



*Standard Water*

# **"ES" Series**

## **Electric Humidifier**

The "ES" Series Electric Humidifier from PURE Humidifier Co. is loaded with features and options. All you need is tap water, electricity, and a sanitary drain—the humidifier does the rest.

These units feature a Tri-Probe sensor made up of three Teflon<sup>®</sup> coated stainless steel probes. The lower probe prevents the heating elements from energizing when the water level is too low. The middle probe electrically activates the water control valve to fill the reservoir. The top probe shuts off the water control valve when the water level reaches the proper height. A control panel with a microprocessor controller mounted on the panel door constantly monitors the humidifier cycle for efficient operation. The microprocessor controller also provides a vacuum fluorescent display to indicate the status of the humidifier. High efficiency immersion water heaters (up to twelve) heat the water to provide steam. Furthermore, a flusher serves to constantly remove surface water mineral build-up and doubles as a water overflow safety pipe to the drain. A standard accumulative timed drain cycle performs automatic draining and flushing, thus reducing mineral build-up within the reservoir.

When it comes to installation, you have a choice with the "ES" Series Electric Humidifier. The humidifier can be free-standing with a simple (optional) flexible hose connecting the unit to the stainless steel injection tube inserted through the duct wall. You can also mount the unit on the wall with wall brackets, or floor-mounted with support legs (both optional). For mounting under a duct you simply need hangers and support brackets.

These humidifiers can also be mounted inside the air handling system (local codes may require moisture-proof construction of certain components). Fast-Pac or Insty-Pac tube assemblies can be provided for short dissipation in any built-up or manufactured air handling system.

The versatility of the "ES" Series Electric Humidifier, with its unique side-entry heater assembly, allows you to design these easy-to-clean units into any system simply, efficiently, and reliably.

*Our results are comforting*



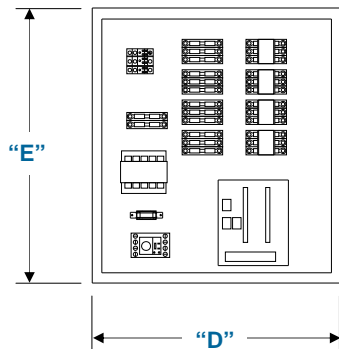
## Capacities & Weights "ES" Series

Sheet No.  
**ES-2**

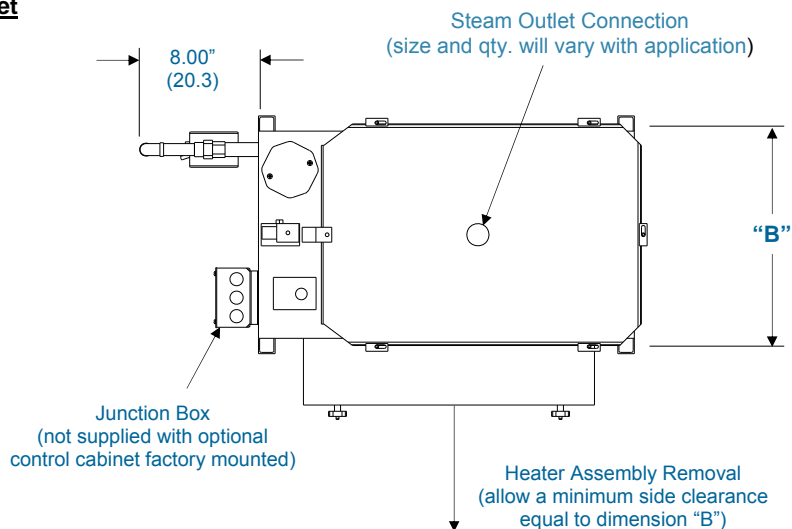
Standard Water Unit Model No.	Steam Output Capacity †		KW	Humidifier Reservoir Weight*				Control Cabinet Weight Δ	
	lbs/hr	kg/hr		Empty		Full		lbs	kg
ES-3	9.0	4.1	3	50.5	22.9	130.5	59.2	32.0	14.5
ES-4.5	13.5	6.1	4.5	50.5	22.9	130.5	59.2	32.0	14.5
ES-5.5	18.0	8.1	6.0	50.5	22.9	130.5	59.2	32.0	14.5
ES-7.5	22.5	10.2	7.5	50.5	22.9	130.5	59.2	32.0	14.5
ES-11	31.5	14.2	10.5	50.5	22.9	130.5	59.2	32.0	14.5
ES-14	40.5	18.4	13.5	50.5	22.9	130.5	59.2	32.0	14.5
ES-15	45.0	20.4	15	50.5	22.9	130.5	59.2	32.0	14.5
ES-16.5	49.5	22.5	16.5	50.5	22.9	130.5	59.2	32.0	14.5
ES-19.5	58.5	26.5	19.5	50.5	22.9	130.5	59.2	32.0	14.5
ES-22	63.0	28.6	21	61.0	27.7	177.0	80.3	55.0	25.0
ES-28	81.0	36.7	27	61.0	27.7	177.0	80.3	55.0	25.0
ES-30	90.0	40.8	30	61.0	27.7	177.0	80.3	55.0	25.0
ES-33	99.0	45.0	33	61.0	27.7	177.0	80.3	55.0	25.0
ES-39	117.0	53.1	39	61.0	27.7	177.0	80.3	55.0	25.0
ES-42	126.0	57.2	42	61.0	27.7	177.0	80.3	55.0	25.0
ES-45	135.0	61.2	45	65.5	29.7	181.5	82.3	72.0	32.7
ES-49.5	148.5	67.4	49.5	65.5	29.7	181.5	82.3	72.0	32.7
ES-58.5	175.5	80.0	58.5	65.5	29.7	181.5	82.3	72.0	32.7
ES-63	189.0	85.7	63	65.5	29.7	181.5	82.3	72.0	32.7
ES-66	198.0	89.8	66	88.0	39.9	243.0	110.2	72.0	32.7
ES-78	234.0	106.1	78	88.0	39.9	243.0	110.2	72.0	32.7
ES-84	252.0	114.3	84	88.0	39.9	243.0	110.2	72.0	32.7
ES-102	306.0	138.8	102	88.0	39.9	243.0	110.2	72.0	32.7

\* When calculating the total dry weight of the humidifier, the control cabinet weight must be added to the reservoir weight.  
 Δ The control cabinet is shipped loose unless optional factory mounting is specified. Reference the "Dimension Sheet" for control cabinet dimensions.  
 † The above capacities are based on 100% efficiency. Actual humidifier capacity may vary due to the heat loss from the humidifier reservoir. The ambient air temperature, air velocity, and injection tube system will affect the rate of heat loss from the humidifier reservoir.

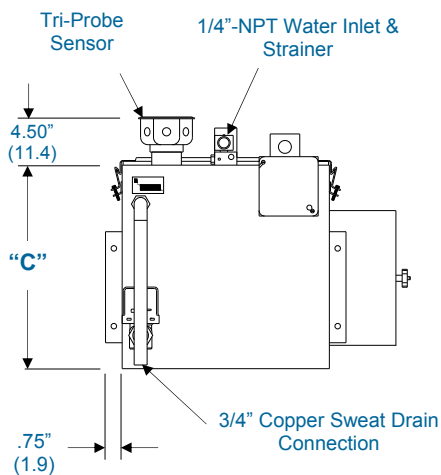
#### **NEMA- 12 Humidifier Control Cabinet** (reference control cabinet notes)



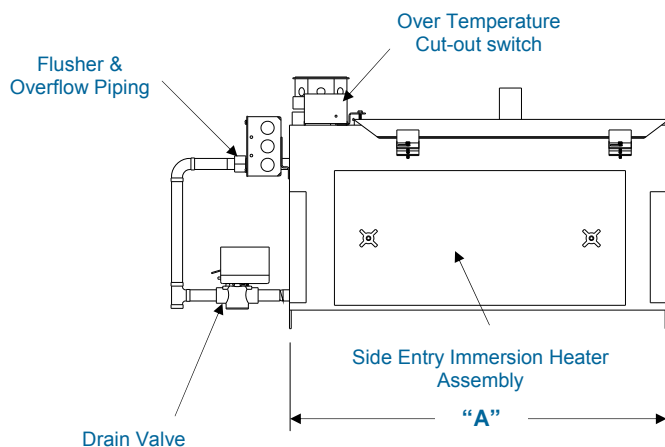
1. Door has been removed from the drawing for clarity.
2. Control cabinet is shipped loose for field mounting unless optional factory mounting is specified.
3. Dimension “F” = Control cabinet depth.



**Top View**



**Front View**



**Right Side View**

**Unit Dimensions in inches (cm)**

Model Number	Dim. “A”	Dim. “B”	Dim. “C”
ES-3 thru ES-19.5	17.50” (44.5)	14.00” (35.6)	13.75” (34.9)
ES-22 thru ES-63	25.50” (64.8)	14.00” (35.6)	13.75” (34.9)
ES-66 thru ES-102	34.00” (86.4)	18.25” (46.4)	13.75” (34.9)

**Control Cabinet Dimensions in inches (cm)**

Model Number	Dim. “D”	Dim. “E”	Dim. “F”
ES-3 thru ES-19.5	14.00” (35.6)	16.00” (40.6)	6.00” (15.2)
ES-22 thru ES-63	20.00” (50.8)	20.00” (50.8)	7.00” (17.8)
ES-66 thru ES-102	20.00” (50.8)	24.00” (61.0)	7.00” (17.8)
ES-*	24.00” (61.0)	30.00” (76.2)	7.00” (17.8)

\* Control panel for use with units having 123 amps or higher



## Electrical Specifications "ES" Series

Sheet No.  
**ES-4**

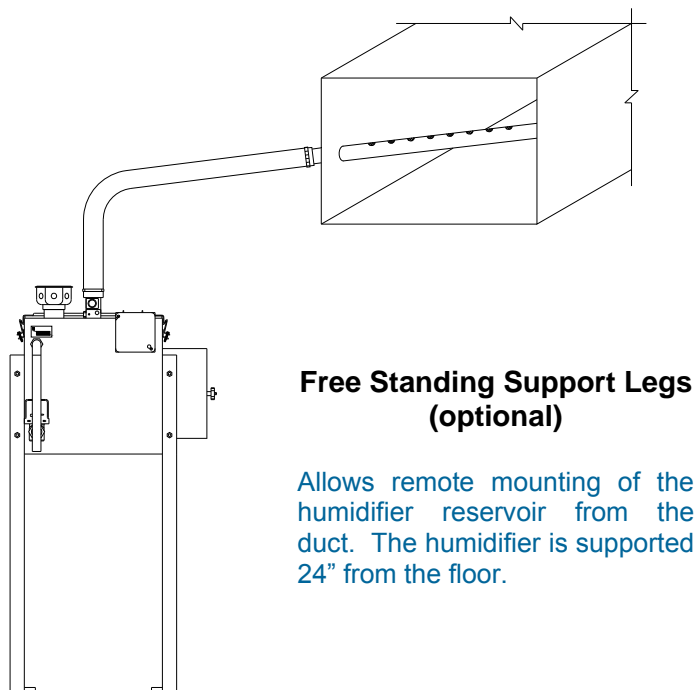
### Single Phase Amperage†

Standard Water Unit Model No.	Unit KW	120V	208V	240V	480V	600V	No. of Heaters	Heater KW	Control Circuit Voltage
ES-3	3	25.0	14.4	12.5	6.3	5.0	3	1.0	24 vac
ES-4.5	4.5	37.5	21.6	18.8	9.4	7.5	3	1.5	24 vac
ES-5.5	6.0		28.8	25.0	12.5	10.0	3	2.0	24 vac
ES-7.5	7.5		36.1	31.3	15.6	12.5	3	2.5	24 vac
ES-11	10.5				21.9	17.5	3	3.5	24 vac
ES-14	13.5				28.1	22.5	3	4.5	24 vac
ES-15	15				31.3	25.0	3	5.0	24 vac
ES-16.5	16.5				34.4	27.5	3	5.5	24 vac
ES-19.5	19.5				40.6	32.5	3	6.5	24 vac
ES-22	21				43.8	35.0	6	3.5	24 vac
ES-28	27				56.3	45.0	6	4.5	24 vac
ES-30	30				62.5	50.0	6	5.0	24 vac
ES-33	33				68.8	55.0	6	5.5	24 vac
ES-39	39				81.3	65.0	6	6.5	24 vac
ES-42	42				87.5	70.0	6	7.0	24 vac
ES-45	45				93.8	75.0	9	5.0	24 vac
ES-49.5	49.5				103.1	82.5	9	5.5	24 vac
ES-58.5	58.5				121.9	97.5	9	6.5	24 vac
ES-63	63				131.3	105.0	9	7.0	24 vac
ES-66	66				137.5	110.0	12	5.5	24 vac
ES-78	78				162.5	130.0	12	6.5	24 vac
ES-84	84				175.0	140.0	12	7.0	24 vac
ES-102	102				170.0		12	8.5	24 vac

### Three Phase Amperage†

Standard Water Unit Model No.	Unit KW	208V	240V	480V	600V	No. of Heaters	Heater KW	Control Circuit Voltage
ES-3	3	8.3	7.2	3.6	2.9	3	1.0	24 vac
ES-4.5	4.5	12.5	10.8	5.4	4.3	3	1.5	24 vac
ES-5.5	6.0	16.6	14.4	7.2	5.8	3	2.0	24 vac
ES-7.5	7.5	20.8	18.0	9.0	7.2	3	2.5	24 vac
ES-11	10.5	29.1	25.3	12.6	10.1	3	3.5	24 vac
ES-14	13.5	37.5	32.4	16.2	13.0	3	4.5	24 vac
ES-15	15	41.6	36.1	18.0	14.4	3	5.0	24 vac
ES-16.5	16.5	45.8	39.7	19.8	15.9	3	5.5	24 vac
ES-19.5	19.5			23.5	18.8	3	6.5	24 vac
ES-22	21	58.3	50.5	25.3	20.2	6	3.5	24 vac
ES-28	27	75.0	64.9	32.5	26.0	6	4.5	24 vac
ES-30	30	83.3	72.2	36.1	28.9	6	5.0	24 vac
ES-33	33	91.6	79.4	39.7	31.8	6	5.5	24 vac
ES-39	39			46.9	37.5	6	6.5	24 vac
ES-42	42			50.5	40.4	6	7.0	24 vac
ES-45	45	124.9	108.3	54.1	43.3	9	5.0	24 vac
ES-49.5	49.5	137.4	119.1	59.5	47.6	9	5.5	24 vac
ES-58.5	58.5			70.4	56.3	9	6.5	24 vac
ES-63	63			75.8	60.6	9	7.0	24 vac
ES-66	66	183.2	158.8	79.4	63.5	12	5.5	24 vac
ES-78	78			93.8	75.1	12	6.5	24 vac
ES-84	84			101.0	80.8	12	7.0	24 vac
ES-102	102			122.7	98.2	12	8.5	24 vac

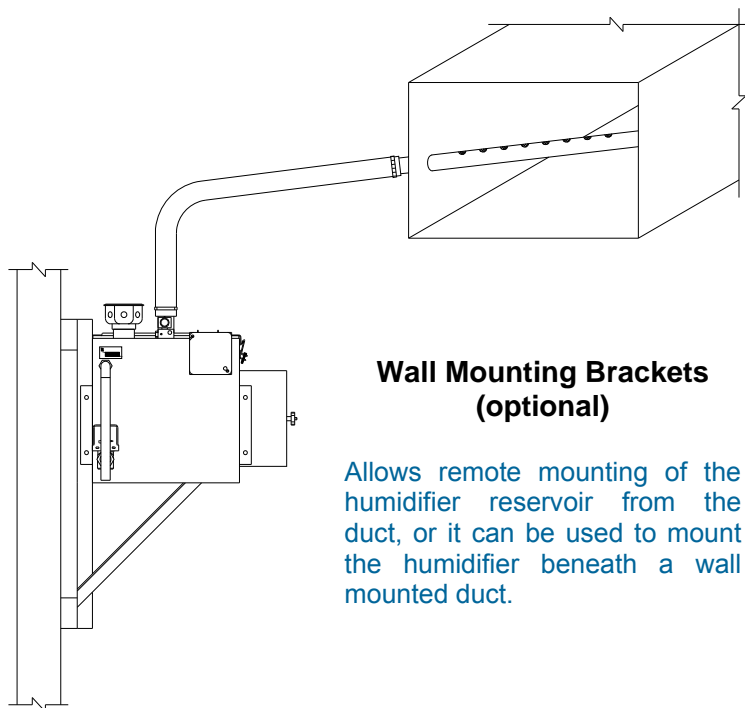
† Other voltages available upon request. Please consult factory for specific availability.



**Free Standing Support Legs  
(optional)**

Allows remote mounting of the humidifier reservoir from the duct. The humidifier is supported 24" from the floor.

The "ES" Series Electric Humidifier offers a wide variety of mounting applications. If the duct is remote from the humidifier reservoir, free-standing floor support legs or wall brackets (both optional) are available. The humidifier can even be mounted directly within an air handling unit (local codes may require moisture proof construction of certain components). Single or multiple injection tubes can be used to custom fit any duct or air handler size.



**Wall Mounting Brackets  
(optional)**

Allows remote mounting of the humidifier reservoir from the duct, or it can be used to mount the humidifier beneath a wall mounted duct.



**Specification Sample**  
**"ES" Series**

Sheet No.  
**ES-6**

**Humidifier**

1. The humidifier shall be electrically heated immersion heater type as manufactured by PURE Humidifier Co. of Chaska, Minnesota.
2. The humidifier shall be tested and approved by ETL Testing Laboratories, Inc. (ETL# 472940).
3. The humidifier shall have an evaporating reservoir with a gasket-sealed cover that is capable of operating at pressures of at least 19" (48 cm W.C.) without steam or water leaks. The reservoir shall be made of type 304 stainless steel with welded joints.
4. The humidifier shall be designed to facilitate easy removal of the cover and side-entry immersion heater assembly for cleaning. A side-entry immersion heater assembly shall be incorporated into the side of the humidifier to permit periodic scale removal and easy access to immersion heater elements.
5. Humidifier shall be field-convertible from an electric immersion heater style "ES" humidifier to a steam heat exchanger style "SX" humidifier with a simple change of the side-entry assembly.
6. An adjustable surface water flusher shall be included to drain away a portion of the water upon each refill cycle. This is to allow mineral deposits produced by earlier evaporation cycles to be removed. Flusher shall be designed for minimal water waste and efficient flushing.
7. The immersion heater(s) shall be incoloy clad and designed for 80 watts per square inch. They shall be attached to the reservoir cover and be easily removed for cleaning or inspection. Expansion and contraction of the heater sheath allows mineral build-up to flake off.
8. A brass body, solenoid operated water fill valve shall be factory-mounted on the cover of the humidifier reservoir. The fill valve shall be located to allow a minimum air gap of 1-1/2" (3.81 cm). An inline strainer shall be factory-mounted on the fill valve to remove any water-borne particulate matter before the humidifier fill valve. The water strainer shall have a removable screen to permit periodic inspection and cleaning.
9. The humidifier shall have a manual reset over-temperature switch factory-installed on the humidifier reservoir. The temperature switch shall provide humidifier over-temperature protection.
10. An INTAC<sup>®</sup> programmable microprocessor control module shall be factory-mounted on the cover of the control panel and shall electronically control the automatic refilling, low water cut-off, high water cut-off, manual surface water flushing and safety switch interlock functions. When in flush mode, the water fill valve shall stay open for 5 minutes then close.  
  
The microprocessor shall control all water level control functions through a Tri-Probe sensor mounted on the top front of the humidifier reservoir. The Tri-Probe sensor shall electrically sense the water level within the reservoir.  
  
A motor operated drain valve with a brass body and a cumulative timer will be incorporated in the INTAC<sup>®</sup> microprocessor controller. When the timer is activated the heater(s) will be de-energized and the drain valve will open. The drain period will be field-adjustable in 1 hour increments between 1 and 500 hours with the drain duration adjustable in 1 minute increments between 1 and 120 minutes. During the drain period the humidifying chamber will drain completely and the fill valve will be energized to provide a thorough rinsing action. After the drain period is completed, the drain valve will close and the humidifier will refill and provide humidity on demand.  
  
A seasonal drain system shall automatically drain the humidifier reservoir after a selected "NON-USE" period. The controller shall automatically reset the humidifier on call for humidity.
11. The humidifier shall be provided with an ETL listed JIC NEMA 12 control cabinet, shipped loose (reference factory mounting option). The control cabinet shall be made of 14-gauge steel with ANSI 61 gray polyester powder coating, continuous hinge, and oil-resistant gasket. The panel shall include a factory wired sub-panel with magnetic contactor(s), Tri-Probe sensor, fused control circuit transformer, numbered terminal block, and heater fuse(s).

**Reference the "Options" page for a description of the options which can be added to the base specification.**



## INTAC® Specification Sample "ES" Series

Sheet No.  
**ES-7**

An INTAC® programmable electronic microprocessor humidifier control system shall be mounted and pre-wired to the humidifier control panel door. All humidifier electrical, ground and control terminal connections shall be enclosed in an ETL listed NEMA 12 enclosure. The INTAC® controller shall provide the following standard features:

- Self-diagnostics and system verification on start-up.
  - Evaporating reservoir water level verification, control and safety interlock. The controller shall be compatible with all water types.
  - Automatic reservoir drain and flush system. The controller shall periodically drain and flush the reservoir based on Accumulated Run Time, Elapsed Time or by an externally triggered dry contact closure (except RO/DI water).
  - Cold water tempering prevents excessively hot water from draining during an automatic or seasonal drain cycle.
  - Seasonal Drain system shall automatically drain the humidifier reservoir after a selected "NON-USE" period. The controller shall automatically reset the humidifier on a call for humidity (if utilized).
  - Safety circuit input terminals including over-temperature shut down.
  - Terminal connections to accept virtually all control input signals. Input control range is selected as an "ON-SCREEN" prompt.
  - User adjustable controlling and high-limit RH PID functions with adjustable parameters (if utilized).
  - Door-mounted display and user interface. Provides two lines of system messaging on a vacuum fluorescent display screen, LED operational indication and keypad parameter entry system.
  - Vacuum fluorescent display brightness is adjustable.
  - Adjustable input signal filter to attenuate noisy control input signal.
  - Numbered screen prompts for set-up and service identification.
  - Keypad lock-out with user selected access levels.
  - Time-delayed scrolling display loop will begin cycling ten minutes after no buttons have been pressed and will display the next item for 30 seconds before continuing down the list – displays system parameters including: Low and High RH Alarms, System Faults, System Status, Set Point and Actual Space RH, Set Point and Actual Duct RH (optional), Outdoor Air Temperature (optional), Percent Power Output, Humidifier Output (in lbs/hr or kg/hr), Accumulated Run Time, Time to Clean timer, Water Level, Water Temperature Set Point and Actual (optional) and Control Type.
- INTAC® controller will automatically shut down when the ambient temperature is outside of designed operating temperature range.
  - Full Networking and BAS communication capability. Communication connections shall provide two-way communication via EIA-485 connected Modbus between the INTAC® controller and the Building Automation System (BAS) (if utilized).
  - High/Low humidity deviation alarm contacts (modulating control only).
  - Multiple humidifiers can run off of one control signal from a BAS system. Humidifiers can be set up to run in parallel or in series.
  - Safety Circuit/System Fault/Low Water alarm contacts.
  - Flash Memory – allows system upgrades through EIA-485 terminal connections with a laptop computer and access to e-mail.

### OPTIONAL FEATURES

- A. Variable air volume (VAV) anticipation control. The INTAC® software shall accept a modulating high-limit humidity input and space controlling RH input, then modulates the heater output to prevent over saturation of the supply air due to changes in the quantity of air flow. A compatible humidity sensor shall be shipped loose for field installation.
- B. Cold weather relative humidity reset. The INTAC® software shall accept a modulating temperature input and automatically reduce the space RH set-point on a drop in the outside temperature. The reduction of the RH set-point during cold weather periods prevents damage due to interior window condensation.
- C. Reservoir thermocouple water temperature control. The INTAC® software provides standby water temperature sensing and freeze protection.

**Reference the "Specification Sample" for the humidifier base specification.**



## Options "ES" Series

Sheet No.

ES-8

### Humidifier

**Cold Water Tempering.** A factory-installed temperature sensor shall be mounted onto the humidifier reservoir. Prevents excessively hot water from draining during an automatic or seasonal drain cycle.

**Insulation.** Unit shall be covered (except top cover) with 3/4" (1.9 cm) thick fiberglass duct insulation. Insulation material shall have aluminum foil facing.

**Freeze Protection.** A factory installed temperature sensor shall be mounted onto the humidifier reservoir. The system shall maintain the water temperature above freezing.

**Stand-by Water Temperature Sensing.** Consists of a temperature sensor to maintain water temperature at a selected level for fast response upon a call for humidity.

### Mounting

**Support Legs.** Provide support legs made of 1-1/4" x 1-1/4" x 1-1/4" (3.2 cm) angle iron and painted with enamel gray paint. Distance from humidifier bottom to floor shall be 24" (61 cm).

**Wall Brackets.** Provide two wall brackets made of 1-1/4" x 1-1/4" x 1-1/4" (3.2 cm) angle iron and painted with enamel gray paint.

### Injection Tubes

**Injection Tube(s) and Flexible Hose.** Each unit shall include one or more 10-foot (305 cm) sections of 1-1/2" (3.8 cm) I.D. flexible hose and a 1-1/2" (3.8 cm) O.D. stainless steel injection tube long enough to extend across the duct. Steam ports shall direct steam upward into the airflow. The reservoir cover shall have a matching connection so the flexible hose can be connected with two stainless steel hose clamps. A two-piece duct plate shall be provided to seal the duct opening.

**Fast-Pac Multiple Tube Assembly.** Tube assembly consists of a stainless steel supply/condensate header with a 3/4"-NPT drain connection and horizontal 1-1/2"Ø stainless steel injection tubes.

**Insty-Pac Tube Assembly.** Tube assembly consists of a steam supply/separators header constructed of stainless steel with steam inlet, condensate drain outlet, and steam jacketed injection tubes welded to header. Steam jacketed injection tubes constructed of stainless steel with punched steam ports of the proper size and spacing to deliver the maximum specified capacity.

### To Control Cabinet

**Control Cabinet Factory Mounting.** Humidifier control cabinet shall be factory-mounted and wired to the left side of the humidifier.

**NEMA 4 Control Cabinet.** A NEMA 4 weather tight control cabinet shall be substituted for the standard NEMA 12 cabinet.

**Control Panel Door Lock.** Control cabinet shall be provided with a factory-installed key lock on the cabinet door.

### Modulating Controls (select one)

**Time Cycle Modulation.** Provides 0-100% power modulation of the heater outputs. The heaters shall be time cycle modulated according to the demand. A compatible humidity sensor shall be shipped loose for field installation ( $\pm 3-4\%$  RH).

**SCR Modulation.** Provides 0-100% power modulation of the heater outputs down to a one-second cycle rate. All heater sets have full SCR control. A compatible humidity sensor shall be shipped loose for field installation ( $\pm 1-2\%$  RH).

**SCRmod Control.** This is a trim, plus-stage setup using SCRs on one heater set and contactors on the rest. Provides 0-100% power modulation of the heater outputs down to a one-second cycle rate. A 3% hysteresis is built-in so the contactors are not turning on and off quickly. A compatible humidity sensor shall be shipped loose for field installation ( $\pm 2-3\%$  RH).

### Controls

**VAV Control.** The INTAC<sup>®</sup> software shall accept a modulating high-limit input and space controlling RH input and modulate the heater output to prevent over saturation of the supply air due to changes in the quantity of airflow. A compatible duct humidity sensor shall be shipped loose for field installation.

**Outdoor Air Temperature Setback.** Provides automatic reduction of RH set-point to prevent condensation on windows during extreme cold weather.

**Air Flow Proving Switch.** A diaphragm-operated air flow proving switch with adjustable control range of .05" W.C. to 12.0" W.C. shall be provided for field installation. Switch rating shall be 2.5 amps at 120V.

**Duct High-Limit.** A high-limit humidistat shall be provided for duct installation. The high-limit shall be field set to prevent over saturation within the supply duct.