils shall be designed with copper sweat connections, and shall be shipped with caps on connections.
Coil casing material shall be of G90 galvanized steel, 16 gauge minimum. Heavier material, stainless steel, copper, or aluminum casing are to be provided as required.
Coils designed for hot-gas applications shall have oversized tube sheet holes for hot gas feeds to allow for free expansion and contraction of tubes during operation.
Intermediate tube supports are to be provided on all coils 48" and longer fin length. Coil casing on top and bottom of coils are to have double-flange construction, allowing for vertical stacking of coils.
All coils are to be brazed with minimum 5% silver content (BCup-3) filler material to insure joint integrity.
Coils shall be tested at 550 psig using dry nitrogen, submerged under water. Dual-operator verification shall determine that all coils are leak-free.
Coils shall be shipped with nitrogen charge to verify leak-free integrity, and to prevent moisture migration into coil.
Coils shall be certified to withstand 750 psig working pressure.

REFRIGERATION COMPRESSORS

Compressors shall be either hermetic or semi-hermetic type.

A) Semi-Hermetic- Semi-hermetic reciprocating compressors shall be provided on systems with total cooling capacity of 25 Tons and larger. Up to 40 tons a single compressor will be used and multiple semi-hermetic compressors over 40 Tons. Compressors shall be completely factory assembled, piped, insulated, internally wired and tested. Units shall be shipped in one piece and come fully charged with refrigerant and filled with compressor oil. Units shall be rated in accordance with ARI standards. The refrigerant system shall be leak tested, evacuated and refrigerant charged at the factory. Compressors shall be suction gas cooled and come with integral spring vibration isolators, oil level sight glass, discharge mufflers, vibrasorbers, automatic reversible oil pump, oil filter screen. Oil charging valve, crankcase

heater which de-energizes during compressor operation, liquid line service valves. Unit shall also have the following safety control features:

- Low pressure cutout
- High pressure cutout, manual reset
- Adjustable low ambient lockout
- Liquid line solenoids incorporating pump down system
- Anticycling time device (to prevent excessive cycling and premature wear on compressor and contactors) and phase and brownout protection.
- Oil failure control

Provide cylinder suction pressure unloaders for capacity control, with minimum steps required to provide coil frost protection, based on refrigerant circuit suction temperatures. Provide filter dryers, sight glasses and compressor service valves for each individual compressor. Provide hot gas bypass for each compressor. Compressor staging to be provided by a Honeywell T775 Series standalone controller mounted in the unit.

B) Hermetic compressors- Compressors shall be set on resilient neoprene mounts and complete with line voltage break internal overload protection, internal pressure relief valve and crankcase heater. Each unit shall have a minimum of two compressors. Whereby a unit utilizing two compressors the first stage compressor must be a digital scroll operating with a Emerson EC3 series stand-alone superheat controller with a built in synchronization control for the digital scroll. Unit will provide turndown on cooling. Multiple refrigeration circuits shall be separate from each other. Refrigeration circuits shall be complete with liquid line filter-driers, and service ports fitted with Schraeder fittings. Units shall incorporate load compensated thermal expansion valves with external equalizers (electronic expansion valves on digital systems) and combination sight glass moisture indicators. System charge will be designed for 10 degrees Fahrenheit. Each system shall be factory run and adjusted prior to shipment. Controls shall include:

- Compressor motor contactors
- Overload protection control
- Cooling relays
- Ambient compressor lockout
- Dual pressure controls
- Anti-cycle timers
- Hot gas bypass on lead compressor to maintain adequate suction pressure in the event of low loads

  (only when digital scrolls are not being used)

Packaged units shall operate down to 50 degrees Fahrenheit as standard. Minus 40 refrigeration systems are available as an option. Compressors shall be located on the side of the unit in a service enclosure complete with hinged access doors.

HTDM Performance Specifications

Model HTDM	Input/ Output (MBH)	Air Capacity (CFM)	Temp. Rise (degF)	0.25" W.C.		0.5" W.C.		0 .75" W.C.		1.0" W.C.		1.5" W.C		2.0" W.C.		Gas Conn. Inches
				Blower	BHP	Blower	BHP	Blower	BHP	Blower	BHP	Blower	BHP	Blower	BHP	
200	200/170	1431	110	9x9	0.31	9x7	0.43	9x7	0.51	9x7	0.59	9x7	0.75	CF	-	1
		1574	100	9x9	0.37	9x7	0.52	9x7	0.60	9x7	0.68	9x7	0.86	CF	-	
		1749	90	9x9	0.45	9x9	0.56	9x9	0.66	9x7	0.82	9x7	1.01	9x7	1.21	
		1968	80	12x9	0.42	9x9	0.73	9x9	0.84	9x9	0.96	9x7	1.27	9x7	1.49	
		2249	70	12x9	0.60	12x9	0.71	9x9	1.14	9x9	1.27	10x8	1.46	10x8	1.72	
		2623	60	12x9	0.85	12x9	0.98	12x9	1.11	9x9	1.71	10x8	1.91	10x8	2.23	
		3148	50	12x9	1.27	12x9	1.44	12x9	1.60	12x9	1.76	12x9	2.06	9x9	3.27	

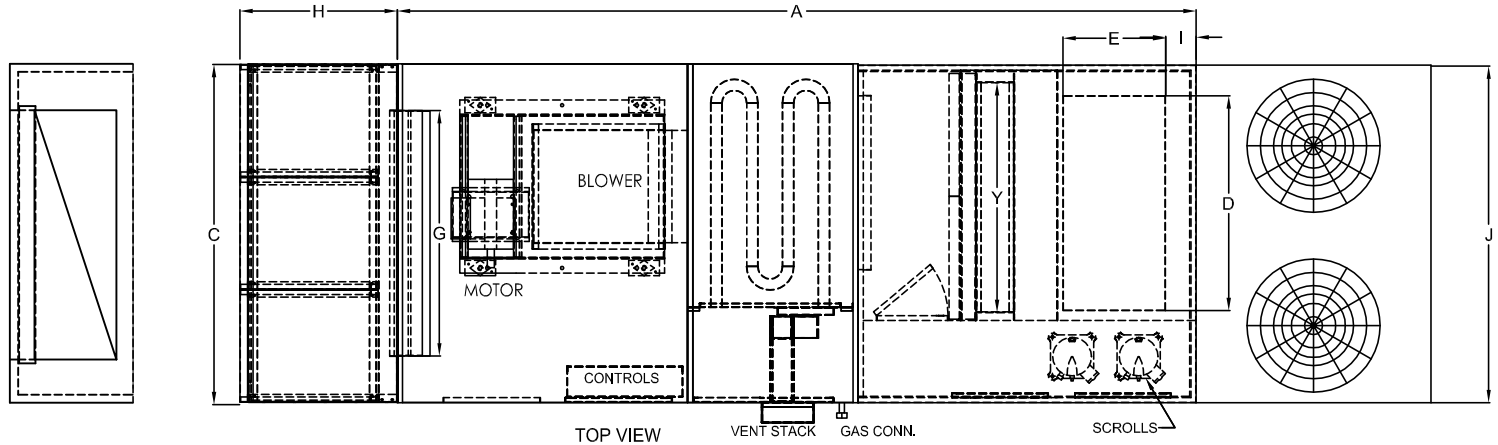
Model HTDM	Input/ Output (MBH)	Air Capacity (CFM)	Temp. Rise (degF)	0.25" W.C.		0.5" W.C.		0 .75" W.C.		1.0" W.C.		1.5" W.C		2.0" W.C.		Gas Conn. Inches
				Blower	BHP	Blower	BHP	Blower	BHP	Blower	BHP	Blower	BHP	Blower	BHP	
400	400/328	2761	110	12x9	0.79	12x9	0.93	12x9	1.08	12x9	1.23	12x9	1.51	9x9	2.48	1
		3037	100	12x12	0.85	12x12	1.01	12x12	1.18	12x9	1.35	12x9	1.80	12x9	2.10	
		3374	90	12x12	1.09	12x12	1.27	12x12	1.45	12x12	1.63	12x12	2.01	12x9	2.53	
		3796	80	15x15	0.98	12x12	1.63	12x12	1.82	12x12	2.03	12x12	2.44	12x12	2.87	
		4339	70	15x15	1.31	15x15	1.53	12x12	2.42	12x12	2.65	12x12	3.11	12x12	3.59	
		5062	60	15x15	1.85	15x15	2.09	15x15	2.35	15x15	2.60	12x12	4.20	12x12	4.74	
		6074	50	18x18	2.56	18x18	2.08	15x15	3.57	15x15	3.84	15x15	4.48	15x15	5.11	

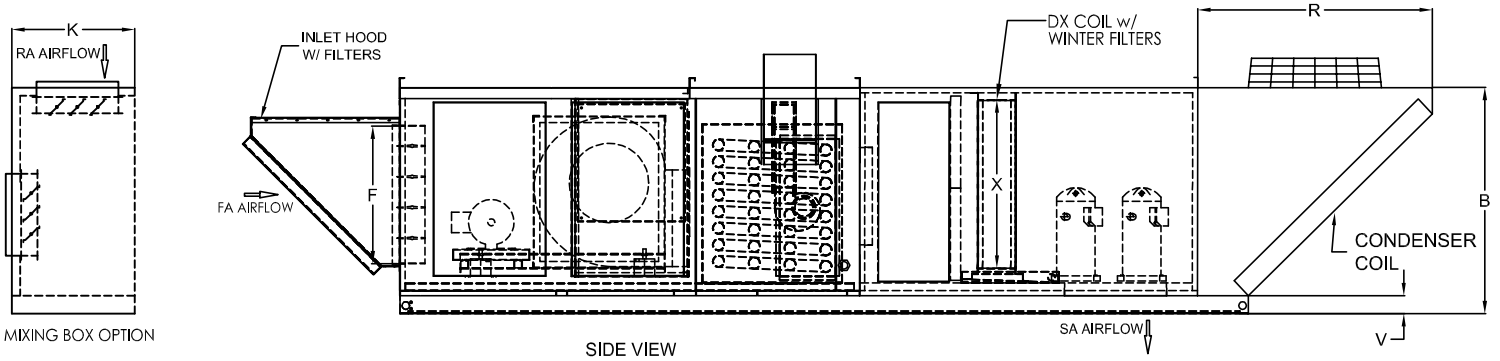
Model HTDM	Input/ Output (MBH)	Air Capacity (CFM)	Temp. Rise (degF)	0.25" W.C.		0.5" W.C.		0 .75" W.C.		1.0" W.C.		1.5" W.C		2.0" W.C.		Gas Conn. Inches
				Blower	BHP	Blower	BHP	Blower	BHP	Blower	BHP	Blower	BHP	Blower	BHP	
600	600/492	4141	110	12x12	1.78	12x12	1.96	12x12	2.14	12x12	2.34	12x12	2.80	12x12	3.26	1
		4556	100	15x15	1.33	15x15	1.55	15x15	1.78	15x15	2.02	15x15	2.51	12x12	3.03	
		5062	90	18x18	1.40	15x15	1.96	15x15	2.21	15x15	2.47	15x15	3.00	15x15	3.55	
		5694	80	18x18	1.79	15x15	2.54	15x15	2.81	15x15	3.10	15x15	3.68	15x15	4.28	
		6508	70	18x18	2.40	18x18	2.77	18x18	3.79	18x18	3.51	18x18	4.28	18x18	5.06	
		7593	60	18x18	3.42	18x18	3.84	18x18	4.27	18x18	4.70	18x18	5.57	18x18	6.46	
		9111	50	20x20	4.00	20x20	4.48	20x20	4.97	20x20	5.49	20x20	6.58	18x18	9.13	

Model HTDM	Input/ Output (MBH)	Air Capacity (CFM)	Temp. Rise (degF)	0.25" W.C.		0.5" W.C.		0 .75" W.C.		1.0" W.C.		1.5" W.C		2.0" W.C.		Gas Conn. Inches
				Blower	BHP	Blower	BHP	Blower	BHP	Blower	BHP	Blower	BHP	Blower	BHP	
1000	1000/800	6734	110	18x18	2.34	18x18	2.71	18x18	3.09	18x18	3.47	18x18	4.24	18x18	5.04	1 1/4
		7407	100	20x20	2.07	18x18	3.28	18x18	3.69	18x18	4.10	18x18	4.94	18x18	5.79	
		8230	90	20x20	2.61	18x18	4.16	18x18	4.59	18x18	5.04	18x18	5.96	18x18	6.90	
		9259	80	20x20	3.48	20x20	3.94	20x20	4.41	20x20	4.91	20x20	4.95	20x20	7.07	
		10582	70	20x20	4.56	20x20	5.06	20x20	5.58	20x20	6.11	20x20	7.22	20x20	8.40	
		12346	60	22x22	5.63	20x20	7.13	20x20	7.72	20x20	8.31	20x20	9.53	20x20	10.81	
		14815	50	22x22	8.60	22x22	9.40	22x22	10.13	22x22	10.88	22x22	12.42	22x22	14.04	

NOTES: -All Static Values Include the Blower, Burner, and Casing
-Accesory Static Values Must be Added to Obtain the Total Static (see pg. 3)
-Brake Horsepower Does Not Include Drive Losses
-A V-bank filter section is required on HTDM 1000 and 1500 with a temperature rise of less than 70 degF

Consult factory for: -Higher Air Capacities or Special Applications
-Performance Data on Higher Statics than Listed
-Performance Data at Elevations Other Than Sea Level





MODEL	CFM	HEATING CAPACITY INPUT(MBH)	COOLING CAPACITY (TONS)	A	B	C	D	E	F	G	H	I	J	K	X	Y	V	R
MTI-11-200-DX	3700	200	3~9	126-9/16	36-1/8	61-3/4	28	10	26	28	30-3/4	5	67	30	26	40	3~3-1/2	30-5/8
MTI-11-300-DX	4500	300	5~9	130-5/8	40-1/16	61-3/4	38	18	26	28	30-3/4	4	67	35	30	42	3~3-1/2	30-5/8
MTI-11-400-DX	4500	400	6~9	130-5/8	40-1/16	61-3/4	38	18	26	28	30-3/4	4	67	35	30	42	3-1/2	30-5/8
MTI-11-600-DX	5670	600	10~15	165	43-1/16	66	42	20	27	28	30-3/4	6	66	35	33	45	3-1/2	45-7/8
MTI-11-800-DX	5670	800	13~15	165	44-1/8	66	42	20	27	48	30-3/4	6	66	35	33	45	3-1/2	45-7/8

NOTES:

1. PROVIDE TIGHT FITTING INSPECTION PANELS IN DUCT DOWN STREAM FROM THE DUCT FURNACE THESE PANELS SHOULD BE 12X12 IN. SO THAT THE HEAT EXCHANGER CAN BE INSPECTED.
2. GAS CONNECTION IS 3/4 IN. N.P.T. UNLESS OTHERWISE SPECIFIED.
3. VENT CAP TO BE INSTALLED WITHOUT ALTERATIONS.

ICG
WESTERN SALES

TITLE
MTI SERIES
PACKAGED DX COOLING, WITH BOTTOM DISCHARGE

MODEL: MTI-11-200~800-DX

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JR			
CHK. BY	DATE	JOB NO.	PAGE
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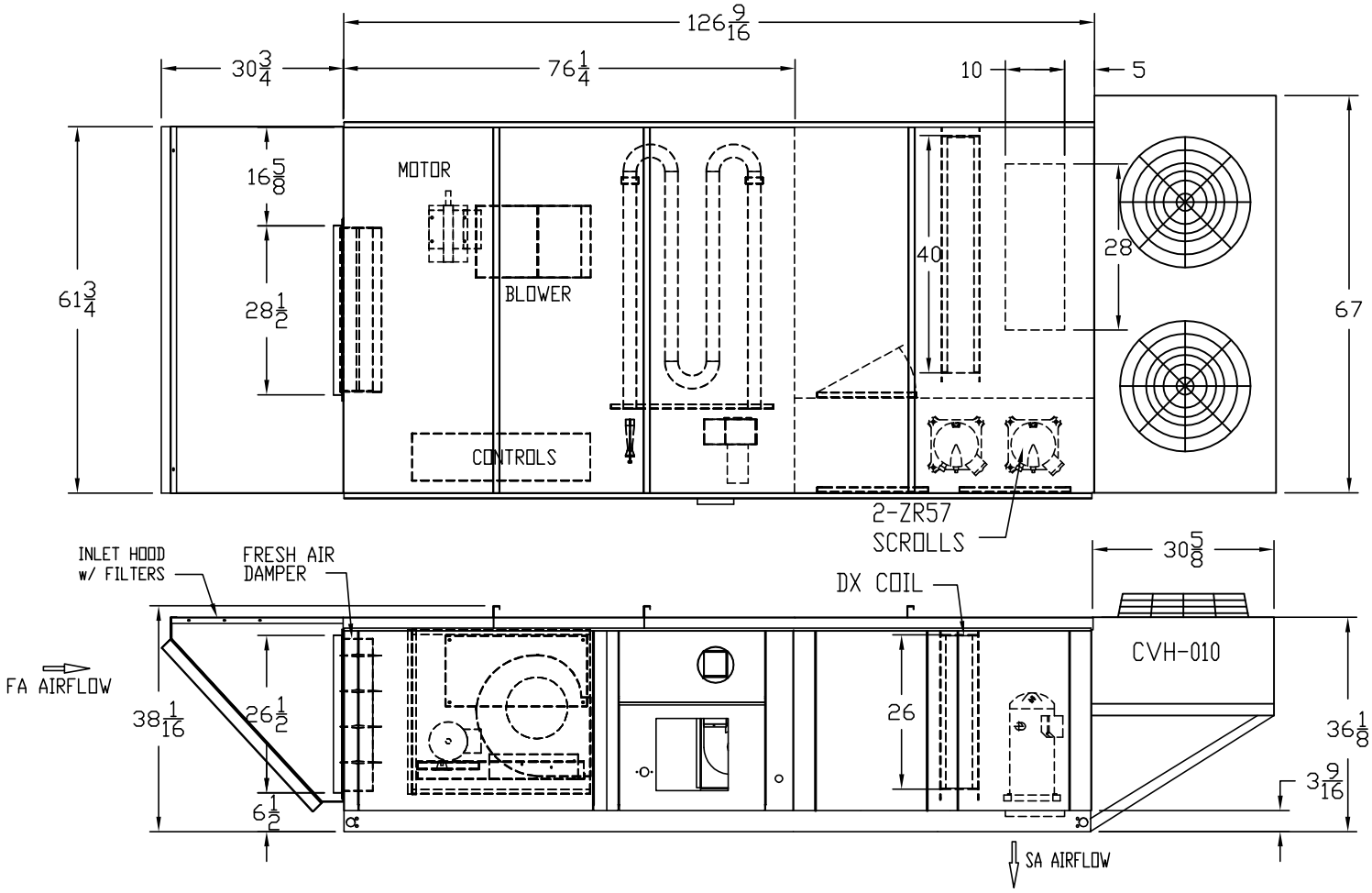

Notes
1. Provide tight fitting inspection panels in duct down steam from the duct furnace. These panels should be 12x12.
2. Gas connection is 3/4 N.P.T unless otherwise specified
3. Vent cap to be installed without Alterations.

Rev	By	Revision Description	Date

WESTERN SALES

TITLE
MTI SERIES
PACKAGED DX COOLING, WITH BOTTOM DISCHARGE

MODEL: MTI-11-200-DX09

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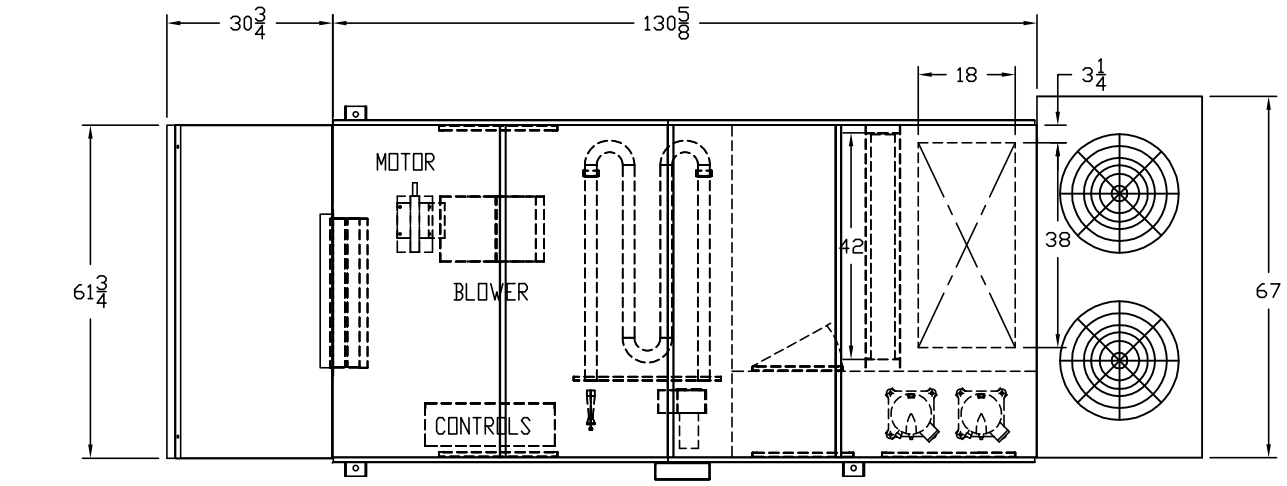
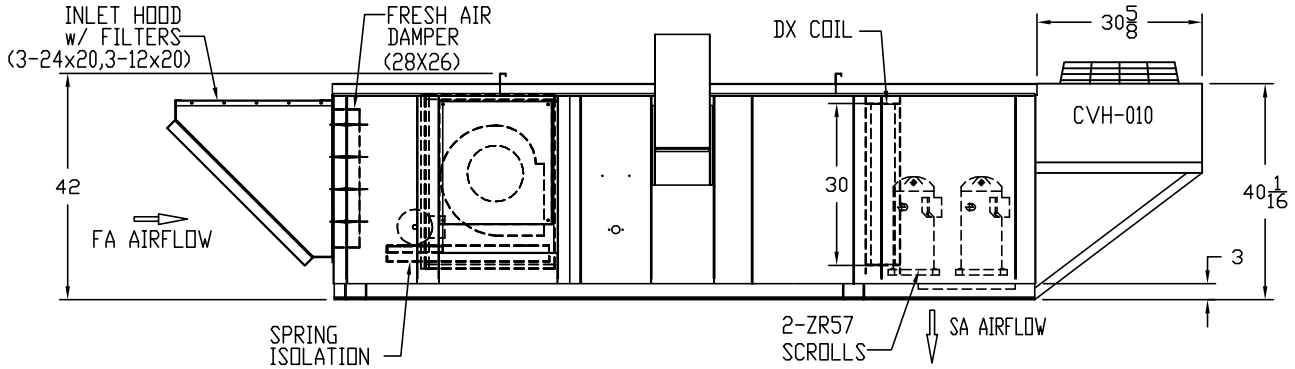


TOP VIEW



SIDE VIEW

Notes
1. Provide tight fitting inspection panels in duct down steam from the duct furnace. These panels should be 12x12.
2. Gas connection is 3/4 N.P.T unless otherwise specified
3. Vent cap to be installed without Alterations.

Rev	By	Revision Description	Date

WESTERN SALES

TITLE
MTI SERIES
PACKAGED DX COOLING, WITH BOTTOM DISCHARGE

MODEL: MTI-11-300/400-DX09

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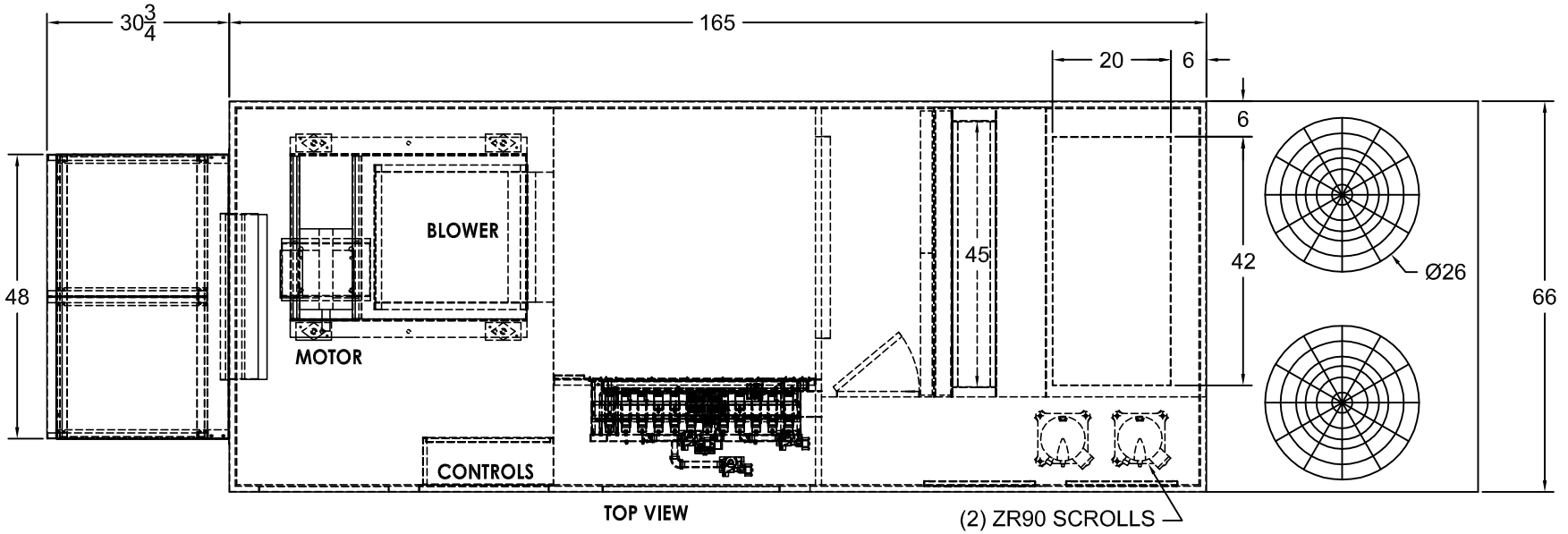

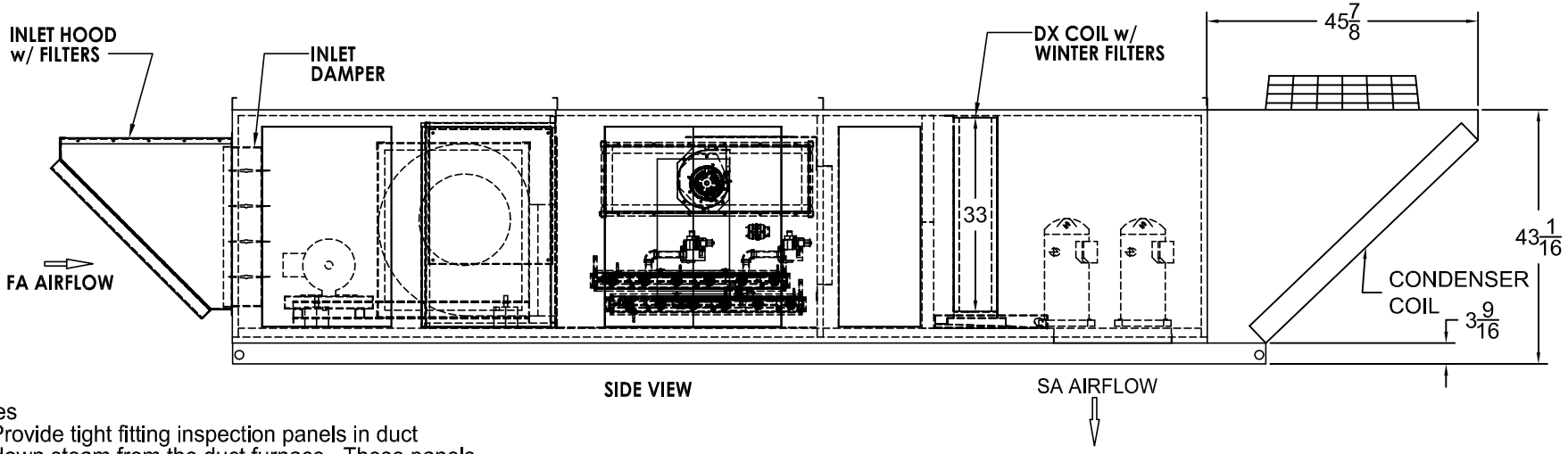

Notes
1. Provide tight fitting inspection panels in duct down steam from the duct furnace. These panels should be 12x12.
2. Gas connection is 3/4 N.P.T unless otherwise specified
3. Vent cap to be installed without Alterations.

Rev	By	Revision Description	Date

WESTERN SALES

TITLE
MTI SERIES
PACKAGED DX COOLING, WITH BOTTOM DISCHARGE

MODEL: MTI-11-600-DX15

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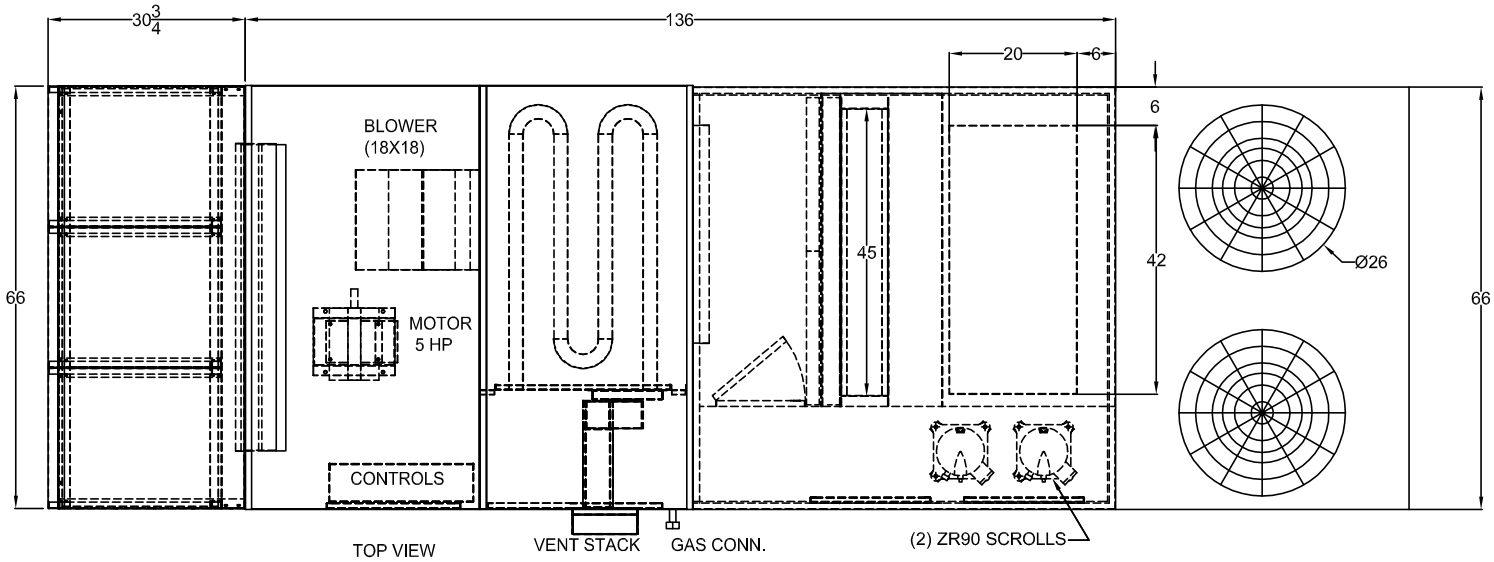

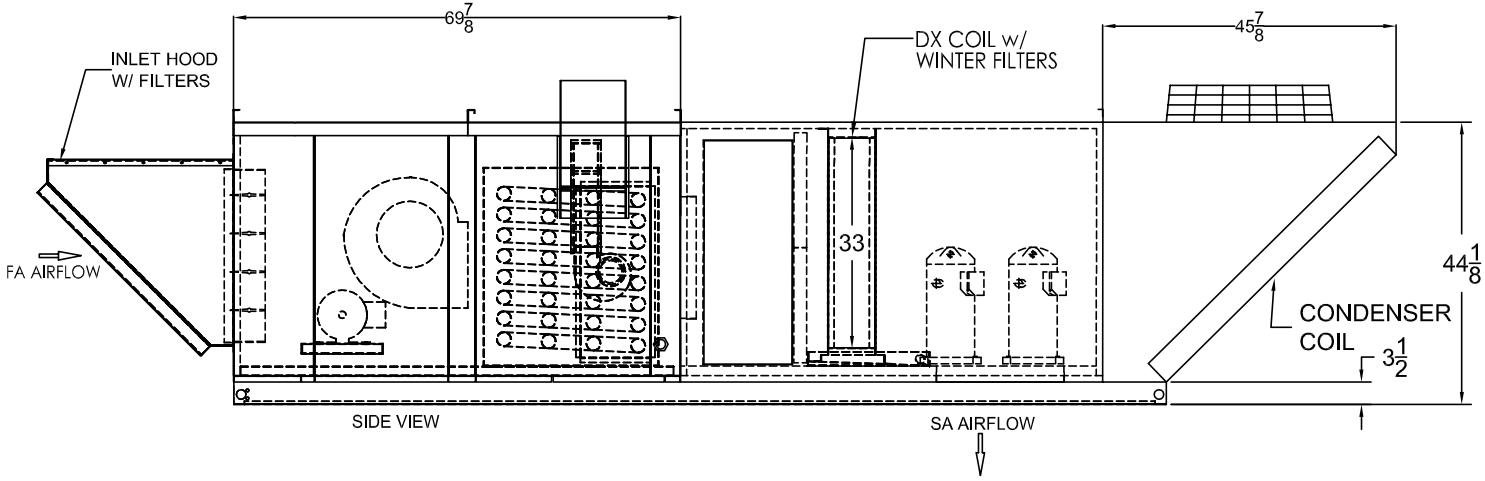

NOTES:

1. PROVIDE TIGHT FITTING INSPECTION PANELS IN DUCT DOWN STREAM FROM THE DUCT FURNACE THESE PANELS SHOULD BE 12X12 IN. SO THAT THE HEAT EXCHANGER CAN BE INSPECTED.
2. GAS CONNECTION IS 3/4 IN. N.P.T. UNLESS OTHERWISE SPECIFIED.
3. VENT CAP TO BE INSTALLED WITHOUT ALTERATIONS.

Rev	By	Revision Description	Date

WESTERN SALES

TITLE
MTI SERIES
PACKAGED DX COOLING, WITH BOTTOM DISCHARGE

MODEL: MTI-11-800-DX15

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MTI –TYPE
-Industrial Indirect Fired Series-
TYPICAL SPECIFICATIONS

TYPE AND DESCRIPTION

Supply an ICE .Manufacturing Ltd.. indirect fired heat vent unit designed for (indoor) (outdoor) installation. The capacity and configuration shall be as detailed on the drawings. The unit shall be ETL certified and listed to be in compliance with the current ANSI Z83.8 second edition; CSA/CGA 2.6-2002; Addenda A-2003; Addenda B-2004.

The burners, gas train and controls are to be in accordance with (ANSI) (FM) (IRI) (FM and IRI) requirements. Both burner and blower shall be compensated for altitude of operation.

The unit is to be completely factory test fired to verify proper operation. The unit capacity is to be validated with an instantaneous flow meter. A complete electrical circuit analysis is to be conducted and all systems operated and measured. A combustion analyzer is to be employed while unit is operating at full capacity to verify combustion emissions. Burner combustion must be clean and odorless and no aliphatic aldahydes are to be detectable. Combustion efficiency is to be at least 80% while maintaining clean emissions.

UNIT CASING

Unit construction is to be of industrial quality heavy gauge bonderized steel. The unit design shall incorporate a full base pan supported by an integral heavy base.

To ensure the casings are airtight and weatherproof, all panels are to be caulked during assembly. All casings are to be hand fitted and secured with gasketed self-tapping screws. Roof casing are to feature three-break standing seam panel design.

Entire unit casing and accessories are to be insulated with fiberglass insulation with hard neoprene facing. (1 or 2 in. thick 1-1/2# or 2# density) insulation is to be secured with industrial glue and welded pin spots. Insulation is to be certified to fire and flamespread ratings as outlined by the ANSI code. The entire floor of the unit is to feature a steel liner sandwiching the insulation.

Units are to be equipped with access doors to all serviceable components. Access doors are to have full-length stainless steel piano hinges. All access doors are to be equipped with an insulation liner, positive seal latches and gasketing . Access doors are to open outward on negative pressure sections and inward on positive pressure sections. Access doors to feature 6 in. handles with locking roller mechanism for ease of latching. All outdoor unit access doors are to be equipped with drain troughs.

Units are to be finished with an industrial grade chain stop alkyd enamel paint. The medium grey finish coat is to be a mimum of 3 mils thick and provide 100% coverage.

BLOWER / MOTOR SECTION

Unit(s) shall be supplied with a single AMCA rated centrifugal forward curved insdustrial statically and dynamically balanced blower. The fan shall be mounted on a heavy duty machined and polished shaft. The shafts maximum operating speed is not to exceed 75% of its first critical speed. The bearings and motor shall be mounted in the airstream. The T-frame motor shall be mounted in a motor compartment on a fully adjustable base. The bearings are to be industrial pillow block type supplied with extended grease lines. The blower is to be driven with an (adjustable) (fixed) 1.25 s.f. V-belt drive package concealed in a belt guard. Outdoor units shall have hinged door(s) to provide easy access to maintain and inspect motor, belts & bearings.

FURNACE SECTION

The furnace section shall be positioned downstream of the blower section to ensure it is operating in a positive pressure chamber. The furnace is to be constructed of minimum 16 gauge heavy duty 409 (optional 304) stainless steel tubes. The furnace shall include heavy duty inshot burners.

The furnace section will operate under a negative pressure as induced by the power venter. The power venter will be two speed to provide optimum combustion and efficiency levels on reduced capacities. The power ventor shall come standard with a blocked flue switch, and the burner equipped with a flame roll out switch. A modulating electro-mechanical valve will reduce gas flow in response to the signal from the unit mounted PLC. The modulation will allow reduction of capacity down to 1/6 of high fire per furnace.

Indoor units shall be suitable for sidewall venting, and shall come with optional sealed combustion kit.

CONTROL/MANIFOLD COMPARTMENT

Unit control enclosure to have hinged access. Terminal strip and all wiring shall be numbered. The controls for the heater shall include;

- blower motor starter w/ambient compensated overloads and auxiliary contact(s).
- primary to 120v control transformer
- 6,ooo volt ignition transformer
- control circuit breaker and service switch
- manual reset temperature high limit
- flamesafeguard circuit
- discharge temperature control sensor
- differential air proving safety switch
- automatic low temperature limit (optional)

All wiring external to control enclosure shall be run in conduit. The gas manifold shall include;

- main gas pressure regulator
- high gas pressure regulator (optional)
- manual shutoff & test firing valve
- main gas automatic shutoff valve
- auxiliary main gas automatic shutoff valve
- modulating control system
- pilot pressure regulator

- pilot automatic shutoff valve
- pilot manual shutoff valve
- pilot needle valve
- multiple test ports

Outdoor units shall have hinged doors to provide easy access to maintain and inspect valves and controls.

EVAPORATOR COILS

Evaporator coils are intended for use with a wide range of applications and refrigerant types. Coils are to be designed to maximize performance under specified conditions with minimal air-side pressure drop.
Coils shall be UL recognized as Refrigerant Containing Component. Coils to be used with refrigerant R-410A shall have undergone cycle testing, and shall be safety listed with 750 psig rating.
Tubes and return bends shall be constructed from seamless UNS C12200 copper conforming to ASTM B224 and ASTM E527. Properties shall be O50 light annealed with a maximum grain size of 0.040 mm.
Tubes are to mechanically expanded into fins (secondary surface) for maximum heat transfer. Materials are to be 3/8" diameter x (0.014, 0.022) wall thickness, 1/2" diameter x (0.016, 0.025) wall thickness, or 5/8" diameter x (0.020, 0.025, 0.035, 0.049) wall thickness.
Secondary surface (fins) shall be of the plate-fin design using aluminum or copper, with die-formed collars. Fin design to be flat, waffle, or sine-wave in a staggered tube pattern to meet performance requirements.
Collars will hold fin spacing at specified density, and cover the entire tube surface. Aluminum properties are to be Alloy 1100 per ASTM B209, with O (soft) temper; copper is to be Alloy 11000 per ASTM B152-06 with soft (anneal) temper. Fins are to be free of oils and oxidation.
Headers are to be constructed of seamless UNS C12200, Type L (drawn) copper material sized to match specified connection size. Type K (drawn) copper headers shall be offered as optional material.
Die-formed copper end caps are brazed on the inside of the headers, unless spun-closed (for sized up to 1-3/8").
Evaporator coils shall be designed with brass liquid distributors (as required), and copper sweat suction connections. Distributors shall be capped using soft-solder for ease of cap removal; suction connections shall be capped.
Coil casing material shall be of G90 galvanized steel, 16 gauge minimum. Heavier material, stainless steel, copper, or aluminum casing are to be provided as required.
Intermediate tube supports are to be provided on all coils 48" and longer fin length. Coil casing on top and bottom of coils are to have double-flange construction, allowing for vertical stacking of coils.
All coils are to be brazed with minimum 5% silver content (BCup-3) filler material to insure joint integrity.
Coils shall be tested at 550 psig using dry nitrogen, submerged under water. Dual-operator verification shall determine that all coils are leak-free.
Coils shall be shipped with nitrogen charge to verify leak-free integrity, and to prevent moisture migration into coil.
Coils shall be certified to withstand 750 psig working pressure.

CONDENSER COILS

Condenser coils are intended for use with a wide range of applications and refrigerant types. Coils are to be designed to maximize performance under specified conditions with minimal air-side pressure drop.

Coils shall be UL recognized as Refrigerant Containing Component. Coils to be used with refrigerant R-410A shall have undergone cycle testing, and shall be safety listed with 750 psig rating.
Tubes and return bends shall be constructed from seamless UNS C12200 copper conforming to ASTM B224 and ASTM E527. Properties shall be O50 light annealed with a maximum grain size of 0.040 mm.
Tubes are to mechanically expanded into fins (secondary surface) for maximum heat transfer. Materials are to be 3/8" diameter x (0.014, 0.022) wall thickness, 1/2" diameter x (0.016, 0.025) wall thickness, or 5/8" diameter x (0.020, 0.025, 0.035, 0.049) wall thickness.
Internally enhanced rifled or cross-hatched tubes can be offered as an option.
Secondary surface (fins) shall be of the plate-fin design using aluminum or copper, with die-formed collars. Fin design to be flat, waffle, or sine-wave in a staggered tube pattern to meet performance requirements.
Collars will hold fin spacing at specified density, and cover the entire tube surface. Aluminum properties are to be Alloy 1100 per ASTM B209, with O (soft) temper; copper is to be Alloy 11000 per ASTM B152-06 with soft (anneal) temper. Fins are to be free of oils and oxidation.
Headers are to be constructed of seamless UNS C12200, Type L (drawn) copper material sized to match specified connection size. Type K (drawn) copper headers shall be offered as optional material.
Die-formed copper end caps are brazed on the inside of the headers, unless spun-closed (for sized up to 1-3/8").
Condenser coils shall be designed with copper sweat connections, and shall be shipped with caps on connections.
Coil casing material shall be of G90 galvanized steel, 16 gauge minimum. Heavier material, stainless steel, copper, or aluminum casing are to be provided as required.
Coils designed for hot-gas applications shall have oversized tube sheet holes for hot gas feeds to allow for free expansion and contraction of tubes during operation.
Intermediate tube supports are to be provided on all coils 48" and longer fin length. Coil casing on top and bottom of coils are to have double-flange construction, allowing for vertical stacking of coils.
All coils are to be brazed with minimum 5% silver content (BCup-3) filler material to insure joint integrity.
Coils shall be tested at 550 psig using dry nitrogen, submerged under water. Dual-operator verification shall determine that all coils are leak-free.
Coils shall be shipped with nitrogen charge to verify leak-free integrity, and to prevent moisture migration into coil.
Coils shall be certified to withstand 750 psig working pressure.

REFRIGERATION COMPRESSORS

Compressors shall be either hermetic or semi-hermetic type.

A) Semi-Hermetic- Semi-hermetic reciprocating compressors shall be provided on systems with total cooling capacity of 25 Tons and larger. Up to 40 tons a single compressor will be used and multiple semi-hermetic compressors over 40 Tons. Compressors shall be completely factory assembled, piped, insulated, internally wired and tested. Units shall be shipped in one piece and come fully charged with refrigerant and filled with compressor oil. Units shall be rated in accordance with ARI standards. The refrigerant system shall be leak tested, evacuated and refrigerant charged at the factory. Compressors shall be suction gas cooled and come with integral spring vibration isolators, oil level sight glass, discharge mufflers, vibrasorbers, automatic reversible oil pump, oil filter screen. Oil charging valve, crankcase

heater which de-energizes during compressor operation, liquid line service valves. Unit shall also have the following safety control features:

- Low pressure cutout
- High pressure cutout, manual reset
- Adjustable low ambient lockout
- Liquid line solenoids incorporating pump down system
- Anticycling time device (to prevent excessive cycling and premature wear on compressor and contactors) and phase and brownout protection.
- Oil failure control

Provide cylinder suction pressure unloaders for capacity control, with minimum steps required to provide coil frost protection, based on refrigerant circuit suction temperatures. Provide filter dryers, sight glasses and compressor service valves for each individual compressor. Provide hot gas bypass for each compressor. Compressor staging to be provided by a Honeywell T775 Series standalone controller mounted in the unit.

B) Hermetic compressors- Compressors shall be set on resilient neoprene mounts and complete with line voltage break internal overload protection, internal pressure relief valve and crankcase heater. Each unit shall have a minimum of two compressors. Whereby a unit utilizing two compressors the first stage compressor must be a digital scroll operating with a Emerson EC3 series stand-alone superheat controller with a built in synchronization control for the digital scroll. Unit will provide turndown on cooling. Multiple refrigeration circuits shall be separate from each other. Refrigeration circuits shall be complete with liquid line filter-driers, and service ports fitted with Schraeder fittings. Units shall incorporate load compensated thermal expansion valves with external equalizers (electronic expansion valves on digital systems) and combination sight glass moisture indicators. System charge will be designed for 10 degrees Fahrenheit. Each system shall be factory run and adjusted prior to shipment. Controls shall include:

- Compressor motor contactors
- Overload protection control
- Cooling relays
- Ambient compressor lockout
- Dual pressure controls
- Anti-cycle timers
- Hot gas bypass on lead compressor to maintain adequate suction pressure in the event of low loads

  (only when digital scrolls are not being used)

Packaged units shall operate down to 50 degrees Fahrenheit as standard. Minus 40 refrigeration systems are available as an option. Compressors shall be located on the side of the unit in a service enclosure complete with hinged access doors.

MTI Performance Specifications

MTI 11-200 - 200 MBH INPUT/160 MBH OUTPUT

Air Capacity (CFM)	Temp. Rise	0.25" W.C. BHP	0.5" W.C. BHP	0 .75" W.C. BHP	1.0" W.C. BHP	1.5" W.C. BHP	2.0" W.C. BHP	Gas Conn. Inches
3704	**40**	1.97	2.16	1.85	2.56	2.96	3.34	
2963	**50**	1.28	1.45	1.60	1.75	2.05	2.35	
2469	**60**	1.28	1.41	1.53	1.67	1.97	2.28	
2116	**70**	0.95	1.07	1.20	1.33	1.58	1.83	3/4
1852	**80**	0.74	0.86	0.97	1.08	1.29	1.51	
1646	**90**	0.60	0.70	0.80	0.89	1.08	1.27	

MTI 11-300 - 300 MBH INPUT/240 MBH OUTPUT

Air Capacity (CFM)	Temp. Rise	0.25" W.C. BHP	0.5" W.C. BHP	0 .75" W.C. BHP	1.0" W.C. BHP	1.5" W.C. BHP	2.0" W.C. BHP	Gas Conn. Inches
5556	**40**	2.48	2.75	3.02	3.30	3.87	4.47	
4444	**50**	2.83	3.04	3.27	3.49	3.96	4.45	
3704	**60**	1.89	2.08	2.28	2.48	2.89	3.27	
3175	**70**	1.38	1.56	1.73	1.90	2.22	2.54	3/4
2778	**80**	1.08	1.23	1.37	1.51	1.79	2.08	
2469	**90**	0.87	1.00	1.12	1.25	1.51	1.77	

MTI 11-400 - 400 MBH INPUT/320 MBH OUTPUT

Air Capacity (CFM)	Temp. Rise	0.25" W.C. BHP	0.5" W.C. BHP	0 .75" W.C. BHP	1.0" W.C. BHP	1.5" W.C. BHP	2.0" W.C. BHP	Gas Conn. Inches
7407	**40**	3.46	3.86	4.26	4.67	5.51	6.36	
5926	**50**	2.74	3.02	3.31	3.60	4.20	4.81	
4938	**60**	2.97	3.18	3.40	3.65	4.17	4.71	
4233	**70**	2.09	2.29	2.51	2.74	3.20	3.67	3/4
3704	**80**	1.58	1.78	1.98	2.18	2.60	3.02	
3292	**90**	1.26	1.44	1.62	1.81	2.19	2.59	

NOTES:

-All Static Values Include Blower, Burner, Casing and Filters

-Accesory Static Values Must be Added to Obtain the Total Static

-Brake Horsepower Does Not Include Drive Losses

- Units can be derated to achieve specific heat requirements, please note on your order your specific heat requirement

Consult factory for:

-Higher Air Capacities or Special Applications

-Performance Data on Higher Statics than Listed

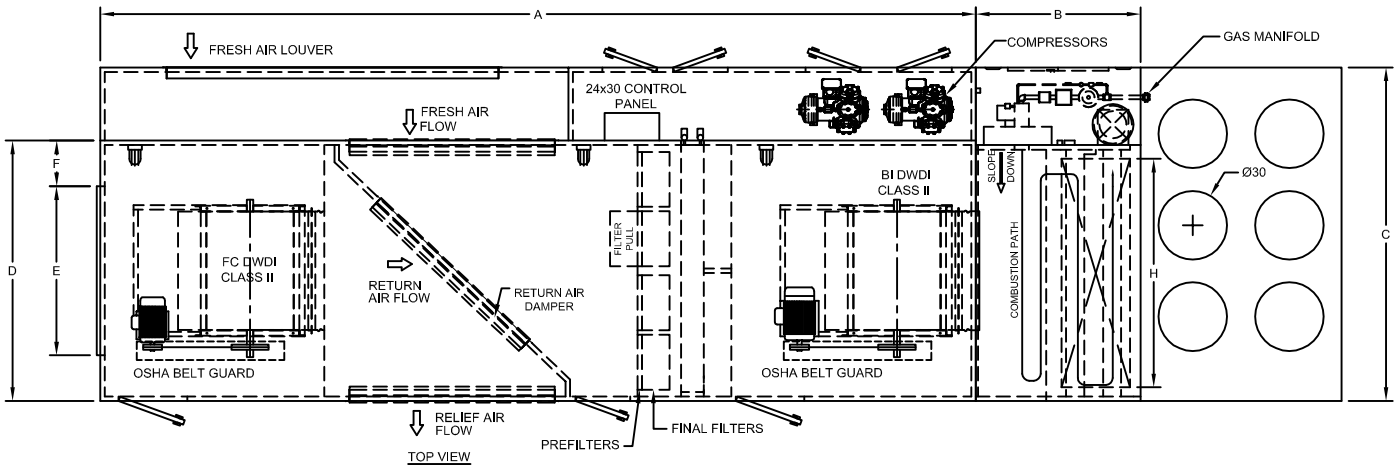
-Performance Data at Elevations Other Than Sea Level

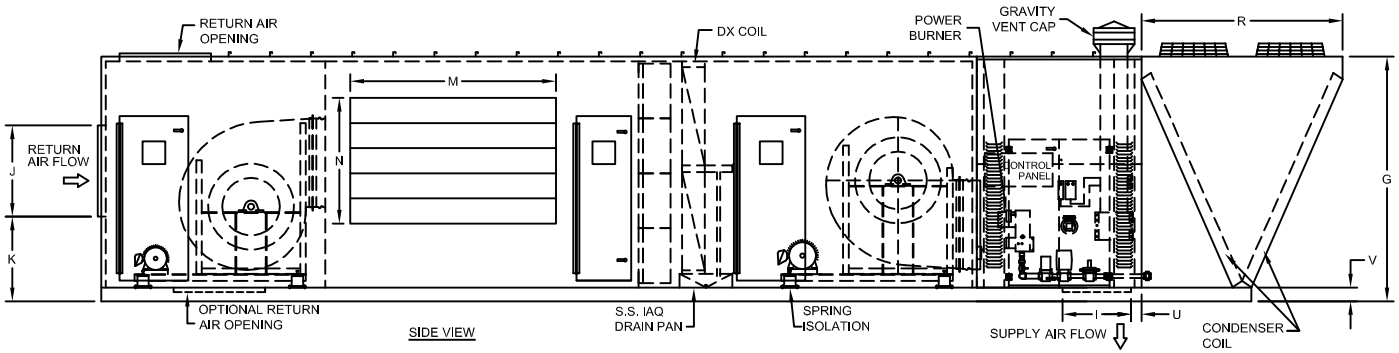
MTI 11-600 - 600 MBH INPUT/480 MBH OUTPUT

Air Capacity (CFM)	Temp. Rise	0.25" W.C. BHP	0.5" W.C. BHP	0 .75" W.C. BHP	1.0" W.C. BHP	1.5" W.C. BHP	2.0" W.C. BHP	Gas Conn. Inches
11111	**40**	8.25	9.00	9.90	10.20	11.00	12.46	
8889	**50**	5.28	5.75	6.25	6.73	7.70	8.71	
7407	**60**	4.72	5.04	5.37	5.73	6.44	7.17	
6349	**70**	3.39	3.69	3.99	4.31	4.94	5.60	3/4
5556	**80**	2.60	2.88	3.16	3.43	4.01	4.61	
4938	**90**	3.12	3.34	3.58	3.84	4.37	4.90	
4444	**100**	2.46	2.68	2.91	3.15	3.63	4.13	
4040	**110**	2.01	2.22	2.44	2.66	3.10	3.56	

MTI 11-800 - 800 MBH INPUT/640 MBH OUTPUT

Air Capacity (CFM)	Temp. Rise	0.25" W.C. BHP	0.5" W.C. BHP	0 .75" W.C. BHP	1.0" W.C. BHP	1.5" W.C. BHP	2.0" W.C. BHP	Gas Conn. Inches
14815	**40**	10.39	11.05	11.76	12.42	13.79	15.19	
11852	**50**	6.49	7.60	7.61	8.20	9.43	10.68	
9877	**60**	6.25	6.91	7.44	7.96	9.04	10.13	
8466	**70**	4.69	5.15	5.61	6.07	7.00	7.97	3/4
7407	**80**	3.64	4.05	4.45	4.88	5.72	6.58	
6584	**90**	2.95	3.32	3.68	4.06	4.83	5.63	
5926	**100**	2.84	3.12	3.41	3.70	4.30	4.93	
5387	**110**	2.34	2.60	2.87	3.14	3.71	4.29	





MODEL	CFM	HEATING CAPACITY RANGE(MBH)	COOLING CAPACITY (TONS)	A	B	C	D	E	F	G	H	I	J	K	M	N	R	U	V	DX COIL QTY/SIZE	S/A MOTOR (HP)	S/A FAN (inch)	R/A MOTOR (HP)	R/A FAN (inch)	R/A DAMPER HEIGHTx WIDTH	PREFILTER QTY/SIZEX2"	FINAL FILTER QTY/SIZEX12"
AH-150-GIDM-DX36	15000	450 ~ 1000	36	268	62	110	78	50	14	79	71	20	30	20	40	45	60	4-1/2	4	2-30x72	20	22	10	22	30x60	6-24x24,3-24x12	6-24x24,3-24x12
AH-180-GIDM-DX45	18000	450 ~ 1000	45	298	62	110	78	50	14	92	70	22	30	38	50	50	60	4-1/2	6	2-35.5x72	20	27	10	27	40x60	9-24x24	9-24x24
AH-210-GIDM-DX50	21000	450 ~ 1000	50	310	62	122	90	60	15	92	80	30	40	38	52	55	60	4-1/2	6	2-35.5x84	30	30	15	30	40x72	9-24x24,3-24x12	9-24x24,3-24x12
AH-240-GIDM-DX60	24000	450 ~ 1750	60	323	72	134	102	60	21	92	91	30	36	38	52	55	60	4-1/2	6	2-35.5x96	25	33	15	33	40x72	12-24x24	12-24x24
AH-320-GIDM-DX80	32000	550 ~ 1750	80	383	72	146	114	74	20	107	100	30	40	37	90	55	88	4-1/2	6	2-43x108	30	36	15	36	55x90	16-24x24	16-24x24
AH-400-GIDM-DX100	40000	650 ~ 2000	100	395	72	170	138	80	29	109	111	30	43	36	90	66	88	4-1/2	6	2-44x132	40	40	20	40	55x108	20-24x24	20-24x24
AH-480-GIDM-DX120	48000	750 ~ 2500	120	415	72	194	162	100	31	112	150	32	48	32	90	82	88	4-1/2	8	2-44.5x156	50	44	25	44	55x134	24-24x24	24-24x24
AH-600-GIDM-DX150	60000	1000 ~ 2750	150	436	88	194	162	100	31	133	132	32	52	45	90	82	88	4-1/2	8	2-55x156	60	48	30	48	55x134	30-24x24	30-24x24
AH-700-GIDM-DX175	70000	1250 ~ 2750	175	495	88	212	180	110	35	135	150	35	58	50	112	78	88	4-1/2	10	2-55x166	75	54	40	54	65x134	35-24x24	35-24x24

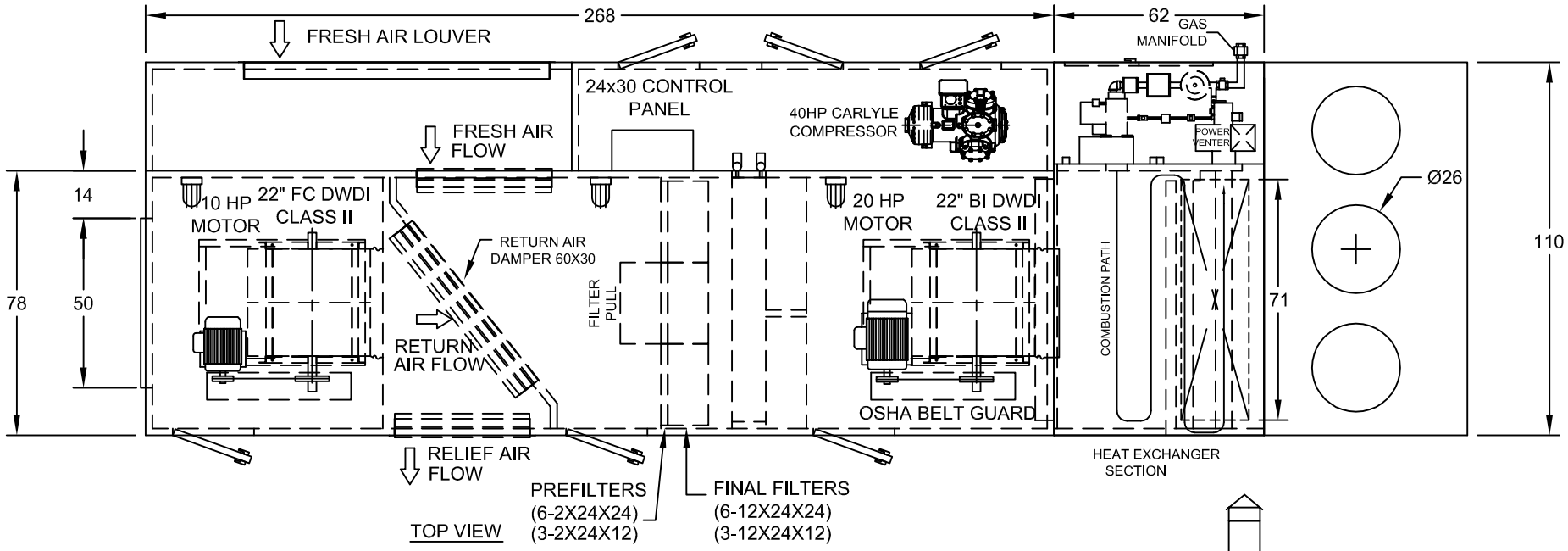
NOTES:

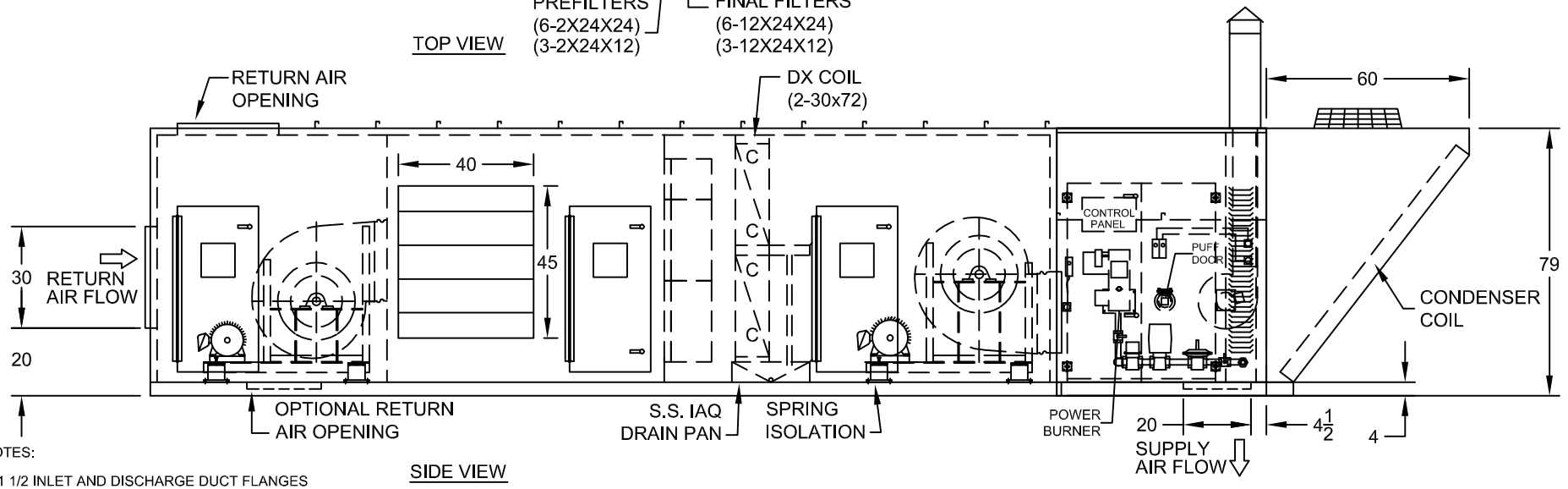
1. 1 1/2 INLET AND DISCHARGE DUCT FLANGES.
2. SERVICE ACCESS PANELS MUST NOT BE OBSTRUCTED RECOMMENDED CLEARENCE 24 INCHES.
3. DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES. FOR REFERENCE USE ONLY, SUBJECT TO CHANGE WITHOUT NOTICE.

WESTERN SALES

TITLE
15,000 ~ 70,000CFM AIR HANDLING UNIT
MIXING BOX c/w RELIEF, PACKAGED DX COOLING, RETURN AIR BLOWER, SUPPLY AIR BLOWER
MODEL: AH-GIDM-DX

DRAWN BY	ISSUED BY	SCALE	DRW. NO.
		1/7"=1'	
CHK. BY	DATE	JOB NO.	PAGE
			T-24





NOTES:

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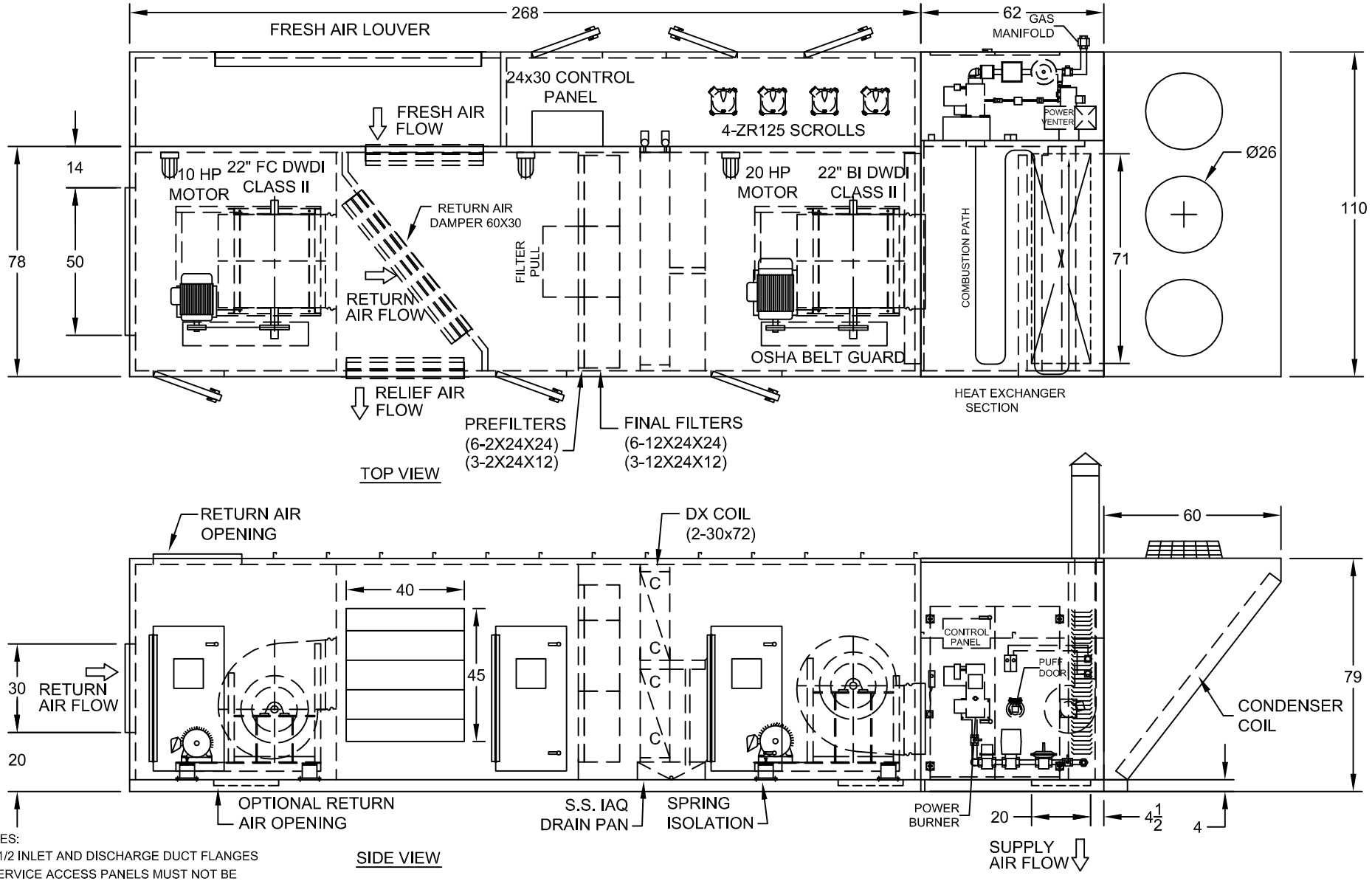
Rev	By	Revision Description	Date

WESTERN SALES

TITLE
15,000 CFM AIR HANDLING UNIT
MIXING BOX c/w RELIEF, PACKAGED DX COOLING,
RETURN AIR BLOWER, SUPPLY AIR BLOWER
MODEL: AH-150-GIDM100-DX36

DRAWN BY	ISSUED BY	SCALE	DRW. NO.
		1/4"=1'	
CHK. BY	DATE	JOB NO.	PAGE
			T-25



NOTES:

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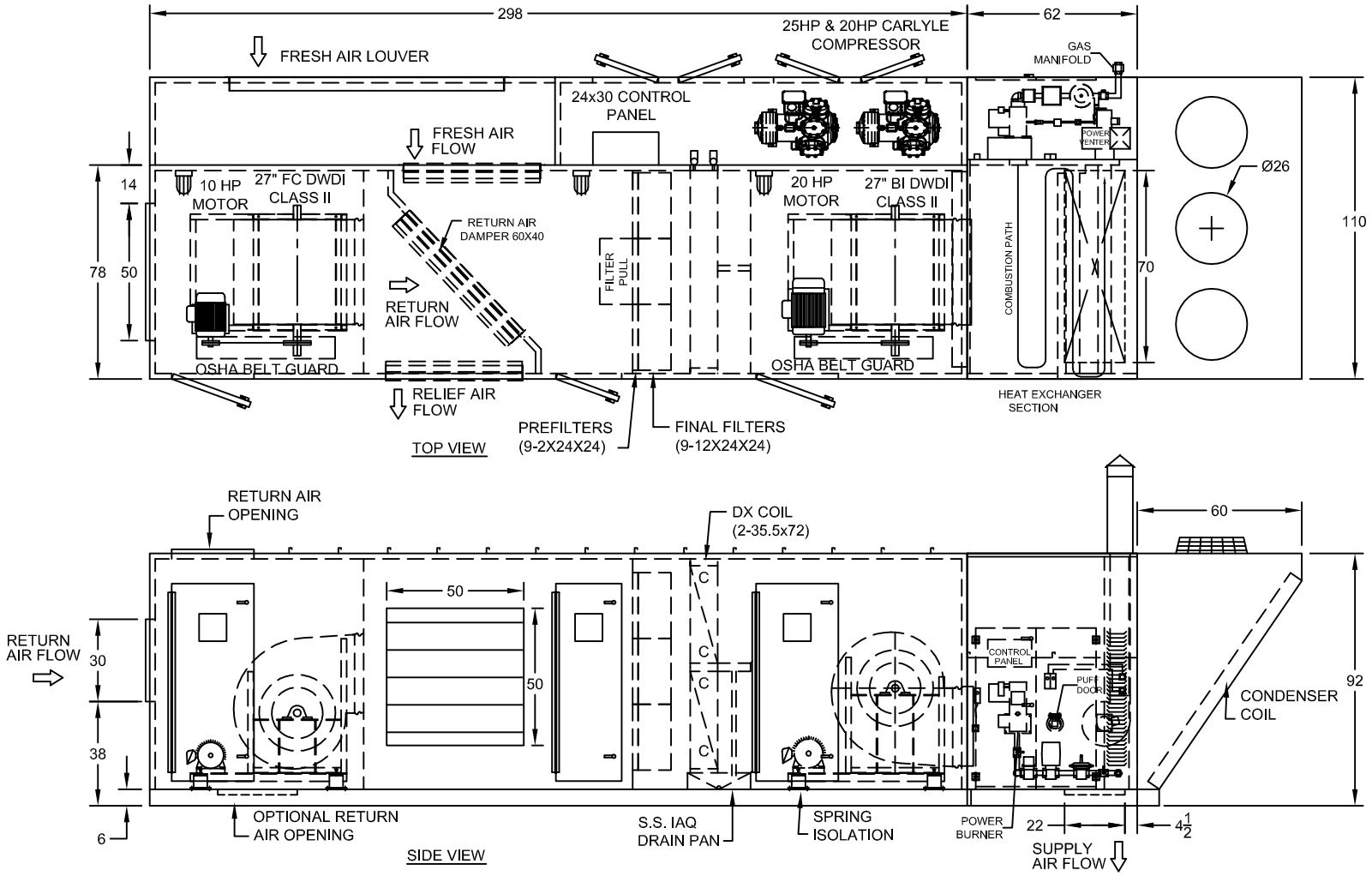
Rev	By	Revision Description	Date

WESTERN SALES

TITLE
15,000CFM AIR HANDLING UNIT
MIXING BOX c/w RELIEF, PACKAGED DX COOLING,
RETURN AIR BLOWER, SUPPLY AIR BLOWER
MODEL: AH-150-GIDM100-DX36

DRAWN BY	ISSUED BY	SCALE	DRW. NO.
		1/4"=1'	
CHK. BY	DATE	JOB NO.	PAGE
			T-26



NOTES:

1. 1 1/2 INLET AND DISCHARGE DUCT FLANGES
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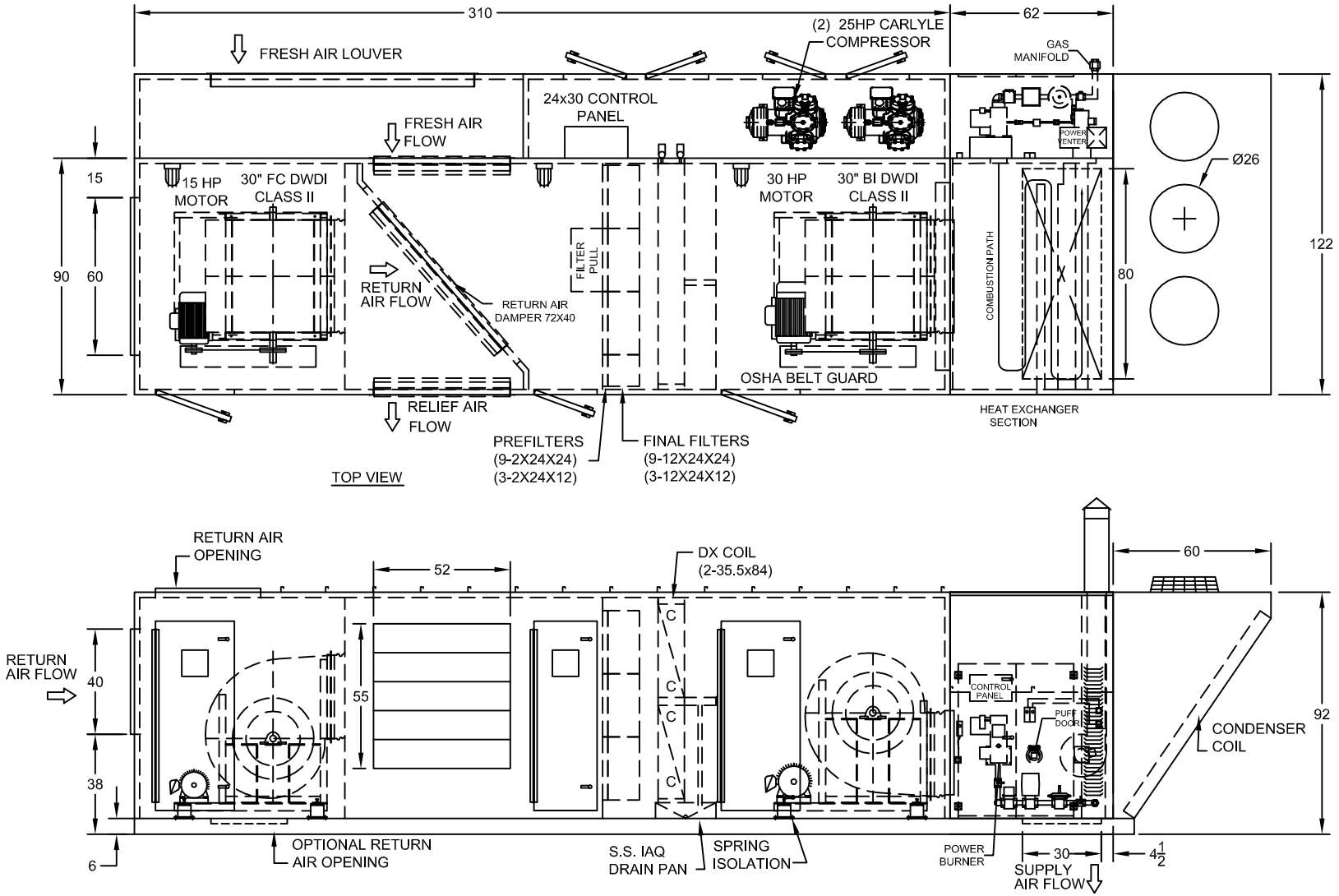
Rev	By	Revision Description	Date

WESTERN SALES

TITLE
18,000CFM AIR HANDLING UNIT
MIXING BOX c/w RELIEF, PACKAGED DX COOLING,
RETURN AIR BLOWER, SUPPLY AIR BLOWER
MODEL: AH-180-GIDM100-DX45

DRAWN BY	ISSUED BY	SCALE	DRW. NO.
		1/5"=1'	
CHK. BY	DATE	JOB NO.	PAGE
			T-27



NOTES:

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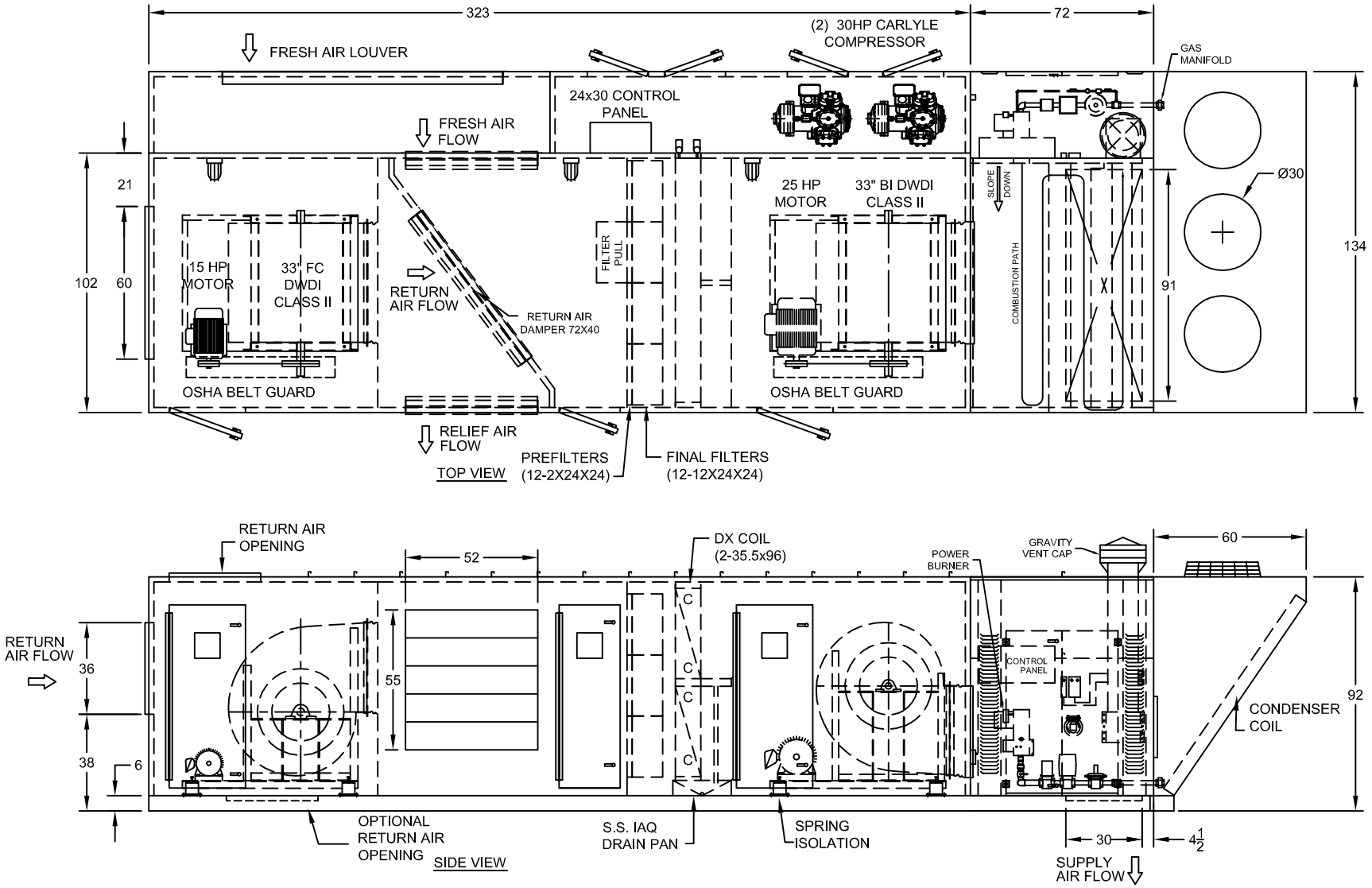
Rev	By	Revision Description	Date

WESTERN SALES

TITLE
21,000CFM AIR HANDLING UNIT
MIXING BOX c/w RELIEF, PACKAGED DX COOLING, RETURN AIR BLOWER, SUPPLY AIR BLOWER
MODEL: AH-210-GIDM100-DX50

DRAWN BY	ISSUED BY	SCALE	DRW. NO.
		1/4"=1'	
CHK. BY	DATE	JOB NO.	PAGE
			T-28



NOTES:

1. 1 1/2 INLET AND DISCHARGE DUCT FLANGES
2. SERVICE ACCESS PANELS MUST NOT BE OBSTRUCTED RECOMMENDED CLEARANCE 24 INCHES.
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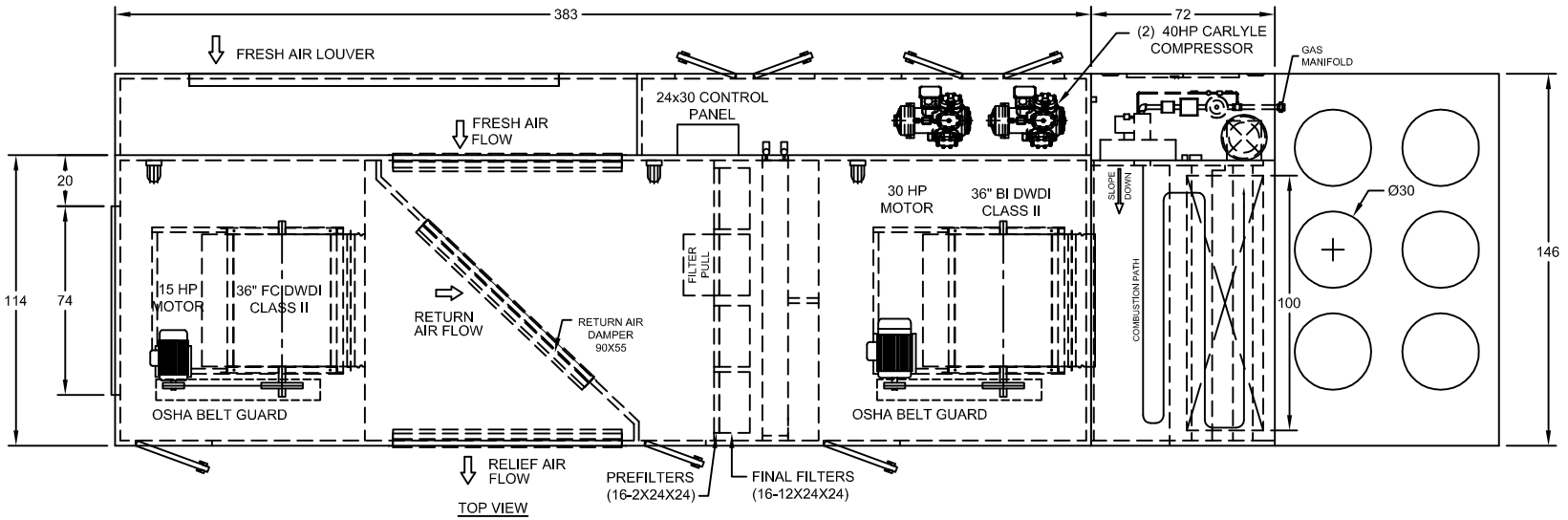
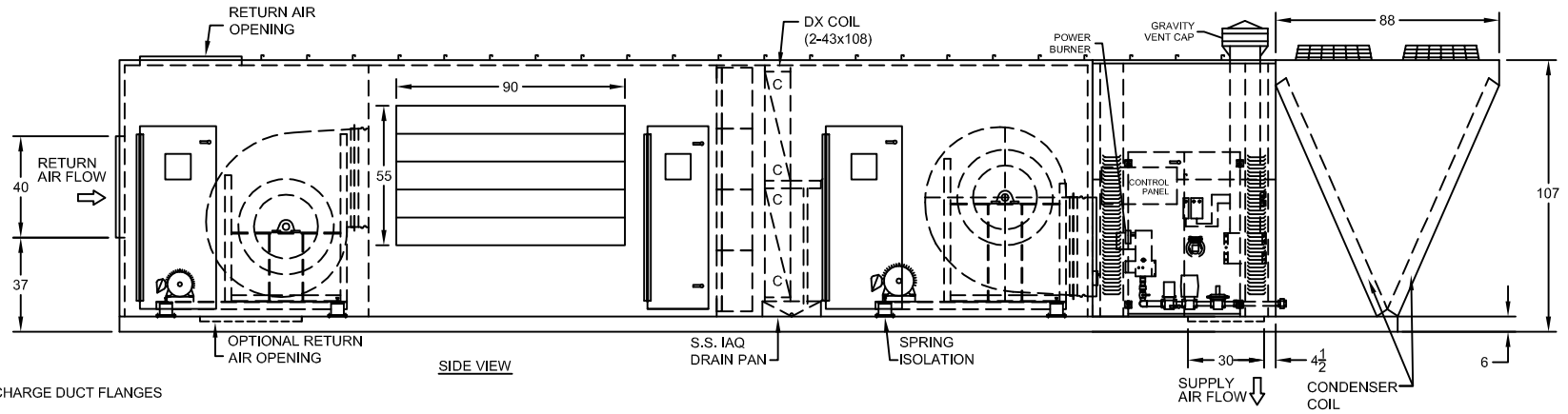
Rev	By	Revision Description	Date

ICG WESTERN SALES

TITLE
24,000CFM AIR HANDLING UNIT
MIXING BOX c/w RELIEF, PACKAGED DX COOLING,
RETURN AIR BLOWER, SUPPLY AIR BLOWER
MODEL: AH-240-GIDM175-DX60

DRAWN BY	ISSUED BY	SCALE	DRW. NO.
		1/5"=1'	
CHK. BY	DATE	JOB NO.	PAGE
			T-29





NOTES:

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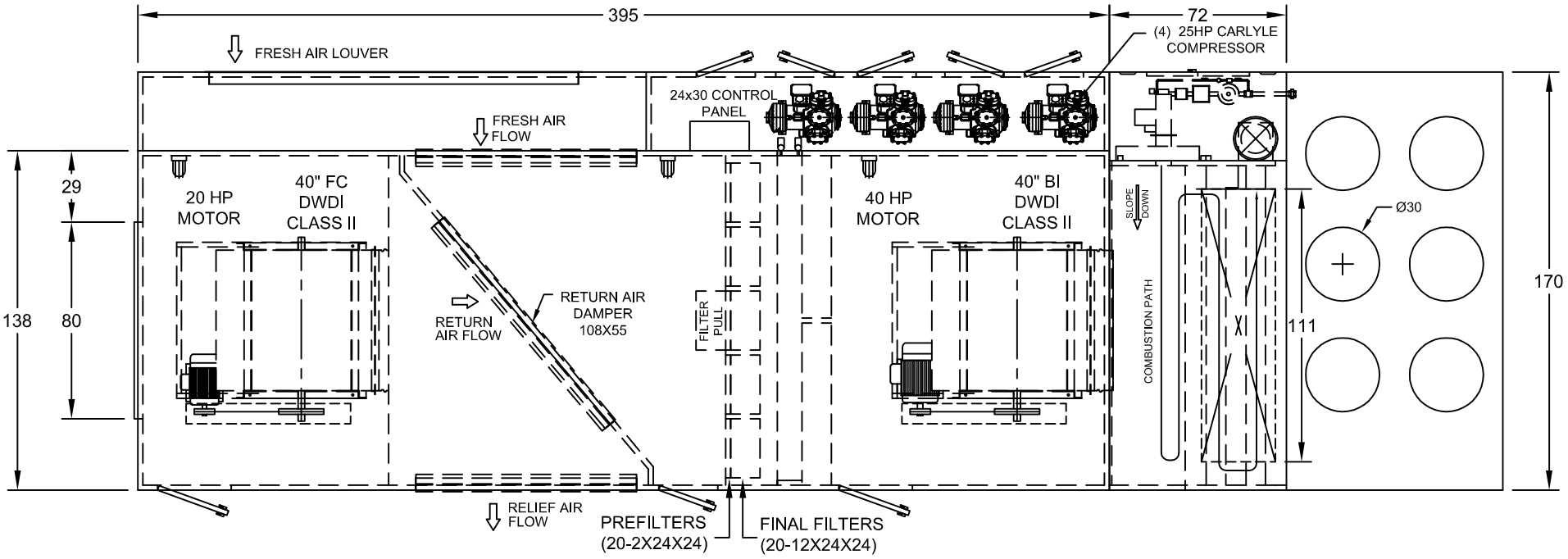
Rev	By	Revision Description	Date

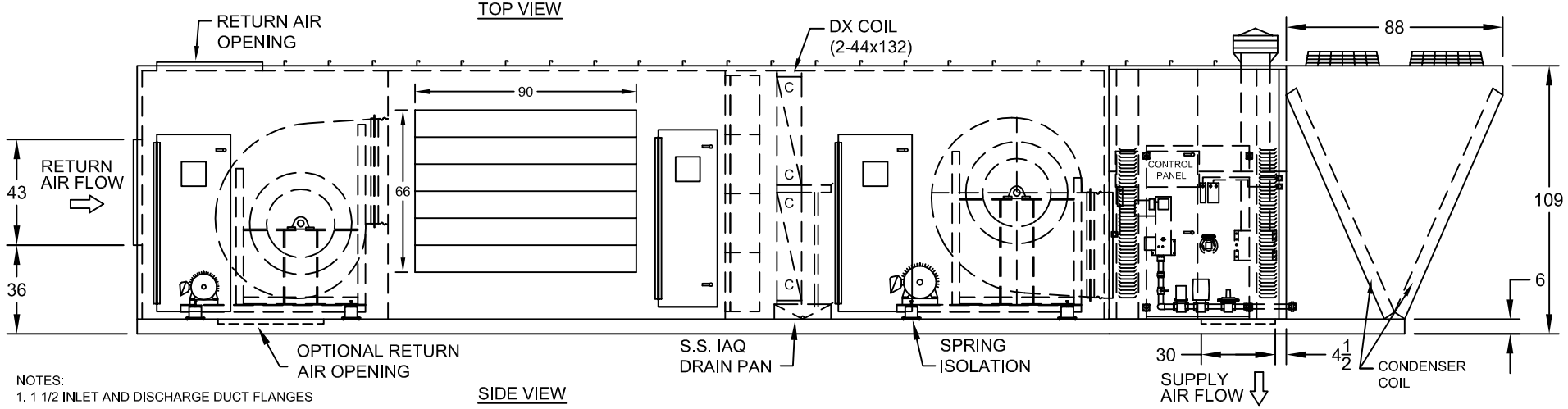
WESTERN SALES

TITLE
32,000CFM AIR HANDLING UNIT
MIXING BOX c/w RELIEF, PACKAGED DX COOLING,
RETURN AIR BLOWER, SUPPLY AIR BLOWER
MODEL: AH-320-GIDM175-DX80

DRAWN BY	ISSUED BY	SCALE	DRW. NO.
		1/6"=1'	
CHK. BY	DATE	JOB NO.	PAGE
			T-30



TOP VIEW



SIDE VIEW

NOTES:
1. 1 1/2 INLET AND DISCHARGE DUCT FLANGES
2. SERVICE ACCESS PANELS MUST NOT BE OBSTRUCTED RECOMMENDED CLEARANCE 24 INCHES.
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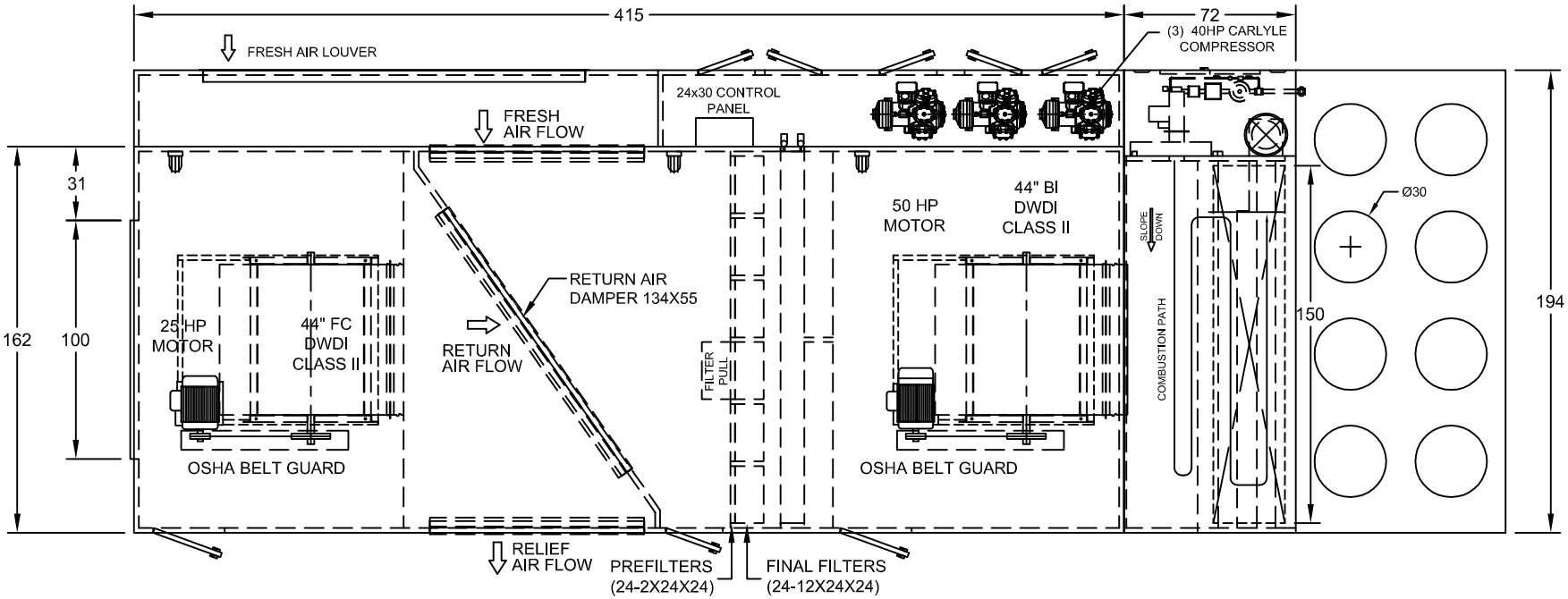
Rev	By	Revision Description	Date

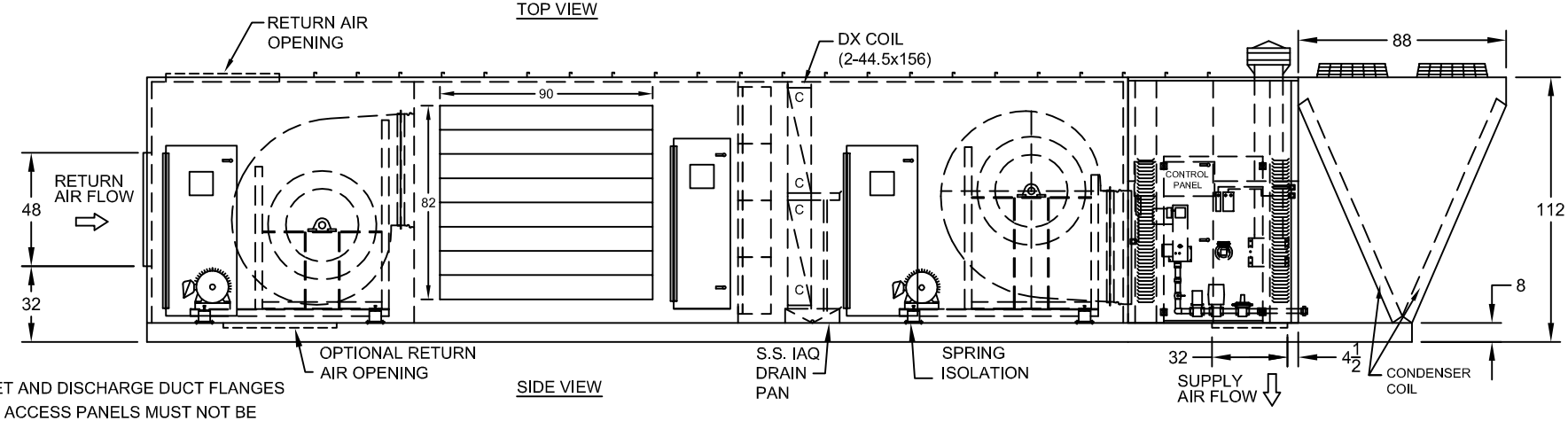
ICG WESTERN SALES

TITLE
40,000CFM AIR HANDLING UNIT
MIXING BOX c/w RELIEF, PACKAGED DX COOLING,
RETURN AIR BLOWER, SUPPLY AIR BLOWER
MODEL: AH-400-GIDM200-DX100

DRAWN BY	ISSUED BY	SCALE	DRW. NO.
		3/16"=1'	
CHK. BY	DATE	JOB NO.	PAGE
			T-31



TOP VIEW



SIDE VIEW

NOTES:

1. 1 1/2 INLET AND DISCHARGE DUCT FLANGES
2. SERVICE ACCESS PANELS MUST NOT BE OBSTRUCTED RECOMMENDED CLEARANCE 24 INCHES.
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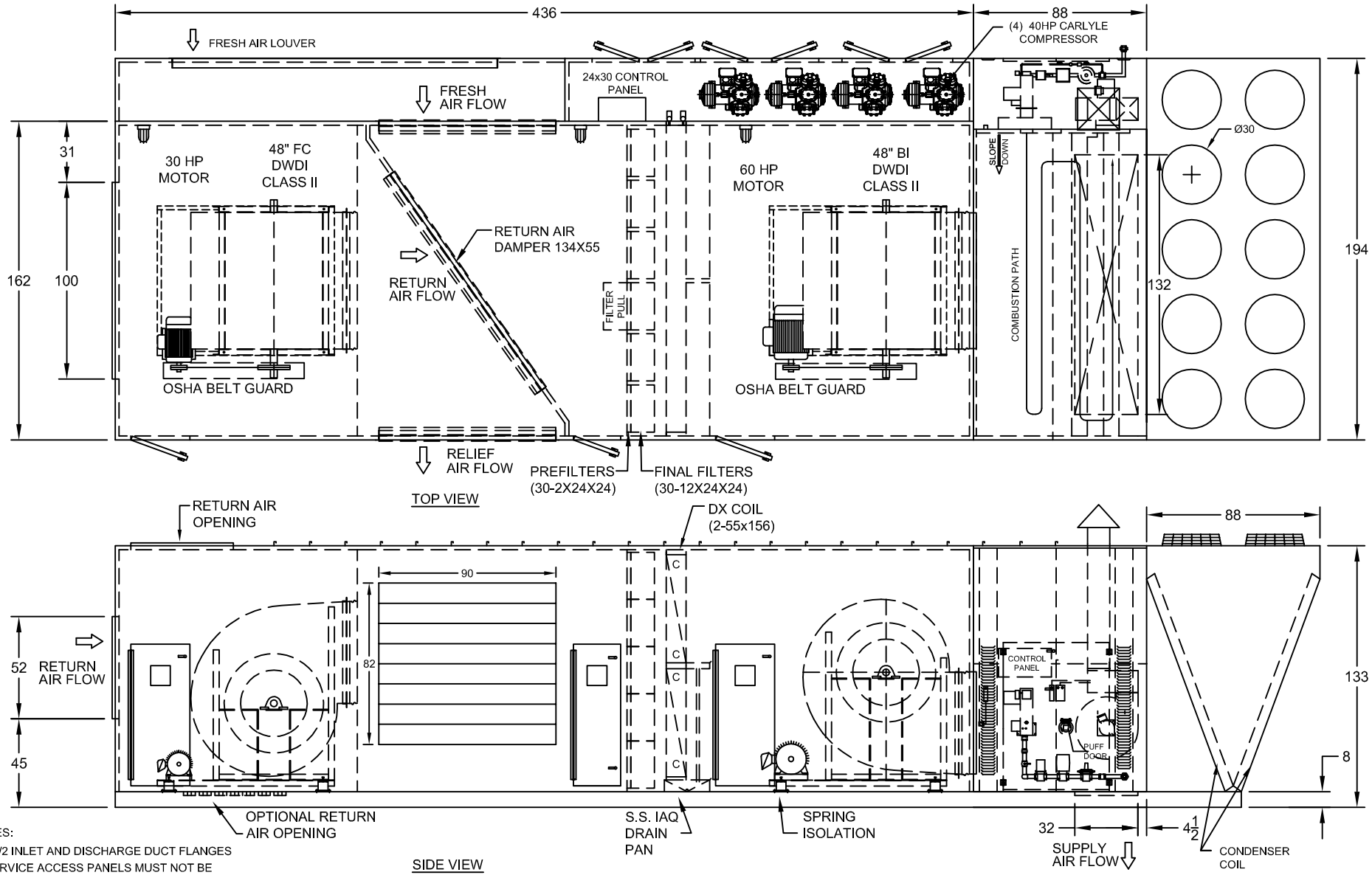
Rev	By	Revision Description	Date

WESTERN SALES

TITLE
48,000CFM AIR HANDLING UNIT
MIXING BOX c/w RELIEF, PACKAGED DX COOLING, RETURN AIR BLOWER, SUPPLY AIR BLOWER
MODEL: AH-480-GIDM250-DX120

DRAWN BY	ISSUED BY	SCALE	DRW. NO.
		1/6"=1'	
CHK. BY	DATE	JOB NO.	PAGE
			T-32



NOTES:

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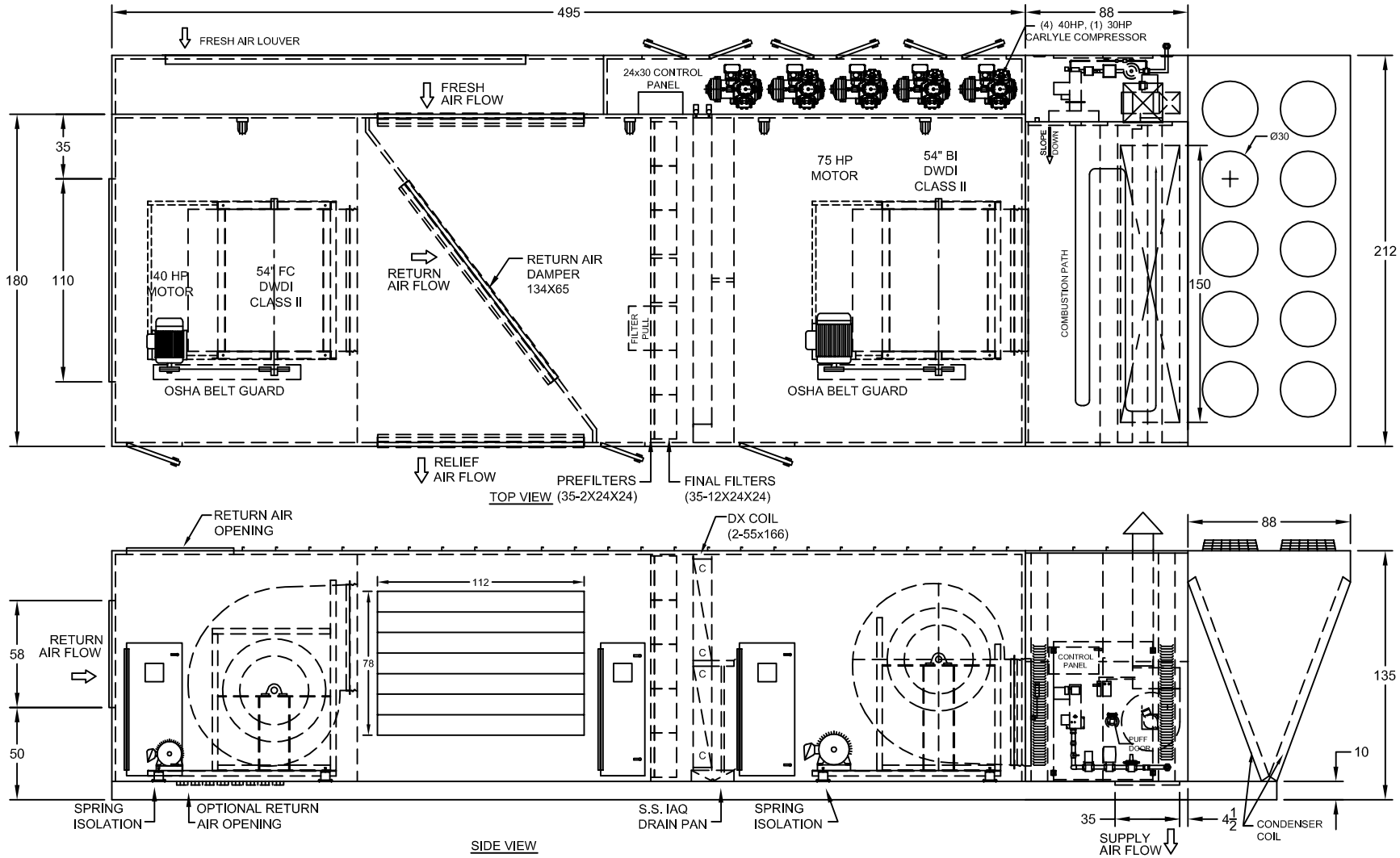
Rev	By	Revision Description	Date

ICG WESTERN SALES

TITLE
60,000CFM AIR HANDLING UNIT
MIXING BOX c/w RELIEF, PACKAGED DX COOLING,
RETURN AIR BLOWER, SUPPLY AIR BLOWER
MODEL: AH-600-GIDM275-DX150

DRAWN BY	ISSUED BY	SCALE	DRW. NO.	
		1/6"=1'		
CHK. BY	DATE		JOB NO.	PAGE T-33



NOTES:

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Rev	By	Revision Description	Date

ICG WESTERN SALES

TITLE
70,000CFM AIR HANDLING UNIT
MIXING BOX c/w RELIEF, PACKAGED DX COOLING,
RETURN AIR BLOWER, SUPPLY AIR BLOWER
MODEL: AH-700-GIDM275-DX175

DRAWN BY	ISSUED BY	SCALE	DRW. NO.
		1/7"=1'	
CHK. BY	DATE	JOB NO.	PAGE
			T-34

GIDM UNIT TYPICAL SPECIFICATIONS

TYPE AND DESCRIPTION

Furnish an I.C.E GIDM Model indirect fired self-contained make-up air unit in accordance with the following specifications. The unit shall be ETL and C.G.A certified.

The heater shall be designed to ensure a minimum efficiency of 80% at full firing rate. The heat exchanger and blower shall be constructed so they can easily be disassembled and reassembled in the field if necessary. The unit shall be equipped to operate from a single point power connection. The heater shall be flame tested before shipment and the manufacturer shall keep a detailed flame test report on file. Factory testing shall be confirmed with a combustion analyzer and flow meter. Heat exchanger shall also be pressure tested to a minimum of 20 PSI to verify zero leakage. Complete pressure test report shall be provided with operation and maintenance manual upon shipping of unit. The heater shall be shipped completely factory assembled and wired including all prepiped manifold components and fuses, ready for immediate power and fuel connections.

CASING

The unit exterior casing shall be heavy gauge G90 rated bonderized steel [with a solid (or perforated) 22-gauge liner]. Unit roofs shall be sloped for water drain off and feature standing seam construction. The entire unit casing shall be insulated with 2-in. thick 1.5, [2.0 or 3-lb.] Fiberglass insulation with hard neoprene backing in a sandwich wall fashion. The unit exterior shall be finished with industrial enamel paint. An integral welded iron channel frame shall support the unit casing. Formed sheet metal bases are unacceptable. The structural iron frame shall be sandblasted, primed and finished with industrial enamel paint.

BLOWER/MOTOR SECTION

The fan section and motor assembly shall be constructed in accordance with the requirements of the Air Moving and Conditioning Association (AMCA). The assembly shall be designed to house the fan(s), bearings, motor, and v-belts, which shall be selected for at least 50% above the rated motor capacity. The fan(s) and motor shall be mounted on a welded unitary base made of angle iron frame. The frame shall be sandblasted, primed and finished with industrial catalyzed epoxy paint. The unitary base shall be provided with seismic spring vibration isolation. The blower section shall have a hinged access door to allow easy maintenance of filters and belts. The NEMA T-Frame motor shall be mounted on an adjustable base located within the fan section. The blower shall be a forward curve DWDI centrifugal blower. [The blower shall be a efficient, non-overloading backward inclined type. Inlets shall be fully streamlined and housings shall be suitably braced to prevent vibration or pulsation. Housings shall be constructed of heavy gauge steel and shall be continuously welded throughout. The standard coating shall be durable and heat resistant up to 500°F]. The blower wheel shall be statically and dynamically balanced, and mounted on a turned, ground and polished shaft with rigid bearing supports. The shaft shall be designed with a maximum operating speed not exceeding 75% of the first critical speed. The bearings shall be split taper lock ball bearing type L20 minimum life of 100,000 hours.

Fan performance shall be based on tests conducted in accordance with AMCA Standard Test Code for Air moving Devices. All fans shall have sharply rising pressure characteristic extending throughout the operating range and continuing to rise well beyond the efficiency peak to assure quiet and stable operation under all conditions. Horsepower characteristics shall be truly non-overloading and shall reach a peak in the normal selection area. Fan manufacturer shall provide sound power ratings in the eight octave bands, which shall be based on AMCA Standard 300-67, test, setup number 1. Sound power ratings shall be referenced 10-12 watts. A factory dynamic balance shall be made on all fans after their assembly. An IRD or PMC analyzer shall be used to measure velocity, and the final reading shall not exceed 0.1 inches per second. The exact level of vibration shall be recorded on the fan as proof of the final dynamic balance at the factory.

HEAT EXCHANGER

The heat exchanger shall be of four pass design with a primary combustion chamber and multi-tube secondary. Internal turbulators or other flue restrictor to boost efficiency are unacceptable. The entire primary heat transfer surface shall be constructed of Type 409 Series stainless steel, and shall be cooled in its entirety by the air to be heated. The Secondary heat transfer surface shall also be constructed from Type 409 Series stainless steel. The stainless steel tubes shall be continuously welded into the secondary front and rear header tube sheets to ensure an airtight seal. Mechanically swedging the tubes are unacceptable. All heat transfer surfaces, including headers and the front collector box, shall be inside the casing and in the airstream. The construction of the heat exchanger shall permit free, unrestricted lateral, vertical, and peripheral expansion during the heating and cooling cycle without damage or strain to any part. The heat exchanger shall be designed to prevent contamination of heated air with the products of combustion. A spring-loaded pressure relief door with glass view port shall be provided. The entire heater casing shall be lined with a 22 gauge liner.

BURNER

The heater shall have of a power type 409 stainless steel GP Combustion [or Maxon Ovenpak] burner, with integral combustion air blower and motor; combustion air-proving switch, removable pilot assembly and positive pilot combustion air supply. The combustion air damper shall be interlocked with the main gas valve to insure a proper air/gas mixture. A solid state programmable safeguard relay [with UV Scanner] and purge card shall continuously monitor main and pilot flame. The main and pilot valve train to the burner shall be completely factory prepiped. This assembly shall be wired [with JIC wiring that is liquid tight with NEMA 4 or 12 enclosures] and shall include the following minimum components; main and automatic [Maxon] shut off valves and adequate unions and test ports for service. [All manual valves shall be of lubricated plug type.] A 6,000-volt transformer shall accomplish ignition of pilot flame. The unit shall be suitable for natural gas and designed and certified by ETL and C.G.A to provide full gas modulation. Depending on the burner selection, turndown from 100% to 70% of output are achievable.

ELECTRICAL CONTROL EQUIPMENT

Electrical assembly and components shall be in strict accordance with the latest provisions and requirements of the Nation Electric Code. Control cabinet shall be designed and constructed to ETL specifications. A dead front safety disconnect switch shall be mounted on the control enclosure door.

Electrical cabinets shall be NEMA 1 [12]. The cabinets shall be located in a weatherproof cabinet. Provisions for service padlocking shall be provided. The following items shall be located within the electrical enclosure: fuses, starters, control relays, timing and holding relays, resistors and numbered terminal strips. All components shall be labeled and cross-referenced to control and field wiring diagrams. The control circuit shall be 110V, single phase. Wiring shall be neatly run in “PANDUIT” wiring duct. [JIC wiring shall be implemented in liquid-tight NEMA 4 or 12 enclosures.] Low and/or line voltage thermostats shall be furnished shipped loose for installation by others. Unit shall be equipped with automatic low limit freeze protection with bypass timer A discharge temperature sensor shall be wired in series-parallel to room sensor.

REMOTE CONTROL PANELS

Remote NEMA 1 [12] locking [stainless] steel control panels shall be equipped with summer/of/winter switch and blower on, burner on, flame failure and loaded filter lights. A remote adjustment potentiometer shall control damper positioning. A LCD display shall provide system temperature and setpoints.

MIXBOX & FILTER SECTION

A mixbox with fresh air and return air dampers shall be provided. The dampers are to be [AMCA certified TAMCO 1000 or 9000] aluminum airfoil low leak type with seals. The dampers are to be inset into 22 gauge steel mixbox liners. The dampers shall be equipped with modulation actuators.

The blower section shall include a motor operated outside air intake sized for 100% outside air. The filters shall be sized for a maximum face velocity of 500 fpm. The [pre]filters shall be 2” pleated throwaway type with minimum of 85% arrestance and 30% dust. [Final RIGA-FLO filters shall be 12" cartridge filters with minimum 99% arrestance and 85% dust efficiencies. Filters shall be front loading type, installed in type 8 frames with 'C' holding clips.] Filter access shall be through a latched and gasketed access doors located on both sides of the unit.

EVAPORATOR COILS

Evaporator coils are intended for use with a wide range of applications and refrigerant types. Coils are to be designed to maximize performance under specified conditions with minimal air-side pressure drop.
Coils shall be UL recognized as Refrigerant Containing Component. Coils to be used with refrigerant R-410A shall have undergone cycle testing, and shall be safety listed with 750 psig rating.
Tubes and return bends shall be constructed from seamless UNS C12200 copper conforming to ASTM B224 and ASTM E527. Properties shall be O50 light annealed with a maximum grain size of 0.040 mm.
Tubes are to mechanically expanded into fins (secondary surface) for maximum heat transfer. Materials are to be 3/8” diameter x (0.014, 0.022) wall thickness, 1/2” diameter x (0.016, 0.025) wall thickness, or 5/8” diameter x (0.020, 0.025, 0.035, 0.049) wall thickness.
Secondary surface (fins) shall be of the plate-fin design using aluminum or copper, with die-formed collars. Fin design to be flat, waffle, or sine-wave in a staggered tube pattern to meet performance requirements.

Collars will hold fin spacing at specified density, and cover the entire tube surface. Aluminum properties are to be Alloy 1100 per ASTM B209, with O (soft) temper; copper is to be Alloy 11000 per ASTM B152-06 with soft (anneal) temper. Fins are to be free of oils and oxidation.
Headers are to be constructed of seamless UNS C12200, Type L (drawn) copper material sized to match specified connection size. Type K (drawn) copper headers shall be offered as optional material.
Die-formed copper end caps are brazed on the inside of the headers, unless spun-closed (for sized up to 1-3/8").
Evaporator coils shall be designed with brass liquid distributors (as required), and copper sweat suction connections. Distributors shall be capped using soft-solder for ease of cap removal; suction connections shall be capped.
Coil casing material shall be of G90 galvanized steel, 16 gauge minimum. Heavier material, stainless steel, copper, or aluminum casing are to be provided as required.
Intermediate tube supports are to be provided on all coils 48" and longer fin length. Coil casing on top and bottom of coils are to have double-flange construction, allowing for vertical stacking of coils.
All coils are to be brazed with minimum 5% silver content (BCup-3) filler material to insure joint integrity.
Coils shall be tested at 550 psig using dry nitrogen, submerged under water. Dual-operator verification shall determine that all coils are leak-free.
Coils shall be shipped with nitrogen charge to verify leak-free integrity, and to prevent moisture migration into coil.
Coils shall be certified to withstand 750 psig working pressure.

CONDENSER COILS

Condenser coils are intended for use with a wide range of applications and refrigerant types. Coils are to be designed to maximize performance under specified conditions with minimal air-side pressure drop.
Coils shall be UL recognized as Refrigerant Containing Component. Coils to be used with refrigerant R-410A shall have undergone cycle testing, and shall be safety listed with 750 psig rating.
Tubes and return bends shall be constructed from seamless UNS C12200 copper conforming to ASTM B224 and ASTM E527. Properties shall be O50 light annealed with a maximum grain size of 0.040 mm.
Tubes are to mechanically expanded into fins (secondary surface) for maximum heat transfer. Materials are to be 3/8" diameter x (0.014, 0.022) wall thickness, 1/2" diameter x (0.016, 0.025) wall thickness, or 5/8" diameter x (0.020, 0.025, 0.035, 0.049) wall thickness.
Internally enhanced rifled or cross-hatched tubes can be offered as an option.
Secondary surface (fins) shall be of the plate-fin design using aluminum or copper, with die-formed collars. Fin design to be flat, waffle, or sine-wave in a staggered tube pattern to meet performance requirements.
Collars will hold fin spacing at specified density, and cover the entire tube surface. Aluminum properties are to be Alloy 1100 per ASTM B209, with O (soft) temper; copper is to be Alloy 11000 per ASTM B152-06 with soft (anneal) temper. Fins are to be free of oils and oxidation.
Headers are to be constructed of seamless UNS C12200, Type L (drawn) copper material sized to match specified connection size. Type K (drawn) copper headers shall be offered as optional material.
Die-formed copper end caps are brazed on the inside of the headers, unless spun-closed (for sized up to 1-3/8").
Condenser coils shall be designed with copper sweat connections, and shall be shipped with caps on connections.

Coil casing material shall be of G90 galvanized steel, 16 gauge minimum. Heavier material, stainless steel, copper, or aluminum casing are to be provided as required.
Coils designed for hot-gas applications shall have oversized tube sheet holes for hot gas feeds to allow for free expansion and contraction of tubes during operation.
Intermediate tube supports are to be provided on all coils 48" and longer fin length. Coil casing on top and bottom of coils are to have double-flange construction, allowing for vertical stacking of coils.
All coils are to be brazed with minimum 5% silver content (BCup-3) filler material to insure joint integrity.
Coils shall be tested at 550 psig using dry nitrogen, submerged under water. Dual-operator verification shall determine that all coils are leak-free.
Coils shall be shipped with nitrogen charge to verify leak-free integrity, and to prevent moisture migration into coil.
Coils shall be certified to withstand 750 psig working pressure.

REFRIGERATION COMPRESSORS

Compressors shall be either hermetic or semi-hermetic type.

A) Semi-Hermetic- Semi-hermetic reciprocating compressors shall be provided on systems with total cooling capacity of 25 Tons and larger. Up to 40 tons a single compressor will be used and multiple semi-hermetic compressors over 40 Tons. Compressors shall be completely factory assembled, piped, insulated, internally wired and tested. Units shall be shipped in one piece and come fully charged with refrigerant and filled with compressor oil. Units shall be rated in accordance with ARI standards. The refrigerant system shall be leak tested, evacuated and refrigerant charged at the factory. Compressors shall be suction gas cooled and come with integral spring vibration isolators, oil level sight glass, discharge mufflers, vibrasorbers, automatic reversible oil pump, oil filter screen. Oil charging valve, crankcase heater which de-energizes during compressor operation, liquid line service valves. Unit shall also have the following safety control features:
    - Low pressure cutout
    - High pressure cutout, manual reset
    - Adjustable low ambient lockout
    - Liquid line solenoids incorporating pump down system
    - Anticycling time device (to prevent excessive cycling and premature wear on compressor and contactors) and phase and brownout protection.
    - Oil failure control

    Provide cylinder suction pressure unloaders for capacity control, with minimum steps required to provide coil frost protection, based on refrigerant circuit suction temperatures. Provide filter dryers, sight glasses and compressor service valves for each individual compressor. Provide hot gas bypass for each compressor. Compressor staging to be provided by a Honeywell T775 Series standalone controller mounted in the unit.

B) Hermetic compressors- Compressors shall be set on resilient neoprene mounts and complete with line voltage break internal overload protection, internal pressure relief valve and crankcase heater. Each unit shall have a minimum of two compressors. Whereby a unit utilizing two compressors the first stage compressor must be a digital scroll operating with a Emerson EC3 series stand-alone superheat controller with a built in synchronization control

for the digital scroll. Unit will provide turndown on cooling. Multiple refrigeration circuits shall be separate from each other. Refrigeration circuits shall be complete with liquid line filter-driers, and service ports fitted with Schraeder fittings. Units shall incorporate load compensated thermal expansion valves with external equalizers (electronic expansion valves on digital systems) and combination sight glass moisture indicators. System charge will be designed for 10 degrees Fahrenheit. Each system shall be factory run and adjusted prior to shipment. Controls shall include:

- Compressor motor contactors
- Overload protection control
- Cooling relays
- Ambient compressor lockout
- Dual pressure controls
- Anti-cycle timers
- Hot gas bypass on lead compressor to maintain adequate suction pressure in the event of low loads

  (only when digital scrolls are not being used)

Packaged units shall operate down to 50 degrees Fahrenheit as standard. Minus 40 refrigeration systems are available as an option. Compressors shall be located on the side of the unit in a service enclosure complete with hinged access doors.