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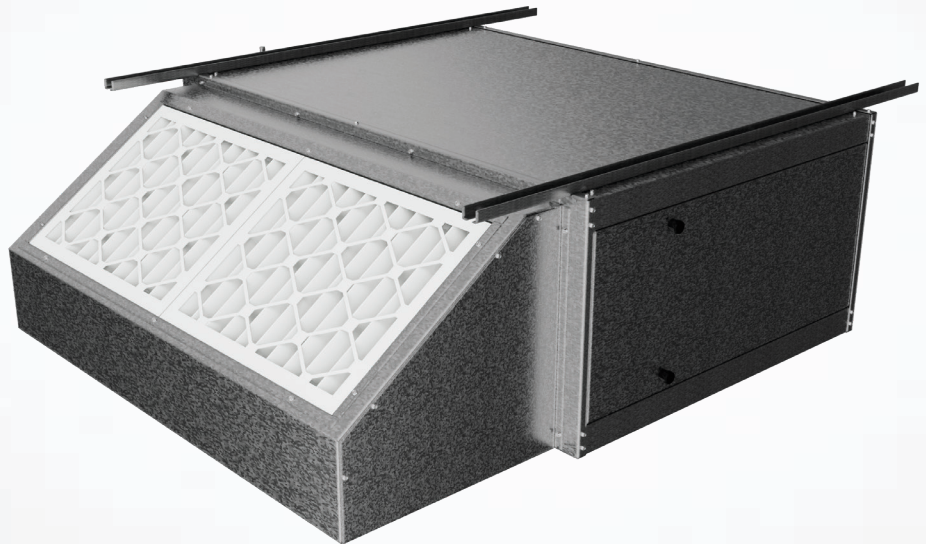
SERIES FAN POWERED TERMINAL UNIT

INSTALLATION, OPERATION & MAINTENANCE MANUAL

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Models: HTY

CFM Range: 600-2,000



Model:
HTY

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It is the responsibility of the end user to properly characterize and dispose of all waste materials according to applicable regulatory and legal entities. Where reasonable, safe, and compliant with local regulatory and legal requirements, IEC encourages recycling materials when disposing of its products.

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Model Nomenclature

Model:
HTY



UNIT | VINTAGE

HTY = Series Fan Powered Terminal Unit

SIZE

06 = 600 CFM	14 = 1400 CFM
08 = 800 CFM	16 = 1600 CFM
10 = 1000 CFM	18 = 1800 CFM
12 = 1200 CFM	20 = 2000 CFM

COILS/ELECTRIC³ HEATING

Two-Pipe Cooling and Heating or Four-Pipe Cooling

B = 4-Row
K = 6-Row
L = 8-Row

Four-Pipe Heating or Voltage

Coiled Heating	Electric Heating
Y = None	C = 120V
6 = 1-Row	D = 208V
7 = 2-Row	E = 240V
	F = 277V

Coil Connection or kW

Coiled Heating	Electric Heating
Y = None	D = 2.0
S = Same End	F = 3.0
	G = 5.0
	H = 6.0
	J = 7.0
	K = 8.0
	L = 9.0
	M = 10.0

MOTOR

Voltage

C = 115-1-60
D = 208-1-60
E = 230-1-60
F = 277-1-60

Type

R = ECM, Constant CFM

CONTROLS

System / Thermostat

Manual Fan Operation

A2 = None

Function Control

G = 40 amp appropriate fuse

H = 40 amp disconnect

K = 41-60 amp disconnect

P 61-80 amp disconnect

Voltage

Y = None

B = 24V

HAND/ARRANGEMENT

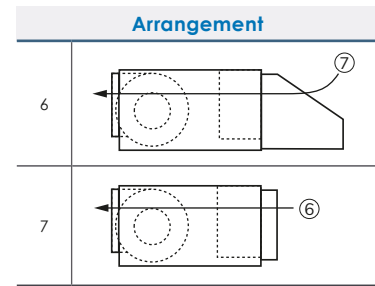
Hand⁴

R = Right

L = Left

Arrangement

See Below



NOTES:

- For additional details, refer to Price Guide.
- Consult factory for 50 Hz applications.
- Note that kW's depend on voltage and unit size. Motor and heater voltage must match. Dual power sources are not available.
- Standing in front of the unit, hand is determined by looking into the air supply.

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Attentions, Warnings & Cautions

WARNING

Never pressurize any equipment beyond specified test pressures listed on the unit rating plate. Always pressure test with an inert fluid or gas such as clear water or dry nitrogen to avoid possible damage or injury in the event of a leak or component failure during testing.

WARNING

No attempt should be made to handle, install, or service any unit without following safe practices regarding mechanical equipment.

CAUTION

Never wear bulky or loose fitting clothing when working on any mechanical equipment. Gloves should always be worn for protection against sharp sheet metal edges, heat, and other possible sources of injury. Safety glasses or goggles should always be worn, especially when drilling, cutting, or working with lubricants or cleaning chemicals.

CAUTION

Always protect adjacent flammable material when welding or soldering. Use a suitable heat shield material to contain sparks or drops of solder. Have a fire extinguisher readily available.

CAUTION

Always protect chilled and hot water valve bodies, strainers, ball valves, and other flow control related devices from heat caused by soldering or brazing processes.

CAUTION

Disconnect all power prior to any installation or service (unit may use more than one power source; ensure all are disconnected) Power to remote mounted control devices may not be supplied by unit.

CAUTION

Electric shock can cause death.

ATTENTION

The equipment must always be properly supported. Temporary supports used during installation or service must be adequate to hold the equipment securely.

ATTENTION

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

Section 1 – Installation

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PREFACE

International Environmental Corporation fan coil units represent a prudent investment offering trouble-free operation and long service with proper installation, operation, and regular maintenance. Your equipment is initially protected under the manufacturer's standard warranty; however, this warranty is provided under the condition that the steps outlined in this manual for initial inspection, proper installation, regular periodic maintenance, and everyday operation of the equipment be followed in detail. This manual should be fully reviewed in advance before initial installation, start-up, and any maintenance. Should any questions arise, please contact your local Sales Representative or the factory BEFORE proceeding.

The equipment covered by this manual is available with a variety of options and accessories. Consult the approved unit submittals, order acknowledgment, and other manuals for specific details on unit options and accessories.

UNPACKING AND INSPECTION

All units are carefully inspected at the factory throughout the manufacturing process under a strict quality assurance program. All major components and sub-assemblies are carefully tested for proper operation and verified for full compliance with factory standards. Operational testing of some customer-furnished components such as control valves and electronic control items may be an exception.

Each unit is carefully packaged for shipment to avoid damage during normal transit and handling. Equipment should always be stored in a dry and covered location and in the proper orientation as marked on the carton.

All shipments are made F.O.B. factory and it is the responsibility of the receiving party to inspect the equipment upon arrival. Any obvious damage to the carton and/or its contents should be recorded on the bill of lading and a claim should be filed with the freight carrier.

After determining the condition of the carton exterior, carefully remove each unit from the carton and inspect for hidden damage. At this time, check to make sure that factory provided items such as valve packages and actuators, switches, drip lips, etc., are accounted for. Any hidden damage should be recorded and immediately reported to the carrier and a claim filed. In the event a claim for shipping damage is filed, the unit, shipping carton, and all packing must be retained for physical inspection by the freight carrier. All equipment should be stored in the factory shipping carton with internal packing in place until installation.

At the time of receipt, the equipment type and arrangement should be verified against the order documents. Should any discrepancy be found, the local IEC Factory Representative should be notified immediately so that proper action may be taken.

NOTE: Should any questions arise concerning warranty repairs, the factory must be notified BEFORE any corrective action is taken.

Section 1 – Installation

PREPARE JOBSITE AND UNITS

To save time and to reduce the possibility of costly errors, set up a complete sample installation in a typical room at the jobsite. Check all the critical dimensions such as field piping, wiring, and duct connection to ensure they agree with job requirements. Refer to job drawings and product dimension drawings as required (See Figure 1 for sample drawing). Instruct all trades in their part of the installation. Should any discrepancies be discovered, contact your local representative before continuing with unit installations.

For each unit, confirm incoming and control power requirements match available power source. Refer to unit nameplate and wiring diagram.

1. Check all tags on unit to determine if shipping screws are to be removed. Remove screws as directed.
2. Rotate the fan wheel by hand to ensure that the fan is unrestricted and can rotate freely. Check for shipping damage and fan obstructions. Adjust blower wheel as required.
3. Perform “Dry Fit” of valve assembly that may be shipped unattached to unit coil assembly. Should any questions arise on fit up please contact your local representative immediately.

HANDLING AND INSTALLATION

While all equipment is designed and fabricated with sturdy materials and may present a rugged appearance, great care must be taken to assure that no force or pressure be applied to the coil, piping or drain stub-outs during handling. Also, depending on the options and accessories, some units could contain delicate components that may be damaged by improper handling. Wherever possible, all units shall be maintained in an upright position, and handled by the chassis, plenum sections, or as close as possible to the mounting-point locations. In the case of a full cabinet unit, the unit must obviously be handled by the exterior casing. This is acceptable providing the unit is again maintained in an upright position and no force is applied that may damage internal components or painted surfaces.

The equipment covered in this manual IS NOT suitable for outdoor installations. The equipment should never be stored or installed where it may be subjected to a hostile environment such as rain, snow, or extreme temperatures.

Before, during, and after installation, special care must be taken to prevent foreign material such as paint, plaster, and drywall dust from being deposited in the drain pan or on the motor or blower wheels. Failure to do so may have serious adverse effects on unit operation, and in the case of the motor and blower assembly, may result in immediate or premature failure. All manufacturer’s warranties are void if foreign material is allowed to be deposited in the drain pan or on the motor or blower wheels of any unit. Some units and/or job conditions may require some form of temporary covering during construction.

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UNIT CLEARANCE AND SERVICE ACCESS

For specific unit dimensions, refer to the product technical catalog for your model. Provide adequate clearance for the removal of the panel, access to controls, or replacement of internal serviceable components including air filters. Allow clearances according to local and national codes.

Service access is available from the bottom and side of the unit.

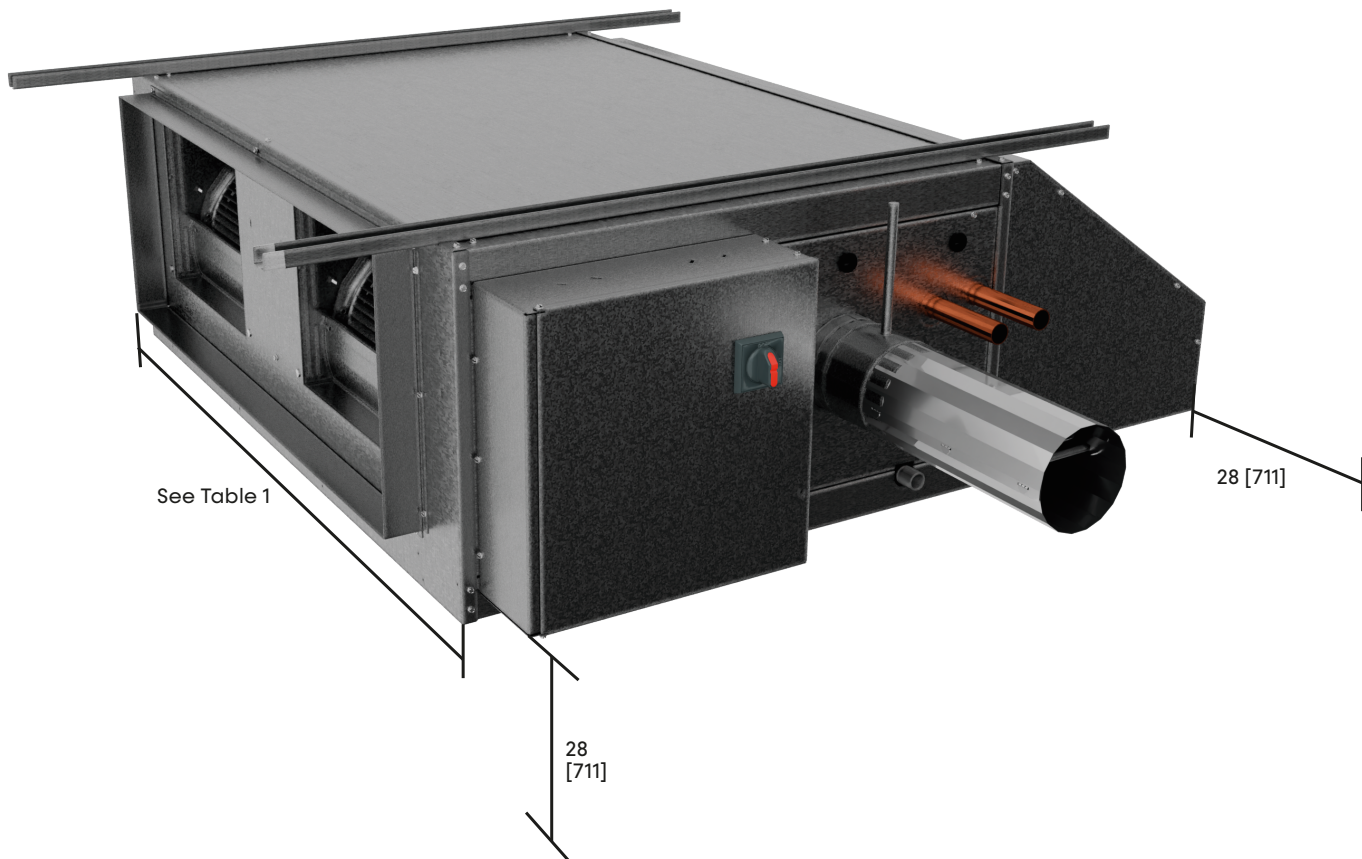
Units have either right or left hand piping. Reference piping locations by facing the front of the unit (airflow discharges from the front). The control panel is always on the same end as the piping unless otherwise specified.

Table 1: Horizontal HTY

Unit Size	HTY in [mm]
6	500
8	400
10	1,000
12	1,200
14	1,400
16	1,500
18	1,950
20	2,000

Table 2: Maximum External Static Pressure

Unit Size	Minimum Airflow (CFM) [w.g.]	Maximum Airflow (CFM) [in w.g.]	Rated ESP (in w.g.)	Maximum Static (in w.g.)	Airflow at Maximum Static (CFM)
6	200	650	0.5	0.70	500
8	200	950	0.5	0.80	400
10	300	1,250	0.5	0.75	1,000
12	300	1,500	0.5	0.55	1,200
14	400	1,800	0.5	0.50	1,400
16	400	2,000	0.5	0.75	1,500
18	500	2,150	0.5	0.75	1,950
20	500	2,300	0.5	0.75	2,000



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Section 1 – Installation

MOUNTING TYPE

The Series Fan Powered Terminal ships with pre-installed strut channels. Additional hardware is provided by others.

COOLING/HEATING CONNECTIONS

After mounting the unit, it is then ready for the various service connections such as water, drain, and electrical. At this time, it should be verified that the proper types of services are actually provided to the unit. On those units requiring chilled water and/or hot water, the proper line size and water temperature should be available to the unit.

CAUTION

Toxic residues and loose particles resulting from manufacturing and field piping techniques such as joint compounds, soldering flux, and metal shavings may be present in the unit and the piping system. Special consideration must be given to system cleanliness when connecting to solar, domestic or potable water systems.

Submittals and product literature detailing unit operation, controls, and connections should be thoroughly reviewed BEFORE beginning the connection of the various cooling and/or heating mediums to the unit.

1. Condensate Drain Pan

The drain should always be connected and piped to an acceptable disposal point. For proper moisture carry-off, the drain piping should be sloped away from the unit at least 1/8 inch per foot. A drain trap may be required by local codes and it is strongly recommended for odor containment. The differential height of the trap inlet to outlet must be at least one inch greater than the total static pressure on the unit. The height from the drain outlet to the bottom of the trap must not be less than the total static pressure. The condensate drain hose should be secured with a clamp after installing.

2. Valve Package Install (when applicable)

NOTE: Always protect chilled and hot water valve bodies, strainers, ball valves, and other flow control-related devices from heat caused by soldering or brazing processes by wrapping these devices in cold or damp rags.

NOTE: Zone valves recommended to prevent excessive condensate (from running wild coil).

All accessory valve packages should be installed as required, and all service valves should be checked for proper operation.

If coil and valve package connections are to be made with a “sweat” or solder joint, care should be taken to assure that no components in the valve package are subjected to a high temperature which may damage seals or other materials. Many two-position electric control valves, depending on valve operation, are provided with a manual opening lever. This lever should be placed in the “open” position during all soldering or brazing operations.

Ground-Joint seal preparation for copper unions (recommended by manufacturer):

- a. Make sure the ground joint area is free of nicks and scratches.
- b. Spray the ground-joint area with silicone spray or beeswax to enhance seating.
- c. Recommended torques for ground joint seal:
 - ½-inch (12.7 mm) (nominal) unions – 35 ft./lbs. (23,519 mm/kg) (minimum)
 - ¾-inch (19 mm) (nominal) unions – 60 ft./lbs. (40,318 mm/kg) (minimum)
 - 1-inch (25.4 mm) (nominal) unions - 79 ft./lbs. (53,085 mm/kg) (minimum)
- d. Make sure alignment of line does not put lateral stress on the ground-joint seal.
- e. Make sure that excess solder droplets do not reach the ground-joint area.

If the valve package connection at the coil is made with a union, the coil side of the union must be prevented from twisting (“backed up”) during tightening to prevent damage to the coil tubing. Over-tightening must be avoided to prevent distorting (“egg shaping”) the union seal surface and destroying the union.

The supply and return connections are marked on the coil stub-outs and the valve package, with an “S” meaning supply or inlet and “R” meaning return or outlet indicating flow direction to and from the coil. Blue letters mark the chilled water connections and red letters mark the hot water or steam connections.

Section 1 – Installation

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HTY

Field supplied or factory supplied valve packages will need to be insulated in the field by the installing contractor. Factory supplied valve packages are shipped loose for field installation.

- a. Remove valve actuators temporarily during valve installation. Protect unit wiring from damage.
- b. Install valve packages and connect to the coil in sequence, first heating, then cooling.
- c. Tighten unions using backup wrench to prevent damage to coil tubes. Align exiting tubes to the center of the pipe openings.
- d. If desired, apply split bushings or grommets (provided by others) to the pipes for mechanical support and protection. Do not allow copper tube to contact steel cabinet.
- e. Now is a good time to leak test the unions and fittings, using air pressure and soap. The coil air vent(s) may be used for this purpose.

If none of the above factory accessories have been provided with the units, a drip lip (available from the factory) may still be required to direct piping condensate into the unit drain pan.

After the connections are completed, the system should then be tested for leaks. Since some components are not designed to hold pressure with a gas, hydronic systems should be tested with water. Pressure testing should be completed prior to sheet rocking or painting.

CAUTION

All water coils must be protected from freezing after initial filling with water. Even if the system is drained, unit coils may still hold enough water to cause damage when exposed to temperatures below freezing.

After system integrity has been established, insulate the piping in accordance with the project specifications. This is the responsibility of the installing or insulation contractor. All chilled water piping and valves not located over drain pans must be insulated to prevent damage from sweating. This includes factory and field piping inside the unit cabinet.

ELECTRICAL CONNECTIONS

The electrical service to the unit should be compared to the unit nameplate to verify compatibility. The routing and sizing of all piping, and the type and sizing of all wiring and other electrical components such as circuit breakers, disconnect switches, etc. should be determined by the individual job requirements. Verify the electrical conductor size is suitable for the distance to the equipment connection and will support the equipment electrical load. All installations should be made in compliance with all governing codes and ordinances. Compliance with all codes is the responsibility of the installing contractor.

The unit serial plate lists the unit electrical characteristics such as the required supply voltage, fan and heater amperage and required circuit ampacities. The unit wiring diagram shows all unit and field wiring. Since each project is different and each unit on a project may be different, the installer must be familiar with the wiring diagram and serial plate on the unit BEFORE beginning any wiring.

All components furnished for field installation by either the factory or the controls contractor should be located and checked for proper function and compatibility. All internal components should be checked for shipping damage, and any loose connections should be tightened to minimize problems during start-up.

Any devices such as fan switches that have been furnished from the factory for field installation must be wired in strict accordance with the wiring diagram that appears on the unit. Failure to do so could result in personal injury or damage to components and will void all manufacturer's warranties.

The fan motor(s) should never be controlled by any wiring or device other than the factory-provided board without factory authorization. Fan motor(s) may be temporarily wired for use during construction only with prior factory approval in strict accordance with the instructions issued at that time.

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HTY

Section 1 – Installation

Units with optional factory-furnished and installed aquastats may be shipped with the aquastats mounted on a coil stub-out. Remove the aquastat before installation of a valve package. Consult the factory piping diagram in the approved submittals for proper location when reinstalling the aquastats. If the valve package is field-furnished, the aquastat must be installed in a location where it will sense the water temperature regardless of control valve position. A bleed bypass may be required to guarantee proper aquastat operation.

All field wiring should be done in accordance with governing codes and ordinances. Any modification of the unit wiring without factory authorization will void all of the factory warranties, and will nullify any agency listings.

The manufacturer assumes no responsibility for any damages and/or injuries resulting from improper field installation and/or wiring.

1. After planning for and bringing incoming power to the unit, locate the control box (incoming electrical power wiring compartment).
2. Determine appropriate knock out to feed incoming power wiring into box.
3. Secure incoming power wiring to the disconnect switch with proper service entrance connector and/or appropriate strain relief.
4. Replace control box cover.

DUCTWORK CONNECTIONS

All ductwork and/or supply and return grilles should be installed in accordance with the project plans and specifications.

For units with no return-air ductwork, check local code requirements for possible application restrictions. All units must be installed in areas that are non-combustible.

Some models are designed to be connected to ductwork with a MINIMUM amount of external static pressure. These units may be damaged by operation without the proper ductwork connected. Consult the approved submittals and the product catalog for unit external static pressure limitations.

If a sound attenuator is ordered as a part to be installed in the field, the front filter section will need to be removed prior to installing the sound attenuator. The original filter frame on the unit can then be discarded.

Units provided with outside air for ventilation should have some form of low-temperature protection to prevent coil freeze-up. This protection may be any of several methods such as a low-temperature thermostat to close the outside air damper or a preheat coil to temper the outside air before it reaches the unit.

It should be noted that none of these methods will adequately protect a coil in the event of power failure. The safest method of freeze protection is to use glycol in the proper percent solution for the coldest expected air temperature.

Flexible duct connections should be used on all air handling equipment to minimize vibration transmissions. All ductwork and insulation should be installed to allow proper access to all components for service and repair such as filters, motor/blower assemblies, etc.

The manufacturer assumes no responsibility for undesirable system operation due to improper design, equipment or component selection, and/or installation of base unit, ductwork, grilles, and other related components.

Section 1 – Installation

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FINAL PREPARATIONS

1. Turn off power to the unit (open unit electrical disconnect) and install lockout tags on all power supplies to unit.
2. Install damper actuator as required.
3. Install Direct Digital Communicating (DDC) controls and perform any other final wiring as applicable. Ensure all electrical connections are tight.
4. Perform a final visual inspection. All equipment, plenums, ductwork, and piping should be inspected to verify that all systems are complete and properly installed and mounted, and that no debris or foreign articles such as paper or drink cans are left in the units or other areas. Clean dirt, dust, and other construction debris from unit interior. Be sure to check fan wheel and housing and clean, if necessary.
5. Rotate fan wheel by hand to be sure it is free and does not rub housing. Check that wing nuts securing fan assembly to fan deck are tight. Adjust if necessary.
6. Install filter in frame at rear of coil. If field-supplied filters are used, be sure size is as specified per the technical catalog.
7. Ensure all panels and filters are installed before checking fan operation. Turn on power to the unit.
8. Check the fan and motor operation.
9. Verify drain line is properly and securely positioned and that the line is clear. Pour water into drain to check operation.

Model:
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Section 2 – Startup

GENERAL STARTUP

Before beginning any startup operation, the startup personnel should familiarize themselves with the unit, options and accessories, and control sequence to understand the proper system operation. All personnel should have a good working knowledge of general startup procedures and have the appropriate startup and balancing guides available for consultation.

The building must be completely finished including doors, windows, and insulation. All internal walls and doors should be in place and in the normal position. In some cases the interior decorations and furniture may influence overall system performance. The entire building should be as complete as possible before beginning any system balancing.

The initial step in any startup operation should be a final visual inspection. All equipment, plenums, ductwork, and piping should be inspected to verify that all systems are complete and properly installed and mounted, and that no debris or foreign articles such as paper or drink cans are left in the units or other areas.

Each unit should be checked for:

1. Free blower wheel operation
2. Loose wires
3. Loose or missing access panels or doors
4. Clean filter of the proper size and type

Except as required during start-up and balancing operations, no fan coil units should be operated without all the proper ductwork attached, supply and return grilles in place, and all access doors and panels in place and secure. Failure to do so could result in damage to the equipment or building and furnishings, and/or void all manufacturer's warranties.

Maximum operating altitude for units is 13,400 feet (4km).

All units are IPX0 rated.

COOLING/HEATING SYSTEM

Prior to the water system start-up and balancing, the chilled/hot water systems should be flushed to clean out dirt and debris which may have collected in the piping during construction. During this procedure, all unit service valves must be in the closed position. This prevents foreign matter from entering the unit and clogging the valves and metering devices. Strainers should be installed in the piping mains to prevent this material from entering the units during normal operation.

During system filling, air venting from the unit is accomplished by the use of the standard, manual air vent fitting, or the optional, automatic air vent fitting installed on the coil. Manual air vents are Schrader valves. To vent the air from the coil, depress the valve until the air has vented the coil. When water begins to escape through the valve, release the valve. Automatic air vents may be unscrewed one turn counterclockwise to speed initial venting, but should be screwed in for automatic venting after start-up operations.

CAUTION

The air vent provided on the unit is not intended to replace the main system air vents and may not release air trapped in other parts of the system. Inspect the entire system for potential air traps and vent those areas as required, independently. In addition, some systems may require repeated venting over a period of time to properly eliminate air from the system.

Section 2 – Startup

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AIR SYSTEM BALANCING

All ductwork must be complete and connected. All grilles, filters, and access doors and panels must be properly installed to establish actual system operating conditions **BEFORE** beginning air balancing operations.

Each individual unit and the attached ductwork is a unique system with its own operating characteristics. For this reason, air balancing is normally done by balance specialists who are familiar with all procedures required to properly establish air distribution and fan-system operating conditions. These procedures should not be attempted by unqualified personnel.

Exposed units without ductwork do not require air balancing other than selecting the desired fan speed.

Units may be supplied with a differential pressure air velocity sensor Airflow Measurement Probe (AFMP). These AFMP units will need to have the pressure differential converted to flow velocity. See Appendix A for airflow measurement station installation and balancing.

After proper system operation is established, the actual unit air delivery and the actual fan motor amperage draw for each unit should be recorded in a convenient place for future reference.

WATER TREATMENT

Proper water treatment is a specialized industry. IEC recommends consulting an expert in this field to analyze the water for compliance with the water quality parameters listed below and to specify the appropriate water treatment regimen. The expert may recommend typical additives such as rust inhibitors, scaling preventative, antimicrobial growth agents, or algae preventatives. Anti-freeze solutions may also be used to lower the freezing point.

IEC water coil tubes and headers are constructed of pure copper. Multiple brass alloys may be present in the valve package, depending on unit configuration. It is the user's responsibility to ensure the tube and piping materials furnished by IEC, are compatible with the treated water.

Failure to provide proper water quality will void the fan coil unit's warranty.

Water Containing	Required Concentration
Sulphate	Less than 200 ppm
pH	7.0 – 8.5
Chlorides	Less than 200 ppm
Nitrate	Less than 100 ppm
Iron	Less than 4.5 mg/l
Ammonia	Less than 2.0 mg/l
Manganese	Less than 0.1 mg/l
Dissolved Solids	Less than 1000 mg/l
CaCO ₃ Hardness	300 - 500 ppm
CaCO ₃ Alkalinity	300 - 500 ppm
Particulate Quantity	Less than 10 ppm
Particulate Size	800 micron max

Maximum Water Operating Temperature: 190° (87°C)
Maximum Allowable Water Pressure: 500 PSIG (3447 kpa)

WATER SYSTEM BALANCING

A complete knowledge of the hydronic system, along with its components and controls, is essential to proper water system balancing. This procedure should not be attempted by unqualified personnel. The system must be complete and all components must be in operating condition **BEFORE** beginning water system balancing operations.

Each hydronic system has different operating characteristics depending on the devices and controls used in the system. The actual balancing technique may vary from one system to another.

After the proper system operation is established, the appropriate system operating conditions such as various water temperatures and flow rates should be recorded in a convenient place for future reference.

Before and during water system balancing, conditions may exist due to incorrect system pressures which may result in noticeable water noise or undesired valve operation. After the entire system is balanced, these conditions should not exist on properly designed systems.

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Section 3 – Controls Operation

BOARD COMPONENTS AND SPECIFICATIONS

Before proper control operation can be verified, all other systems must be operating properly. The correct water and air temperatures must be present for the control function being tested. Some controls and features are designed to not operate under certain conditions. For example, on a 2-pipe cooling/heating system with auxiliary electric heat, the electric heater cannot be energized with hot water in the system. A wide range of controls, electrical options, and accessories may be used with the equipment covered in this manual. Consult the approved unit submittals, order acknowledgments, and other literature for detailed information regarding each individual unit and its controls. Since controls and features may vary from one unit to another, care should be taken to identify the controls used on each unit and their proper control sequence. Information provided by component manufacturers regarding installation, operation, and maintenance of their individual controls is available upon request.

SUPPLY AIR DUCT TEMPERATURE SENSOR

The supply air duct temperature sensor must be field-installed, down-stream of the supply air in the duct. Follow the install instructions provided with the sensor.

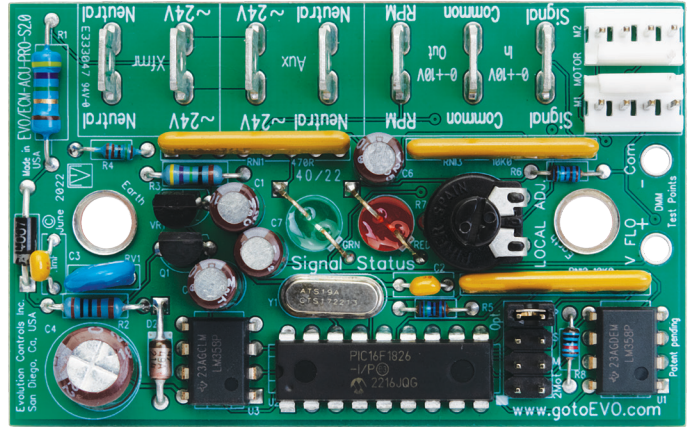
COOLING AND HEATING COIL CONTROL VALVE AND ACTUATOR

The cooling and heating coil control valves ship installed on the valve package (entire valve package is field-installed). Connect the control valves to the system controls, per the provided wiring diagram.

MOTOR CONTROL BOARD

The EVO/ECM-ACU-Pro control board allows 2.4V to +10V automation signals to adjust and monitor EC Motors for constant airflow. The board provides remote adjustment of the motor output from 0 to 100% of the motor’s programmed control range. A signal lamp on the control continuously flashes out the floor index (percentage of the programmed control range). The green lamp continuously indicates the flow index. After a pause, the lamp flashes out the tens digit, then the units digits of a

number between 1 and 99. Long flashes represent the tens digit, and short flashes represent the units digit. For example, a flow index of 23 flashed two longs, then three shorts. Two extra long flashes indicate a flow index of 0. An extra long flash and ten short flashes indicates a flow index of 100. The lamp flashes the signal that was present when the flash sequence started.

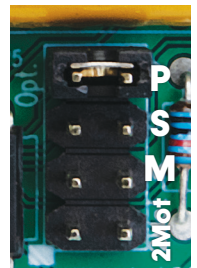


Air Balancer

1. Use Adjust to set the air flow. This adjustment will have authority until automation is connected.
2. Read the flashing green lamp and record the flow index on the air balance report

Automation Integrator

3. Set the signal to 0V to invoke manual override.
4. Record the RPM on the air balance report.
5. Enter the flow index on the air balance report.
6. Observe the RPM is at or near the RPM observed in step 2.
7. Cycle the motor on/off 5 times. This clears the manual override function unless the “M” jumper is in place. Or, wait for the clear to occur naturally as daily schedules start and stop the mechanical equipment.



Section 4

– Normal Operation & Periodic Maintenance

Model:
HTY

GENERAL

Each unit on a job will have its own unique operating environment and conditions which may dictate a maintenance schedule for that unit that is different from other equipment on the job. A formal schedule of regular maintenance and an individual unit log should be established and maintained. This will help to achieve the maximum performance and service life of each unit on the job.

Information regarding safety precautions contained in the preface at the beginning of this manual should be followed during any service and maintenance operations.

For more detailed information concerning service operations consult your Sales Representative or the factory.

MOTOR/BLOWER ASSEMBLY

The type of fan operation is determined by the control components and their method of wiring. This may vary from unit to unit. Refer to the wiring diagram that is attached to each unit for that unit's individual operating characteristics.

All motors have permanently lubricated bearings. No field lubrication is required.

Should the assembly require more extensive service, the motor/blower assembly may be removed from the unit to facilitate such operations as motor or blower wheel/housing replacement, etc.

Dirt and dust should not be allowed to accumulate on the blower wheel or housing. This can result in an unbalanced blower wheel condition which can damage a blower wheel or motor. The wheel and housing may be cleaned periodically using a vacuum cleaner and a brush taking care not to dislodge the factory balancing weights on the blower wheel blades.

COIL

Coils may be cleaned by removing the side or bottom panels and brushing the entering air face between fins with a stiff brush. Brushing should be followed by cleaning with a vacuum cleaner. If a compressed air source is available, the coil may also be cleaned by blowing air through the coil fins from the leaving air face. This should again be followed by vacuuming. Units provided with the proper type of air filters, replaced regularly, will require less frequent coil cleaning.

OPTIONAL ELECTRIC HEATER ASSEMBLY

Electric heaters typically require no normal periodic maintenance when unit air filters are changed properly. The operation and service life may be affected by other conditions and equipment in the system. The two most important operating conditions for an electric heater are proper air flow and proper supply voltage. High supply voltage and/or poorly distributed or insufficient air flow over the element will result in element overheating. This condition may result in the heater cycling on the high limit thermal cutout. Open-strip heaters have an automatic reset switch with a back-up, high-limit thermal switch.

Automatic reset switches reset automatically after the heater has cooled down. High-limit thermal switches must be replaced once the circuit has been broken. The high-limit thermal cutout device is a safety device only, and is not intended for continuous operation. With proper unit application and operation, the high-limit thermal cutout will not operate. This device only operates when a problem exists, and ANY condition that causes high-limit cutout MUST be corrected immediately. High supply voltage also causes excessive amperage draw and may trip the circuit breaker or blow the fuses on the incoming power supply.

After proper air flow and supply power are assured, regular filter maintenance is important to provide clean air over the heater. Dirt that is allowed to deposit on the heating element will cause hot spots and eventual element burn through. These hot spots will normally not be enough to trip the high-limit thermal cut-out device, and may not be evident until actual heater element failure.

Model:
HTY

Section 4 – Normal Operation & Periodic Maintenance

ELECTRICAL WIRING AND CONTROLS

The electrical operation of each unit is determined by the components and wiring of the unit. This may vary from unit to unit. Consult the wiring diagram attached to the unit for the actual type and number of controls provided on each unit.

The integrity of all electrical connections should be verified at least twice during the first year of operation. Afterwards, all controls should be inspected regularly for proper operation. Some components may experience erratic operation or failure due to age. Wall thermostats may also become clogged with dust and lint, and should be periodically inspected and cleaned to provide reliable operation.

When replacing any components such as fuses, contactors, or relays, use only the exact type, size and voltage component as furnished from the factory. Any deviation without factory authorization could result in personnel injury or damage to the unit. This will also void all factory warranties. All repair work should be done in such a manner as to maintain the equipment in compliance with governing codes, ordinances and testing agency listings.

More specific information regarding the use and operating characteristics of the standard controls offered by the manufacturer are contained in other manuals.

VALVES AND PIPING

No formal maintenance is required on the valve-package components most commonly used with fan coil units other than a visual inspection for possible leaks in the course of other normal periodic maintenance. In the event that a valve should need replacement, the same precautions taken during the initial installation to protect the valve package from excessive heat should also be used during replacement.

FILTERS

The time interval between each replacement should be established based on regular inspection of the filter, and should be recorded in the log for each unit. Refer to the product catalog for the recommended filter size for each product type and size. If the replacement filters are not purchased from the factory, the filters used should be the same type and size as those furnished from, or recommended by the factory. Consult the factory for applications using filter types other than the factory standard throwaway or optional MERV 8/13 filters.

DAMPER ASSEMBLY

It is recommended each damper be cycled and tested every 6 months and in accordance with local codes and actuator manufacturer recommendations. If dampers are installed in potentially dirty airstreams, the blades and other internal parts may need annual cleaning to avoid dirt build up.

Remove any foreign material.

- Verify that hardware used to install damper does not contact moving parts of the damper.
- Lubricate linkage, bearings and other moveable parts with a silicone lubricant. Do not use petroleum-base products as they could cause excessive dust collection.
- Operate (open and close) the damper via the actuator or extended shaft.
- Check the blade linkage to make sure the blade shafts and blades rotate 90° from full open to full closed.

Section 4

– Normal Operation & Periodic Maintenance

Model:
HTY

DRAIN

The drain should be checked before initial start-up, and at the beginning of each cooling season to assure that the drain, drain trap, and line are clear. If it is clogged, steps should be taken to clear the debris so that condensate will flow easily.

Periodic checks of the drain should be made during the cooling season to maintain a free-flowing condensate. Units provided with a secondary or “tell-tale” drain connection will indicate a clogged main-drain line by flow from the “tell-tale” connection.

Should the growth of algae and/or bacteria be a concern, consult an air conditioning and refrigeration supply organization familiar with local conditions for chemicals, or other solutions available to control these agents.

REPLACEMENT PARTS

Factory replacement parts should be used wherever possible to maintain unit performance, its normal operating characteristics, and the testing agency listings. Replacement parts may be purchased through a local Sales Representative.

Contact the local Sales Representative or the factory before attempting any unit modifications. Any modifications not authorized by the factory could result in personnel injury, damage to the unit, and could void all factory warranties.

When ordering parts, the following information must be supplied to ensure proper part identification:

1. Complete unit model number
2. Unit serial number
3. Complete part description, including any numbers

For warranty parts inquiries, in addition to the information previously listed, a description of the issue with the parts is required. Contact the factory for authorization to return any parts, such as defective parts, to be replaced in warranty. All shipments returned to the factory must be marked with a Return Authorization Number which is provided by the factory, if warranty has been approved.

On warranty replacements, in addition to the information previously listed, the unit shipping code which appears on the upper right-hand corner of the serial plate is required. Contact the factory for authorization to return any parts such as defective parts replaced in warranty. All shipments returned to the factory must be marked with a Return Authorization Number which is provided by the factory.

Model:
HTY

Equipment Startup Checklist

RECEIVING AND INSPECTION

- Unit received undamaged
- Unit received complete as ordered
- "Furnish only" parts accounted for
- Unit arrangement/hand correct
- Unit structural support complete and correct

HANDLING AND INSTALLATION

- Mounting grommets/isolators used
- Unit mounted level and square
- Proper access provided for unit and accessories
- Proper electrical service provided
- Proper over-current protection provided
- Proper service switch/disconnect provided
- Proper chilled water line size to unit
- Proper hot water line size to unit
- All services to unit in code compliance
- All shipping screws and braces removed
- Unit protected from dirt and foreign matter

COOLING/HEATING CONNECTIONS

- Protect valve package components from heat
- Mount valve packages
- Connect field piping to unit
- Pressure test all piping for leaks
- Install drain line and traps, as required
- Insulate all piping, as required
- Install drip lip under piping, as required

DUCTWORK CONNECTIONS

- Install ductwork, fittings and grilles, as required
- Flexible duct connections at unit
- Proper supply and return grille type and size
- Control outside air for freeze protection
- Insulate all ductwork, as required

ELECTRICAL CONNECTIONS

- Refer to unit wiring diagram
- Connect incoming power service or services
- Install and connect "furnish only" parts

UNIT STARTUP

- General visual unit and system inspection
- Check for proper fan rotation
- Record electrical supply voltage
- Check all wiring for secure connections
- Close all unit isolation valves
- Flush water systems

Appendix A

Airflow Measurement Probe

Model:
HTY

SENSOCON AIRFLOW MEASUREMENT PROBE

The airflow measurement probe shall be installed a linear distance equal to primary air duct diameter upstream of any downstream disturbance. There shall be no disturbance upstream of the airflow measurement probe within a distance equal to two times (2x) the duct diameter. Disturbances include any bends or elbows in the duct or any other installed equipment.

The airflow measurement probe provides an air velocity pressure that can be used to calculate air flow volume through the duct.

$$CFM = 16.88 \times \sqrt{\Delta P} \times d^2$$

Where:

CFM = Volumetric air flow through the duct in cubic feet per minute

ΔP = Difference between high and low pressure readings from the airflow measurement probe in inches water column

d = Inner diameter of duct in inches

The airflow measurement probe provides accurate pressure differential readings for air velocities between 300 and 5000 fpm. CFM ranges vary by duct size as shown in the table below.

Duct Dia. (in)	Duct Area (in ²)	Min CFM	Max CFM
4	12.57	26	436
5	19.63	41	682
6	28.27	59	982
8	50.27	105	1745

Use 3/16-inch air tubing and hose clamps to secure the air hose to the airflow measurement probe hose barbs and a mating sensor. Ensure there are no leaks in the tubing connections.

Model:
HTY

Appendix A Suggested Minimum Distances

Table A-1. Suggested Minimum Distances from Up and Downstream Disturbances 1, 2, 3

Relationship to Fan →	Positive Pressure Side of Fan						Negative Pressure Side of Fan					
Disturbance Location Relative to AMD →	Upstream			Downstream			Upstream			Downstream		
Choose greater of Xmin or Xcalc, where D = (Width + Height)/2 →	Figure	X		Figure	Y		Figure	X		Figure	Y	
Disturbance ↓		Xmin	Xcalc		Ymin	Ycalc		Xmin	Xcalc		Ymin	Ycalc
Air Cleaners												
Filter (pleated)	A-X-01	24" [610 mm]		A-Y-01	6" [153 mm]		A-X-01	18" [458 mm]		A-Y-01	6" [153 mm]	
Filter (roll)	A-X-02	12" [305 mm]		A-Y-02	6" [153 mm]		A-X-02	12" [305 mm]		A-Y-02	6" [153 mm]	
Coils and Heaters												
H/W Coil	C-X-01	18" [458 mm]		C-Y-01	6" [153 mm]		C-X-01	18" [458 mm]		C-Y-01	6" [153 mm]	
C/W Coil	C-X-01	18" [458 mm]		C-Y-01	6" [153 mm]		C-X-01	18" [458 mm]		C-Y-01	6" [153 mm]	
Electric Heater	C-X-02			C-Y-02	Call EBTRON		C-X-02			C-Y-02		
Dampers⁴												
Ducted (Modulating)	D-X-01			D-Y-01	9" [229 mm] ⁵	0.75D ⁵	D-X-01	Call EBTRON		D-Y-01	9" [229 mm]	0.75D
Ducted (2-position, Open/Closed)	D-X-01	20" [508 mm]		D-Y-01	10" [254 mm] ⁵		D-X-01	20" [508 mm]		D-Y-01	10" [254 mm]	
Outdoor Air Intake												
≤1,250 FPM [6.35 m/s]		NA			NA		D-X-01	Call EBTRON		D-Y-01	6" [153 mm] ⁶	
>1,250 FPM [6.35 m/s]		NA			NA		D-X-01	Call EBTRON		Call EBTRON		
Elbows												
Elbow (no turning vanes)	E-X-01	36" [915 mm]	3D	E-Y-01	18" [458 mm]	1.5D	E-X-01	36" [915 mm]	3D	E-Y-01	18" [458 mm]	1.5D
Elbow (turning vanes)	E-X-02	9" [229 mm]	0.75D	E-Y-02	9" [229 mm]	0.75D	E-X-02	9" [229 mm]	0.75D	E-Y-02	9" [229 mm]	0.75D
Elbow (radius or sweep)	E-X-03	21" [534 mm]	1.75D	E-Y-03	21" [534 mm]	1.75D	E-X-03	21" [534 mm]	1.75D	E-Y-03	21" [534 mm]	1.75D
Exhaust Louvers												
Backdraft		NA		L-Y-01	30" [762 mm]			NA			NA	
Stationary		NA		L-Y-01	18" [458 mm]			NA			NA	
Fans (Ducted)												
Centrifugal Fan	F-X-01	24" [610 mm]	2D		NA			NA		F-Y-01	12" [305 mm]	1D
Vane Axial Fan	F-X-02	24" [610 mm]	2D		NA			NA		F-Y-02	12" [305 mm]	1D

Notes:

- This table is based on the immediate up and downstream disturbances and should be used as a guide. Additional nearby obstructions should be considered prior to selecting a location.
- Call EBTRON at 800-232-8766 for disturbances not shown or for product application assistance.
- Place the AMD beyond the absorption distance of humidifiers, evaporative coolers and other sources of water condensate.
- Distances are from the leading edge of a fully open damper blade when the damper is located downstream of the AMD and the trailing edge of when the AMD is located upstream.
- The AMD may provide false readings as the damper approaches the closed position due to turbulence at the measurement location.
- Xmin = Damper Blade Width.
- Install in hood.
- The expected accuracy can not be predicted if the AMD is located closer to the louver than suggested. Field adjustment may be required.
- Maintain louver or hood minimum distance requirements to probe.

Table Continued on Next Page

Appendix A Suggested Minimum Distances

Model:
HTY

Table Continued from Previous Page

Relationship to Fan →	Positive Pressure Side of Fan					Negative Pressure Side of Fan						
Disturbance Location Relative to AMD →	Upstream			Downstream			Upstream			Downstream		
Choose greater of Xmin or Xcalc, where D = (Width + Height)/2 →	Figure	X		Figure	Y		Figure	X		Figure	Y	
Disturbance ↓		Xmin	Xcalc		Ymin	Ycalc		Xmin	Xcalc		Ymin	Ycalc
Fan Plenums												
Plenum to Duct	P-X-01	18" [458 mm]	1.5D		NA			NA			NA	
Duct to Plenum		NA			NA			NA		P-Y-01	12" [305 mm]	1D
Outdoor Air Intake Hoods												
Angled (or Radiused) Hoods												
Installed Accuracy (without adjustment)												
≤ ±15%		NA			NA		H-X-01	0" [0 mm] ⁷			NA	
≤ ±10%		NA			NA		H-X-01	6" [153 mm]			NA	
≤ ±5%		NA			NA		H-X-01	12" [305 mm]			NA	
Straight Through Hoods		NA					H-X-02	12" [305 mm]			NA	
Outdoor Air Intake Louvers⁸												
Hurricane/Rain Louvers												
<500 FPM [2.5 m/s]		NA			NA		L-X-01	18" [458 mm]			NA	
500 to 1,250 FPM [2.5 to 6.35 m/s]		NA			NA		L-X-01	24" [610 mm]			NA	
>1,250 FPM [6.35 m/s]		NA			NA		L-X-01	36" [915 mm]			NA	
Stationary Louvers < 6" [152 mm]												
<500 FPM [2.5 m/s]		NA			NA		L-X-01	18" [458 mm]			NA	
500 to 1,250 FPM [2.5 to 6.35 m/s]		NA			NA		L-X-01	24" [610 mm]			NA	
>1,250 FPM [6.35 m/s]		NA			NA		L-X-01	36" [915 mm]			NA	
Stationary Louvers ≥ 6" [152 mm]												
<500 FPM [2.5 m/s]		NA			NA		L-X-01	12" [305 mm]			NA	
500 to 1,250 FPM [2.5 to 6.35 m/s]		NA			NA		L-X-01	18" [458 mm]			NA	
>1,250 FPM [6.35 m/s]		NA			NA		L-X-01	24" [610 mm]			NA	

Notes:

- This table is based on the immediate up and downstream disturbances and should be used as a guide. Additional nearby obstructions should be considered prior to selecting a location.
- Call EBTRON at 800-232-8766 for disturbances not shown or for product application assistance.
- Place the AMD beyond the absorption distance of humidifiers, evaporative coolers and other sources of water condensate.
- Distances are from the leading edge of a fully open damper blade when the damper is located downstream of the AMD and the trailing edge of when the AMD is located upstream.
- The AMD may provide false readings as the damper approaches the closed position due to turbulence at the measurement location.
- Xmin = Damper Blade Width.
- Install in hood.
- The expected accuracy can not be predicted if the AMD is located closer to the louver than suggested. Field adjustment may be required.
- Maintain louver or hood minimum distance requirements to probe.

Table Continued on Next Page

Model:
HTY

Appendix A Suggested Minimum Distances

Table Continued from Previous Page

Relationship to Fan →	Positive Pressure Side of Fan						Negative Pressure Side of Fan					
Disturbance Location Relative to AMD →	Upstream			Downstream			Upstream			Downstream		
Choose greater of Xmin or Xcalc, where D = (Width + Height)/2 →	Figure	X		Figure	Y		Figure	X		Figure	Y	
Disturbance ↓		Xmin	Xcalc		Ymin	Ycalc		Xmin	Xcalc		Ymin	Ycalc
Outdoor Air Intake, Plenum to Duct ⁹												
<500 FPM [2.5 m/s]		NA			NA		P-X-01	6" [153 mm]				NA
500 to 1,250 FPM [2.5 to 6.35 m/s]		NA			NA		P-X-01	12" [305 mm]				NA
>1,250 FPM [6.35 m/s]		NA			NA		P-X-01	18" [458 mm]				NA
T Fittings												
T Main Duct (no turning vanes)	T-X-01	12" [305 mm]	1D	T-Y-01	6" [153 mm]	0.5D	T-X-02	18" [458 mm]	1.5D	T-Y-02	6" [153 mm]	0.5D
T Main Duct (turning vanes)	T-X-03	18" [458 mm]	1.5D	T-Y-03	6" [153 mm]	0.5D	T-X-04	12" [305 mm]	1D	T-Y-04	6" [153 mm]	0.5D
T Branch Duct (no turning vanes)	T-X-05	36" [915 mm]	3D	NA			NA			T-Y-05	12" [305 mm]	1D
T Branch Duct (turning vanes)	T-X-06	18" [458 mm]	1.5D	NA			NA			T-Y-06	12" [305 mm]	1D
Terminal T (no turning vanes)	T-X-07	36" [915 mm]	3D	T-Y-07	12" [305 mm]	1D	T-X-07	24" [610 mm]	2D	T-Y-07	6" [153 mm]	0.5D
Terminal T (turning vanes)	T-X-08	18" [458 mm]	1.5D	T-Y-08	9" [229 mm]	0.75D	T-X-08	12" [305 mm]	1D	T-Y-08	6" [153 mm]	0.5D
Transitions												
Reducing Transition	Z-X-01	6" [153 mm]	0.5D	Z-Y-01	6" [153 mm]	0.5D	Z-X-01	6" [153 mm]	0.5D	Z-Y-01	6" [153 mm]	0.5D
Expanding Transition	Z-X-02	18" [458 mm]	1.5D	Z-Y-02	6" [153 mm]	0.5D	Z-X-02	18" [458 mm]	1.5D	Z-Y-02	6" [153 mm]	0.5D

Notes:

- This table is based on the immediate up and downstream disturbances and should be used as a guide. Additional nearby obstructions should be considered prior to selecting a location.
- Call EBTRON at 800-232-8766 for disturbances not shown or for product application assistance.
- Place the AMD beyond the absorption distance of humidifiers, evaporative coolers and other sources of water condensate.
- Distances are from the leading edge of a fully open damper blade when the damper is located downstream of the AMD and the trailing edge of when the AMD is located upstream.
- The AMD may provide false readings as the damper approaches the closed position due to turbulence at the measurement location.
- Xmin = Damper Blade Width.
- Install in hood.
- The expected accuracy can not be predicted if the AMD is located closer to the louver than suggested. Field adjustment may be required.
- Maintain louver or hood minimum distance requirements to probe.

Appendix A Placement Figures

Model:
HTY

Table A-2. Placement Figures – Ducts and Plenums

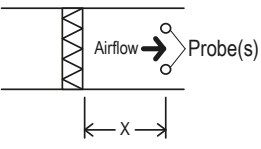
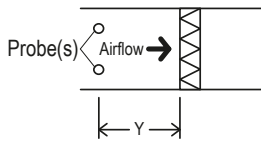
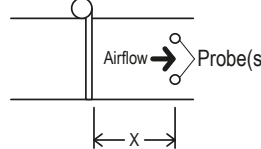
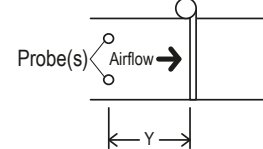
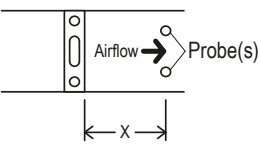
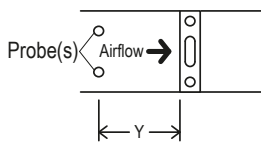
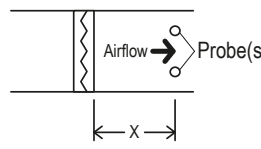
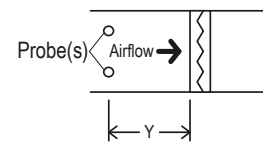
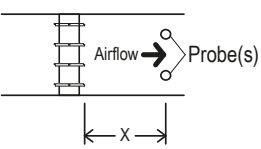
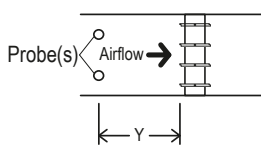
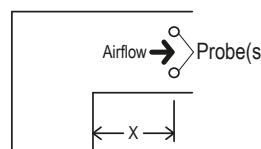
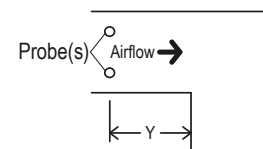
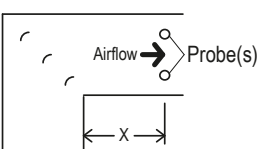
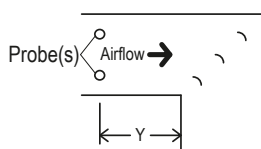
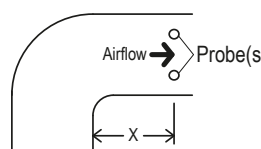
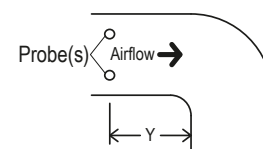
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Fig. ID: C-X-01	Fig. ID: C-Y-01	Fig. ID: C-X-02	Fig. ID: C-Y-02
			
Coil	Coil	Electric Heater	Electric Heater
Fig. ID: D-X-01	Fig. ID: D-Y-01	Fig. ID: E-X-01	Fig. ID: E-Y-01
			
Damper	Damper	Elbow (no turning vanes)	Elbow (no turning vanes)
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Elbow (turning vanes)	Elbow (turning vanes)	Elbow (radius)	Elbow (radius)

Table Continued on Next Page

Model:
HTY

Appendix A Placement Figures

Table Continued from Previous Page

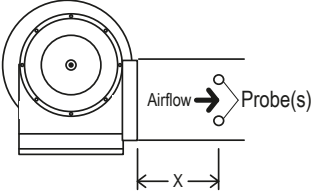
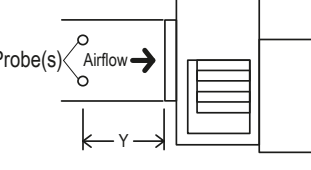
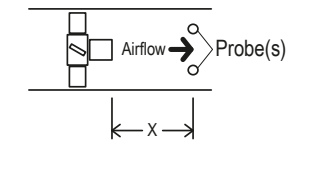
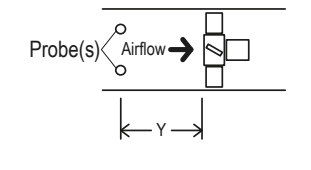
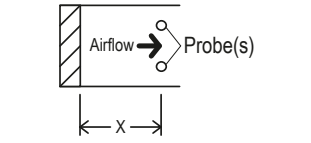
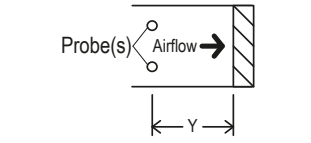
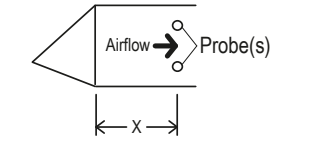
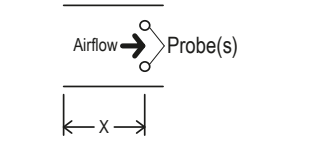
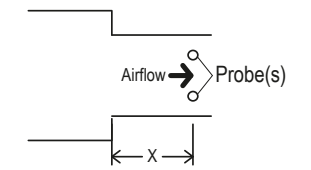
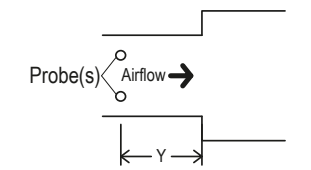
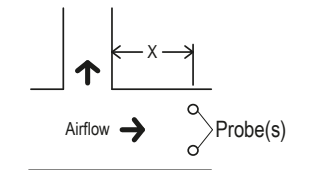
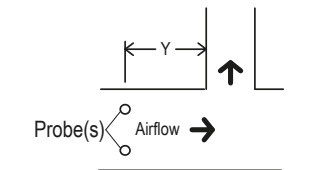
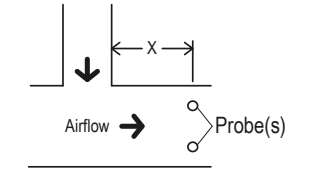
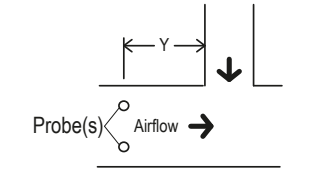
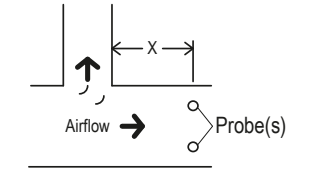
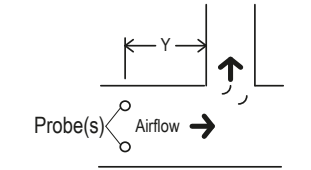
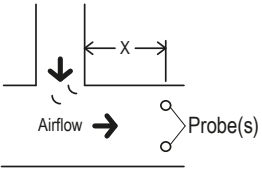
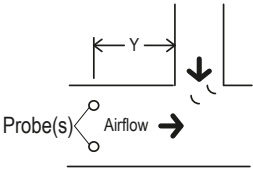
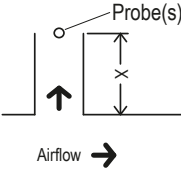
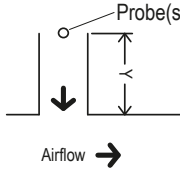
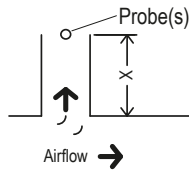
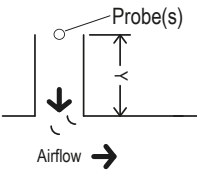
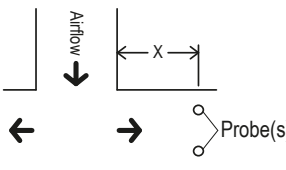
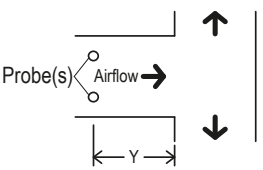
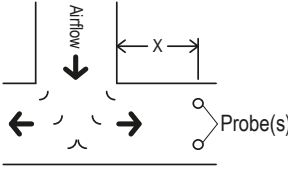
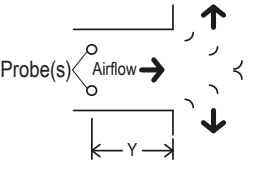
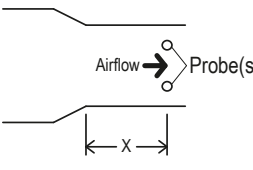
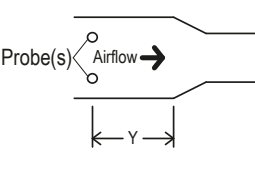
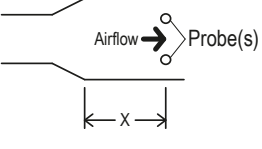
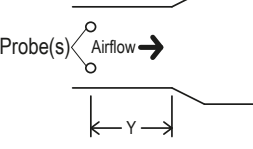
<p>Fig. ID: F-X-01</p>  <p>Centrifugal Fan</p>	<p>Fig. ID: F-Y-01</p>  <p>Centrifugal Fan</p>	<p>Fig. ID: F-X-02</p>  <p>Vane Axial Fan</p>	<p>Fig. ID: F-Y-02</p>  <p>Vane Axial Fan</p>
<p>Fig. ID: L-X-01</p>  <p>Louver</p>	<p>Fig. ID: L-Y-01</p>  <p>Louver</p>	<p>Fig. ID: H-X-01</p>  <p>Hood – Angled (or Radiused)</p>	<p>Fig. ID: H-X-02</p>  <p>Hood – Straight Through</p>
<p>Fig. ID: P-X-01</p>  <p>Plenum to Duct</p>	<p>Fig. ID: P-Y-01</p>  <p>Duct to Plenum</p>	<p>Fig. ID: T-X-01</p>  <p>T Main Duct (no turning vanes)</p>	<p>Fig. ID: T-Y-01</p>  <p>T Main Duct (no turning vanes)</p>
<p>Fig. ID: T-X-02</p>  <p>T Main Duct (no turning vanes)</p>	<p>Fig. ID: T-Y-02</p>  <p>T Main Duct (no turning vanes)</p>	<p>Fig. ID: T-X-03</p>  <p>T Main Duct (turning vanes)</p>	<p>Fig. ID: T-Y-03</p>  <p>T Main Duct (turning vanes)</p>

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Appendix A Placement Figures

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<p>Fig. ID: T-X-04</p>  <p>T Main Duct (turning vanes)</p>	<p>Fig. ID: T-Y-04</p>  <p>T Main Duct (turning vanes)</p>	<p>Fig. ID: T-X-05</p>  <p>T Branch Duct (no turning vanes)</p>	<p>Fig. ID: T-Y-05</p>  <p>T Branch Duct (no turning vanes)</p>
<p>Fig. ID: T-X-06</p>  <p>T Branch Duct (turning vanes)</p>	<p>Fig. ID: T-Y-06</p>  <p>T Branch Duct (turning vanes)</p>	<p>Fig. ID: T-X-07</p>  <p>Terminal T (no turning vanes)</p>	<p>Fig. ID: T-Y-07</p>  <p>Terminal T (no turning vanes)</p>
<p>Fig. ID: T-X-08</p>  <p>Terminal T (turning vanes)</p>	<p>Fig. ID: T-Y-08</p>  <p>Terminal T (turning vanes)</p>	<p>Fig. ID: Z-X-01</p>  <p>Reducing Transition</p>	<p>Fig. ID: Z-Y-01</p>  <p>Reducing Transition</p>
<p>Fig. ID: Z-X-02</p>  <p>Expanding Transition</p>	<p>Fig. ID: Z-Y-02</p>  <p>Expanding Transition</p>		

Model:
HTY

Terms and Conditions

IEC TERMS AND CONDITIONS

1. Orders shall not be binding upon International Environmental Corporation, an Oklahoma corporation (hereinafter referred to as "IEC") unless accepted by an authorized representative of IEC at its office in Oklahoma City, Oklahoma. No distributor, sales representative or any other person or entity (except authorized employees of IEC at its office in Oklahoma City, Oklahoma) has any authority whatsoever to bind IEC to any representation or agreement of any kind.
2. IEC does not build items to plans and specifications. IEC agrees to furnish only the items as described in IEC's acknowledgment unless IEC's office in Oklahoma City, Oklahoma has previously received and accepted, in writing, approved submittals from Purchaser.
3. Prices acknowledged are firm only if Purchaser releases the goods covered by this order for immediate production by IEC within thirty (30) days from the date of Purchaser's initial offer to purchase and for shipment by IEC within IEC's estimated shipping date, unless otherwise agreed to in writing by IEC at its office in Oklahoma City, Oklahoma. If Purchaser does not meet the terms and conditions of this paragraph, the prices are subject to escalation to those prices in effect at time of shipment without notice to Purchaser.
4. All prices are F.O.B. IEC's factory, unless otherwise agreed by IEC in writing; and all payments and prices shall be in U.S.A. dollars.
5. If goods are released for production but IEC is prevented by the Purchaser from shipping upon completion or by IEC's estimated shipping date, whichever is later, IEC may at its option, in addition to all other remedies, invoice Purchaser to be payable within thirty (30) days and store the goods at Purchaser's sole expense.
6. Title to and risk of loss to the goods passes to the Purchaser F.O.B. IEC's factory.
7. **Disclaimer**
It is expressly understood that unless a statement is specifically identified as a warranty, statements made by IEC or its representatives relating to IEC's products, whether oral, written or contained in any sales literature, catalog or any other agreement, are not express warranties and do not form a part of the basis of the bargain, but are merely IEC's opinion or commendation of IEC's products. **EXCEPT AS SPECIFICALLY SET FORTH HEREIN, THERE IS NO EXPRESS WARRANTY AS TO ANY OF IEC'S PRODUCTS. IEC MAKES NO WARRANTY AGAINST LATENT DEFECTS. IEC MAKES NO WARRANTY OF MERCHANTABILITY OF THE GOODS OR OF THE FITNESS OF THE GOODS FOR ANY PARTICULAR PURPOSE.**
8. **Grant of Limited Express Warranty**
IEC warrants IEC products purchased and retained in the United States of America and Canada to be free from defects in material and workmanship under normal use and maintenance as follows: (1) All complete fan coil units built or sold by IEC for twelve (12) months from date of unit start-up or eighteen (18) months from date of shipment (from factory), whichever comes first.

All parts must be returned to IEC's factory in Oklahoma City, Oklahoma, freight prepaid, no later than sixty (60) days after the date of the failure of the part; if IEC determines the part to be defective and within IEC's Limited Express Warranty, IEC shall, when such part has been either replaced or repaired, return such to a factory recognized contractor or service organization, F.O.B. IEC's factory, Oklahoma City, Oklahoma, freight prepaid. The warranty on any parts repaired or replaced under warranty expires at the end of the original warranty period. For information and warranty service contact:

International Environmental Corporation
Customer Service
5000 W. I-40 Service Rd.
Oklahoma City, OK 73128
(405) 605-5000

This warranty does not cover and does not apply to: (1) Air filters, fuses, fluids; (2) Products relocated after initial installation; (3) Any portion or component of any system that is not supplied by IEC, regardless of the cause of the failure of such portion or component; (4) Products on which the unit identification tags or labels have been removed or defaced; (5) Products on which payment to IEC is or has been in default; (6) Products which have defects or damage which result from improper installation, wiring, electrical imbalance characteristics or maintenance; or are caused by accident, misuse or abuse, fire, flood, alteration or misapplication of the product; (7) Products which have defects or damage which result from a contaminated or corrosive air or liquid supply, or operation at abnormal temperatures; (8) Mold, fungus or bacteria damages; (9) Products subjected to corrosion or abrasion; (10) Products manufactured or supplied by others; (11) Products which have been subjected to misuse, negligence or accidents; (12) Products which have been operated in a manner contrary to IEC's printed instructions; or (13) Products which have defects, damage or insufficient performance as a result of insufficient or incorrect system design or the improper application of IEC's products.

IEC is not responsible for: (1) The cost of any fluids or other system components, or associated labor to repair or replace the same, which is incurred as a result of a defective part covered by IEC's Limited Express Warranty; (2) The costs of labor, materials or service incurred in removal of the defective part, or in obtaining and replacing the new or repaired part; or, (3) Transportation costs of the defective part from the installation site to IEC or of the return of any part not covered by IEC's Limited Express Warranty.

Limitation: This Limited Express Warranty is given in lieu of all other warranties. If, notwithstanding the disclaimers contained herein, it is determined that other warranties exist, any such warranties, including without limitation any express warranties or any implied warranties of fitness for particular purpose and merchantability, shall be limited to the duration of the Limited Express Warranty.
9. **Limitation of Remedies**
In the event of a breach of the Limited Express Warranty, IEC will only be obligated at IEC's option to repair the failed part or unit or to furnish a new or rebuilt part or unit in exchange for the part or unit which has failed. If after written notice to IEC's factory in Oklahoma City, Oklahoma of each defect, malfunction or other failure and a reasonable number of attempts by IEC to correct the defect, malfunction or other failure and the remedy fails of its essential purpose, IEC shall refund the purchase price paid to IEC in exchange for the return of the sold good(s). Said refund shall be the maximum liability of IEC. **THIS REMEDY IS THE SOLE AND EXCLUSIVE REMEDY OF THE BUYER OR THEIR PURCHASER AGAINST IEC FOR BREACH OF CONTRACT, FOR BREACH OF ANY WARRANTY OR FOR IEC'S NEGLIGENCE OR IN STRICT LIABILITY.**
10. **Limitation of Liability**
IEC shall have no liability for any damages if IEC's performance is delayed for any reason or is prevented to any extent by any event such as, but not limited to: any war, civil unrest, government restrictions or restraints, strikes, or work stoppages, fire, flood, accident, shortages of transportation, fuel, material or labor, acts of God or any other reason beyond the sole control of IEC. **IEC EXPRESSLY DISCLAIMS AND EXCLUDES ANY LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGE IN CONTRACT, FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY, OR IN TORT, WHETHER FOR IEC'S NEGLIGENCE OR AS STRICT LIABILITY.**
11. IEC shall have no system design, application or maintenance responsibility or responsibility for mold, fungus or bacteria to Purchaser or any other third party.
12. All sales, goods and services, use, excise, value added, transportation, privilege, occupational consumption, storage, document, transaction or other taxes which may be levied by any taxing authority as a result of this transaction shall be paid by the Purchaser.
13. Unless otherwise agreed to in writing by IEC any technical data furnished in conjunction with this order and not obtainable from another source shall not be duplicated, used, or disclosed in whole or in part for any purpose other than to evaluate this order.
14. IEC shall have no liability or other obligation hereunder, if IEC's performance is delayed for any reason or is prevented to any extent by any event such as, but not limited to: any act of God, strike or work stoppage, fire, flood, accident, allocation, or other controls of Government authorities, shortages of transportation, fuel, material or labor, or any other cause beyond IEC's sole control. Any shipping date stated by IEC is IEC's best estimate but IEC makes no guarantee of shipment by any such date and shall have no liability or other obligation for failure to ship on such date, regardless of cause.
15. Payment terms are net thirty (30) days from date of shipment on approved credit. One and one half percent (1 1/2%) per month (18% annual rate) may be charged on past due accounts or the highest rate permitted by applicable law, whichever is lesser. In the event the account is placed for collection, Purchaser shall be responsible for all reasonable attorneys fees or costs on a solicitor and client basis, plus all other costs and expenses incurred by IEC in securing payment.
16. Purchaser shall not cancel the contract without prior written consent of an authorized representative of IEC at its offices in Oklahoma City, Oklahoma. In the event Purchaser cancels the contract with the prior written consent of IEC after the Purchaser's offer to purchase is received and acknowledged in writing, IEC shall be entitled to receive from Purchaser IEC's cost incurred to time of cancellation plus a reasonable allowance for overhead and profit.
17. Purchaser shall not assign any of its interest or rights under this agreement without written consent of IEC.
18. IEC will protect all its lien rights. IEC will not furnish lien waivers or releases until IEC receives payment, in full, at its office in Oklahoma City, Oklahoma from Purchaser for the goods covered by this order. There is no authorized retainage for any reason.
19. This Agreement shall be construed, and the rights and liabilities of the parties hereunder shall be determined in accordance with the laws of the State of Oklahoma. If it shall be found that any portion of this agreement violates any particular law of the United States or any state in the United States having jurisdiction or, if applicable, any law of Canada or any province or territory in Canada having jurisdiction, such portion of the agreement shall be of no force and effect in that political unit, division or sub-division in which they are illegal or unenforceable and the agreement shall be treated as if such portion or portions had not been inserted. In the event that any dispute or disagreement in connection with any order should arise or exist between Purchaser and IEC, jurisdiction and venue for any legal action shall be, if IEC so elects, exclusively in the state or federal courts in Oklahoma County, Oklahoma. The statute of limitations on any claim of the Purchaser against the IEC shall be one (1) year from the date the cause of action occurs.
20. Without regard to any other agreement, all obligations of Purchaser to IEC shall become immediately due and payable if Purchaser becomes insolvent or if Purchaser does not make payments when due or breaches any other agreement or fails to perform any obligation.
21. All orders are expressly limited and made conditional upon acceptance by Purchaser of the terms and conditions set forth above without change. There shall be no understandings, agreements, or obligations (outside these terms and conditions) unless specifically set forth in writing and accepted by signature of an authorized representative of IEC in Oklahoma City, Oklahoma.
22. The parties hereto have requested that these presents and all judicial proceedings relating thereto be drafted in English. Les parties aux présentes ont demandé à ce que les présentes et toutes procédures judiciaires y afférentes soient rédigées en anglais.

Notes

Model:
HTY

Model:
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Revision History

Date	Section	Description
05/24/2024	Created	
06/17/2024	Document	Template Update
	Sound Data	Update Visual Design



A **NIBE** GROUP MEMBER

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www.iec-okc.com



It is the responsibility of the end user to properly characterize and dispose of all waste materials according to applicable regulatory and legal entities. Where reasonable, safe, and compliant with local regulatory and legal requirements, IEC encourages recycling materials when disposing of its products.

International Environmental Corporation (IEC) works continually to improve its products. As a result, the design and specifications of each product may be changed without notice and may not be as described herein. Please contact IEC for information regarding current design and product specifications. Statements and other information contained herein are not express warranties and do not form the basis of any bargain between the parties but are merely IEC's opinion or commendation of its products. Manufacturer's standard limited warranty applies. The latest version of this document is available at www.iec-okc.com.