ICE WESTERN
Reliability at its finest.

9754 54 ST SE
Calgary, AB—T2C 5J6
Phone: 403-252-5577
Fax: 403-252-5556
www.icewestern.com

HTDM 91+ OMEGA SERIES

DESIGN FEATURES

HEATING ONLY

- Drum & Tube Heat Exchanger.
- 409 Stainless Steel 14 Gauge Heat Exchanger Material.
- Proprietary Tube Placement/Arrangement.
- Omega Air Pattern.
- Up To 60:1 Turndown

HEAT/COOL

- High Efficient & Durable Digital Scroll D.X. Cooling eliminates the need for Hot Gas Bypass.
- 10:1 Turndown on Single Stage Compressors and 20:1 Turndown for Tandem Compressors.
- VFD Controlled Condenser Fan (No Fan Cycling).

ICE WESTERN BELIEVES YOU DESERVE QUALITY AND SERVICE

QUALITY

ICE is committed to providing quality through every step of the operation. Every product undergoes testing and quality inspection to ensure the highest standards are met. ICE employees take great pride as manufacturers of HVAC units.

SERVICE

ICE provides qualified staff that can assist in start-up service and troubleshooting.

PRICE

ICE offers some of the best pricing in the HVAC industry. ICE can match or surpass any competitor's unit capabilities and quality commitments as well as meet or beat their delivery times.

CUSTOM UNITS

ICE provides custom built units to meet customer specifications and exceed customer expectations. No job is too big or too difficult.

All models are approved according to the Standard for Gas Unit Heaters, Gas Packaged Heaters, Gas Utility Heaters, and Gas fired duct furnaces ANSI Z83.8/CSA 2.6 Issued 2013/04/01

All models are approved according to the Standard for Gas-Fired Appliances for Use at High Altitudes CGA 2.17 Issue: 1991/01/01

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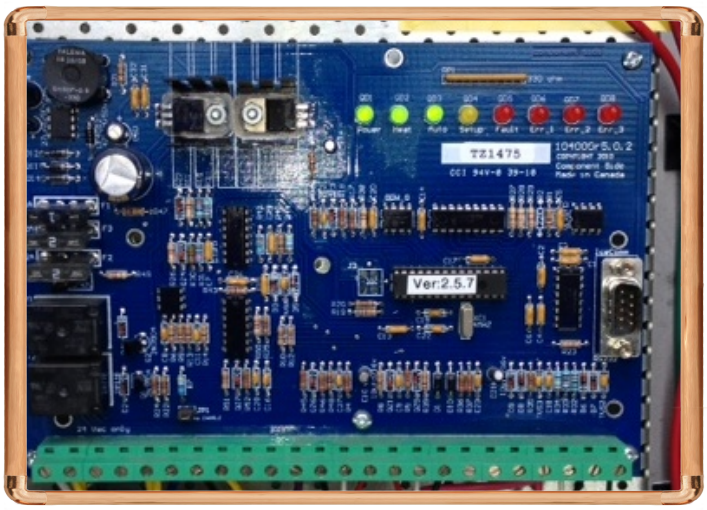
THE REVOLUTIONARY ICECON III

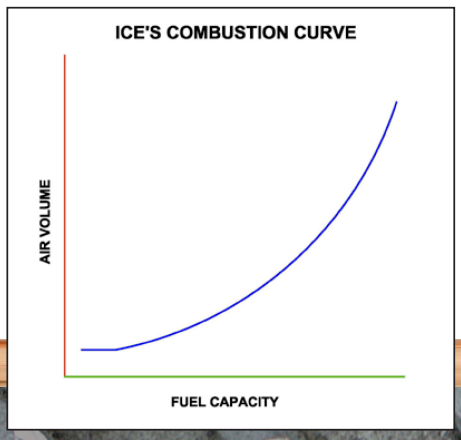
For the past 20 years the ICECON III board capability has allowed ICE to create near perfect combustion throughout the operating range of the heat exchanger. Because of this advanced technology ICE has become very successful in producing efficient and high quality heat exchangers and burners.

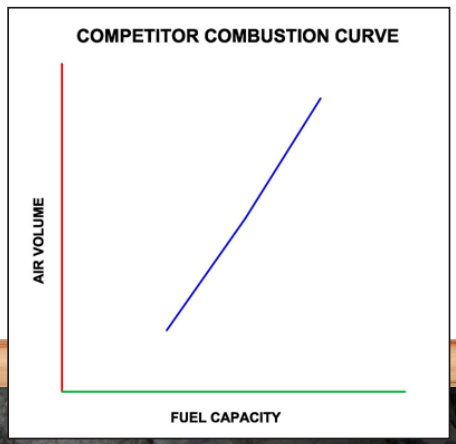
ICECON III

- **Heat Modes: Factory set discharge temperature**
- **Remote Temperature Selector (RTS)**
- **External modulation control**
- **Signal: 4-10mA, 0-10 VDC, compatible with Building Management Systems (BMS)**
- **Error signal indication:**
  - **High limit**
  - **Low limit**
  - **Air Proving**
  - **Flame Failure**
  - **Gas Valve**
- **Options:**
  - **Space Over-ride**
  - **Low Limit**
  - **System Pre-heat**
  - **Standby**
  - **Fan Standby**



The ICECON III board comes with 6 factory presets within the combustion curve. From these 6 presets a microprocessor produces an infinite number of points to precisely create the combustion curve. The ICECON III can be precisely programmed for different elevations to ensure the highest quality rate of combustion. To acquire this near perfect combustion, the ICECON board sends signals to a Triac solid state relay which controls the rpm of the combustion motor and optimizes the gas ball valve position to allow for combustion at any set point desired. The combustion fan information and gas valve position feedback is sent back to the ICECON III via a tac sensor for constant interlock of both variables. This technology produces quiet combustion and smooth modulation changes between low fire and high fire to ensure greater efficiency, greater control and impressive turndown ratios that cannot be matched by competitors.





ICG WESTERN

CONTENTS

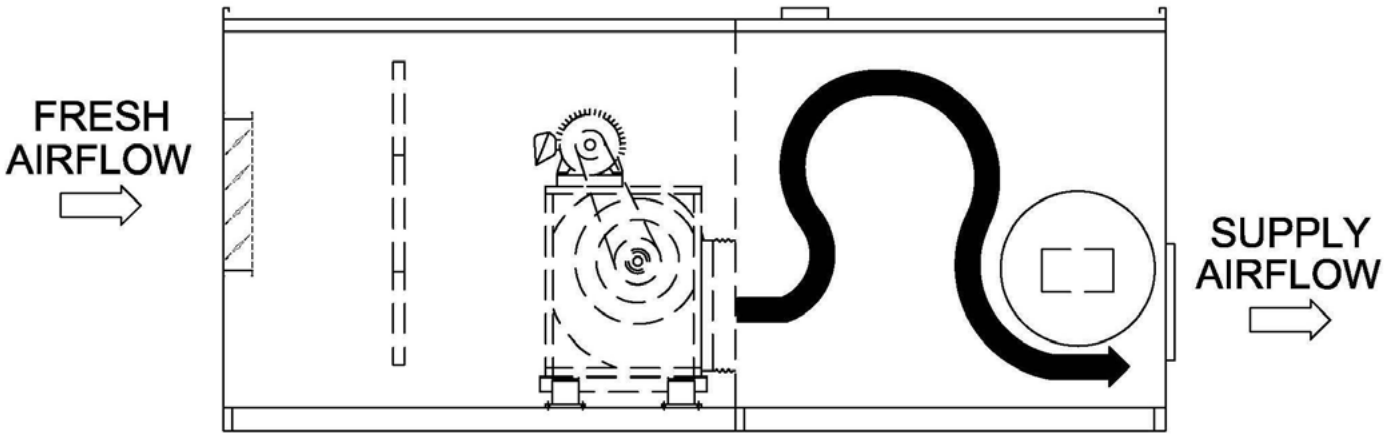
DESIGN FEATURES:

HEATING ONLY:

- **DRUM & TUBE HEAT EXCHANGER**
- **409 STAINLESS STEEL 14 GAUGE HEAT EXCHANGER MATERIAL**
- **PROPRIETARY TUBE PLACEMENT/ARRANGEMENT**
- **OMEGA AIR PATTERN**
- **INTERNAL TURBULATORS INCREASE HEAT TRANSFER**

HEAT/COOL:

- **HIGH EFFICIENT & DURABLE DIGITAL SCROLL D.X. COOLING WHICH ELIMINATES THE NEED FOR HOT- GAS BYPASS**
- **10:1 TURNDOWN ON SINGLE STAGE COMPRESSORS AND 20:1 TURNDOWN FOR TANDEM COMPRESSORS**
- **VFD CONTROLLED CONDENSER FAN (NO FAN CYCLING)**
- **DIGITAL SUPERHEAT CONTROLLER**
- **ELECTRONIC EXPANSION VALVE**



OMEGA DESIGN

THE OMEGA HEAT EXCHANGER DESIGN PROVIDES A REVOLUTIONARY AIR PATTERNING OVER ALL THE CRITICALLY ESSENTIAL COMPONENTS OF THE HEAT EXCHANGER. THIS CONTINUAL "SCRUBBING" OF THE HEAT EXCHANGER DRUM & TUBES ALLOWS FOR THE HIGHEST HEAT TRANSFER POSSIBLE.

THE OMEGA FLOW OF THE SUPPLY AIR HAS BEEN SHOWN TO ELIMINATE "HOT SPOT" AREAS OF THE HEAT EXCHANGER, ENSURING LONG HEAT EXCHANGER LIFE AND MAXIMUM HEAT TRANSFER. DURABLE 14 GAUGE 409 STAINLESS STEEL CONSTRUCTION OF THE ENTIRE HEAT EXCHANGER PROVIDES THE BEST MALEABLE EXPANSION AND CONTRACTION PROPERTIES DURING THE COMBUSTION PROCESS, THE HIGHEST POSSIBLE RESISTANCE TO CONDENSATE AND THE GREATEST CONDUCTIVITY OF HEAT TO SUPPLY AIR. THIS ENSURES THE HIGHEST CAPACITIES AND EFFICIENCIES AVAILABLE.

For more information, please call 403-252-5577 ext. 222 or visit our website: www.icewestern.com

STANDARD FEATURES

ASSURANCE
- ETL listed
- Factory wired, piped, and test fired

CABINET
- Welded structural or formed channel base frame primed with rust inhibitor
- Heavy gauge colorbond steel casing with rust-resistant gray enamel paint finish
- One inch thick 1.5# density neoprene coated fiberglass. The insulation is glued and pinned, solid liner in the burner section Lifting lugs

VENTING
- Type 3/4 venting
- Condensate neutralizer tank (shipped loose

BLOWER/MOTOR
- AMCA rated forward curve DWDI centrifugal blower Polished steel shaft with rust inhibitor
- Maximum operating speed less than 75% of first critical speed Standard heavy-duty industrial bearings used on unit with blower sizes 20x20 and larger.
- Sealed cartridge bearings provided on units with blower sizes 18x18 and smaller.
- ODP motor, 1800 RPM, T frame, 1.15 service factor mounted on adjustable base
- Drives designed for 150% motor brake horsepower
- Adjustable V-belt drives used up to and including 5 HP; fixed drives on 7.5 HP and larger

HEAT EXCHANGER/MANIFOLD
- Fully condensing 91+% efficiency
- Stainless steel primary and secondary heat exchanger and cast iron gas manifold
- Intermittent pilot assembly with spark igniter and ignition transformer Solid state flame monitoring system
- Burner observation port
- Choice of temperature control systems
- Manifold pressure for natural gas 7-14" W C. or 1-5 psig Manifold pressure for propane 11"W.C.
- Manifold includes: pilot regulator, gas valve and shutoff valve, safety shutoff valve, pressure regulator or combination modulating and pressure regulating valve, modulating gas valve, main test fire valve, manifold pressure taps

CONTROLS ENCLOSURE
- Electronic flame safeguard relay manual reset High and low airflow pressure switches Manual reset high limit
- Factory wired control panel with numbered terminal strip Motor starter with overloads
- Control circuit transformer, 120 volt Control panel service switch
- Circuit breaker
- Terminal connections for exhaust interlock
- Nationally recognized components, service parts

OPTIONAL FEATURES

80/20 MIX BOX
Allows the recirculation of air to occur. This will provide a cost effective way of space heating
Includes V-bank filter rack

WEATHERHOUSING
Control and manifold enclosure

FILTER SECTION
V-bank filter section with side access suitable for 2" filters

WINTER FILTER SECTION
Located on the discharge side of burner

FILTERS
2" thick permanent, pleated and throwaway filters; high efficiency filters, various efficiency bag filters and HEPA filters complete with filter gauge and/or indicating light

MOTORIZED INLET & DISCHARGE DAMPER
Parallel blade damper with a two-position spring return actuator and end switch

ROOF CURB
Prefabricated galvanized roof curb 16" or 24" high; full perimeter available on most units

BLOWERS
Backward inclined, air foil, and plug fans
For special fan performance, contact the factory

HEAT RECOVERY
Heat wheels or cutting edge fixed media options

DX PLENUM
Coil located in vertical or horizontal airflow complete with drain pan when applicable

COIL PLENUMS
Heating coils- steam, hot water, and glycol
Cooling coils- chilled water, DX coil

EVAPORATIVE COOLERS
Industrial and commercial

HINGED ACCESS DOORS
Optional on filter section, motor section and weatherhousing. Comes with #140 ventlock handles, #310 ventlock handles upgrade available

MUSHROOM HOOD
Complete with internal screen for debris

LOUVERED INLET
Standard on all units. Manufactured by ICE and sized for a maximum velocity of 500 FPM to ensure moisture does not enter the unit

4 WAY DISCHARGE HEAD
The adjust able 4 way discharge head provides 4 equal quantities of air in the conditioned space

HORIZONTAL DISCHARGE HEAD
180 deg. vertical and horizontal adjustment with 360 deg. of free rotation

INTERNAL VIBRATION ISOLATION
Blower and motor isolated on separate frame with R.I.S. or spring c/w canvas connector

EXTERNAL VIBRATION ISOLATION
Floor mounted or suspended isolation

SERVICE PLATFORM
Provides access to controls and gas train

MOTORS
TEFC and high-efficiency, meeting EEE and CSA standards and 2-speed

DISCONNECT SWITCH
Weatherproof enclosure; non-fused or fused

FM GAS TRAIN
Meets Factory Mutual (FM) requirements

IRI GAS TRAIN
Meets Industrial Risk Insurers requirements

HIGH GAS PRESSURE REGULATOR
Required on natural gas with pressure in excess of 14" W.C and LP applications in excess of 11 "W.C.

HIGH/LOW GAS PRESSURE SWITCHES
Manual reset. Gas pressure safety switches which lock out the burner in the event of gas pressure malfunction

CONTROL PANELS
NEMA 4 or 12 custom, unit mounted or remote enclosures

ADDITIONAL OPTIONS

- Auto low limit freeze protection control with bypass timer
- 1O point electronic circuit analyzer with signal lights
- Exhaust Interlock Relay
- Proof of Closure Valve
- Inlet Air Controller (burner economizer)
- Ultra violet flame supervision
- Audible alarm
- Null pressure switch
- Firestat
- Purge timer
- Delay exhaust start
- 115 volt GFI service receptacle
- Marine service light with 100 watt bulb, guard, and lighted switch
- High density insulation
- 2" thick and 4" thick insulation
- Motor and bearings out of airstream
- Internal liners- 22 gauge solid or perforated
- JIC wiring
- Extended grease lines
- Belt guards
- Checker plate floor
- Walk-in service corridors
- Corrosion resistant two-step acrylic finish Special coatings
- Special construction: aluminum, stainless steel, heavier gauge

COMPANY PROFILE

CREDIBILITY: ICE Western was founded in 1991 as a custom division of ICE MFG LTD in Winnipeg, Manitoba whose roots trace back to 1950.

Throughout the 1950's the Company established a reputation for designing, manufacturing, and installing natural gas conversion burners to replace oil and coal fired furnaces. In 1961, ICE designed and built the first direct fired make-up air unit for the Canadian natural gas heating market.

More innovative new designs followed and the manufacturing of indirect fired units has continued for over 40 years. Constant improvement provides ICE customers with the next generation of heaters and industrial heating/cooling equipment. Many new products and inovations are on the horizon to meet the ever-increasing concern over cost, consumption and environmental impact.

With decades of proven experience, ICE offers a comprehensive product line of direct & indirect fired equipment with or with out integral packaged DX cooling. However, one size does not fit all, which is why ICE Western offers in house, custom design for any configuration of air-handling, heat recovery or process unit. Don't hesitate to contact ICE Western to discuss a solution for your site-specific conditions.

CAPABILITY: Top management at ICE Western has over 25 years of HVAC and Refrigeration experience. With 300 employees, 3 production facilities and 50 + distributors, ICE units can be found on all types of buildings throughout Canada & the U.S.A. ICE Western has been servicing western Canada and the U.S.A. for over 25 years and now boasts a production facility on a 5 acre lot in Calgary with an extra 40,000 sqft. of brand new production space due online by Spring 2016.

With the addition of production at ICE Western, lead times for industrial cooling & heat recovery have dropped from 20 weeks to 12-14 weeks. A large, camera monitored and fence secured yard with ample storage, allows ICE Western to operate as a staging facility to hold units so that shipping can occur at the customer's convenience.

QUALITY: Employees at ICE take great pride as manufacturers of HVAC equipment. ICE is committed to providing quality through every step of the operation with a quality control program that is equivalent to I.S.O. 9001. Every product is fully tested and inspected before delivery to ensure a high quality product. All models are approved according to The Standard for Gas Unit Heaters, Gas Packaged Heaters, Gas Utility Heaters, and Gas Fired Duct Furnaces: ANSI Z83.8/CSA 2.6 Issued 2013/04/01 and The Standard for Gas-Fired Appliances for Use at High Altitudes: CGA 2.17 Issued 1991/01/01.

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CUSTOM UNITS: ICE provides custom built units to meet specifications and to exceed customer expectations. No job is too big or too difficult. Consult the in house design team for your custom needs.

For more information, please call 403-252-5577 ext. 222 or visit our website: www.icewestern.com

PERFORMANCE SPECIFICATIONS

MODEL	INPUT/OUT PUT MBH	AIR CAPACITY CFM	TEMPERATURE RISE (Deg-F)
HTDM 200 91% EFF OMEGA	200/182	1,532	110
		1,685	100
		1,872	90
		2,106	80
		2,407	70
		2,809	60
		3,370	50

MODEL1	INPUT/OUT PUT MBH	AIR CAPACITY CFM	TEMPERATURE RISE (Deg-F)
HTDM 1500 91% EFF OMEGA	1500/1365	11,490	110
		12,639	100
		14,043	90
		15,799	80
		18,056	70
		21,065	60
		25,278	50

MODEL	INPUT/OUT PUT MBH	AIR CAPACITY CFM	TEMPERATURE RISE (Deg-F)
HTDM 400 91% EFF OMEGA	400/364	3,064	110
		3,370	100
		3,745	90
		4,213	80
		4,815	70
		5,617	60
		6,741	50

MODEL	INPUT/OUT PUT MBH	AIR CAPACITY CFM	TEMPERATURE RISE (Deg-F)
HTDM 2000 91% EFF OMEGA	2000/1820	15,320	110
		16,852	100
		18,724	90
		21,065	80
		24,074	70
		28,086	60
		33,704	50

MODEL	INPUT/OUT PUT MBH	AIR CAPACITY CFM	TEMPERATURE RISE (Deg-F)
HTDM 600 91% EFF OMEGA	600/546	4,596	110
		5,056	100
		5,617	90
		6,319	80
		7,222	70
		8,462	60
		10,111	50

MODEL	INPUT/OUT PUT MBH	AIR CAPACITY CFM	TEMPERATURE RISE (Deg-F)
HTDM 2500 91% EFF OMEGA	2500/2275	19,150	110
		21,065	100
		23,405	90
		26,331	80
		30,093	70
		35,108	60
		42,130	50

MODEL	INPUT/OUT PUT MBH	AIR CAPACITY CFM	TEMPERATURE RISE (Deg-F)
HTDM 1000 91% EFF OMEGA	1000/910	7,660	110
		8,426	100
		9,362	90
		10,532	80
		12,037	70
		14,043	60
		16,852	50

MODEL	INPUT/OUT PUT MBH	AIR CAPACITY CFM	TEMPERATURE RISE (Deg-F)
HTDM 3000 91% EFF OMEGA	3000/2730	22,980	110
		25278	100
		28,086	90
		31,957	80
		36,111	70
		42,130	60
		50,556	50

AMPERAGE SPECIFICATIONS

Due to the many variables involved, please consult ICE Western for an MCA based on your specific requirements.

For more information, please call 403-252-5577 ext. 222 or visit our website: www.icewestern.com

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WEIGHTS (IN POUNDS)

HORIZONTAL UNITS

	HTDM 91+ 200	HTDM 91+ 400	HTDM 91+ 600	HTDM 91+ 1000
Basic Unit: c/w Blower, Filter & Heat Exchanger	3,115	3,816	4,714	6,483
c/w Return Air and Mixbox	3,212	3,973	4,838	6,727
c/w Mixbox & Coil Section	3,834	4,394	5,279	7,333
c/w Mixbox & High Eff. Filter Plenum	3,572	4,225	5,166	7,110
C/W Mixbox With Relief	3,751	4,226	5,283	6,970
c/w Mixbox With Relief & Return Air Blower	4,113	4,736	5,641	7,971
C/W Coil Plenum	3,460	4,378	5,341	7,213
c/w Packaged DX Cooling & Mixbox	4,143	4,976	5,897	8,241

	HTDM 91+ 1500	HTDM 91+2000	HTDM 91+ 2500	HTDM 91+ 3000
Basic Unit: c/w Blower, Filter & Heat Exchanger	7,539	9,593	12,498	13,683
c/w Return Air and Mixbox	7,804	9,785	12,806	14,130
c/w Mixbox & Coil Section	8,486	10,434	13,605	15,321
c/w Mixbox & High Eff. Filter Section	8,221	10,087	13,290	14,647
C/W Mixbox With Relief	8,069	9,977	13,114	14,341
c/w Mixbox With Relief & Return Air Blower	9,147	10,898	14,418	15,702
c/w Coil Plenum	8,476	10,427	12,960	14,868
c/w Packaged DX Cooling & Mixbox	9,487	11,831	15,167	16,836

COMPONENTS

	HTDM 91+ 200	HTDM 91+ 400	HTDM 91+ 600	HTDM 91+ 1000
Coil Plenum; Horizontal Discharge	596	766	868	1,172
Coil Plenum; Down Discharge	682	869	1,033	1,338
High Eff. Filter Section; Horizontal Discharge	449	600	688	888
High Eff. Filter Section Down Discharge	557	695	833	1,114
Inlet Hood	46	60	114	151
Relief Fresh Air Section	717	891	992	1231
Relief Fresh Air Blower Section	1,471	1,702	1,867	2,650

	HTDM 91+ 1500	HTDM 91+ 2000	HTDM 91+ 2500	HTDM 91+ 3000
Coil Plenum; Horizontal Discharge	1,319	1,587	1,826	1,918
Coil Plenum; Down Discharge	1,718	1,962	2,232	2,362
High Eff. Filter Section; Horizontal Discharge	1,005	1,180	1,319	1,334
High Eff. Filter Section Down Discharge	1,289	1,486	1,781	1,856
Inlet Hood	192	293	316	320
Relief Fresh Air Section	1,408	1,607	1,771	1,800
Relief Fresh Air Blower Section	2,900	3,215	3,452	3,596

Note:

- For additional components, add the component weight to the basic unit weight
- Includes 10% safety factor
- For reference only, subject to change without notice

EFFICIENCIES AND TURNDOWNS

MODEL HTDM 91+	EFFICIENCY	TURNDOWNS
200	91%	23:1
400	91%	23:1
600	91%	29:1
1000	91%	50:1
1500	91%	60:1
2000	91%	60:1
2500	91%	60:1
3000	91%	60:1

STATIC PRESSURE DROP(S) DUE TO ACCESSORIES

ACCESSORIES	STATIC PRESSURE DROP (IN INCHES WATER)
Flat and v-Bank Filter Section	0.4
Louvered Inlet Hood	0.1
Evaporative Cooler (Commercial)	0.3
Evaporative Cooler (Industrial)	0.4
Inlet Damper	0.1
DX Plenum & Coil	0.6
80/20 Mixbox w/ Filters	0.7
Horizontal Discharge Head	0.5
High Eff. Filter Section	1.0
Heat Coil	0.2
Fixed Media Heat Recovery	1.0

Note:
Accessory static pressure drops are calculated at maximum CFM loads

STANDARD FILTER SECTION SUMMARY

MODEL HTDM 91+	QUANTITY – SIZE INCHES	TOTAL FILTER FREE AREA ft^2	MAXIMUM AIR FLOW CFM
200	2-16x25x2	5.26	2,780
400	4-16x25x2	11.1	5,550
600	3-16x20x2 3-20x20x2	15	7,500
1000	4-20x25x2 4-20x20x2	25	12,500
1500	12-16x25x2	33.3	16,500
2000	12-24x24x2	48	24,000
2500	16-25x20x2	55.6	27,500
3000	12-25x20x2 8-25x16x2	63.9	32,000

General Filter Performance Notes:

-The standard filter section may contain one of the following three types:

- Replaceable: 2 inch fiberglass media with an average efficiency of 20% at 500 fpm.
- Throwaway: 2 inch pleated media with an average efficiency of 30% at 500 fpm.
- Permanent: 2 inch media with layers of silt and expanded aluminum. The media efficiency averages 20% at 500 fpm. The media can be cleaned using a stream of water.

Note:

- The static pressure drop through the filters is approximately 0.4" W.C. (clean) and approximately 0.8" W.C. (dirty)
- The maximum airflow is calculated so that the velocity across the filters never exceeds 500 fpm
- A V-bank filter section is required on the HTDM 91+ 1000 and 1500 when the temperature rise is less than 70°F

ICE WESTERN

HTDM 91 PLUS PERFORMANCE SPECIFICATIONS

MODELHTDM 91+	INPUT/OUTPUT (MBH)	AIR CAPACITY CFM	TEMP. RISE deg F	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	200/182	1532	110	9x9	0.40	9x9	0.49	9x7	0.76	9x7	0.85	9x7	1.03	9X7	1.21-	1
		1685	100	9x9	0.50	9x7	0.94	9x7	1.04	9x7	1.02	9x7	1.22	9x7	1.42	
		1872	90	9x9	0.63	9x9	0.73	9x7	1.15	9x7	1.26	9x7	1.48	9x7	1.70	
		2106	80	9x9	0.82	9x9	0.92	9x9	1.03	9x9	1.54	12x9	1.33	12x9	1.47	
		2407	70	10x10	0.85	9x9	1.30	9x9	1.42	9x9	1.54	9x9	1.81	12x9	1.72	
		2809	60	10x10	1.49	10x10	1.65	10x10	1.79	10x10	1.95	12x12	2.19	12x9	2.57	
		3370	50	12x9	1.70	12x9	1.85	12x9	2.01	12x9	2.16	12x12	2.65	12x12	3.30	

MODELHTDM 91+	INPUT/OUTPUT (MBH)	AIR CAPACITY CFM	TEMP. RISE deg F	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	400/364	3064	110	12x12	0.89	12x9	1.25	12x9	1.35	12x9	1.49	10x10	2.21	10x10	2.56	1
		3370	100	12x12	1.08	12x12	1.27	12x9	1.69	12x9	1.80	12x9	2.11	12x9	2.43	
		3745	90	12x12	1.39	12x12	1.58	12x12	1.89	12x12	2.01	12x12	2.44	18x18	3.03	
		4213	80	12x12	1.82	12x12	2.03	12x12	2.25	12x12	2.60	18x18	2.15	18x18	3.37	
		4815	70	15z15	1.76	15z15	1.99	15z11	2.30	15z11	2.53	18z18	3.17	18z18	3.89	
		5617	60	15z15	2.56	18x13	2.75	18x13	3.03	18x13	3.33	18x18	3.90	18x18	4.07	
		6741	50	18x18	2.61	20x20	3.57	20x20	4.05	18x13	4.48	18x13	5.53	18x18	6.05	

MODELHTDM 91+	INPUT/OUTPUT (MBH)	AIR CAPACITY CFM	TEMP. RISE deg F	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	600/546	4596	110	15x15	1.30	15x15	1.55	15x11	1.9	15x11	2.05	12x12	3.17	12x12	3.71	1
		5056	100	15x15	1.68	15x15	1.92	15x15	2.14	15x15	2.42	18x18	2.92	18x18	3.65	
		5617	90	15x15	2.12	15x15	2.40	15x15	2.66	15x15	2.91	22x22	3.34	20x15	4.34	
		6319	80	18x18	2.10	18x18	2.40	18x18	2.71	20x15	3.30	18x13	4.26	18x13	4.91	
		7222	70	18x18	2.83	18x18	3.20	18x18	3.53	18x18	3.07	20x15	5.03	20x20	5.87	
		8462	60	18x18	4.13	18x18	4.57	18x18	4.99	18x18	5.39	20x15	6.67	22x15	8.61	
		10111	50	20x18	4.38	20x18	5.03	20x18	5.62	20x18	6.22	20x20	7.71	22x15	8.61	

MODELHTDM 91+	INPUT/OUTPUT (MBH)	AIR CAPACITY CFM	TEMP. RISE deg F	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	1000/910	7660	110	2-1x12	2.96	2-1x12	3.36	2-1x12	3.79	2-1x12	4.24	2-15x15	4.90	2-18x18	6.05	1 1/4
		8426	100	2-1x12	3.66	2-1x12	4.09	2-1x12	4.53	2-1x12	4.91	2-1x12	5.98	2-18x18	6.79	
		9362	90	2-20x20	3.11	2-22x22	3.44	2-22x22	4.14	2-22x22	4.83	2-18x18	6.07	2-18x18	7.50	
		10532	80	2-20x20	3.54	2-20x20	4.26	2-22x22	4.71	2-22x22	5.48	2-22x22	7.07	2-18x18	8.39	
		12037	70	2-25x25	4.26	2-15x15	6.34	2-15x15	6.89	2-22x22	6.44	2-22x22	8.40	2-22x22	10.66	
		14043	60	2-18x18	6.25	2-18x18	6.89	2-22x22	7.10	2-20x20	8.89	2-20x20	10.73	2-22x22	12.11	
		16852	50	2-18x18	9.54	2-18x18	10.37	2-18x18	11.17	2-18x18	11.93	2-20x20	14.22	2-20x20	16.64	

Note:

- All static values include the blower, burner and casing
- Accessory static values must be added to obtain the total static (see page 9)
- Brake horsepower does NOT include drive losses
- A V-bank filter section is required on HTDM 1000, 1500, 2000 and 3000 with a temperature rise of less than 70°F

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- Performance data on higher statics than listed
- Performance data at elevations other than sea level

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MODELHTDM 91+	INPUT/OUTPUT (MBH)	AIR CAPACITY CFM	TEMP. RISE deg F	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	
1500	1500/1365	11490	110	2-20x20	3.06	2-22x22	3.55	2-20x20	4.79	2-20x20	5.56	2-22x22	6.83	2-22x22	4.27	1 1/4
		12639	100	2-20x20	3.72	2-20x15	4.99	2-22x22	4.89	2-22x22	5.77	2-22x22	7.58	2-22x22	9.41	
		14043	90	2-20x20	4.50	2-20x20	5.29	2-18x18	6.52	2-18x18	7.17	2-20x20	9.26	2-20x20	11.06	
		15799	80	2-20x20	6.07	2-18x18	7.86	2-18x18	8.64	2-18x18	9.36	2-20x20	11.03	2-20x20	13.55	
		18056	70	2-20x20	7.89	2-20x20	9.04	2-20x20	10.14	2-20x20	11.13	2-25x25	13.02	2-22x22	14.51	
		21065	60	2-20x20	11.32	2-20x20	12.48	2-20x20	13.82	2-20x20	15.12	2-20x20	17.56	2-20x20	19.34	
		25278	50	2-22x22	14.08	2-22x22	15.36	2-22x22	16.12	2-22x22	17.95	2-25x25	20.78	2-25x25	24.25	

MODELHTDM 91+	INPUT/OUTPUT (MBH)	AIR CAPACITY CFM	TEMP. RISE deg F	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	
2000	2000/1820	15320	110	2-20x20	4.36	2-20x20	5.26	2-18x18	7.02	2-18x18	7.77	2-18x18	9.91	2-20x20	11.44	2
		16852	100	2-20x20	5.41	2-20x20	6.30	2-18x18	4.30	2-18x18	9.41	2-18x18	11.03	2-22x22	11.57	
		18724	90	2-20x20	7.12	2-20x20	8.01	2-20x20	9.05	2-20x20	10.27	2-20x20	12.45	2-20x20	14.23	
		21065	80	2-22x22	7.54	2-20x20	10.72	2-20x20	11.76	2-20x20	12.97	2-20x20	15.64	2-20x20	18.00	
		24074	70	2-22x22	10.13	2-22x22	11.24	2-20x20	15.60	2-20x20	16.78	2-20x20	19.48	2-20x20	22.55	
		28086	60	2-22x22	15.11	2-22x22	16.44	2-22x22	17.71	2-22x22	19.09	2-22x22	21.82	2-22x22	24.82	
		33704	50	2-25x25	20.06	2-25x25	21.71	2-25x25	23.44	2-25x25	25.16	2-25x25	28.76	2-28x28	33.15	

MODELHTDM 91+	INPUT/OUTPUT (MBH)	AIR CAPACITY CFM	TEMP. RISE deg F	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	
2500	2500/2275	19150	110	2-22x22	5.52	2-20x20	8.04	2-20x20	9.00	2-20x20	10.18	2-20x20	12.56	2-20x20	14.33	2
		21065	100	2-22x22	6.85	2-22x22	7.82	2-20x20	10.98	2-20x20	12.07	2-20x20	14.70	2-20x20	17.19	
		23405	90	2-22x22	8.56	2-22x22	9.66	2-22x22	10.73	2-20x20	14.80	2-20x20	17.32	2-20x20	20.35	
		26331	80	2-22x22	11.51	2-22x22	12.78	2-22x22	14.04	2-22x22	20.65	2-22x22	17.91	2-22x22	20.65	
		30093	70	2-25x25	12.75	2-25x25	14.22	2-25x25	15.66	2-25x25	17.19	2-25x25	20.37	2-25x25	24.00	
		35108	60	2-25x25	17.51	2-25x25	19.25	2-25x25	20.93	2-25x25	22.66	2-25x25	26.09	2-25x25	29.77	
		42130	50	2-28x28	21.34	2-28x28	23.39	2-28x28	26.27	2-28x28	28.40	2-28x28	32.75	2-28x28	37.42	

MODELHTDM 91+	INPUT/OUTPUT (MBH)	AIR CAPACITY CFM	TEMP. RISE deg F	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	
3000	3000/32730	22980	110	2-22x22	7.36	2-22x22	8.48	2-22x22	9.56	2-20x20	13.42	2-20x20	15.72	2-20x20	18.66	2 1/2
		25278	100	2-22x22	9.39	2-22x22	10.64	2-22x22	11.82	2-22x22	13.04	2-22x22	15.51	2-22x22	18.13	
		28086	90	2-22x22	12.06	2-22x22	13.42	2-22x22	14.76	2-22x22	16.14	2-22x22	18.74	2-22x22	21.50	
		31957	80	2-25x25	12.70	2-25x25	14.19	2-25x25	15.78	2-25x25	17.29	2-25x25	20.53	2-25x25	23.92	
		36111	70	2-25x25	16.94	2-25x25	18.73	2-25x25	20.44	2-25x25	22.20	2-25x25	25.75	2-25x25	29.30	
		42130	60	2-28x28	20.08	2-28x28	22.10	2-28x28	24.24	2-28x28	26.27	2-28x28	30.50	2-28x28	34.99	
		50556	50	2-30x30	26.38	2-30x30	26.17	2-30x30	30.84	2-30x30	33.10	2-30x30	37.90	2-30x30	43.04	

Note:

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COOLING PERFORMANCE DATA

DX5S		Available Stages of Cooling: 1				
SST (°F)		Air Temperature Entering Condenser (°F)				
		75	85	95	105	115
40	TC	57.8	55.1	52.2	49.2	46.1
	CDT	99.3	110.0	120.0	130.0	140.0
45	TC	63.0	60.0	57.0	53.8	50.5
	CDT	101.0	111.0	121.0	132.0	142.0
50	TC	68.5	65.3	62.1	58.7	55.2
	CDT	102.0	113.0	123.0	133.0	143.0

DX6S		Available Stages of Cooling: 1				
SST (°F)		Air Temperature Entering Condenser (°F)				
		80	95	100	105	115
40	TC	77.4	69.8	67.3	64.7	59.6
	CDT	111	124	128	132	141
45	TC	84.9	77.0	74.4	71.7	66.4
	CDT	114	126	131	135	143
50	TC	92.7	84.5	81.7	78.9	73.4
	CDT	116	129	133	138	146

DX7.5S		Available Stages of Cooling: 1				
SST (°F)		Air Temperature Entering Condenser (°F)				
		80	95	100	105	115
40	TC	97.5	88.0	84.8	81.7	75.3
	CDT	109	120	127	131	140
45	TC	107.0	97.0	93.6	90.2	83.4
	CDT	111	124	129	133	142
50	TC	117.0	106.0	103.0	99.2	92.0
	CDT	114	127	131	136	144

DX10S		Available Stages of Cooling: 1, 2				
SST (°F)		Air Temperature Entering Condenser (°F)				
		80	95	100	105	115
40	TC	119.0	107.0	102.0	98.4	90.3
	CDT	115	127	132	136	145
45	TC	130.0	117.0	113.0	109.0	100.0
	CDT	118	130	134	139	147
50	TC	142.0	128.0	124.0	119.0	110.0
	CDT	121	133	137	141	150

DX10.5S		Available Stages of Cooling: 1, 2, 3, 4				
SST (°F)		Air Temperature Entering Condenser (°F)				
		85	95	100	105	115
40	TC	117.0	109.0	105.0	101.0	93.0
	CDT	115	124	128	133	142
45	TC	129.0	120.0	116.0	111.0	103.0
	CDT	117	126	131	135	144
50	TC	141.0	132.0	127.0	122.0	113.0
	CDT	120	129	133	137	146

DX12.5S		Available Stages of Cooling: 1, 2, 3, 4				
SST (°F)		Air Temperature Entering Condenser (°F)				
		80	95	100	105	115
40	TC	145.0	135.0	131.0	126.0	117.0
	CDT	112	121	126	130	140
45	TC	159.0	149.0	144.0	139.0	130.0
	CDT	114	123	127	132	141
50	TC	174.0	164.0	159.0	153.0	143.0
	CDT	116	124	129	134	143

DX15S		Available Stages of Cooling: 1, 2, 3, 4				
SST (°F)		Air Temperature Entering Condenser (°F)				
		80	95	100	105	115
40	TC	187.0	176.0	170.0	165.0	154.0
	CDT	117	126	130	135	144
45	TC	204.0	192.0	186.0	180.0	168.0
	CDT	119	128	133	137	146
50	TC	222.0	209.0	203.0	197.0	184.0
	CDT	122	131	135	140	148

DX20S		Available Stages of Cooling: 2, 3				
SST (°F)		Air Temperature Entering Condenser (°F)				
		80	95	100	105	115
40	TC	251.0	255.0	217.0	208.0	191.0
	CDT	117	129	133	137	146
45	TC	275.0	248.0	239.0	230.0	212.0
	CDT	121	133	137	141	149
50	TC	299.0	271.0	262.0	252.0	232.0
	CDT	124	136	140	144	152

DX25S		Available Stages of Cooling: 2, 3, 4				
SST (°F)		Air Temperature Entering Condenser (°F)				
		80	95	100	105	115
40	TC	333.0	301.0	290.0	279.0	258.0
	CDT	115	128	133	137	145
45	TC	365.0	330.0	319.0	307.0	284.0
	CDT	118	131	135	140	148
50	TC	398.0	361.0	348.0	336.0	312.0
	CDT	121	134	138	142	151

DX30S		Available Stages of Cooling: 2, 3, 4				
SST (°F)		Air Temperature Entering Condenser				
		80	95	100	105	115
40	TC	371.0	337.0	326.0	314.0	292.0
	CDT	115	128	132	136	145
45	TC	405.0	369.0	357.0	345.0	321.0
	CDT	117	130	135	139	147
50	TC	440.0	402.0	390.0	377.0	351.0
	CDT	120	133	138	142	150

DX40S		Available Stages of Cooling: 2, 3, 4				
SST (°F)		Air Temperature Entering Condenser				
		80	95	100	105	115
40	TC	503.0	461.0	447.0	433.0	405.0
	CDT	111	124	129	133	142
45	TC	551.0	505.0	489.0	474.0	444.0
	CDT	114	127	131	136	145
50	TC	599.0	550.0	534.0	518.0	485.0
	CDT	116	129	134	138	147

DX50T		Available Stages of Cooling: 4, 6, 8				
SST (°F)		Air Temperature Entering Condenser				
		85	95	100	105	115
40	TC	568.0	527.0	506.0	486.0	44.0
	CDT	116	125	130	135	144
45	TC	627.0	583.0	561.0	540.0	496.0
	CDT	119	127	132	137	146
50	TC	688.0	642.0	619.0	595.0	-
	CDT	121	130	134	139	-

DX60T		Available Stages of Cooling: 4, 6, 8				
SST (°F)		Air Temperature Entering Condenser (°F)				
		85	95	100	105	115
40	TC	682.0	634.0	611.0	588.0	541.0
	CDT	116	125	130	135	144
45	TC	749.0	699.0	674.0	650.0	600.0
	CDT	118	127	132	136	146
50	TC	822.0	768.0	741.0	715.0	662.0
	CDT	120	130	134	139	148

DX70T		Available Stages of Cooling: 4, 6, 8				
SST (°F)		Air Temperature Entering Condenser (°F)				
		80	95	100	105	115
40	TC	829.0	778.0	753.0	727.0	677.0
	CDT	115	124	129	133	143
45	TC	910.0	854.0	827.0	800.0	745.0
	CDT	118	127	131	136	145
50	TC	994.0	935.0	905.0	876.0	817.0
	CDT	120	129	133	138	147

DX80T		Available Stages of Cooling: 4, 6, 8				
SST (°F)		Air Temperature Entering Condenser (°F)				
		85	95	100	105	115
40	TC	954.0	896.0	866.0	838.0	780.0
	CDT	117	126	131	136	145
45	TC	1047.0	984.0	953.0	922.0	860.0
	CDT	119	128	128	138	147
50	TC	1144.0	1077.0	1044.0	1011.0	944.0
	CDT	122	131	135	140	149

Nomenclature:

DX 20 S

Nominal Tonnage

S – Single Compressor
T – Twin Compressor

SST -Saturated Suction Temperature (°F)
TC - Gross Cooling Capacity (°F)
CDT - Saturated Discharge Temperature at Compressor (°F)

For capacities larger than or between those indicated or for capacities of twin compressor units less than 50 tons, consult ICE Western.
For reference only, subject to change without notice.

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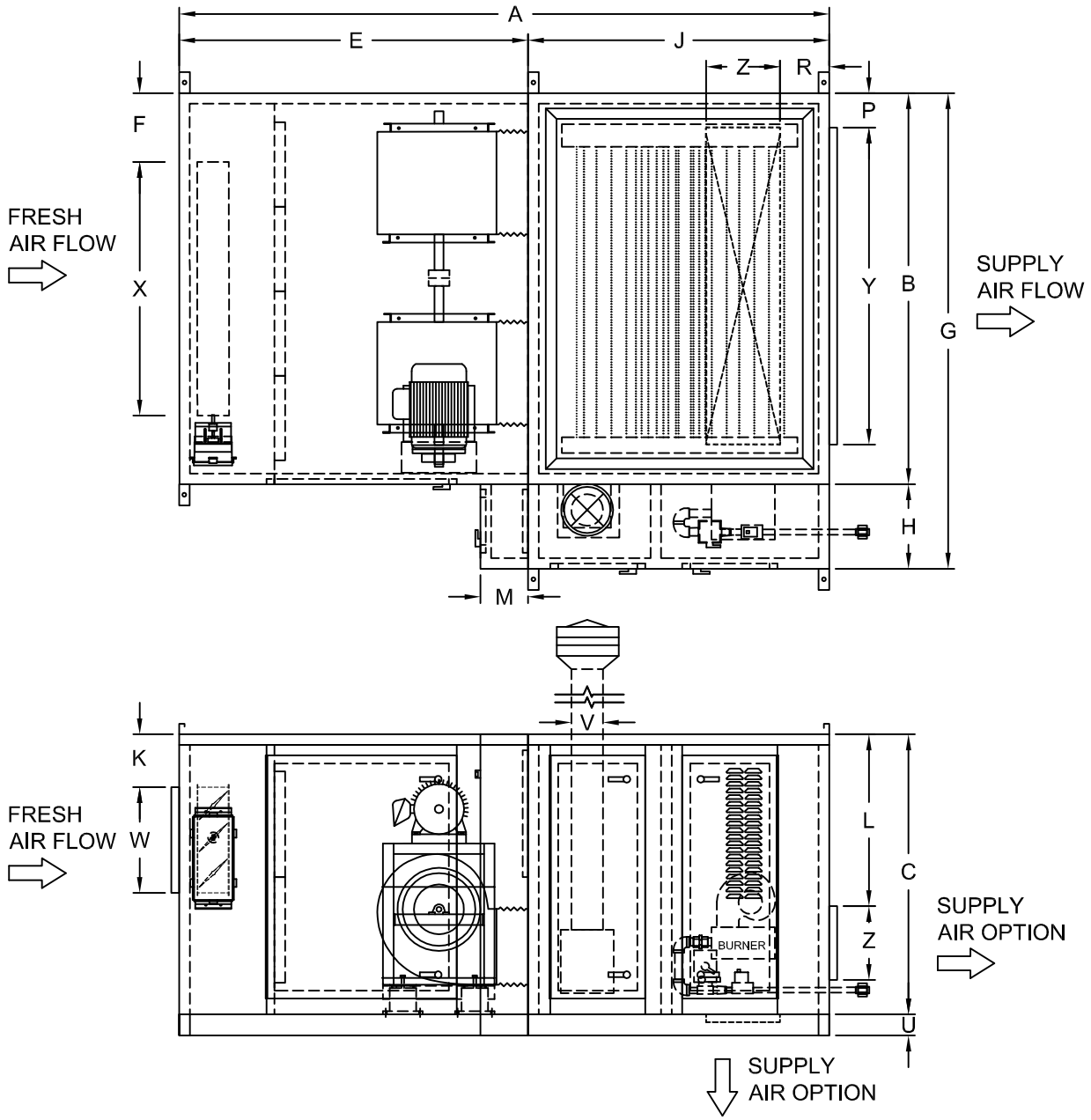


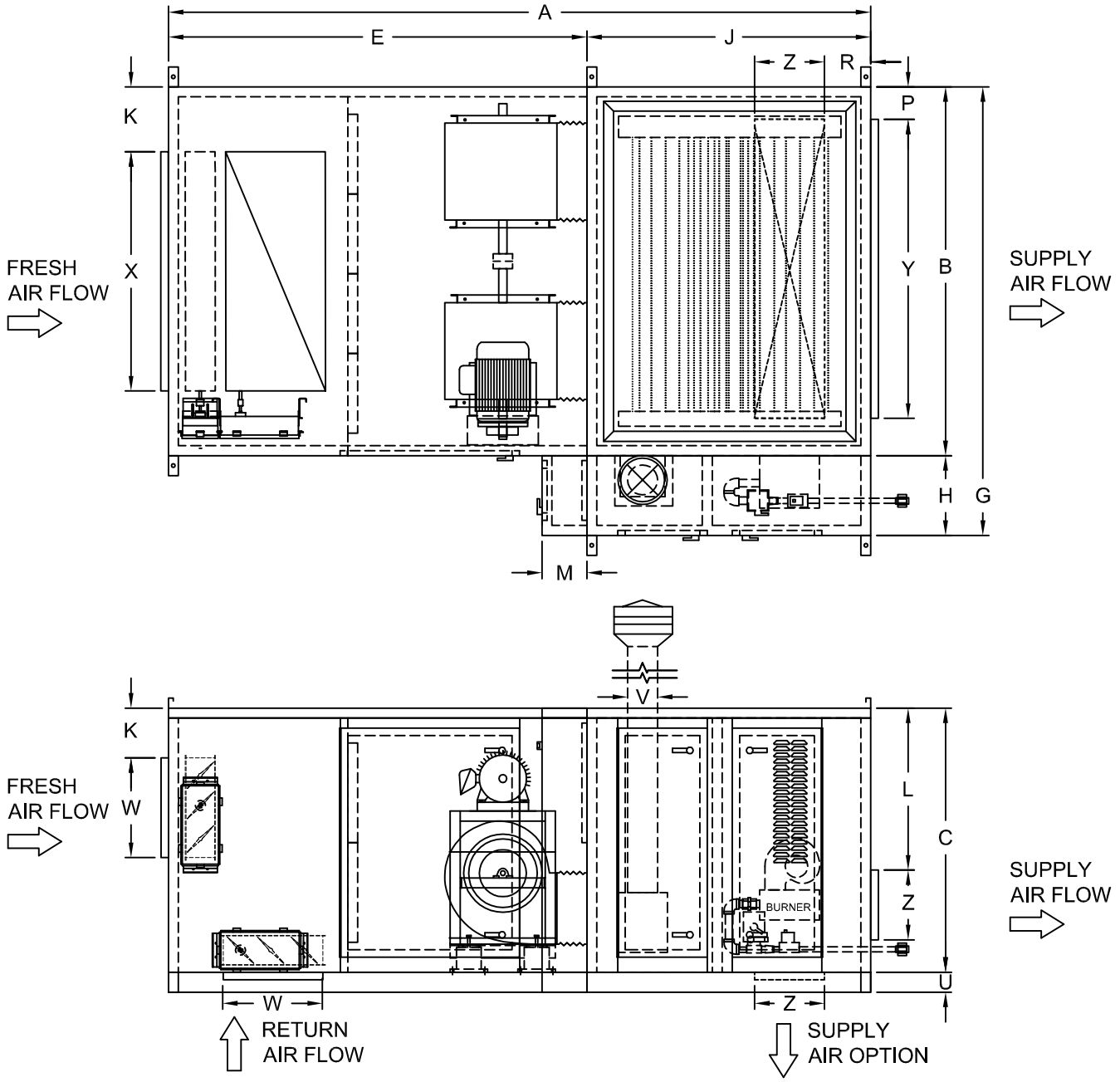
MODEL	A	B	C	E	F	G	H	J	K	L	M	P	R	U	V	W	X	Y	Z
200	114	36	53	56	6	52	16	58	12	33 ½	9	7	10 ½	4	4	18	18	20	12
400	124	60	53	66	6	76	16	58	15	33 ½	9	12	10 ½	4	4	14	42	36	12
600	124	74	53	66	13	90	16	58	10	33 ½	9	8	10 ½	4	6	20	48	58	12
1000	146	84	69	66	6	102	18	80	14	42 ¾	N/A	5	9 ¼	4	6	26	66	74	20
1500	155	89	78	70	6	107	18	85	12	42 ½	N/A	5	12 ½	4	8	30	70	78	24
2000	180	106	78	70	6	124	18	110	16	43 ½	N/A	6	17	6	10	30	92	100	20
2500	186	115	88	70	7	133	18	116	12	48 ½	N/A	5	18	6	10	36	96	104	24
3000	196	118	88	70	7	138	20	126	18	44 ½	N/A	6	20 ½	6	12	40	102	106	26

NOTE:
1. DIMENSIONS ARE GENERALIZED FOR ILLUSTRATIVE PURPOSES. CONTACT I.C.E. FOR A NO-OBLIGATION DESIGN CUSTOMIZED TO MEET YOUR SPECIFIC NEEDS
2. SERVICE ACCESS PANELS MUST NOT BE OBSTRUCTED. RECOMMENDED CLEARANCES IS MINIMUM 24".
3. 1-1/2" DISCHARGE & INLET FLANGES AT OPENINGS.
4. RIGHT HAND UNIT SHOWN, LEFT HAND OPPOSITE SHOWN
5. LIFTING LUG 2"x4" (TYP.)
6. SEE PAGE 32 FOR INTAKE AND EXHAUST HOOD DIMENSIONS
7. DIMENSIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE AND TO MANUFACTURING TOLERANCES.
8. SEE PAGE 31 FOR ROOF CURB DIMENSIONS
9. SEE PAGE 8 FOR UNIT WEIGHTS

WESTERN

HTDM
91 PLUS SERIES

TITLE:
HORIZONTAL CONFIGURATION GRAVITY VENTED
c/w FLAT FILTER



MODEL	A	B	C	E	F	G	H	J	K	L	M	P	R	U	V	W	X	Y	Z
200	130	36	53	72	6	52	16	58	12	33 ½	9	7	10 ½	4	4	18	18	20	12
400	137	60	53	79	6	76	16	58	15	33 ½	9	12	10 ½	4	4	14	42	36	12
600	142	74	53	84	13	90	16	58	10	33 ½	9	8	10 ½	4	6	20	48	58	12
1000	174	84	69	94	6	102	18	80	14	42 ¾	N/A	5	9 ¼	4	6	26	66	74	20
1500	183	89	78	98	6	107	18	85	12	44 ½	N/A	5	12 ½	4	8	30	70	78	24
2000	208	106	78	98	6	125	18	110	16	43 ½	N/A	6	17	6	10	30	92	100	20
2500	214	115	88	98	7	133	18	116	12	48 ½	N/A	5	18	6	10	36	96	104	24
3000	234	118	88	108	7	138	20	126	18	44 ½	N/A	6	20 ½	6	12	40	102	106	26

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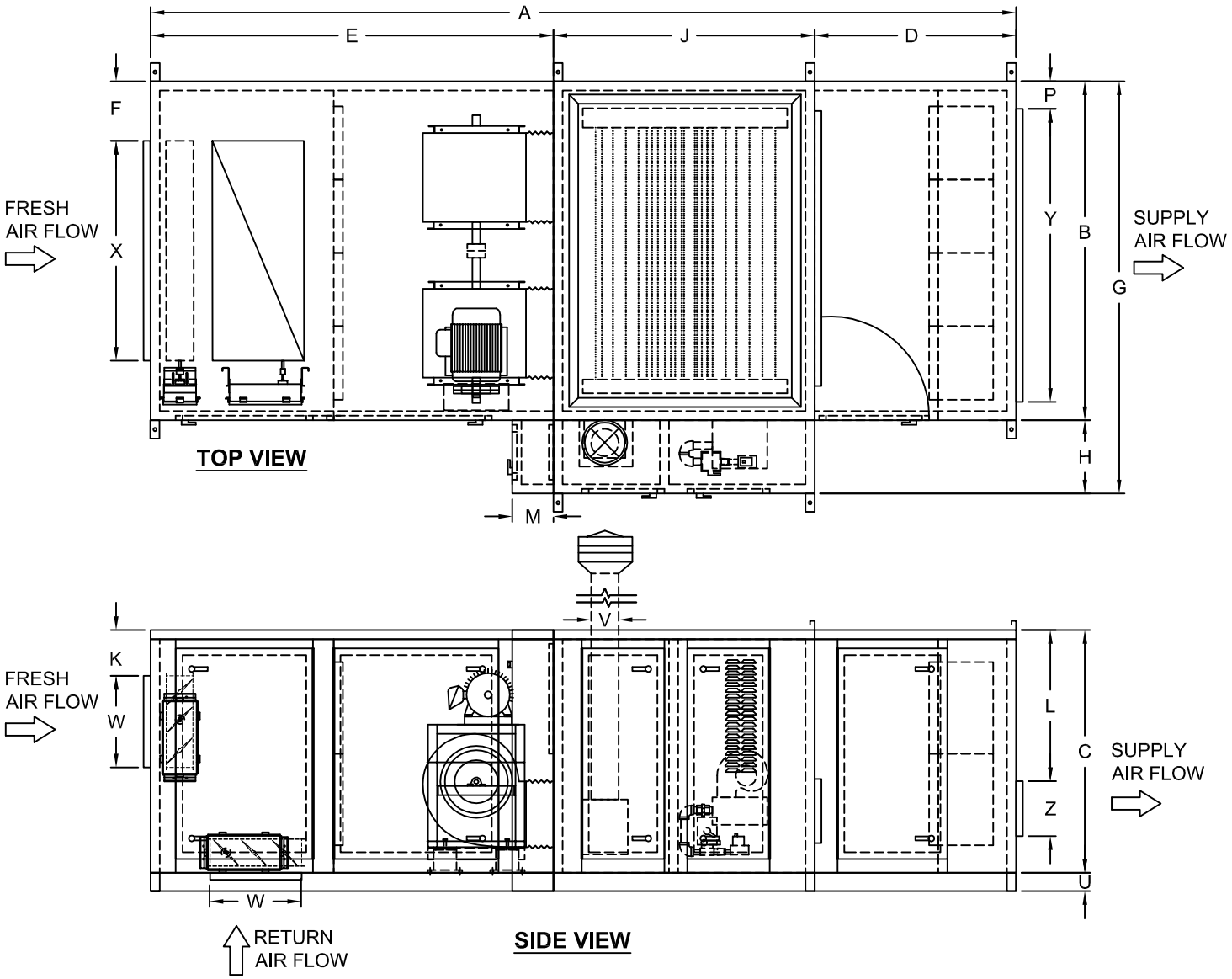
5. LIFTING LUG 2"x4" (TYP.)
6. SEE PAGE 32 FOR INTAKE AND EXHAUST HOOD DIMENSIONS
7. DIMENSIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE AND TO MANUFACTURING TOLERANCES.
8. SEE PAGE 31 FOR ROOF CURB DIMENSIONS
9. SEE PAGE 8 FOR UNIT WEIGHTS

ICE WESTERN

HTDM
91 PLUS SERIES

TITLE:
HORIZONTAL CONFIGURATION GRAVITY VENTED
c/w FLAT FILTER & MIX BOX



MODEL	A	B	C	D	E	F	G	H	J	K	L	M	P	U	V	W	X	Y	Z
200	174	36	53	44	72	6	52	16	58	12	33 ½	9	7	4	4	18	18	20	12
400	181	60	53	44	79	6	76	16	58	15	33 ½	9	12	4	4	14	42	36	12
600	186	74	53	44	84	13	90	16	58	10	33 ½	9	8	4	6	20	48	58	12
1000	218	84	69	44	94	6	102	18	80	14	42 ¾	N/A	5	4	6	26	66	74	20
1500	227	89	78	44	98	6	107	18	85	12	44 ½	N/A	5	4	8	30	70	78	24
2000	252	106	78	44	98	6	125	18	110	16	43 ½	N/A	6	6	10	30	92	100	20
2500	258	115	88	44	98	7	133	18	116	12	48 ½	N/A	5	6	10	36	96	104	24
3000	278	118	88	44	98	7	138	20	126	18	44 ½	N/A	6	6	12	40	102	106	26

NOTE:
1. DIMENSIONS ARE GENERALIZED FOR ILLUSTRATIVE PURPOSES. CONTACT I.C.E. FOR A NO-OBLIGATION DESIGN CUSTOMIZED TO MEET YOUR SPECIFIC NEEDS
2. SERVICE ACCESS PANELS MUST NOT BE OBSTRUCTED. RECOMMENDED CLEARANCES IS MINIMUM 24".
3. 1-1/2" DISCHARGE & INLET FLANGES AT OPENINGS.
4. RIGHT HAND UNIT SHOWN, LEFT HAND OPPOSITE SHOWN
5. LIFTING LUG 2"x4" (TYP.)
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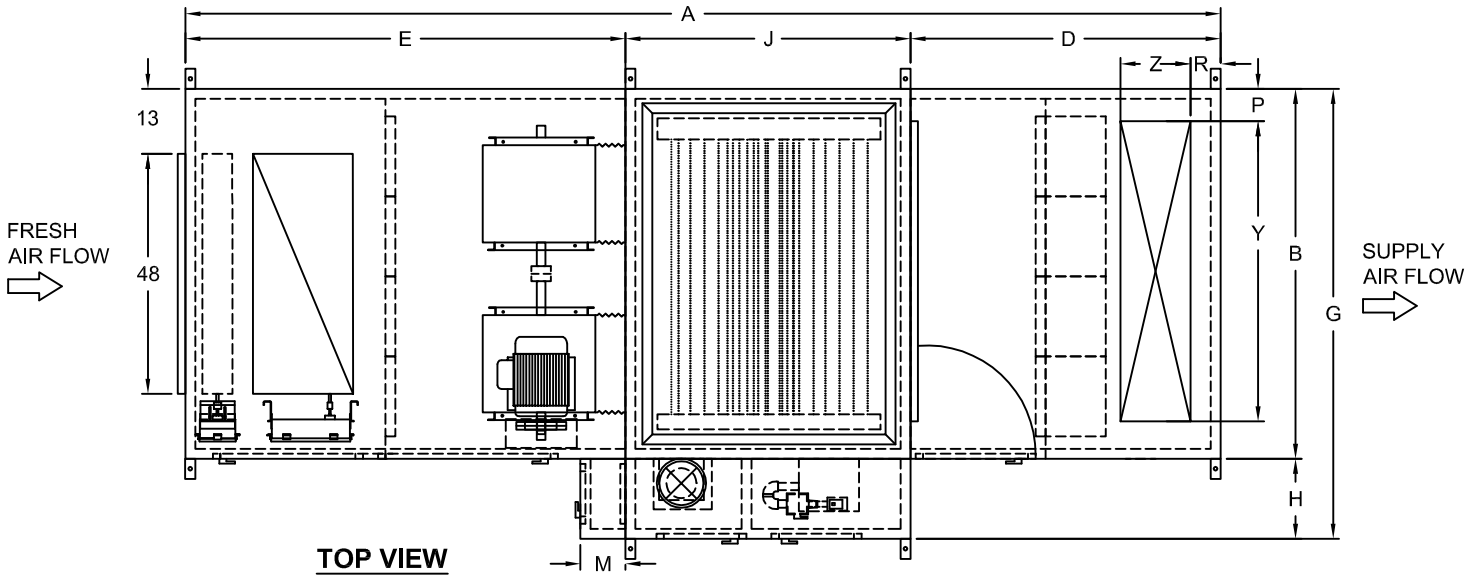
9. SEE PAGE 8 FOR UNIT WEIGHTS

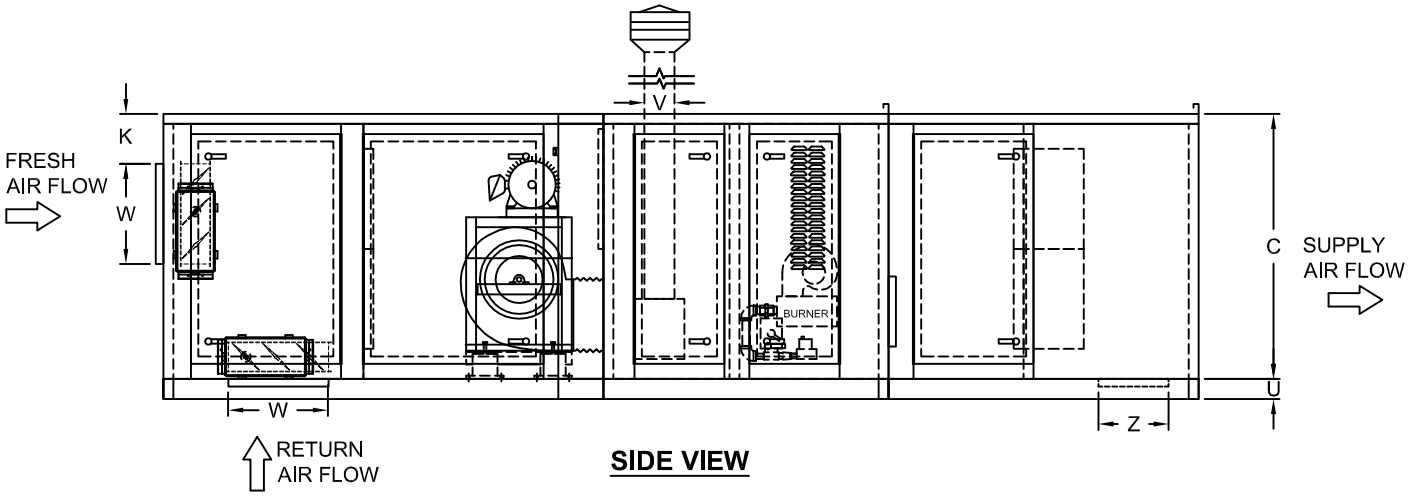
ICE WESTERN

HTDM
91 PLUS SERIES

TITLE:
HORIZONTAL CONFIGURATION GRAVITY VENTED c/w FLAT FILTER, MIX BOX, HIGH E. FILTER PLENUM & HORIZONTAL DISCHARGE



TOP VIEW



SIDE VIEW

MODEL	A	B	C	D	E	F	G	H	J	K	M	P	R	U	V	W	X	Y	Z
200	190	36	53	60	72	6	52	16	58	12	9	7	6	4	4	18	18	20	12
400	197	60	53	60	79	6	76	16	58	15	9	12	6	4	4	14	42	36	12
600	202	74	53	60	84	13	90	16	58	10	9	8	6	4	6	20	48	58	12
1000	242	84	69	68	94	6	102	18	80	14	N/A	5	6	4	6	26	66	74	20
1500	255	89	78	72	98	6	107	18	85	12	N/A	5	6	4	8	30	70	78	24
2000	276	106	78	68	98	6	125	18	110	16	N/A	6	6	6	10	30	92	100	20
2500	286	115	88	72	98	7	133	18	116	12	N/A	5	6	6	10	36	96	104	24
3000	308	118	88	74	108	7	138	20	126	18	N/A	6	6	6	12	40	102	106	26

NOTE:
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2. SERVICE ACCESS PANELS MUST NOT BE OBSTRUCTED. RECOMMENDED CLEARANCES IS MINIMUM 24".
3. 1-1/2" DISCHARGE & INLET FLANGES AT OPENINGS.
4. RIGHT HAND UNIT SHOWN, LEFT HAND OPPOSITE SHOWN
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6. SEE PAGE 32 FOR INTAKE AND EXHAUST HOOD DIMENSIONS
7. DIMENSIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE AND TO MANUFACTURING TOLERANCES.
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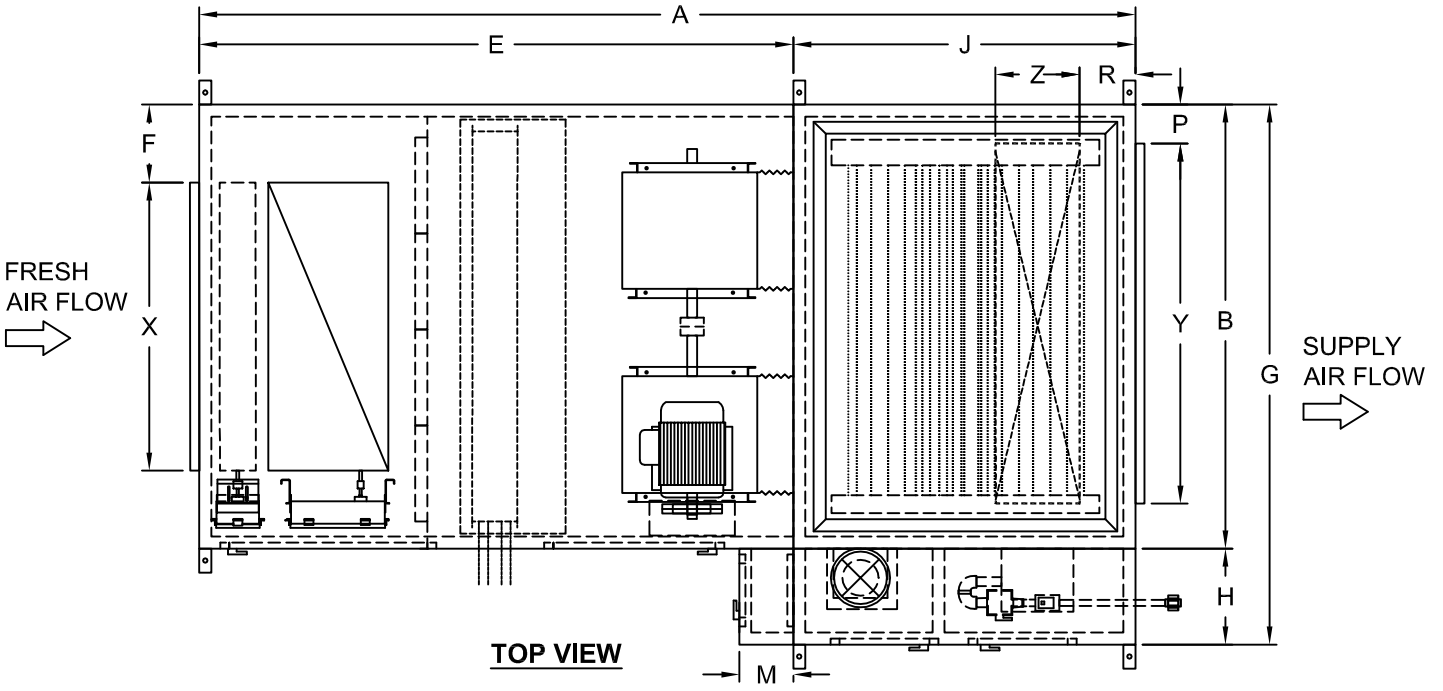
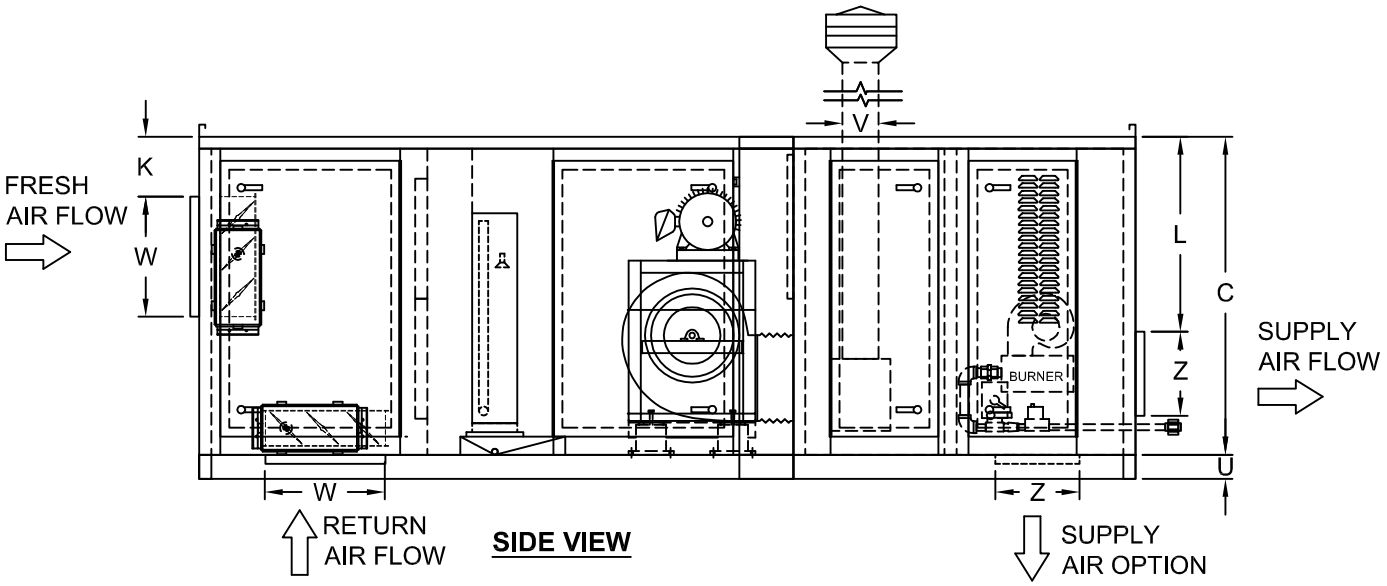
ICE WESTERN

HTDM
91 PLUS SERIES

TITLE:
HORIZONTAL CONFIGURATION GRAVITY VENTED c/w FLAT FILTER, MIX BOX, HIGH E. FILTER PLENUM & BOTTOM DISCHARGE



TOP VIEW



SIDE VIEW

MODEL	A	B	C	E	F	G	H	J	K	L	N	P	R	U	V	W	X	Y	Z
200	145	36	53	87	6	52	16	58	12	33 ½	9	7	10 ½	4	4	18	18	20	12
400	152	60	53	94	6	76	16	58	15	33 ½	9	12	10 ½	4	4	14	42	36	12
600	157	74	53	99	13	90	16	58	10	33 ½	9	8	10 ½	4	6	20	48	58	12
1000	189	84	69	109	6	102	18	80	14	42 ¾	N/A	5	9 ¼	4	6	26	66	74	20
1500	198	89	78	113	6	107	18	85	12	44 ½	N/A	5	12 ½	4	8	30	70	78	24
2000	223	106	78	113	6	125	18	110	16	43 ½	N/A	6	17	6	10	30	92	100	20
2500	229	115	88	113	7	133	18	116	12	48 ½	N/A	5	18	6	10	36	96	104	24
3000	249	118	88	123	7	138	20	126	18	44 ½	N/A	6	20 ½	6	12	40	102	106	26

NOTE:
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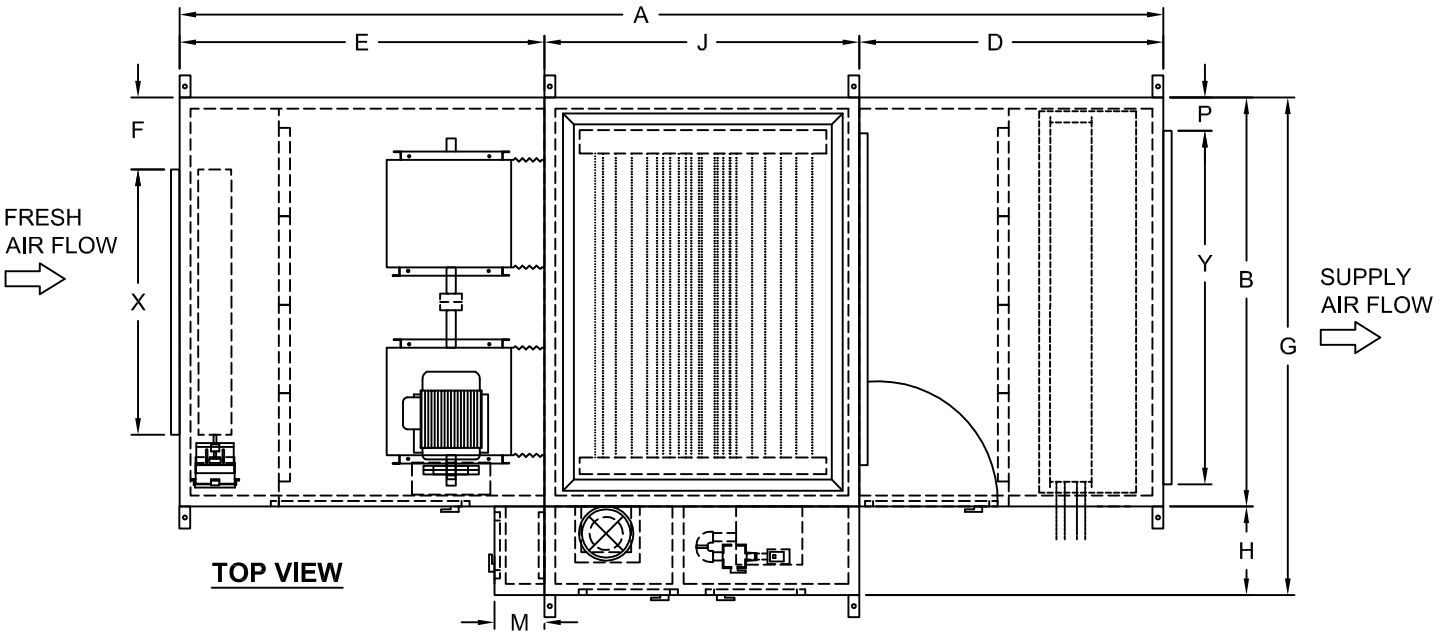
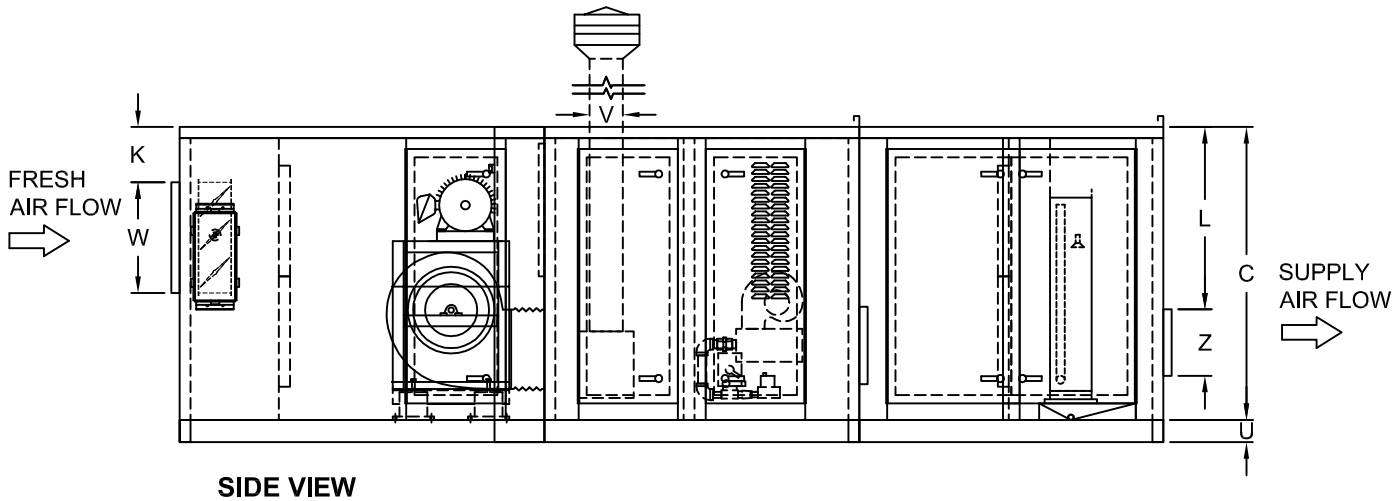
ICE WESTERN

HTDM
91 PLUS SERIES

TITLE:
HORIZONTAL CONFIGURATION GRAVITY VENTED
c/w FLAT FILTER, COIL & MIX BOX



TOP VIEW



SIDE VIEW

MODEL	A	B	C	D	E	F	G	H	J	K	L	M	P	U	V	W	X	Y	Z
200	156	36	53	42	56	6	52	16	58	12	33 ½	9	7	4	4	18	18	20	12
400	166	60	53	42	66	6	76	16	58	15	33 ½	9	12	4	4	14	42	36	12
600	166	74	53	42	66	13	90	16	58	10	33 ½	9	8	4	6	20	48	58	12
1000	188	84	69	42	66	6	102	18	80	14	42 ¾	N/A	5	4	6	26	66	74	20
1500	197	89	78	42	70	6	107	18	85	12	44 ½	N/A	5	4	8	30	70	78	24
2000	222	106	78	42	70	6	125	18	110	16	43 ½	N/A	6	6	10	30	92	100	20
2500	228	115	88	42	70	7	133	18	116	12	48 ½	N/A	5	6	10	36	96	104	24
3000	238	118	88	42	70	7	138	20	126	18	44 ½	N/A	6	6	12	40	102	106	26

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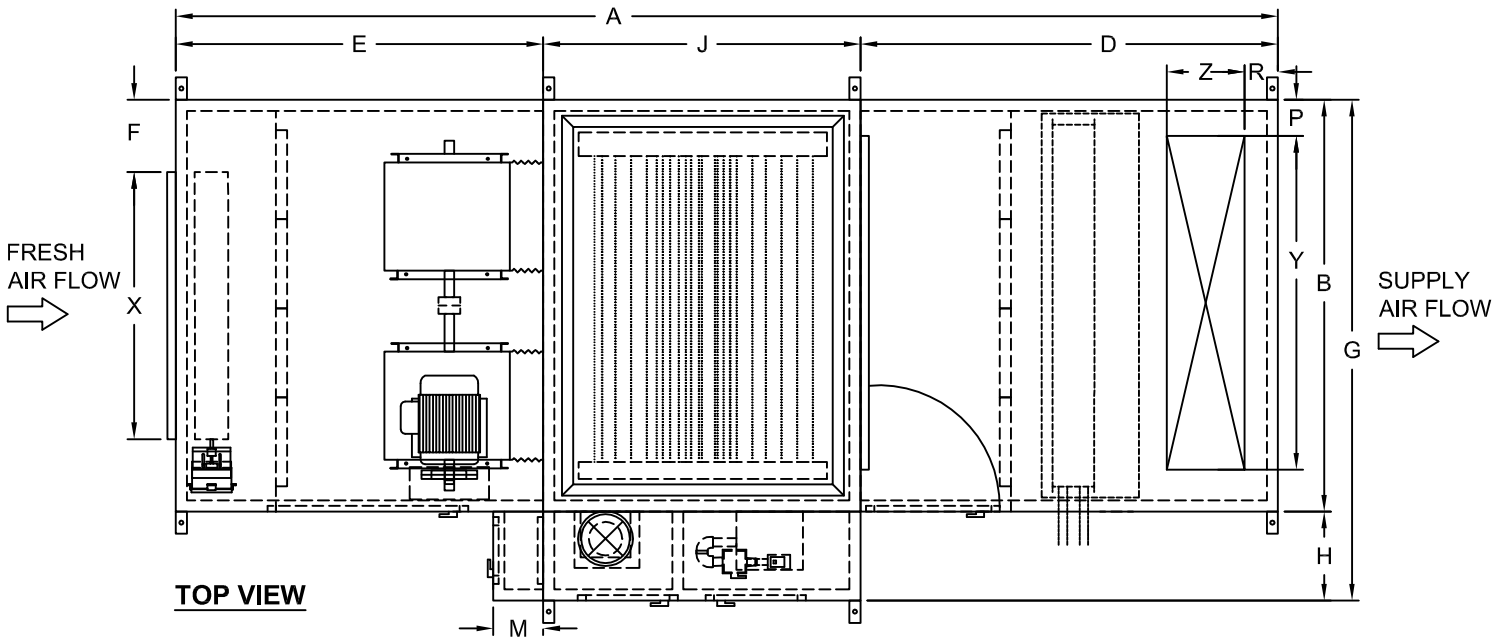
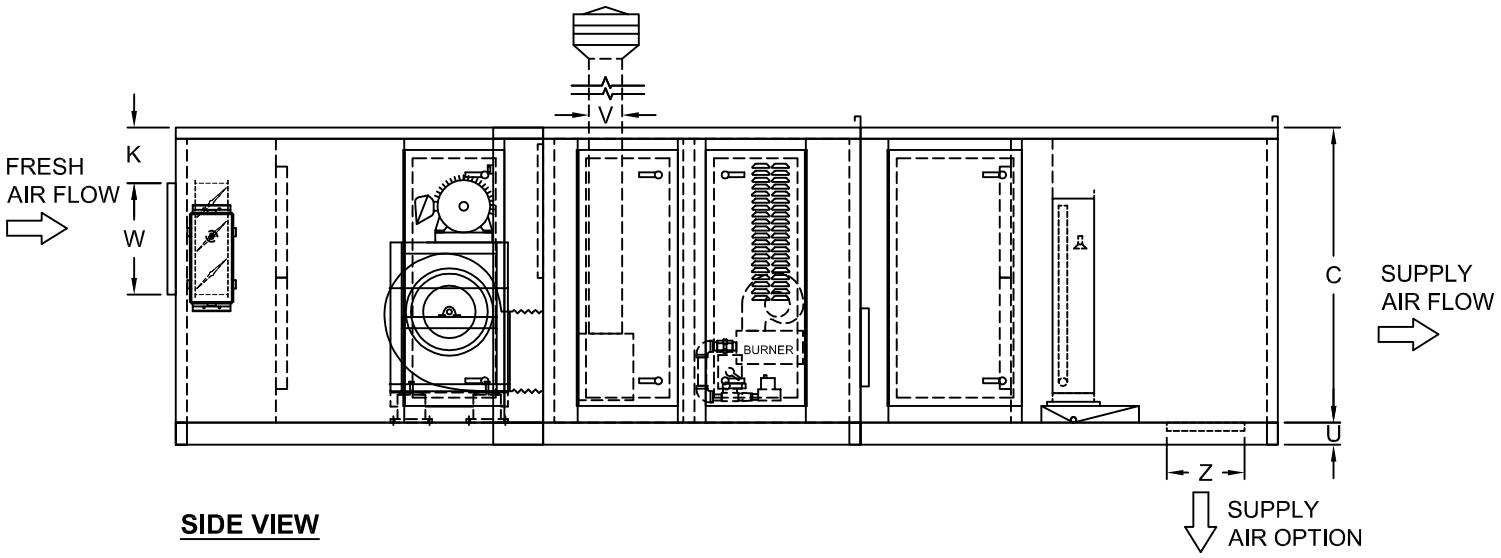
ICE WESTERN

HTDM
91 PLUS SERIES

TITLE:
HORIZONTAL CONFIGURATION GRAVITY VENTED c/w FLAT FILTER, COIL PLENUM AND HORIZONTAL DISCHARGE



TOP VIEW



SIDE VIEW

MODEL	A	B	C	D	E	F	G	H	J	K	M	P	R	U	V	W	X	Y	Z
200	190	36	53	76	56	6	52	16	58	12	9	7	6	4	4	18	18	20	12
400	206	60	53	82	66	6	76	16	58	15	9	12	6	4	4	14	42	36	12
600	200	74	53	76	66	13	90	16	58	10	9	8	6	4	6	20	48	58	12
1000	228	84	69	82	66	6	102	18	80	14	N\A	5	6	4	6	26	66	74	20
1500	241	89	78	86	70	6	107	18	85	12	N\A	5	6	4	8	30	70	78	24
2000	262	106	78	82	70	6	125	18	110	16	N\A	6	6	6	10	30	92	100	20
2500	272	115	88	86	70	7	133	18	116	12	N\A	5	6	6	10	36	96	104	24
3000	284	118	88	88	70	7	138	20	126	18	N\A	6	6	6	12	40	102	106	26

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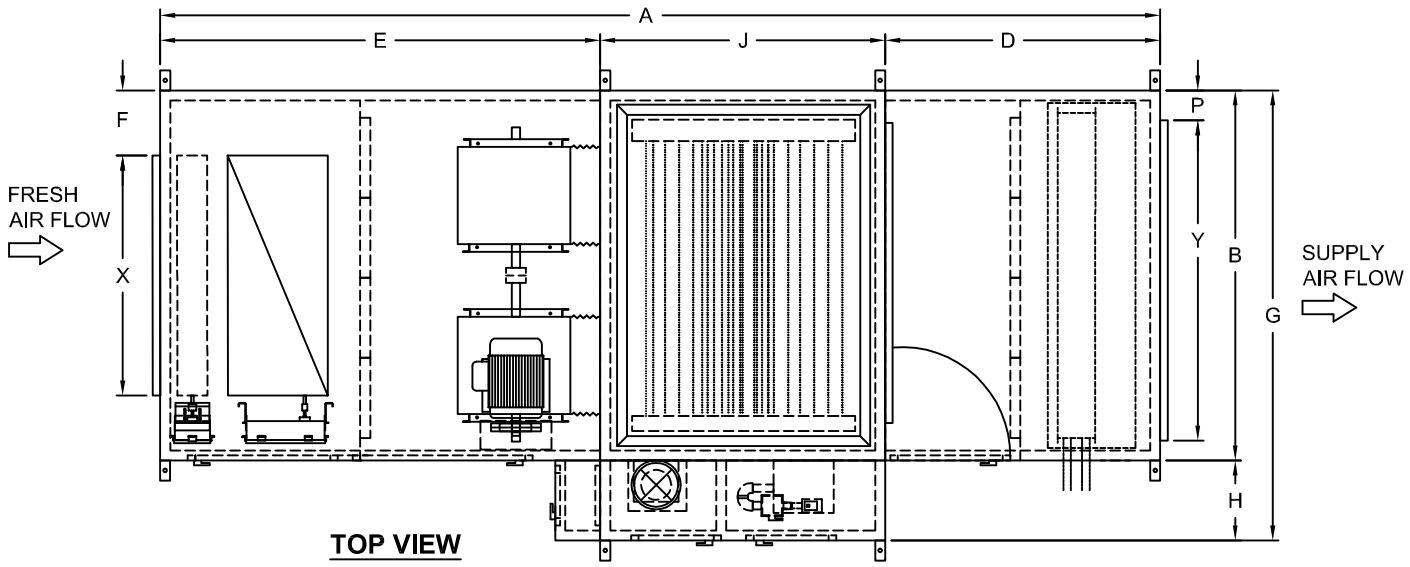
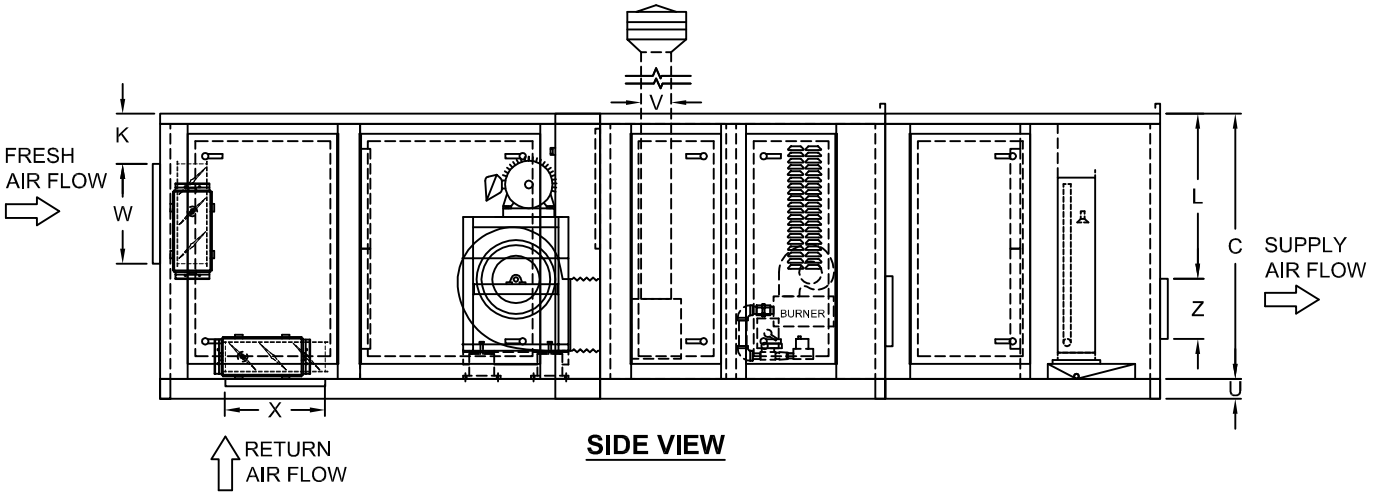
ICE WESTERN

HTDM
91 PLUS SERIES

TITLE:
HORIZONTAL CONFIGURATION GRAVITY VENTED c/w FLAT FILTER, COIL PLENUM & BOTTOM DISCHARGE



TOP VIEW



SIDE VIEW

MODEL	A	B	C	D	E	F	G	H	J	K	L	M	P	U	V	W	X	Y	Z
200	172	36	53	42	72	6	52	16	58	12	33 ½	9	7	4	4	18	18	20	12
400	179	60	53	42	79	6	76	16	58	15	33 ½	9	12	4	4	14	42	36	12
600	184	74	53	42	84	13	90	16	58	10	33 ½	9	8	4	6	20	48	58	12
1000	216	84	69	42	94	6	102	18	80	14	42 ¾	N/A	5	4	6	26	66	74	20
1500	225	89	78	42	98	6	107	18	85	12	44 ½	N/A	5	4	8	30	70	78	24
2000	250	106	78	42	98	6	125	18	110	16	43 ½	N/A	6	6	10	30	92	100	20
2500	256	115	88	42	98	7	133	18	116	12	48 ½	N/A	5	6	10	36	96	104	24
3000	266	118	88	42	108	7	138	20	126	18	44 ½	N/A	6	6	12	40	102	106	26

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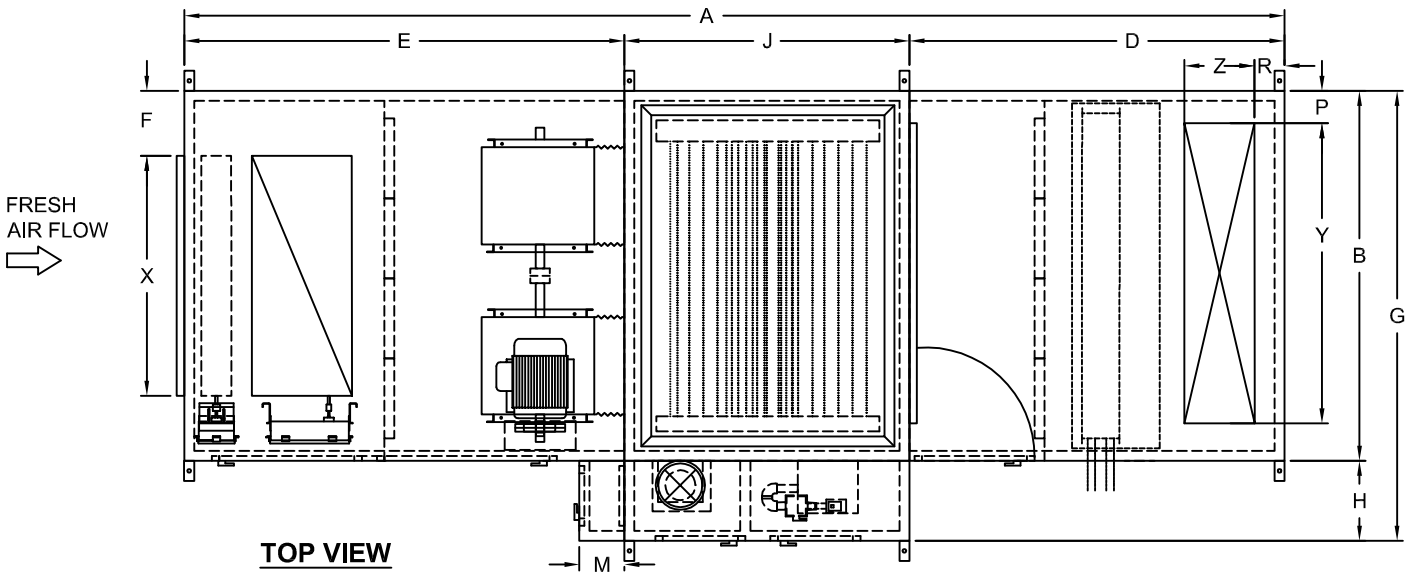
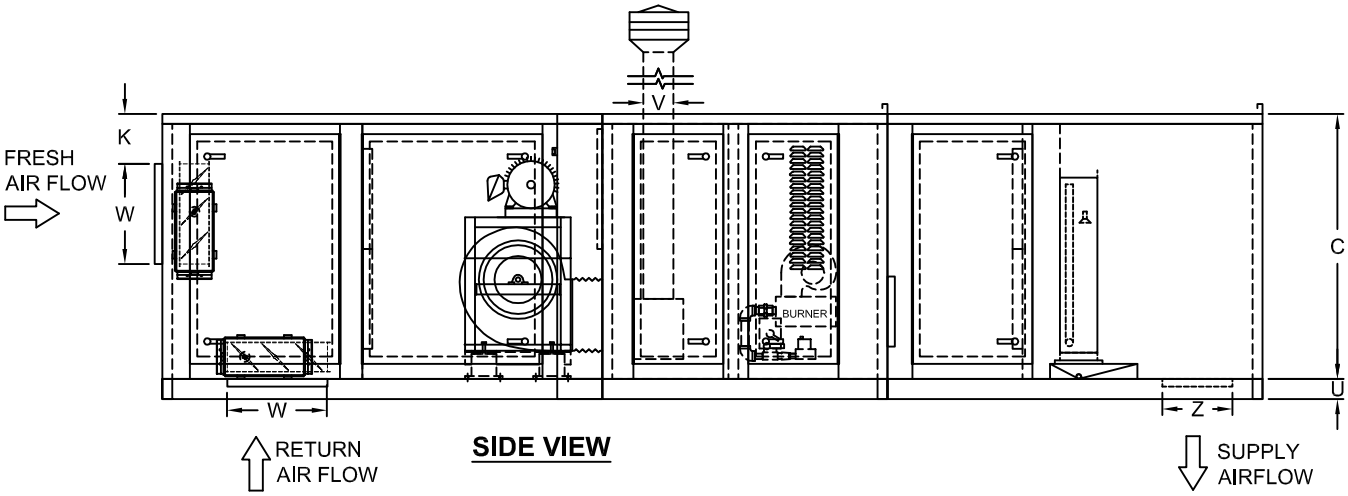
WESTERN

HTDM
91 PLUS SERIES

TITLE:
HORIZONTAL CONFIGURATION GRAVITY VENTED c/w FLAT FILTER, MIX BOX, COIL PLENUM & HORIZONTAL DISCHARGE



TOP VIEW



SIDE VIEW

MODEL	A	B	C	D	E	F	G	H	J	K	L	M	P	R	U	V	W	X	Y	Z
200	206	36	53	76	72	6	52	16	58	12	33 ½	9	7	6	4	4	18	18	20	12
400	219	60	53	82	79	6	76	16	58	15	33 ½	9	12	6	4	4	14	42	36	12
600	218	74	53	76	84	13	90	16	58	10	33 ½	9	8	6	4	6	20	48	58	12
1000	256	84	69	82	94	6	102	18	80	14	42 ¾	N/A	5	6	4	6	26	66	74	20
1500	269	89	78	86	98	6	107	18	85	12	44 ½	N/A	5	6	4	8	30	70	78	24
2000	290	106	78	82	98	6	125	18	110	16	43 ½	N/A	6	6	6	10	30	92	100	20
2500	300	115	88	86	98	7	133	18	116	12	48 ½	N/A	5	6	6	10	36	96	104	24
3000	322	118	88	88	108	7	138	20	126	18	44 ½	N/A	6	6	6	12	40	102	106	26

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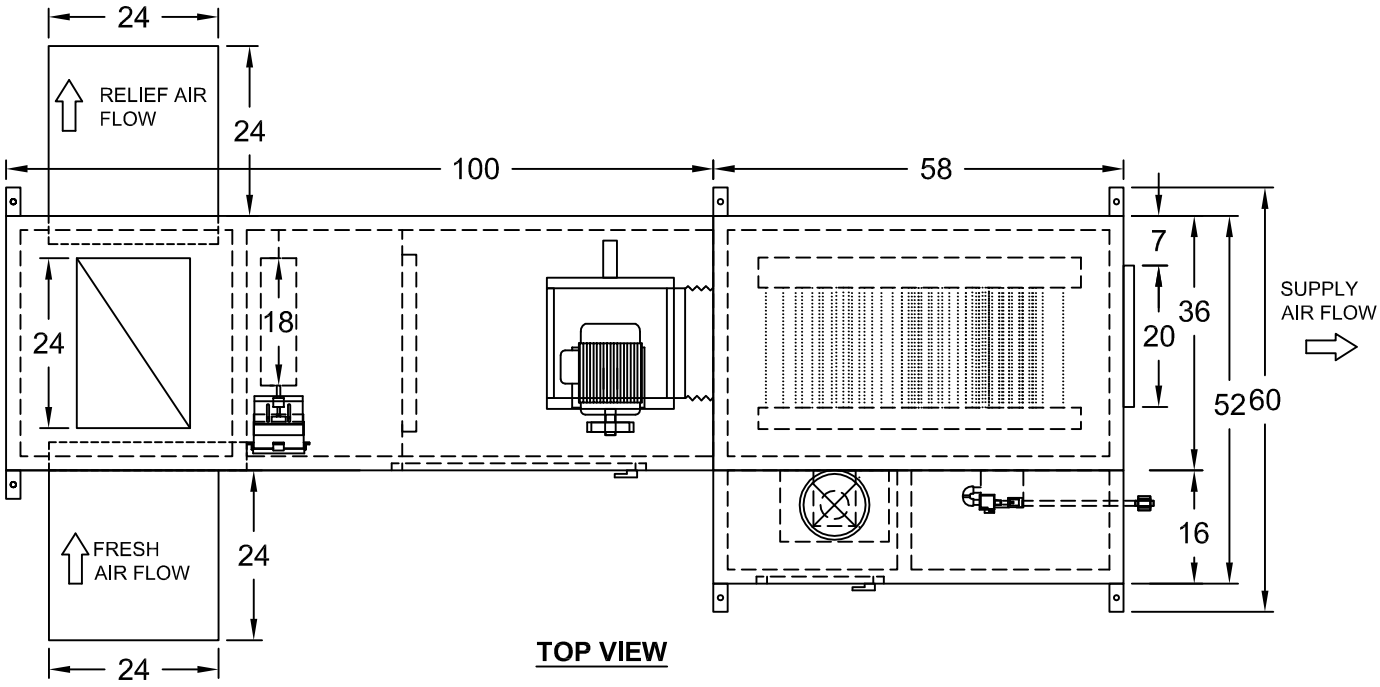
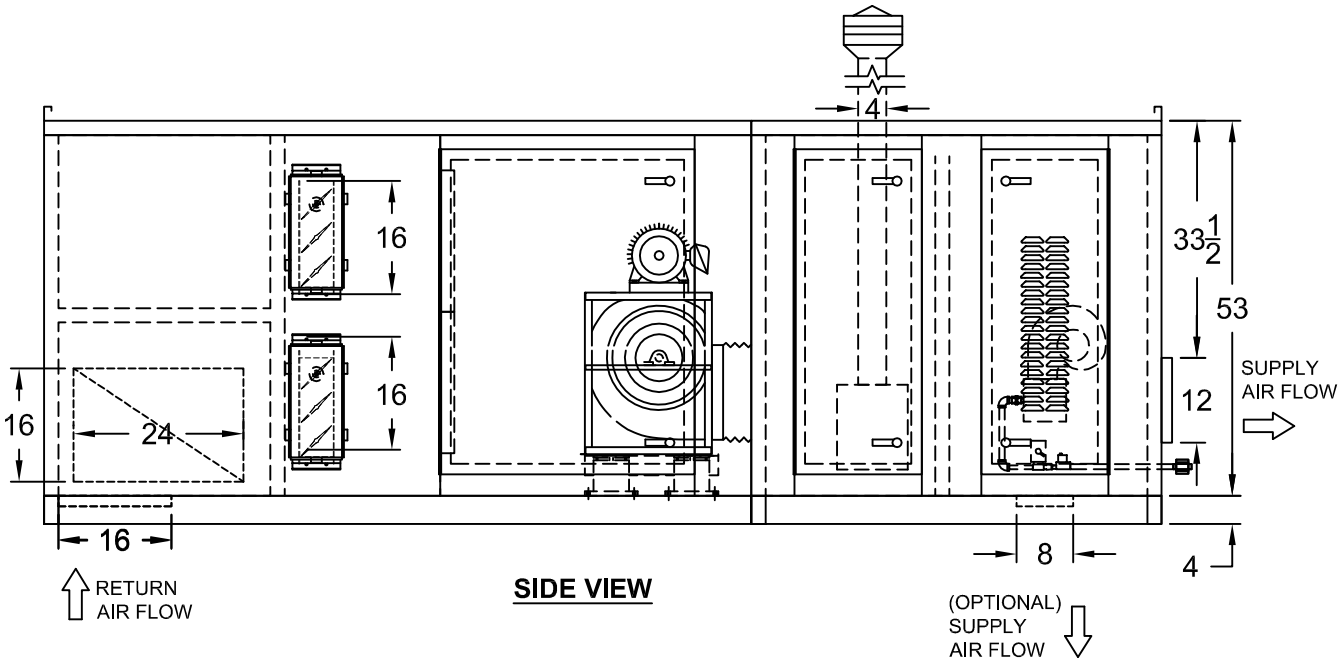
ICE WESTERN

HTDM
91 PLUS SERIES

TITLE:
HORIZONTAL CONFIGURATION GRAVITY VENTED c/w FLAT FILTER, MIX BOX, COIL PLENUM AND BOTTOM DISCHARGE



TOP VIEW



SIDE VIEW

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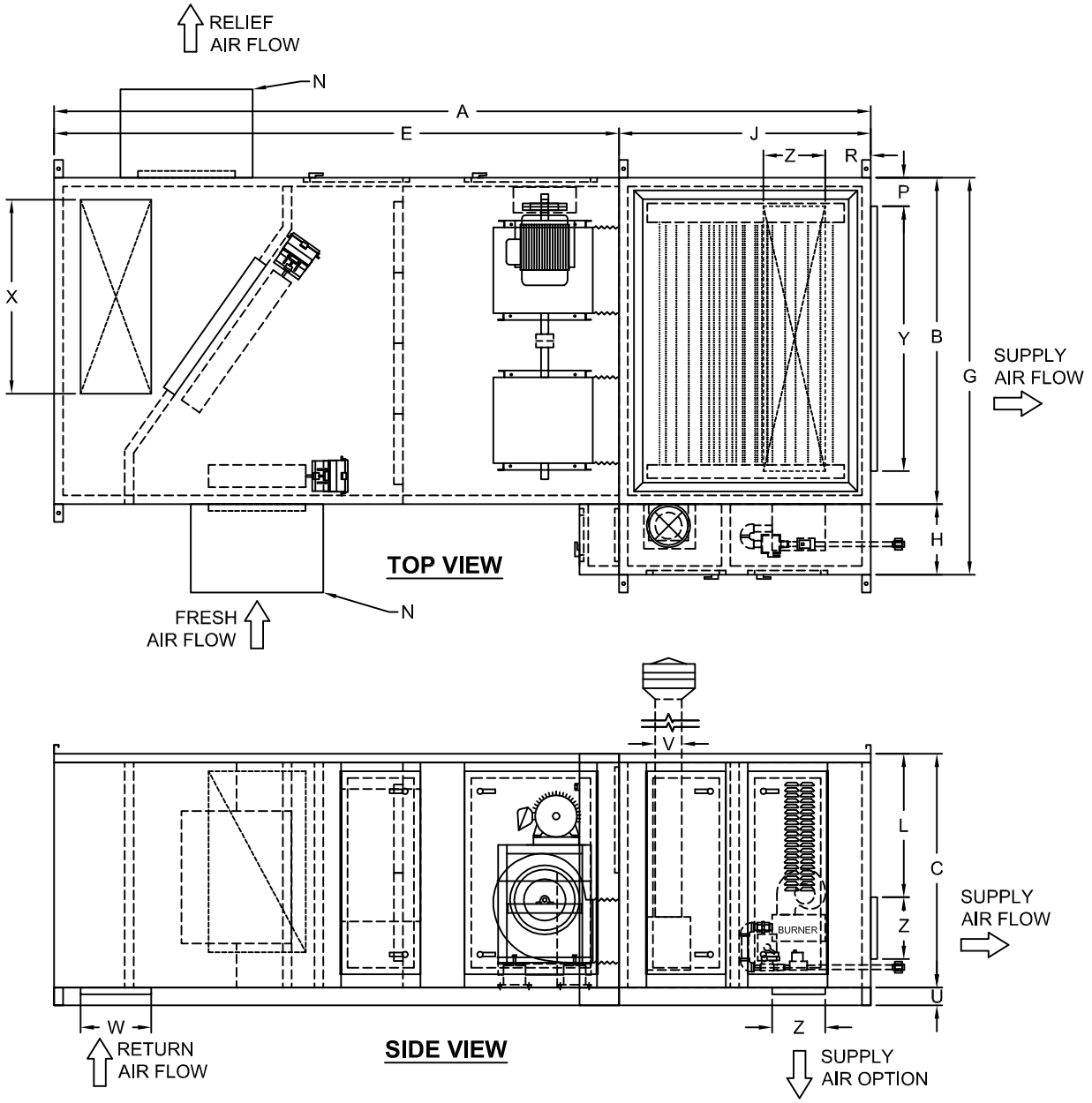
ICE WESTERN	HTDM 91 PLUS SERIES	TITLE: HTDM 200-HORIZONTAL CONFIGURATION GRAVITY VENTED c/w FLAT FILTER & MIX BOX WITH RELIEF FA



MODEL	A	B	C	E	F	G	H	J	K	L	M	N	P	R	U	V	W	X	Y	Z
400	180	60	53	122	6	76	16	58	15	33 ½	9	26x26	12	10 ½	4	4	14	42	36	12
600	180	74	53	122	13	90	16	57	10	33 ½	9	30x30	8	10 ½	4	6	20	48	58	12
1000	202	84	69	122	6	102	18	80	14	42 ¾	N/A	32x32	5	9 ¼	4	6	26	66	74	20
1500	211	89	78	126	6	107	18	85	12	44 ½	N/A	36x36	5	12 ½	4	8	30	70	78	24
2000	236	106	78	126	6	125	18	110	16	43 ½	N/A	36x36	6	17	6	10	30	92	100	20
2500	242	115	88	126	7	133	18	116	12	48 ½	N/A	42x42	5	18	6	10	36	96	104	24
3000	252	118	88	126	7	138	20	126	18	44 ½	N/A	46x46	6	20 ½	6	12	40	102	106	26

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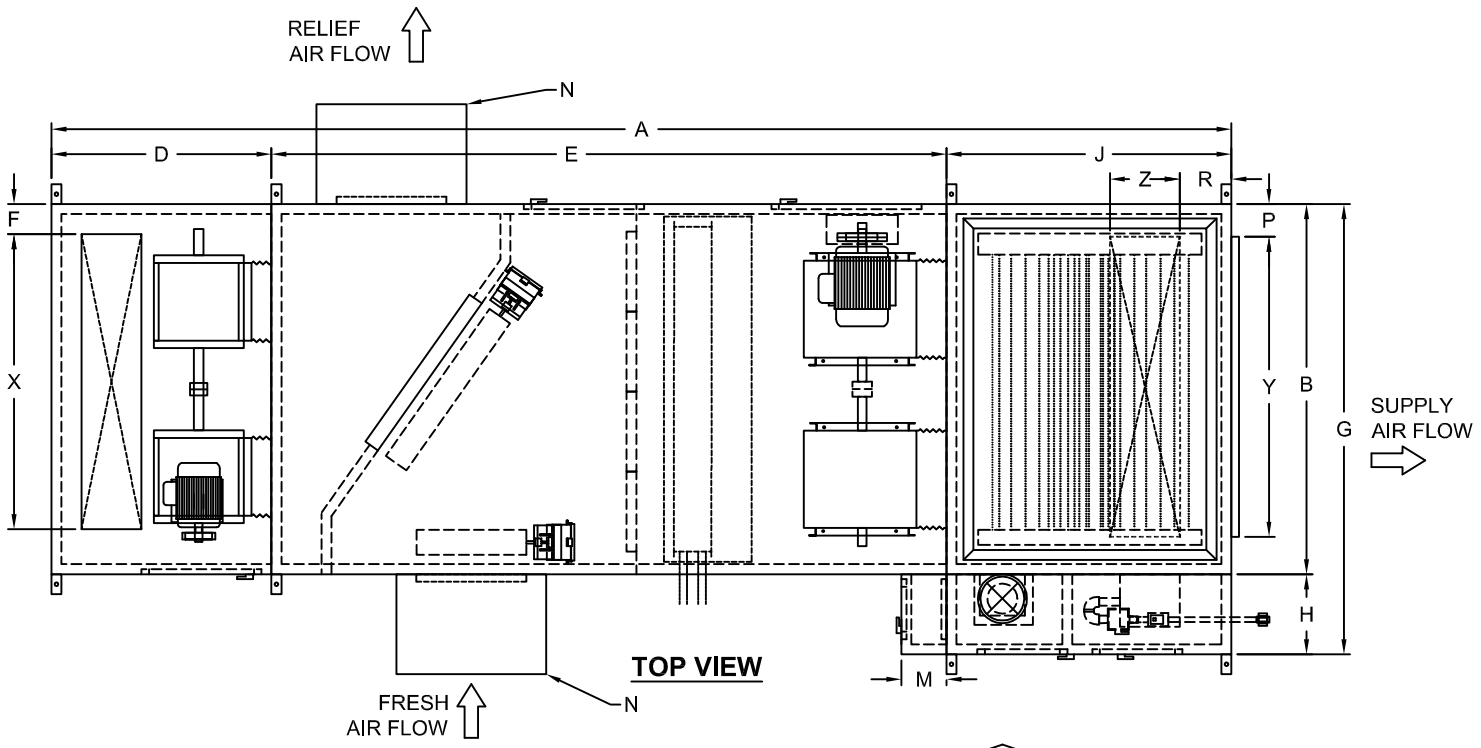
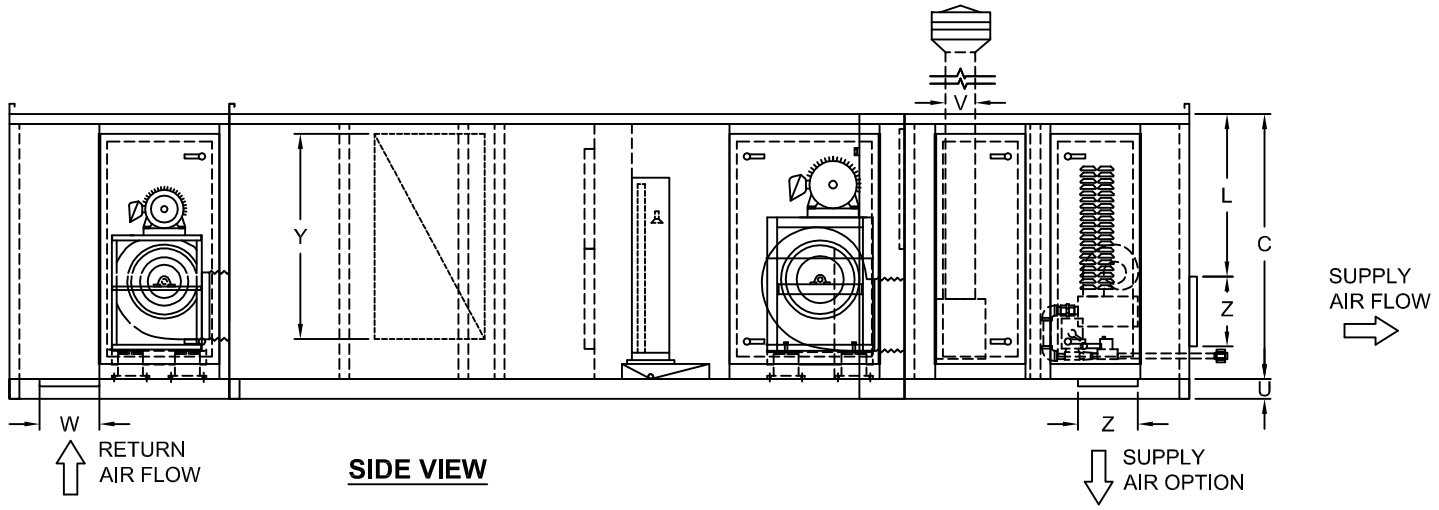
ICE WESTERN

HTDM
91 PLUS SERIES

TITLE:
HORIZONTAL CONFIGURATION GRAVITY VENTED
c/w FLAT FILTER & MIX BOX WITH RELIEF FA





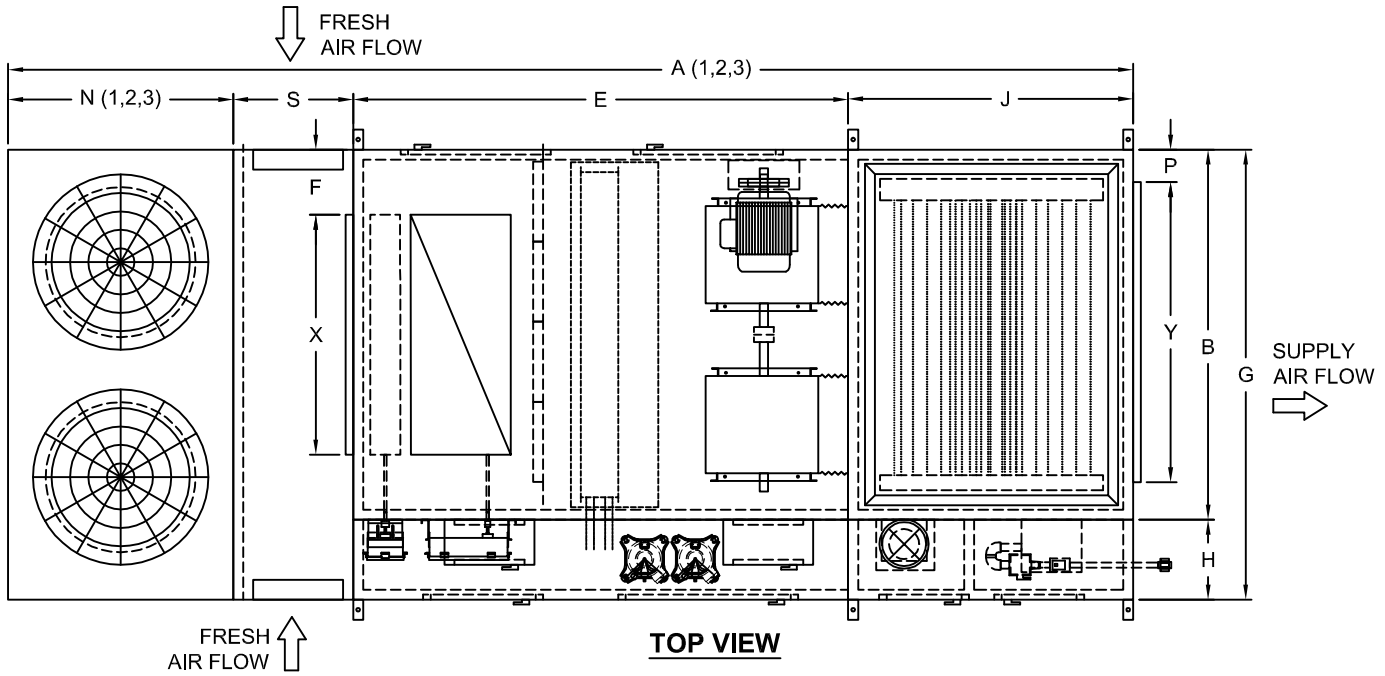
MODEL	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	U	V	W	X	Y	Z
200	259	36	53	32	149	6	52	16	58	12	33 ½	9	24x24	7	10 ½	4	4	18	18	20	12
400	248	60	53	34	138	6	76	16	58	15	33 ½	9	26x26	12	10 ½	4	4	14	42	36	12
600	248	74	53	37	138	13	90	16	58	10	33 ½	9	30x30	8	10 ½	4	6	20	48	58	12
1000	275	84	69	42	143	6	102	18	80	14	42 ¾	N/A	32x32	5	9 ¼	4	6	26	66	74	20
1500	284	89	78	45	147	6	107	18	85	12	44 ½	N/A	36x36	5	12 ½	4	8	30	70	78	24
2000	309	106	78	48	147	6	125	18	110	16	43 ½	N/A	36x36	6	17	6	10	30	92	100	20
2500	315	115	88	52	147	7	133	18	116	12	48 ½	N/A	42x42	5	18	6	10	36	96	104	24
3000	325	118	88	57	147	7	138	20	126	18	44 ½	N/A	46x46	6	20 ½	6	12	40	102	106	26

NOTE:
1. DIMENSIONS ARE GENERALIZED FOR ILLUSTRATIVE PURPOSES. CONTACT I.C.E. FOR A NO-OBLIGATION DESIGN CUSTOMIZED TO MEET YOUR SPECIFIC NEEDS
2. SERVICE ACCESS PANELS MUST NOT BE OBSTRUCTED. RECOMMENDED CLEARANCES IS MINIMUM 24".
3. 1-1/2" DISCHARGE & INLET FLANGES AT OPENINGS.
4. RIGHT HAND UNIT SHOWN, LEFT HAND OPPOSITE SHOWN
5. LIFTING LUG 2"x4" (TYP.)
6. SEE PAGE 32 FOR INTAKE AND EXHAUST HOOD DIMENSIONS
7. DIMENSIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE AND TO MANUFACTURING TOLERANCES.
8. SEE PAGE 31 FOR ROOF CURB DIMENSIONS
9. SEE PAGE 8 FOR UNIT WEIGHTS

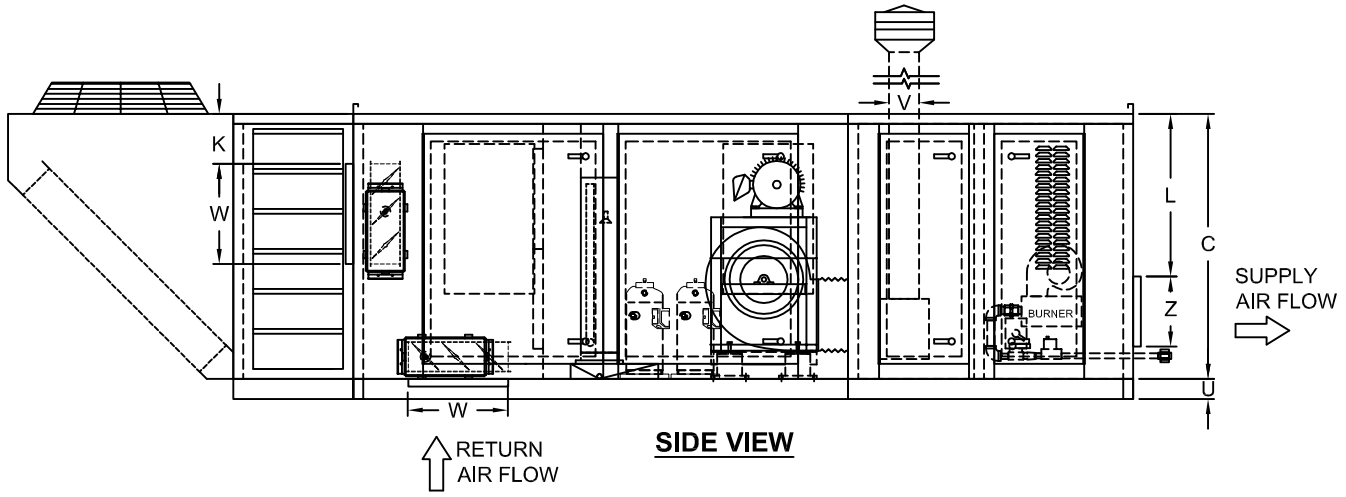
WESTERN

HTDM
91 PLUS SERIES

TITLE:
HORIZONTAL CONFIGURATION GRAVITY VENTED c/w FLAT FILTER, RETURN BLOWER SECTION, COIL & MIX BOX WITH RELIEF FA



TOP VIEW



SIDE VIEW

A1/N1: UNIT WITH SINGLE CONDENSER (AS SHOWN)
A2/N2: UNIT WITH V-BANK CONDENSER
A3/N3: UNIT WITH TRIPLE CONDENSER

MODEL	A1	A2	A3	B	C	E	F	G	H	J	K	L	N1	N2	N3	P	S	U	V	W	X	Y	Z
200	197	231	-	36	53	83	6	52	16	58	12	33 ½	42	76	-	7	14	4	4	18	18	20	12
400	209	245	-	60	53	95	6	76	16	58	15	33 ½	42	78	-	12	14	4	4	14	42	36	12
600	226	261	294	74	53	99	13	90	16	58	10	42 ¾	45	80	113	8	24	4	6	20	48	58	12
1000	260	297	330	84	69	109	6	102	18	80	14	44 ½	45	82	115	5	26	4	6	26	66	74	20
1500	271	310	346	89	78	113	6	107	18	85	12	44 ½	45	84	120	5	28	4	8	30	70	78	24
2000	299	337	375	106	78	113	6	125	18	110	16	43 ½	48	86	124	6	28	6	10	30	92	100	20
2500	307	347	389	115	88	113	7	133	18	116	12	48 ½	48	88	130	5	30	6	10	36	96	104	24
3000	327	369	419	118	88	123	7	138	20	126	18	44 ½	48	90	140	6	30	6	12	40	102	106	26

NOTE:
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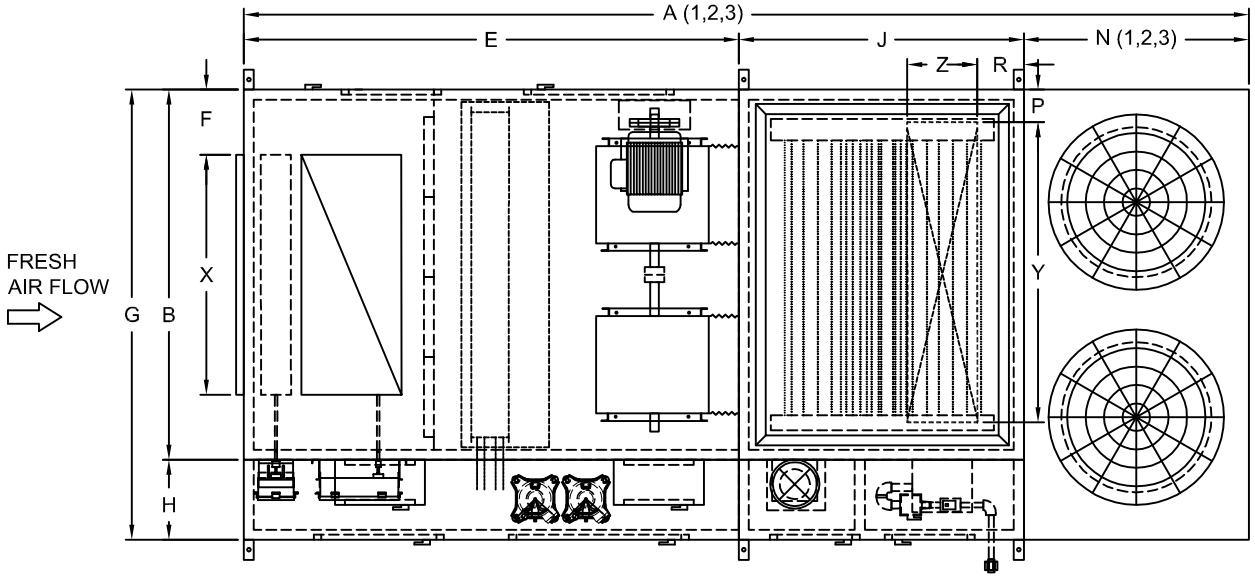
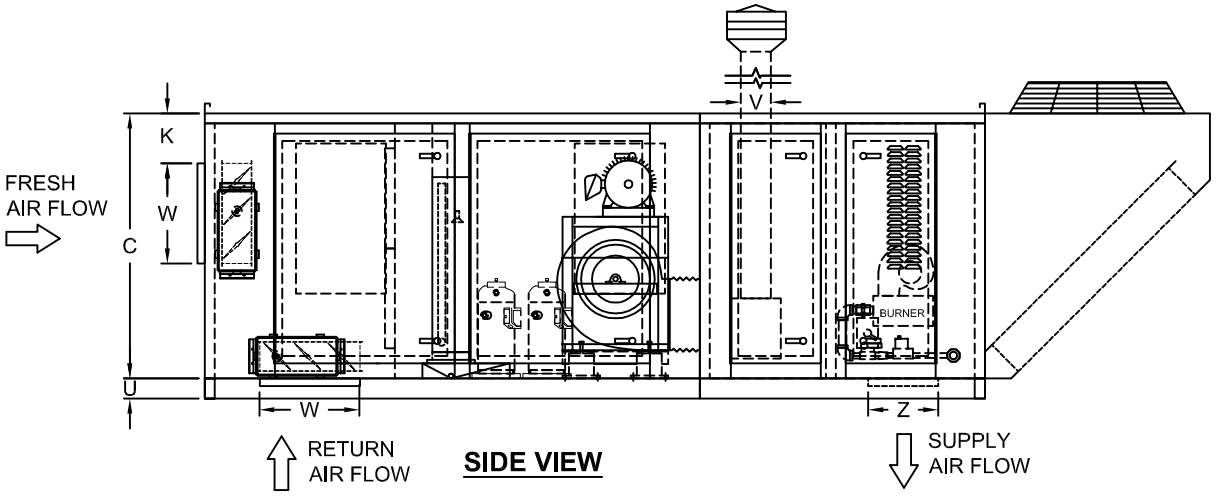
5. LIFTING LUG 2"x4" (TYP.)
6. SEE PAGE 32 FOR INTAKE AND EXHAUST HOOD DIMENSIONS
7. DIMENSIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE AND TO MANUFACTURING TOLERANCES.
8. SEE PAGE 31 FOR ROOF CURB DIMENSIONS
9. SEE PAGE 8 FOR UNIT WEIGHTS



TOP VIEW



SIDE VIEW

A1/N1: UNIT WITH SINGLE CONDENSER (AS SHOWN)
A2/N2: UNIT WITH V-BANK CONDENSER
A3/N3: UNIT WITH TRIPLE CONDENSER

MODEL	A1	A2	A3	B	C	E	F	G	H	J	K	N1	N2	N3	P	U	V	W	X	Y	Z
200	183	217	-	36	53	83	6	52	16	58	12	42	76	-	7	4	4	14	22	20	12
400	195	231	-	60	53	95	6	76	16	58	15	42	78	-	12	4	4	14	42	36	12
600	202	237	270	74	53	99	13	90	16	58	10	45	80	113	8	4	6	20	48	58	12
1000	234	271	304	84	69	109	6	102	18	80	14	45	82	115	5	4	6	26	66	74	20
1500	243	282	318	89	78	113	6	107	18	85	12	45	84	120	5	4	8	30	70	78	24
2000	271	309	347	106	78	113	6	125	18	110	16	48	86	124	6	6	10	30	92	100	20
2500	277	317	359	115	88	113	7	133	18	116	12	48	88	130	5	6	10	36	96	104	24
3000	297	339	389	118	88	123	7	138	20	126	18	48	90	140	6	6	12	40	102	106	26

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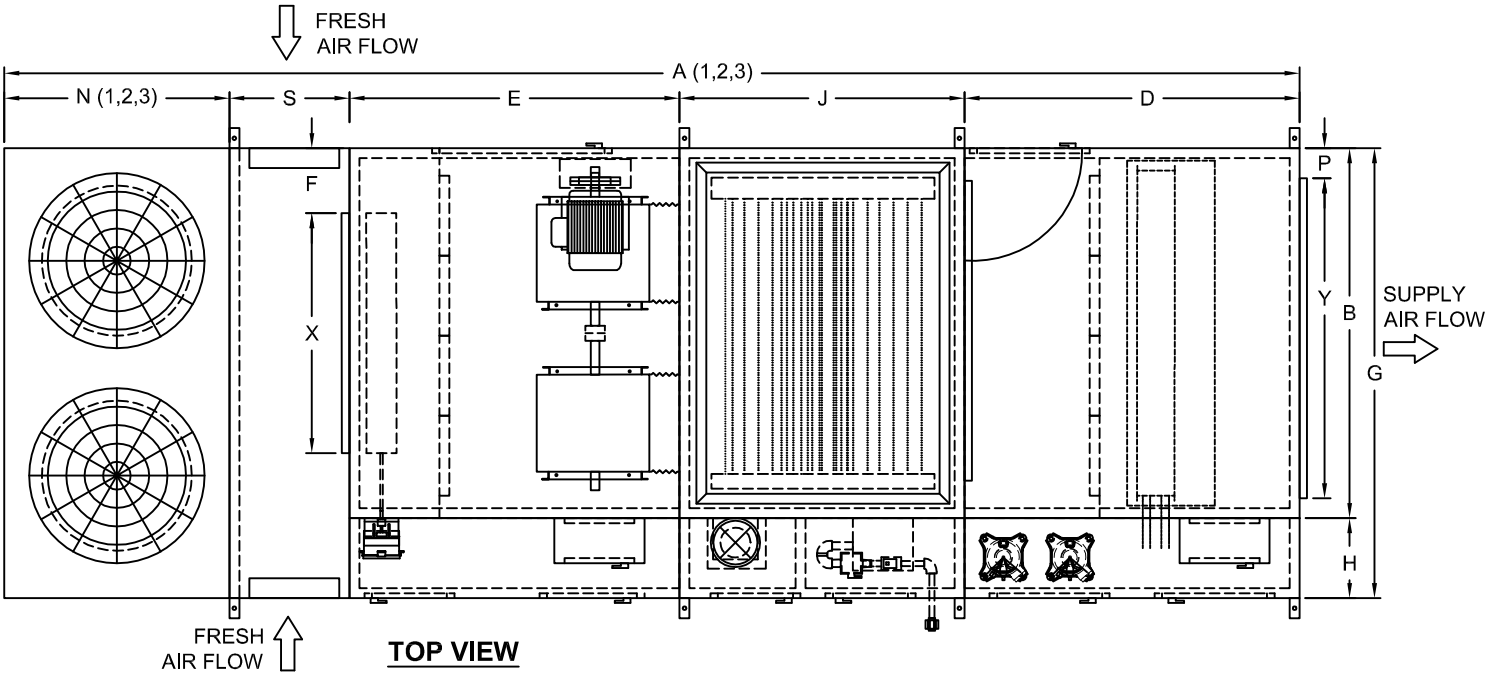
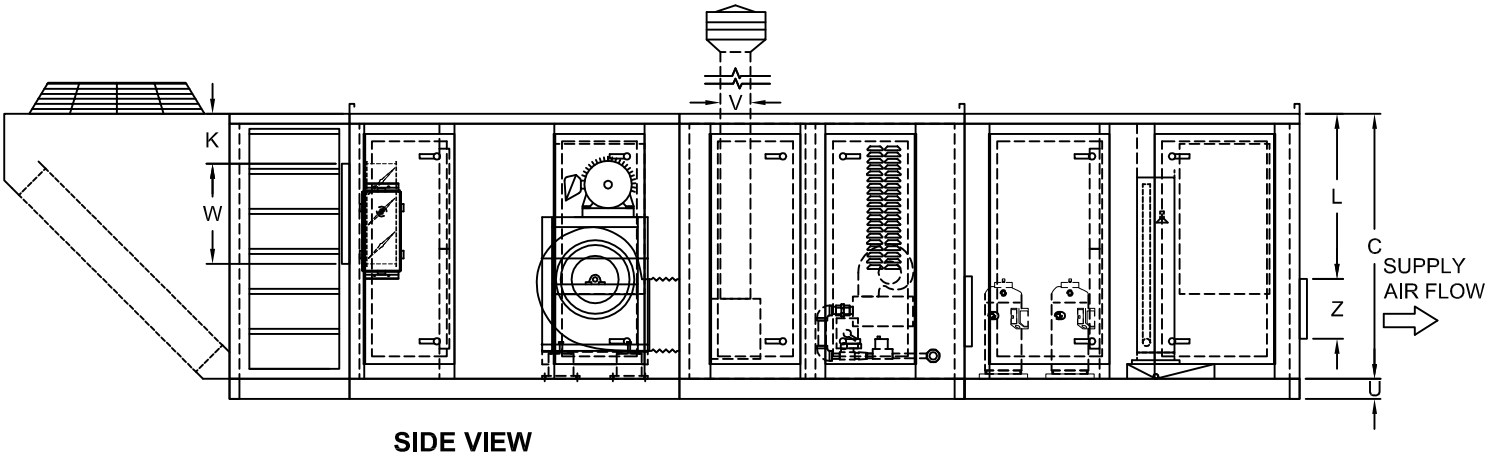


TOP VIEW



SIDE VIEW

A1/N1: UNIT WITH SINGLE CONDENSER (AS SHOWN)
A2/N2: UNIT WITH V-BANK CONDENSER
A3/N3: UNIT WITH TRIPLE CONDENSER

MODEL	A1	A2	A3	B	C	D	E	F	G	H	J	K	L	N1	N2	N3	P	S	U	V	W	X	Y	Z
200	224	258	-	36	53	54	56	6	52	16	58	12	33 ½	42	76	-	7	14	4	4	14	22	20	12
400	234	270	-	60	53	54	66	6	76	16	58	15	33 ½	42	78	-	12	14	4	4	14	42	36	12
600	237	272	305	74	53	54	66	13	90	16	58	10	33 ½	45	80	113	8	24	4	6	20	48	58	12
1000	271	308	341	84	69	54	66	6	102	18	80	14	42 ¾	45	82	115	5	26	4	6	26	66	74	20
1500	282	321	357	89	78	54	70	6	107	18	85	12	44 ½	45	84	120	5	28	4	8	30	70	78	24
2000	310	348	386	106	78	54	70	6	125	18	110	16	43 ½	48	86	124	6	28	6	10	30	92	100	20
2500	318	358	400	115	88	54	70	7	133	18	116	12	48 ½	48	88	130	5	30	6	10	36	96	104	24
3000	328	370	420	118	88	54	70	7	138	20	126	18	44 ½	48	90	140	6	30	6	12	40	102	106	26

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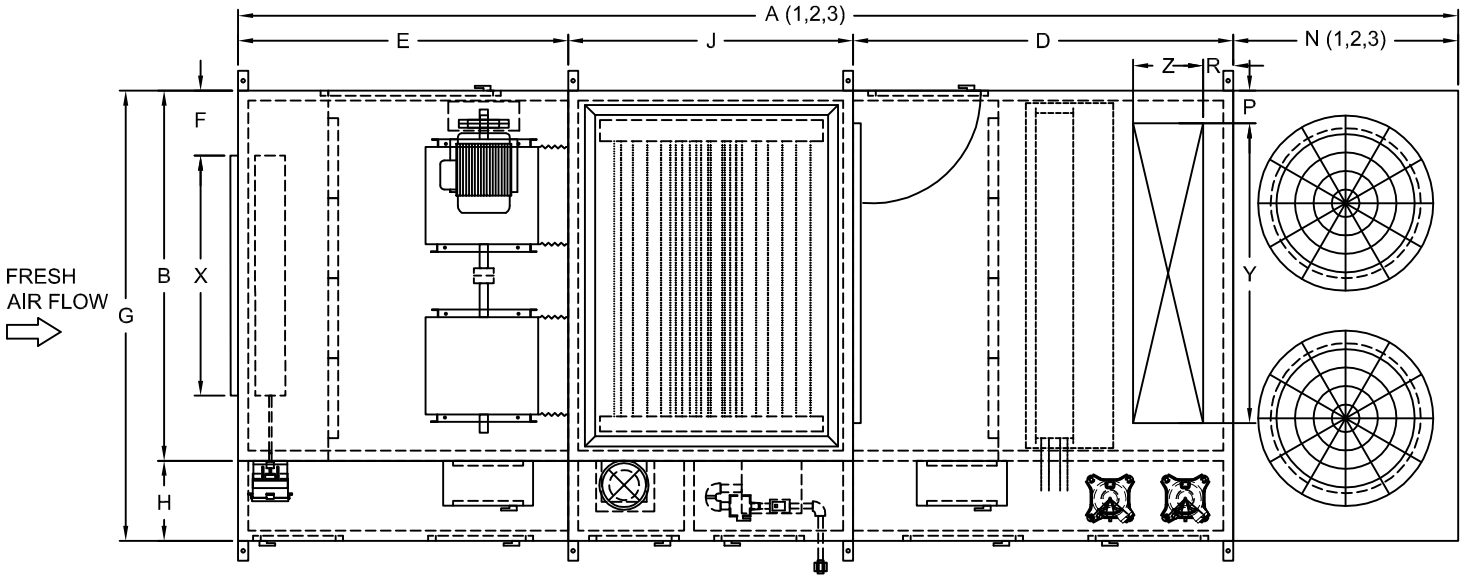
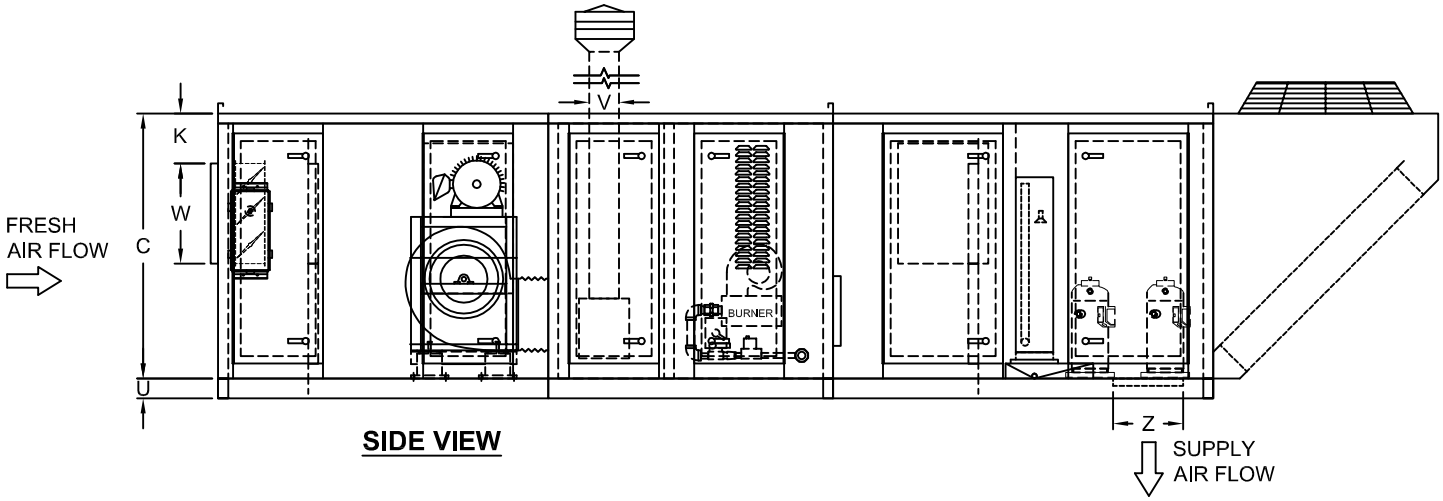
9. SEE PAGE 8 FOR UNIT WEIGHTS



TOP VIEW



SIDE VIEW

A1/N1: UNIT WITH SINGLE CONDENSER (AS SHOWN)
A2/N2: UNIT WITH V-BANK CONDENSER
A3/N3: UNIT WITH TRIPLE CONDENSER

MODEL	A1	A2	A3	B	C	D	E	F	G	H	J	K	N1	N2	N3	P	R	U	V	W	X	Y	Z
200	232	266	-	36	53	76	56	6	52	16	58	12	42	76	-	7	6	4	4	14	22	20	12
400	248	284	-	60	53	82	66	6	76	16	58	15	42	78	-	12	6	4	4	14	42	36	12
600	245	280	313	74	53	76	66	13	90	16	58	10	45	80	113	8	6	4	6	20	48	58	12
1000	273	310	343	84	69	82	66	6	102	18	80	14	45	82	115	5	6	4	6	26	66	74	20
1500	286	325	361	89	78	86	70	6	107	18	85	12	45	84	120	5	6	4	8	30	70	78	24
2000	310	348	386	106	78	82	70	6	125	18	110	16	48	86	124	6	6	6	10	30	92	100	20
2500	320	360	402	115	88	86	70	7	133	18	116	12	48	88	130	5	6	6	10	36	96	104	24
3000	332	374	424	118	88	88	70	7	138	20	126	18	48	90	140	6	6	6	12	40	102	106	26

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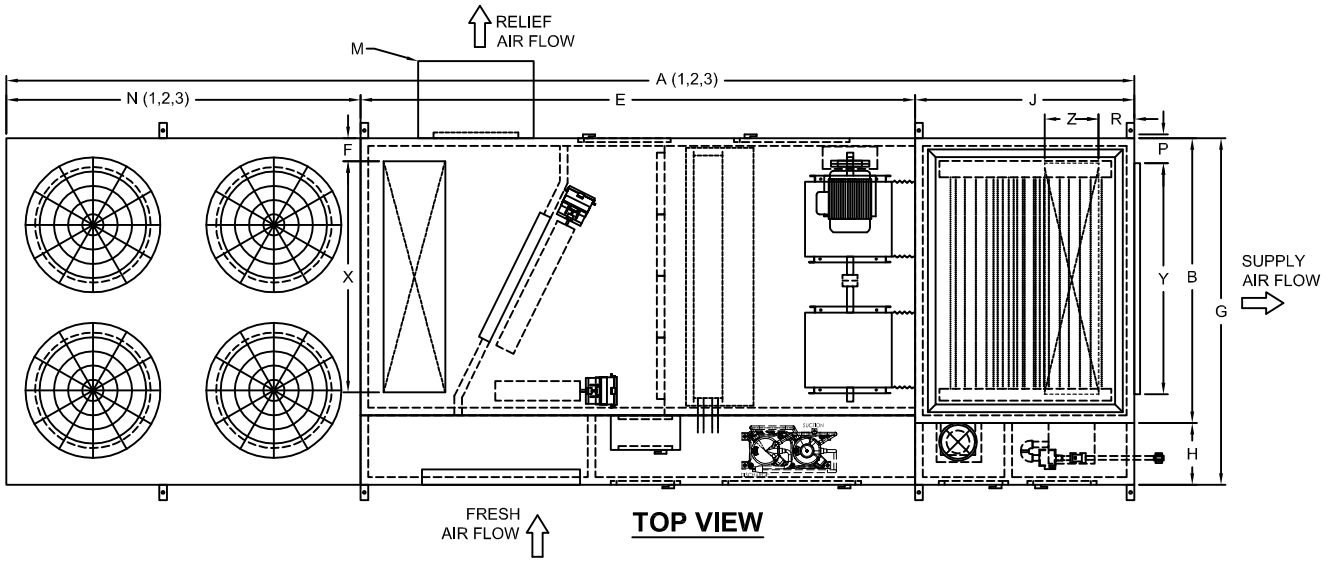

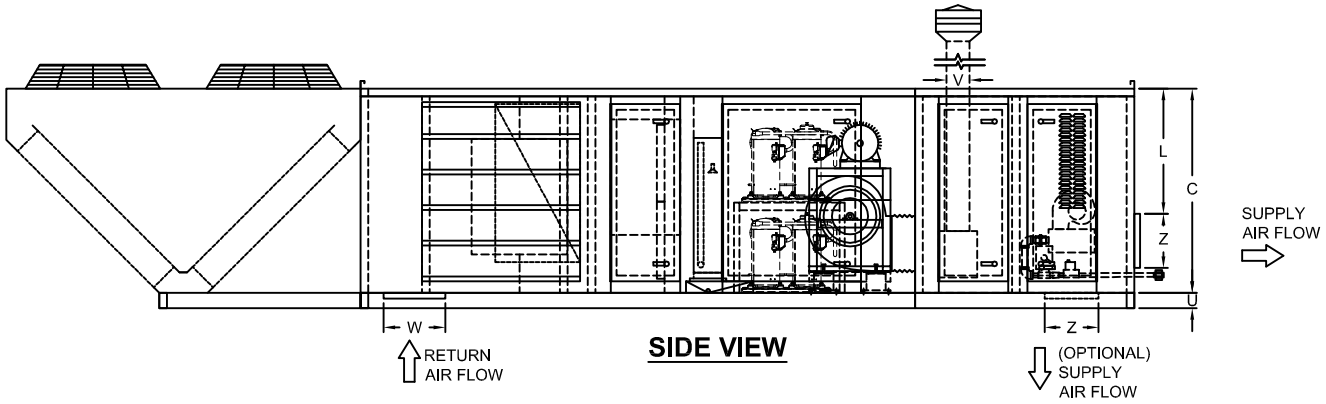

A1/N1: UNIT WITH SINGLE CONDENSER
A2/N2: UNIT WITH V-BANK CONDENSER (AS SHOWN)
A3/N3: UNIT WITH TRIPLE CONDENSER

MODEL	A1	A2	A3	B	C	E	F	G	H	J	K	L	M	N1	N2	N3	P	R	U	V	W	X	Y	Z
200	249	283	-	36	53	149	6	52	16	58	12	33 ½	24x24	42	76	-	7	10 ½	4	4	18	18	20	12
400	238	274	-	60	53	138	6	76	16	58	15	33 ½	26x26	42	78	-	12	10 ½	4	4	14	42	36	12
600	241	276	309	74	53	138	13	90	16	58	10	33 ½	30x30	45	80	113	8	10 ½	4	6	20	48	58	12
1000	268	305	338	84	69	143	6	102	18	80	14	42 ¾	32x32	45	82	115	5	9 ¼	4	6	26	66	74	20
1500	277	316	352	89	78	147	6	107	18	85	12	44 ½	36x36	45	84	120	5	12 ½	4	8	30	70	78	24
2000	305	343	381	106	78	147	6	125	18	110	16	43 ½	36x36	48	86	124	6	17	6	10	30	92	100	20
2500	311	351	393	115	88	147	7	133	18	116	12	48 ½	42x42	48	88	130	5	18	6	10	36	96	104	24
3000	321	363	413	118	88	147	7	138	20	126	18	44 ½	46x46	48	90	140	6	20 ½	6	12	40	102	106	26

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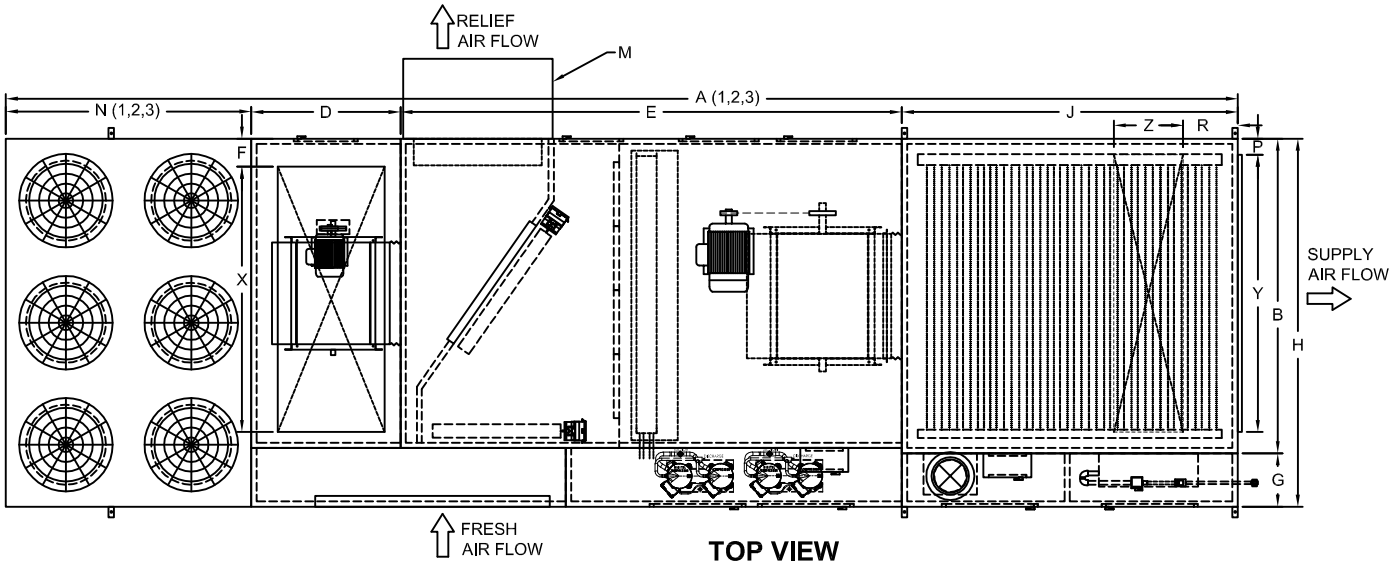
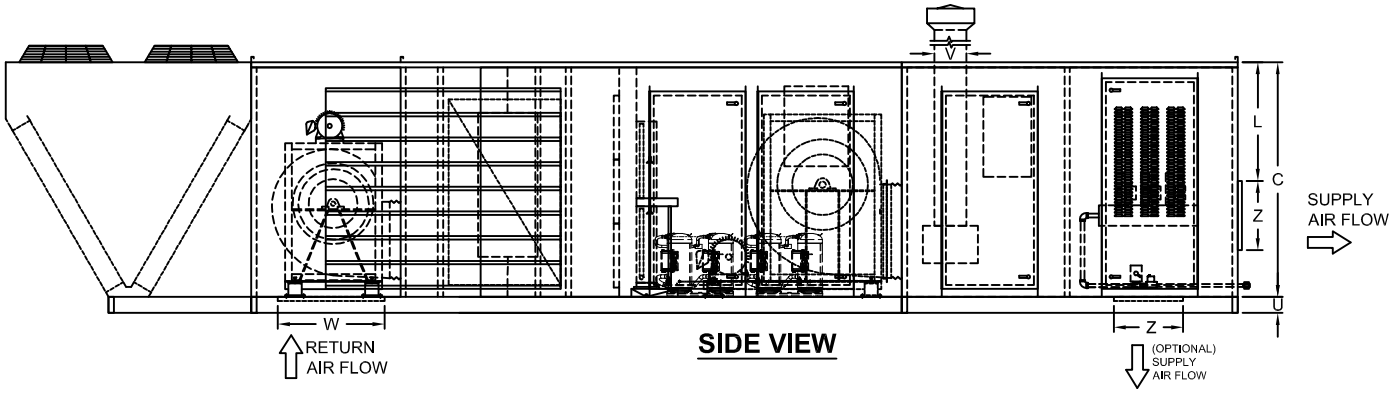
WESTERN

HTDM
91 PLUS SERIES

TITLE:
HORIZONTAL CONFIGURATION GRAVITY VENTED c/w FLAT FILTER, DX COIL & MIX BOX WITH RELIEF FA & CONDENSER



TOP VIEW



SIDE VIEW

A1/N1: UNIT WITH SINGLE CONDENSER
A2/N2: UNIT WITH V-BANK CONDENSER (AS SHOWN)
A3/N3: UNIT WITH TRIPLE CONDENSER

MODEL	A1	A2	A3	B	C	D	E	F	G	H	J	K	L	M	N1	N2	N3	P	R	U	V	W	X	Y	Z
200	281	315	-	36	53	32	149	6	52	16	58	12	33 ½	24x24	42	76	-	7	10 ½	4	4	18	18	20	12
400	272	308	-	60	53	34	138	6	76	16	58	15	33 ½	26x26	42	78	-	12	10 ½	4	4	14	42	36	12
600	277	312	345	74	53	37	138	13	90	16	57	10	33 ½	30x30	45	80	113	8	10 ½	4	6	20	48	58	12
1000	310	347	380	84	69	42	143	6	102	18	80	14	42 ¾	32x32	45	82	115	5	9 ¼	4	6	26	66	74	20
1500	322	361	397	89	78	45	147	6	107	18	85	12	44 ½	36x36	45	84	120	5	12 ½	4	8	30	70	78	24
2000	353	391	429	106	78	48	147	6	125	18	110	16	43 ½	36x36	48	86	124	6	17	6	10	30	92	100	20
2500	363	403	445	115	88	52	147	7	133	18	116	12	48 ½	42x42	48	88	130	5	18	6	10	36	96	104	24
3000	378	420	470	118	88	57	147	7	138	20	126	18	44 ½	46x46	48	90	140	6	20 ½	6	12	40	102	106	26

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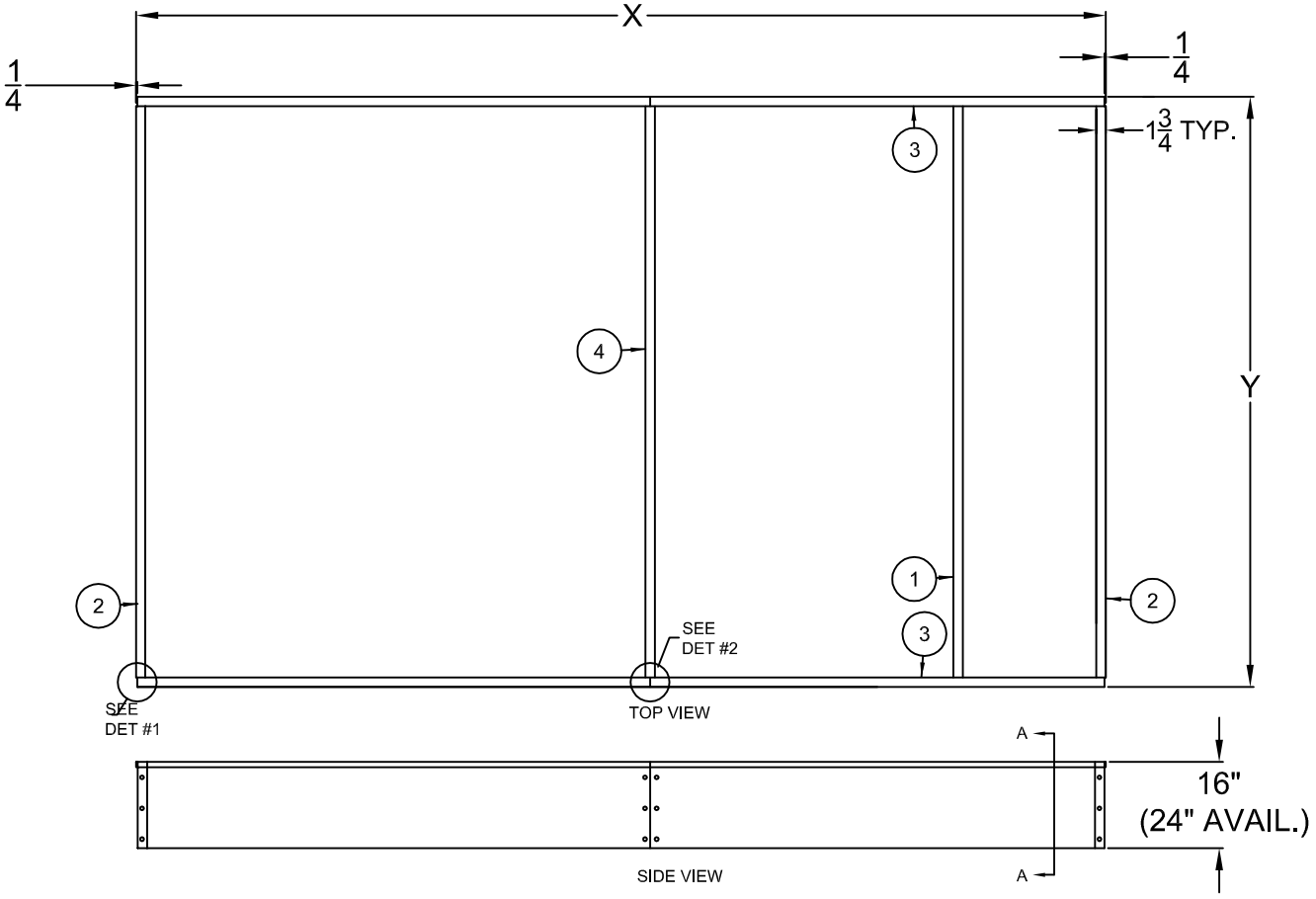
ICE WESTERN

HTDM
91 PLUS SERIES

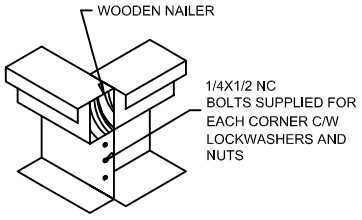
TITLE:
HORIZONTAL CONFIGURATION GRAVITY VENTED c/w FLAT FILTER, RETURN BLOWER SECTION, DX COIL, MIX BOX WITH RELIEF FA & CONDENSER



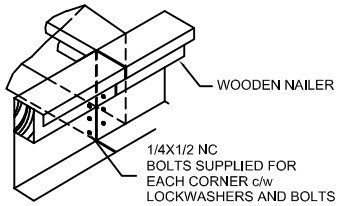
1. DUCT SUPPORT ANGLE (BTM. DISCH. ONLY)
2. CURB ENDS
3. CURB SIDES
4. CENTER CURB BRACING

UNITS WITH 4" BASE FRAME
X: SUBTRACT 4⅝" FROM THE CHOSEN UNIT'S "A" DIMENSION
Y: SUBTRACT 4⅝" FROM THE CHOSEN UNIT'S "B" DIMENSION

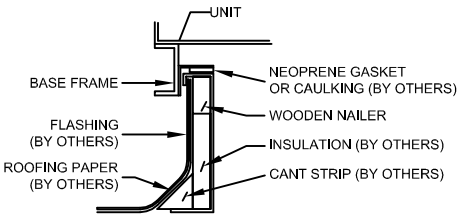
UNITS WITH 6" BASE FRAME
X: SUBTRACT 5¾" FROM THE CHOSEN UNIT'S "A" DIMENSION
Y: SUBTRACT 5¾" FROM THE CHOSEN UNIT'S "B" DIMENSION



CORNER BOLTING ASSEMBLY DETAIL #1



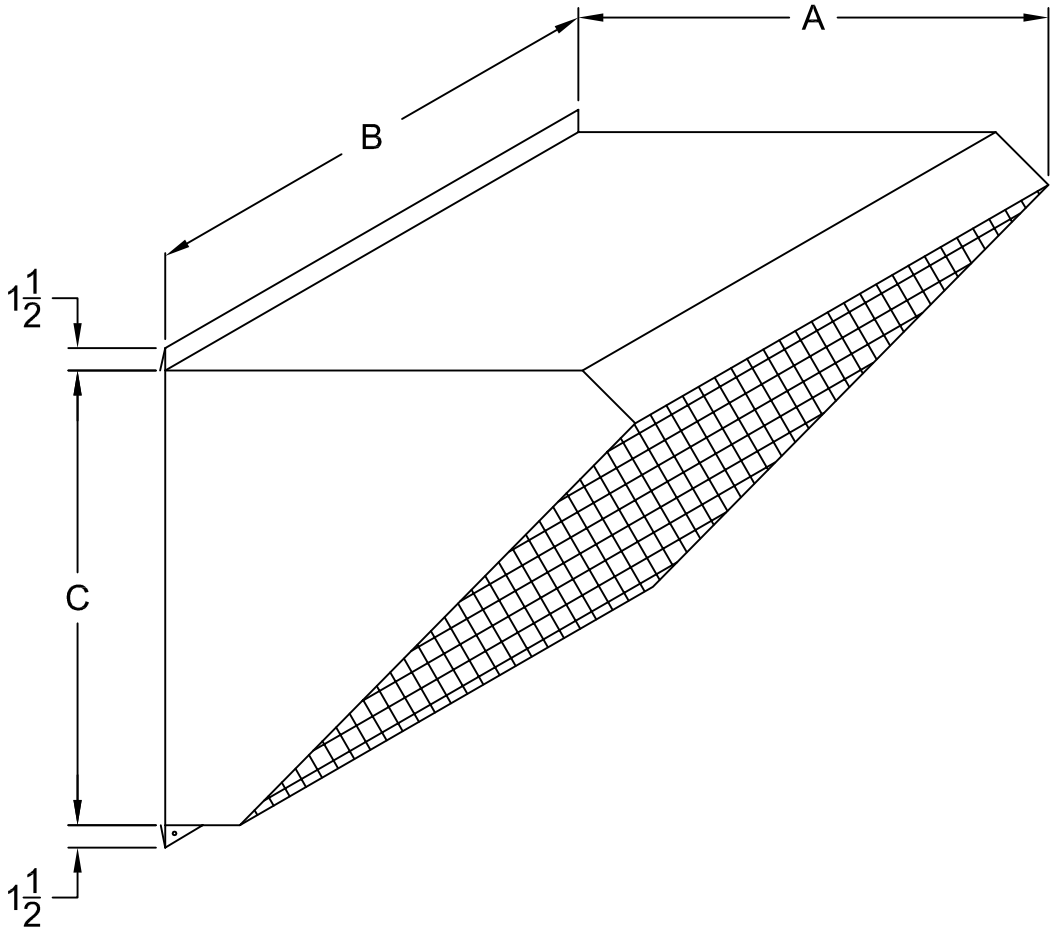
CENTER BRACING
BOLTING ASSEMBLY DETAIL #2



ROOF CURB CROSS SECTION DETAIL AA

NOTE:
1. FOR ILLUSTRATIVE PURPOSES ONLY. CONTACT ICE WESTERN FOR DIMENSIONS SPECIFIC TO YOUR PROJECT.
2. ASSEMBLY HARDWARE INCLUDED WITH CURB
3. CURBS ARE SHIPPED SEPARATELY AND FIELD INSTALLED BY OTHERS
4. DIMENSIONS ARE SUBJECT TO MANUFACTURERS TOLERANCES
5. FOR REFERENCE ONLY, SUBJECT TO CHANGE WITHOUT NOTICE

ICE WESTERN	HTDM 91 PLUS SERIES	TITLE: CURB DETAIL DIMENSIONS



HTDM 91 PLUS SERIES			
MODEL	A	B	C
200	19 3/4	36	51 1/2
400	19 3/4	60	51 1/2
600	39	74	51 1/2
1000	43 1/2	84	67 1/2
1500	52 3/4	89	76 1/2
2000	79	111	76 1/2
2500	79	115	86 1/2
3000	79	118	86 1/2

HTDM 91 PLUS 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 91Plus efficiency 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 Austin Romtech 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 multiple 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 91Plus 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. The flue chimney will be made of stainless steel.

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 91Plus. 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 ICECON III 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 ICECON III 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 ICECON III 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 be 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 be 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.

COMPRESSORS

Hermetic digital scroll 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 electronic expansion valves, an EC3 digital superheat controller and combination sight glass moisture indicators. System charge will be designed for 10 degrees Fahrenheit of superheat. Each system shall be factory run and adjusted prior to shipment. Controls shall include:

- Compressor motor contacts
- Overload protection control
- Cooling relays
- Ambient compressor lockout
- Dual pressure controls
- Anti-cycle timers

CONDENSER FANS

Condenser fans shall be aluminum blade, direct drive, complete with 3 1/4 inch high venturi and 1140 RPM condenser fan motor controlled by VFD taking a signal from a transducer located in the discharge line. This, along with an electronic expansion valve allows for Floating Head and condension down to 70 degrees Fahrenheit condensing.

Packaged units shall operate down to 50 degrees Fahrenheit as standard. Minus 50 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.

ICE Western's
DX Cooling Modulation

AC-Tech VFD

Programmable digital and analog I/O allowing drive to be configured for tasks such as multiple preset speeds, electronic braking and motor jogging

- Power range: 0.37 to 22 kW
- Wide speed range with up to 200% torque for highly dynamic motor response
- EPM plug-in memory chip & programmer to copy parameters

Tandem Digital Scroll Compressors

- Simple, variable modulation, for temperature control within 0.5 F
- Lower operating cost
- Reduced power consumption – up to 30% more efficient than using hot-gas bypass
- Longer cycle times to reduce wear and improve humidity control
- Available for commercial air-conditioning and refrigeration applications
- Available in configurations from 3-30HP

Superheat Controller EC3-X33

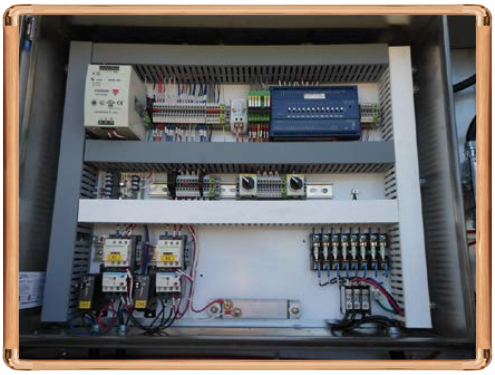
- Perform all control tasks and precisely regulates the superheat at the evaporator
- A complete system consisting of control valve, superheat controller, and temperature and pressure sensor, controls the superheat exactly to setpoint
- The MOP (Maximum Operating Pressure) function protects the compressor from dangerous overload conditions
- Positive shut-off function eliminates the use of an additional solenoid valve, and built in backup battery closes the valve after power loss.

EX4 Electrical Control Valve

- Optimized for control of liquid or gaseous mass flow in refrigeration systems
- Energized directly from the electrical power and therefore operates independent from differential pressure ensuring accurate temp/humidity control

Custom Wiring Options

- BMS integration of all major control manufacturers
- Incorporated JIC Wiring
  - L.O.N. Protocol/Distech
  - BAC-NET Protocol/Distech DTC Control
  - Allen Bradley PLC
  - Siemens PLC



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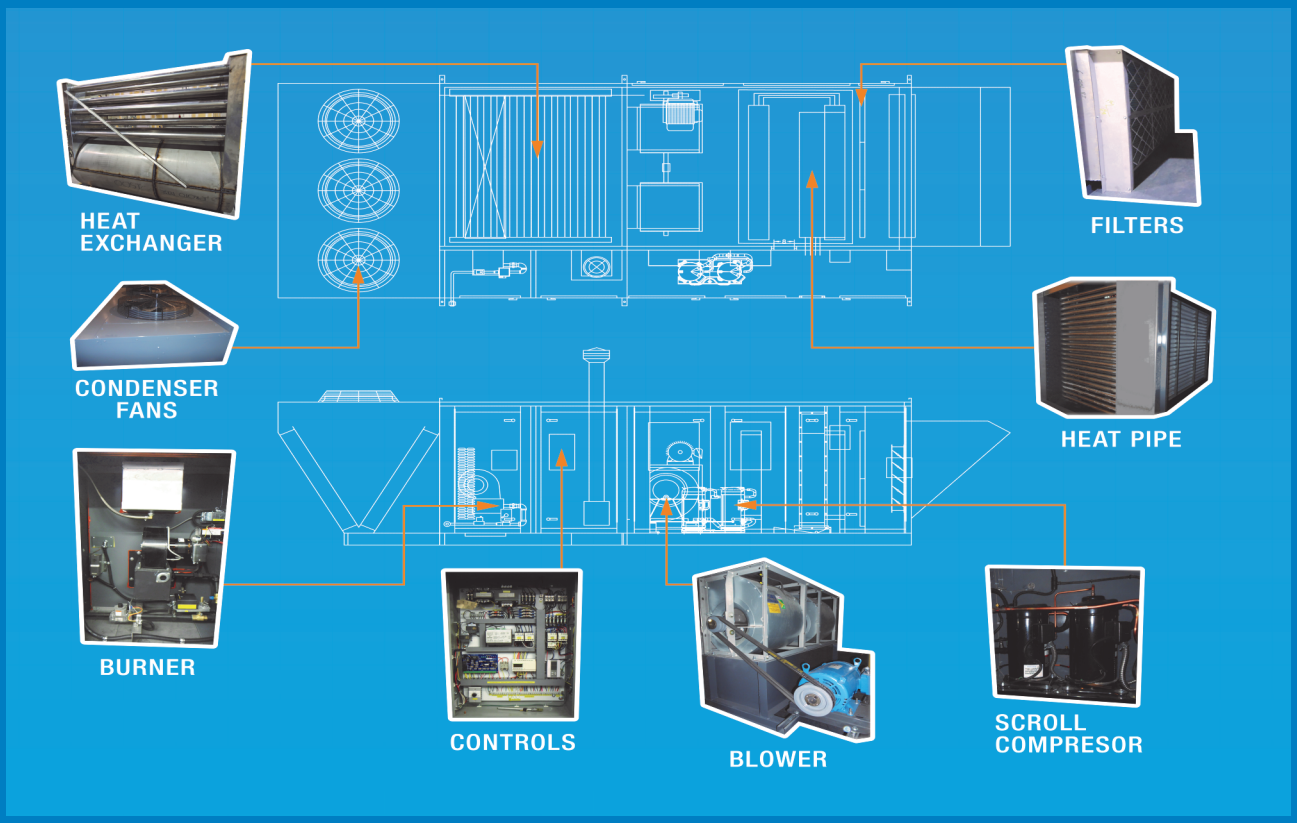
TYPICAL HTDM 91+ COMPONENTS



PERFORMANCE SPECIFICATIONS

MODEL	INPUT/OUTPUT (MBH)	AIR CAPACITY (CFM)	TEMPERATURE RISE (Deg-F)
HTDM 200 91% EFF OMEGA	200/182	1532	110
		1685	100
		1872	90
		2106	80
		2407	70
		2809	60
		3370	50
HTDM 400 91% EFF OMEGA	400/364	3064	110
		3370	100
		3745	90
		4213	80
		4815	70
		5617	60
		6741	50
HTDM 600 91% EFF OMEGA	600/546	4596	110
		5056	100
		5617	90
		6319	80
		7222	70
		8426	60
		10111	50
HTDM 1000 91% EFF OMEGA	1000/910	7660	110
		8426	100
		9362	90
		10532	80
		12037	70
		14043	60
		16852	50

MODEL	INPUT/OUTPUT (MBH)	AIR CAPACITY (CFM)	TEMPERATURE RISE (Deg-F)
HTDM 1500 91% EFF OMEGA	1500/1365	11490	110
		12639	100
		14043	90
		15799	80
		18056	70
		21065	60
		25278	50
HTDM 2000 91% EFF OMEGA	2000/1820	15320	110
		16852	100
		18724	90
		21065	80
		24074	70
		28086	60
		33704	50
HTDM 2500 91% EFF OMEGA	2500/2275	19150	110
		21065	100
		23405	90
		26331	80
		30093	70
		35108	60
		42130	50
HTDM 3000 91% EFF OMEGA	3000/2730	22980	110
		25278	100
		28086	90
		31597	80
		36111	70
		42130	60
		50556	50

For more information, please visit our website: www.icewestern.com