ACE INC
ASSOCIATED • CONSTRUCTION • ENGINEERING

2040 Harnish Blvd
Billings, MT 59101
406.245.0136 (phone)
406.245.2084 (fax)

SUBMITTAL REVIEW

ASSOCIATED CONSTRUCTION ENGINEERING, INC.

☒ Change as noted	☐ No re-submittal required
☐ Revise & Resubmit per comments	☐ No Exception Taken

Review is for conformance with design concept & compliance with contract documents only. Contractor shall check & verify all quantities, field measurements & shall be responsible for all errors in shop drawings. Contractor shall be responsible for deviations from contract documents unless he has called attention to such deviation and secured written approval. All in accordance with the general conditions.

COMMENTS/REMARKS:.

1. All comments must be addressed in writing, or in a re-submittal where indicated.
2. Any substitutions that result in electrical or other changes are the burden/responsibility of the submitting contractor.

Please provide submittal sheets with 35% prop. glycol per design for O&M reference.

-A.S. ACE

REVIEW STATUS:
END OF REVIEW

4G PLUMBING & HEATING, INC.

P.O. Box 17140 Missoula, MT 59808-7140 Fax: (406) 728-6257

PROJECT TITLE: **Marcus Daly Memorial Hospital Surgery Addition**

DATE: **December 1, 2017**

ARCHITECT: **OZ Architect/ACE Engineering**

GENERAL CONTRACTOR: **Swank Enterprises**

SUBCONTRACTOR: **4G Plumbing & Heating, Inc.**

SUPPLIER: **S Conley Sales**

MANUFACTURER'S NAME: **York/JCI**

SUBMITTAL NUMBER:
SPECIFICATION SECTION: **236423**
SPECIFICATION **Scroll Water Chillers**

COMMENTS:

SWANK ENTERPRISES
GENERAL CONTRACTORS
Reviewed by jlake on 12/08/2017

Checking only for conformance with dimension and information pertaining to the fabrication and construction process, all submittals are subject to Architect's & Engineers approval and must conform to the contract documents.

Reviewed by 4G Plumbing & Heating

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Cory Hamminen

384 Gallatin Park Dr. Suite 201, Bozeman, MT 59771
(O) 406.585.7333 (F) 406.585.7666

Marcus Daly Memorial Hospital Surgery Department Remodel

236423 – Scroll Water Chiller

236423 – Air Cooled Scroll Water Chiller: York

York/JCI

Tag: ACC-3
YLAA0175HE Air Cooled Scroll Chiller
460/3/60
Single Point Circuit Breaker with Lockable handle and 65kA SCWR
Control Transformer
High Ambient Kit
BACnet/Modbus/N2 Native
Service Isolation Valves
Electronic Expansion Valves
Thermal Dispersion Flow Switch
V-Guard Panels Plus Hail Guards
Acoustic Sound Blanket
Low Sound Fans with VSD Control

5-Year Compressor Warranty (Parts Only)
1-Year Entire Chiller Warranty (Parts and Labor)
1-Year Refrigerant Warranty

1-Day of Factory Authorized Start-Up

Seismic/Vibration Isolators: Mason Industries

1" Spring Isolators/Seismic Restraints
Certified Overturn Calculations with PE Stamped Drawings
Anchor Bolts Included

See attached copy of equipment schedule and additional submittal data.

Air Cooled Scroll Liquid Chiller -YORK YLAA R410A 50Hz & 60Hz

1. GENERAL

1.01. GENERAL REQUIREMENTS

The requirements of this Section shall conform to the general provisions of the Contract, including General and Supplementary Conditions, Conditions of the Contract, and Contract Drawings.

1.02. SCOPE

Provide Microprocessor controlled, multiple scroll compressor, air-cooled, liquid chillers of the scheduled capacities as shown and indicated on the Drawings, including but not limited to:

1. Chiller package
2. Charge of refrigerant and oil
3. Electrical power and control connections
4. Chilled liquid connections
5. Manufacturer start-up

1.03. QUALITY ASSURANCE

A. Products shall be Designed, Tested, Rated and Certified in accordance with, and Installed in compliance with applicable sections of the following Standards and Codes:

1. AHRI 550/590 – Water Chilling Packages Using the Vapor Compression Cycle
2. AHRI 370 – Sound Rating of Large Outdoor Refrigerating and Air-Conditioning Equipment
3. ANSI/ASHRAE 15 – Safety Code for Mechanical Refrigeration
4. ANSI/ASHRAE 34 – Number Designation and Safety Classification of Refrigerants
5. ASHRAE 90.1 – Energy Standard for Buildings Except Low-Rise Residential Buildings
6. ANSI/NFPA 70 – National Electrical Code (N.E.C.)
7. ASME Boiler and Pressure Vessel Code, Section VIII, Division 1
8. OSHA – Occupational Safety and Health Act
9. Manufactured in facility registered to ISO 9001
10. Conform to Intertek Testing Services for construction of chillers and provide ETL/cETL Listed Mark

B. Factory Run Test: Chiller shall be pressure-tested, evacuated and fully charged with refrigerant and oil, and shall be factory operational run tested with water flowing through the vessel.

C. Chiller manufacturer shall have a factory trained and supported service organization.

D. Warranty: Manufacturer shall Warrant all equipment and material of its manufacture against defects in workmanship and material for a period of eighteen (18) months from date of shipment or twelve (12) months from date of start-up, whichever occurs first. Unit compressors shall be warranted for (66 months from date of shipment of (60) months from date of start-up, whichever occurs first.

1.04. DELIVERY AND HANDLING

A. Unit shall be delivered to job site fully assembled with all interconnecting refrigerant piping and internal wiring ready for field installation and charged with refrigerant and oil by the Manufacturer.

B. Provide protective covering over vulnerable components for unit protection during shipment. Fit nozzles and open ends with plastic enclosures.

C. Unit shall be stored and handled per Manufacturer's instructions.

2. PRODUCTS

2.01. CHILLER MATERIALS AND COMPONENTS

A. General: Install and commission, as shown on the schedules and plans, factory assembled, charged, and tested air cooled scroll compressor chiller(s) as specified herein. Chiller shall be designed, selected, and constructed using a refrigerant with Flammability rating of "1", as defined by ANSI/ASHRAE STANDARD 34 Number Designation and Safety Classification of Refrigerants. Chiller shall include not less than two refrigerant circuits above 50 tons (200kW), scroll compressors, direct-expansion type evaporator, air-cooled condenser, refrigerant, lubrication system, interconnecting wiring, safety and operating controls including capacity controller, control center, motor starting components and special features as specified herein or required for safe, automatic operation.

B. Cabinet: External structural members shall be constructed of heavy gauge, galvanized steel coated with baked on powder paint which, when subject to ASTM B117, 1000 hour, 5% salt spray test, yields minimum ASTM 1654 rating of "6".

C. Operating Characteristics: Provide high ambient temperature control options as required to ensure unit is capable of operation from 30°F to 115°F (-1°C to 46°C) ambient temperature.

D. Service Isolation valves: Discharge (ball type) isolation valves factory installed per refrigerant circuit. Includes a system high-pressure relief valve in compliance with ASHRAE15.

E. Pressure Transducers and Readout Capability

1. Discharge Pressure Transducers: Permits unit to sense and display discharge pressure.
2. Suction Pressure Transducers: Permits unit to sense and display suction pressure.
3. High Ambient Control: Allows units to operate when the ambient temperature is above 115°F (46°C). Includes discharge pressure transducers

2.02. COMPRESSORS

A. Compressors: Shall be hermetic, scroll-type, including:

1. Compliant design for axial and radial sealing.
2. Refrigerant flow through the compressor with 100% suction cooled motor.
3. Large suction side free volume and oil sump to provide liquid handling capability.
4. Compressor crankcase heaters to provide extra liquid migration protection.
5. Annular discharge check valve and reverse vent assembly to provide low-pressure drop, silent shutdown and reverse rotation protection.
6. Initial oil charge.
7. Oil level sight glass.
8. Vibration isolator mounts for compressors.
9. Brazed-type connections for fully hermetic refrigerant circuits.
10. Compressor Motor overloads capable of monitoring compressor motor current. Provides extra protection against compressor reverse rotation, phase-loss and phase-imbalance.

2.03. REFRIGERANT CIRCUIT COMPONENTS

Each refrigerant circuit shall include: a discharge service ball type isolation valve, high side pressure relief, liquid line shutoff valve with charging port, low side pressure relief device, filter-drier, solenoid valve, sight glass with moisture indicator, thermostatic expansion valves, and flexible, closed-cell foam insulated suction line and suction pressure transducer.

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2.04. HEAT EXCHANGERS

A. Evaporator:

1. Evaporator shall be brazed-plate stainless steel construction capable of refrigerant working pressure of 650 psig (3103 kPa) and liquid side pressure of 150 psig (1034 kPa) [Option for 300 psig (2068 kPa) available].

2. Brazed plate heat exchangers shall be UL listed.

3. Exterior surfaces shall be covered with 3.4" (19mm), flexible, closed cell insulation, thermal conductivity of 0.26k ([BTU/HR-Ft² - °F]/in.) maximum.

4. Water nozzles shall be provided with grooves for field provided ANSI/AWWA C-606 mechanical couplings.

5. Evaporator shall include vent and drain fittings and thermostatically controlled heaters to protect to -20°F (-29°C) ambient in off-cycle.

6. A 20-mesh, serviceable wye-strainer and mechanical couplings shall be provided for field installation on evaporator inlet prior to startup.

7. Evaporator shall be provided with piping extension kit and mechanical couplings to extend liquid connection from evaporator to edge of unit. Thermal dispersion type flow switch shall be factory installed in the evaporator outlet pipe extension and wired to the unit control panel. Insulation and heat trace on piping shall be responsibility of installing contractor. Extension kit nozzle connections shall be ANSI/AWWA C-606 (grooved).

B. Air-cooled Condenser:

1. Coils: Condenser coils shall be constructed of a single material to avoid galvanic corrosion due to dissimilar metals. Coils and headers are brazed as one piece. Integral sub cooling is included. Coils shall be designed for a design working pressure of 650 PSIG (45 bar). Condenser coil shall be washable with potable water under 100 psi (7 bar) pressure.

2. Low Sound Fans: Shall be dynamically and statically balanced, direct drive, corrosion resistant glass fiber reinforced composite blades molded into a low noise, full-airfoil cross section, providing vertical air discharge and low sound. Each fan shall be provided in an individual compartment to prevent crossflow during fan cycling. Guards of heavy gauge, PVC (poly- vinylchloride) coated or galvanized steel shall be factory installed.

3. Fan Motors: High efficiency, direct drive, 6 pole, 3 phase, insulation class “F”, current protected, Totally Enclosed Air-Over (TEAO) , rigid mounted, with double sealed, permanently lubricated, ball bearings.

4. Low Sound Fans with Variable Speed Drives. All fans shall be powered by VSDs. Fans shall provide vertical air discharge from extended orifices. Fans shall be composed of corrosion resistant aluminum hub and glass-fiber-reinforced polypropylene composite blades molded into a low-noise airfoil section. Fan impeller shall be dynamically balanced for vibration-free operation. Fan guards of heavy gauge, PVC (polyvinyl chloride) coated or galvanized steel.

2.05. CONTROLS

A. General: Automatic start, stop, operating, and protection sequences across the range of scheduled conditions and transients.

B. Power/Control Enclosure: Rain and dust tight NEMA 3R powder painted steel cabinet with hinged, latched, and gasket sealed door.

C. Microprocessor Control Center:

1. Automatic control of compressor start/stop, anti-coincidence and anti-recycle timers, automatic pumpdown at system shutdown, condenser fans, evaporator pump, evaporator heater, unit alarm contacts, and chiller operation from 0°F to 125°F (-18°C to 52°C) ambient. Automatic reset to normal chiller operation after power failure.

2. Software stored in non-volatile memory, with programmed setpoints retained in lithium battery backed real-time-clock (RTC) memory for minimum 5 years.

3. Forty character liquid crystal display, descriptions in English (or Spanish, French, Italian, or German), numeric data in English (or Metric) units. Sealed keypad with sections for Setpoints, Display/Print, Entry, Unit Options & clock, and On/Off Switch.

4. Programmable Setpoints (within Manufacturer limits): display language; chilled liquid temperature setpoint and range, remote reset temperature range, daily schedule/holiday for start/stop, manual override for servicing, low and high ambient cutouts, low liquid temperature cutout, low suction pressure cutout, high discharge pressure cutout, anti-recycle timer (compressor start cycle time), and anti-coincident timer (delay compressor starts).

5. Display Data: Return and leaving liquid temperatures, low leaving liquid temperature cutout setting, low ambient temperature cutout setting, outdoor air temperature, English or metric data, suction pressure cutout setting, each system suction pressure, liquid temperature reset via a 4-20milliamp or 0-10 VDC input, anti-recycle timer status for each compressor, anti-coincident system start timer condition, compressor run status, no cooling load condition, day, date and time, daily start/stop times, holiday status, automatic or manual system lead/lag control, lead system definition, compressor starts/operating hours (each), status of hot gas valves, evaporator heater and fan operation, run permissive status, number of compressors running, liquid solenoid valve status, load & unload timer status, water pump status.

6. System Safeties: Shall cause individual compressor systems to perform auto shut down; manual reset required after the third trip in 90 minutes. System Safeties include: high discharge pressure, low suction pressure, high pressure switch, and motor protector. Compressor motor protector shall protect against damage due to high input current or thermal overload of windings.

7. Unit Safeties: Shall be automatic reset and cause compressors to shut down if low ambient, low leaving chilled liquid temperature, under voltage, and flow switch operation.

8. Alarm Contacts: Low ambient, low leaving chilled liquid temperature, low voltage, low battery, and (per compressor circuit): high discharge pressure, and low suction pressure.

9. BAS Communications: YORKTalk 2, BACnet MS/TP, Modbus and N2 communication capabilities are standard.

D. Manufacturer shall provide any controls not listed above, necessary for automatic chiller operation. Mechanical Contractor shall provide field control wiring necessary to interface sensors to the chiller control system.

2.06. POWER CONNECTION AND DISTRIBUTION

A. Power Panels:

1. NEMA 3R/12 rain/dust tight, powder painted steel cabinets with hinged, latched, and gasket sealed outer doors. Provide main power connection(s), control power connections, compressor and fan motor start contactors, current overloads, and factory wiring.

2. Power supply shall enter unit at a single location, be 3 phase of scheduled voltage, and connect to individual terminal blocks per compressor. Separate disconnecting means and/or external branch circuit protection (by Contractor) required per applicable local or national codes.

B. Compressor, control and fan motor power wiring shall be located in an enclosed panel or routed through liquid tight conduit.

2.07. ACCESSORIES AND OPTIONS

Some accessories and options supersede standard product features. Your Johnson Controls representative will be pleased to provide assistance.

A. Microprocessor controlled, Factory installed Across-the-Line type compressor motor starters as standard.

B. Outdoor Ambient Temperature Control

C. Power Supply Connections:

D. Control Power Transformer: Converts unit power voltage to 120-1-60 (500 VA capacity). Factory-mounting includes primary and secondary wiring between the transformer and the control panel.

E. Protective Chiller Panels (Factory or Field Mounted)

1. End Louver (hail guard): Louvered steel panels on external condenser coil faces located at the ends of the chiller.

F. Thermal Dispersion Flow Switch (Factory installed and wired in piping extension kit): Normally open, 30bar pressure rating, stainless steel 316L construction, IP67, -4°F to 158°F ambient rating.

G. Low Temperature Process Glycol: Leaving chilled liquid setpoint range 10°F to 50°F (-12°C to 10°C)

H. Sound Reduction (Factory installed):

1. Compressor Acoustic Sound Blankets

3. EXECUTION

3.01. INSTALLATION

A. General: Rig and Install in full accordance with Manufacturer's requirements, Project drawings, and Contract documents.

B. Location: Locate chiller as indicated on drawings, including cleaning and service maintenance clearance per Manufacturer instructions. Adjust and level chiller on support structure.

C. Components: Installing Contractor shall provide and install all auxiliary devices and accessories for fully operational chiller.

D. Electrical: Coordinate electrical requirements and connections for all power feeds with Electrical Contractor (Division 16).

E. Controls: Coordinate all control requirements and connections with Controls Contractor.

F. Finish: Installing Contractor shall paint damaged and abraded factory finish with touch-up paint matching factory finish.

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Design Conditions Datasheet

Unit Tag	Qty	Model No	Net Cooling Capacity (ton.R)	Nominal Voltage	Refrigerant Type
ACC-3	1	YLAA0175HE46XFBBCTX	169.7	460-3-60.0	R410A

PIN:								
YLAA0175HE	46XFBBCTXH	XXBLXCXX45	SEXXXXHXXX	YAXGXXXDBX	XVXXJ1XXXX			
....5...10	....5...20	....5...30	....5...40	....5...50	....5...60	....5...70	....5...80	....5...90

Evaporator Data			Evaporator Data (Cont.)		Performance Data	
EWT (°F)	57.05		Fluid Volume (USGAL)	14.27	EER (Btu/W·h)	9.300
LWT (°F)	45.00		Min. Flow Rate (USGPM)	199.7	NPLV.IP (Btu/W·h)	16.76
Design Flow Rate (USGPM)	375.0		Max. Flow Rate (USGPM)	649.9		
Evap. Press. Drop (ft H2O)	16.4					
Fluid	Propylene Glycol (%)	44	**Condenser Data**		**Physical Data**	
Strainer Press. Drop (ft H2O)	0.000		Ambient Temp. Design (°F)	95.0	Rigging Wt. (lb)	8051
Ext. Kit Press. Drop (ft H2O)	0.000		Altitude (ft)	3570	Operating Wt. (lb)	8170
Total Press. Drop (ft H2O)	16.4		Compressor Type	Scroll - Hermetic	Refrigerant Charge (lb)	185.8
Fouling Factor (h.ft².F/Btu)	0.000100					

Electrical Data				
Circuit	1	2	3	4
Compressor RLA	53 / 53 / 53	53 / 53 / 53		
Fan QTY/FLA (each)	5 / 4	5 / 4		
High LRA Current	290 / 290 / 290	290 / 290 / 290		

Single Point				
Min. Circuit Ampacity	376			
Recommended Fuse/CB Rating	400			
Max. Inverse Time CB Rating	400			
Max. Dual Element Fuse Size (A)	400		**Operating Condition Electrical Data**	
Unit Short Circuit Withstand (STD)	65 [kA]		Compressor kW	202.1
Wires Per Phase	2 + 1		Total Fan kW	16.80
Wire Range (Lug Size)	#3/0 AWG - 250 kcmil + 250 - 500 kcmil		Total kW	218.9
Starter Type	Across The Line			

Notes:

Outside the scope of AHRI Air-Cooled Water-Chilling Packages Using Vapor Compression Cycle Certification Program, but is rated in accordance with AHRI Standard 550/590 (I-P) and AHRI Standard 551/591 (SI). Auxiliary components included in total KW - Oil heaters, Chiller controls. Auxiliary power is already included in the compressor and fan power

Compliant with the requirements of the LEED Energy and Atmosphere Enhanced Refrigerant Management Credit (EAc4).

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Design Conditions Datasheet

Part Load Rating Data				
Stage	**Ambient (°F)**	**Capacity (ton.R)**	**Total kW**	**Unit Efficiency**
1	95.0	169.7	218.9	9.300
2	88.0	149.9	162.0	11.10
3	80.8	129.6	115.7	13.45
4	71.4	102.8	76.42	16.15
5	60.9	73.25	43.41	20.25
6	55.0	36.11	20.40	21.24

Sound Power Levels (In Accordance with AHRI 370)										
Stage	**Ambient (°F)**	**63 Hz (dB)**	**125 Hz (dB)**	**250 Hz (dB)**	**500 Hz (dB)**	**1 kHz (dB)**	**2 kHz (dB)**	**4 kHz (dB)**	**8 kHz (dB)**	**LWA**
1	95.0	100	99	95	95	91	87	84	82	97
2	88.0	99	97	94	94	90	86	83	80	95
3	80.8	96	95	91	91	88	84	80	78	93
4	71.4	94	93	89	89	85	81	78	76	91
5	60.9	89	87	84	84	81	77	73	72	86
6	55.0	86	84	81	81	78	74	70	69	83

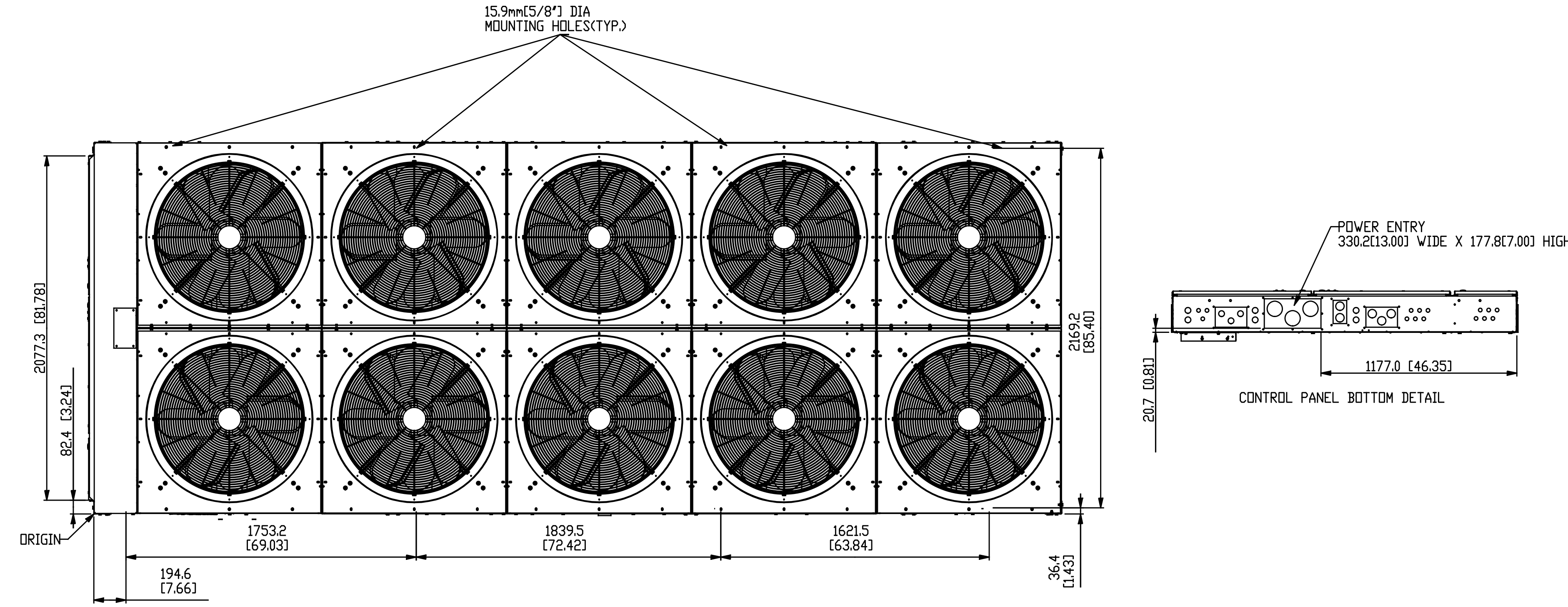
Note: Unit is equipped with Acoustic Sound Blanket and Low Sound Fans with VSD Control.

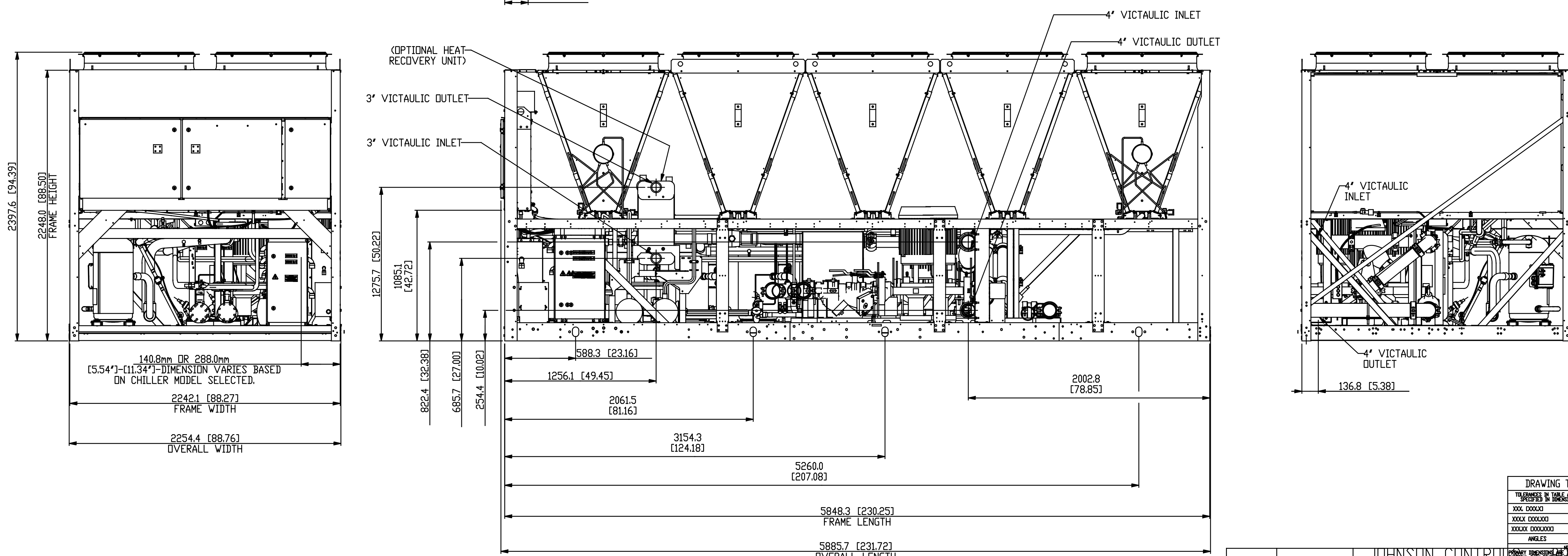
Performance at AHRI Conditions					
Evaporator Data		**Condenser Data**		**Performance Data**	
EWT (°F)	54.00	Ambient Temp. (°F)	95.0	EER (Btu/W·h)	9.788
LWT (°F)	44.00	Altitude (ft)	0	IPLV.IP (Btu/W·h)	16.90
Flow Rate (USGPM)	417.9			Net Cooling Capacity (ton.R)	175.1
Pressure Drop (ft H2O)	16.3				
Fluid	Water				
Fouling Factor (h.ft².F/Btu)	0.000100				
Fluid Volume (USGAL)	14.27				

Note: Unit rated at design condition capacity.

NOTE:

1. PLACEMENT ON A LEVEL SURFACE FREE OF OBSTRUCTIONS (INCLUDING SNOW, FOR WINTER OPERATION) OR AIR-CIRCULATION ENSURES RATE PERFORMANCE, RELIABLE OPERATION AND EASE OF MAINTENANCE. SITE RESTRICTIONS MAY COMPROMISED MINIMUM CLEARANCES INDICATED BELOW, RESULTING IN UNPREDICTABLE AIR FLOW PATTERNS AND POSSIBLE DIMINISHED PERFORMANCE. JOHNSON CONTROLS UNIT CONTROLS WILL OPTIMIZE OPERATION WITHOUT NUISANCE HIGH PRESSURE SAFETY CUTOUT. HOWEVER, THE SYSTEM DESIGNER MUST CONSIDER POTENTIAL PERFORMANCE DEGRADATION.
   1.1. RECOMMENDED MINIMUM CLEARANCES:
      1.1.1. SIDE TO WALL - 1828.8mm [72.00]
      1.1.2. REAR TO WALL - 1828.8mm [72.00]
      1.1.3. CONTROL PANEL TO WALL - 1219.2mm [48.00]
      1.1.4. TOP - NO OBSTRUCTIONS ALLOWED.
      1.1.5. DISTANCE BETWEEN ADJACENT UNITS - 3048mm [120.00]
      1.1.6. NO MORE THAT ONE ADJACENT WALL MAY BE HIGHER THAN UNIT.
2. WEIGHT AND CENTRE OF GRAVITY- REF TO AVM REPORT.
3. INSTALLING CONTRACTOR MUST INCLUDE VENT AND DRAIN ACCOMMODATIONS IN CHILLED WATER PIPING NEAR EVAPORATOR.
4. NUMBER OF COMPRESSORS MAY VARY FROM DRAWING.
   4.1. REFER TO YORKWORKS REPORTS.
5. FOR MONTERREY, MEXICO AND SAN ANTONIO, TEXAS BUILDS ONLY.





THIS DRAWING PERTAINS TO THE FOLLOWING MODELS:		
YLAA 0156 HE	YLAA 0170 SE	YLAA 0175 HE

REVISION

REV.	DATE	EC. NO.	DR.	CHK.	ENG.
B	22-AUG-2016	DX16-0278	AJF	AJF	
CHANGED "INLET" AND "OUTLET" NOTES AT F12.					
ADDED "HEAT RECOVERY UNIT" NOTE AT G12.					

CONTINUED

DRAWING TOLERANCES

TOLERANCES IN TABLE APPLY UNLESS OTHERWISE SPECIFIED IN DIMENSIONS ON THE DRAWING

XXX. DDDXX	±1.5mm [.059]
XXX.X DDDX.XX	±.75mm [.030]
XXX.XX DDDX.XXX	±.35mm [.014]
ANGLES	±1° 0'

THIRD ANGLE

JOHNSON CONTROLS BUILDING EFFICIENCY
507 EAST MICHIGAN STREET, MILWAUKEE, WI, 53202 USA

DO NOT SCALE

YLAA 10-FAN 50 & 60HZ WITH OPTIONAL HEAT RECOVERY

MATERIAL	N/A	
ENG. STD.	N/A	
PART NO.		
CUT SIZE	N/A	
DRAWN	M.LUPTON	06-DEC-2013
MODELER	M.LUPTON	06-DEC-2013
CHKD	A.SAYCH	06-DEC-2013
ENG		

A1 | CAGE NUMBER 66935 | DRAWING NUMBER 035-24059-012 | REVISION B | VERSION 3

SCALE: 1.000 | MASS (kg): 0.000 | ORIG. NO.: | SHEET 1 OF 1 | Released

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Internal Pricing Report

Unit Tag	Qty	Model No	Net Cooling Capacity (ton.R)	Nominal Voltage	Refrigerant Type
ACC-3	1	YLAA0175HE46XFBBCTX	169.7	460-3-60.0	R410A

Line #	Equipment Details	Qty.	MLP	BTP (USD)	Selling Price (USD)	Branch Profit (USD)
1	**Base Unit (2959)**					
	YLAA0175HE	1				
	R-410A Refrigerant (Fully Charged)	1				
	Voltage Code - (460/3/60)	1				
	SP CB w/ L Handle and 65 kA SCWR	1				
	Control Transformer	1				
	High Ambient Kit Standard	1				
	BACnet/Modbus/N2 (Native)	1				
	English	1				
	cUL/cETL Listing	1				
	Service Isolation Valves	1				
	Electronic Expansion Valves	1				
	Extension Kit	1				
	ASME Pressure Vessel & Associated Codes	1				
	Thermal Dispersion Flow Switch for Glycol Applications	1				
	All Aluminum Microchannel Coils	1				
	No Heat Recovery	1				
	V-Guard Panel, plus Hail Guard (Louvered Panel at Unit Rear)	1				
	Acoustic Sound Blanket	1				
	Low Sound Fans with VSD Control	1				
	No Pump Kit	1				
	Subtotal					
2	**Warranty**					
	Warranty (Months are from date of shipment/Years are from date of start up, whichever expires first.)					
	Unit Parts Warranty: 18 months (1 Year)					
	Compressor Warranty: 66 months (5 Years) (Parts Only)					
	Refrigerant Warranty: 18 months (1 Year)					
	Subtotal					
3	**Connectivity - BACnet**					
	Installation Year: 2018					
	Commissioning Labor					
	Gateway for E-Link Non-OptiView Chiller Panel					
	Extended MLP Subtotal					
4	**Start up / PCAT**					
	Branch: Great Fall MT Service - 0329					
	Installation Year: 2018					
	Number of days: 1					
	Tier: 2					
	Subtotal					
	Total Price:					

Accessories and Options

All options are factory installed unless otherwise noted.

POWER OPTIONS:

Unit Power Connections – Single-point terminal block connection(s) are provided as standard. The following power connections are available as options. (See electrical data for specific voltage and options availability.)

Single-Point Supply Terminal Block – Includes enclosure, terminal-block and interconnecting wiring to the compressors. Separate external protection must be supplied, by others, in the incoming compressor-power wiring. (Do not include this option if either the Single-Point Non-Fused Disconnect Switch or Single-Point Circuit Breaker options have been included.)

Single-Point Non-Fused Disconnect Switch – Unit-mounted disconnect switch(es) with external, lockable handle (in compliance with Article 440-14 of N.E.C.)can be supplied to isolate the unit power voltage for servicing. Separate external fusing must be supplied, by others in the power wiring, which must comply with the National Electrical Code and/or local codes.

With 65kA SCCR Protection

Single-Point Circuit Breaker – A unit mounted circuit breaker with external, lockable handle (in compliance with NEC Article 440-14), can be supplied to isolate the power voltage for servicing. (This option includes the Single-Point Power connection.)

Multiple Point Supply With Individual System Circuit Breakers – Two unit-mounted circuit breakers, with external lockable handles (in compliance with NEC Article 440-14), can be supplied to isolate the power voltage for servicing. **(SQ only)**

Control Transformer – Converts unit power voltage to 115-1-60 (0.5 or 1.0 kVA capacity). Factory mounting includes primary and secondary wiring between the transformer and the control panel.

Power Factor Correction Capacitors – Will correct unit compressor power factors to a 0.90-0.95.

CONTROL OPTIONS:

High Ambient Kit – Allows units to operate when the ambient temperature is above 115°F (46°C). Includes sun shield panels and discharge pressure transducers.

Low Ambient Kit – Standard units will operate to 30°F (-1°C). This accessory includes all necessary components to permit chiller operation to 0°F (-18°C). (This option includes the discharge pressure transducer /readout capability option.) For proper head pressure control in applications below 30°F (-1°C) where wind gusts may exceed 5 mph, it is recommended that optional condenser louvered enclosure panels also be included.

Language LCD and Keypad Display – Spanish, French, German, and Italian unit LCD controls and keypad display available. Standard language is English.

Accessories and Options (Cont'd)

COMPRESSOR, PIPING, EVAPORATOR OPTIONS:

Low Temperature Glycol – Replaces standard Thermostatic Expansion Valves with Electronic Expansion Valves to achieve leaving glycol temperatures as low as 10°F (-12°C). Required for any leaving liquid temperature below 30°F (-1°C). Electronic Expansion Valves permit operation at both low temperatures and comfort cooling applications without a capacity loss or derate at either condition.

Chicago Code Relief Valves – Unit will be provided with relief valves to meet Chicago code requirements.

Service Suction Isolation Valve – Service suction discharge (ball-type) isolation valves are added to unit per system (discharge service ball-type isolation valve is standard on each circuit).

Hot Gas By-Pass – Permits continuous, stable operation at capacities below the minimum step of compressor unloading to as low as 5% capacity (depending on both the unit and operating conditions) by introducing an artificial load on the evaporator. Hot gas by-pass is installed on only refrigerant system #1.

Thermal Dispersion Flow Switch – A thermal dispersion type flow switch provides accurate, low maintenance flow proving and is included standard. It is factory wired and installed in the extension pipe between evaporator outlet and edge of chiller. The extension pipe is secured to the chiller frame for shipping to avoid risk of damage to evaporator and is easily attached to the evaporator at startup using the supplied ANSI/AWWA C-606 connector. The flow switch can be deleted if alternate or existing flow switch is field supplied.

Evaporator Nozzle Extension Kit – Pipe and ANSI/AWWA C-606 fittings to extend the evaporator connections to the outside of the chiller. Includes the Thermal Dispersion Flow Switch. Provided as standard on all chillers but can be deleted if alternate or existing piping and flow switch is field supplied. The extension pipe is secured to the chiller frame for shipping to avoid risk of damage to evaporator and is easily attached to the evaporator at startup using the supplied ANSI/AWWA C-606 connector. A support bracket for the extension kit or field piping is standard on all chillers. Extension kit insulation and heat trace to be field provided if required.

Heat Recovery Condenser – A partially condensing refrigerant to liquid condenser recovers heat off both refrigerant circuits and rejects into a single liquid circuit. Factory installed between the compressor discharge and the condenser (air) coils to capture the maximum amount of heat. Capable of recovering up to 85% total heat of rejection (cooling load plus work input); temperatures as high as 140°F (60°C) are possible.

Hydro-Kit – Factory installed Hydro-Kit suitable for water glycol systems with up to 35% glycol at leaving temperatures down to 20°F (-6.7°C). The hydro-kit option is available in a single or dual configuration (dual as standby duty only), with totally enclosed permanently lubricated pump motors.

The hydro-kit comes standard with a variable speed drive, a balancing valve, discharge check valve, discharge shutoff valve, thermal dispersion flow switch, pressure ports, inlet wye-strainer, bleed and drain valves and frost protection.

Service shut off valves, additional pressure ports and taps for the expansion tank are optional within the hydro-kit option. Expansion tanks are available by request.

Accessories and Options (Cont'd)

CONDENSER AND CABINET OPTIONS:

Condenser coil protection against corrosive environments is available by choosing any of the following options. For additional application recommendations, refer to FORM 150.12-ES1.

Environment Guard Premium – Microchannel condenser coils coated with an electro-deposited and baked flexible epoxy coating that is finished with a polyurethane UV resistant top-coat.

Environment Guard Basic – Microchannel condenser coils treated with immersion bath-applied chemical treatment.

Microchannel condenser shall be provided with a 5-year warranty against corrosion damage.

Enclosure Panels (Unit) – Tamperproof enclosure panels prevent unauthorized access to units. Enclosure panels can provide an aesthetically pleasing alternative to expensive fencing. Additionally, for proper head pressure control, Johnson Controls recommends the use of Condenser Louvered Panels for winter applications where wind gusts may exceed five miles per hour (8 kph). The following types of enclosure panels are available:

Wire Panels (Full Unit) – Consists of welded wire-mesh guards mounted on the exterior of the unit. Prevents unauthorized access, yet provides free air flow.

Wire/Louvered Panels – Consists of welded wire-mesh panels on the bottom part of unit and louvered panels on the condenser section of the unit.

Louvered Panels (Condenser Coil Only) – Louvered panels are mounted on the sides and ends of the condenser coils for protection.

Louvered Panels (Full Unit) – Louvered panels surround the front, back, and sides of the unit. They prevent unauthorized access and visually screen unit components. Unrestricted

Accessories and Options (Cont'd)

air flow is permitted through generously sized louvered openings. This option is applicable for any outdoor design ambient temperature up to 115°F (46°).

Coil End Hail Guard – Louvered panel attached to exposed coil end.

SOUND ATTENUATION:

One or both of the following sound attenuation options are recommended for residential or other similar sound sensitive locations.

Compressor Acoustic Sound Blanket – Each compressor is individually enclosed by an acoustic sound blanket. The sound blankets are made with one layer of acoustical absorbent textile fiber of 5/8" (15mm) thickness; one layer of heavy duty anti-vibration material thickness of 1/8" (3mm). Both are closed by two sheets of welded PVC, reinforced for temperature and UV resistance.

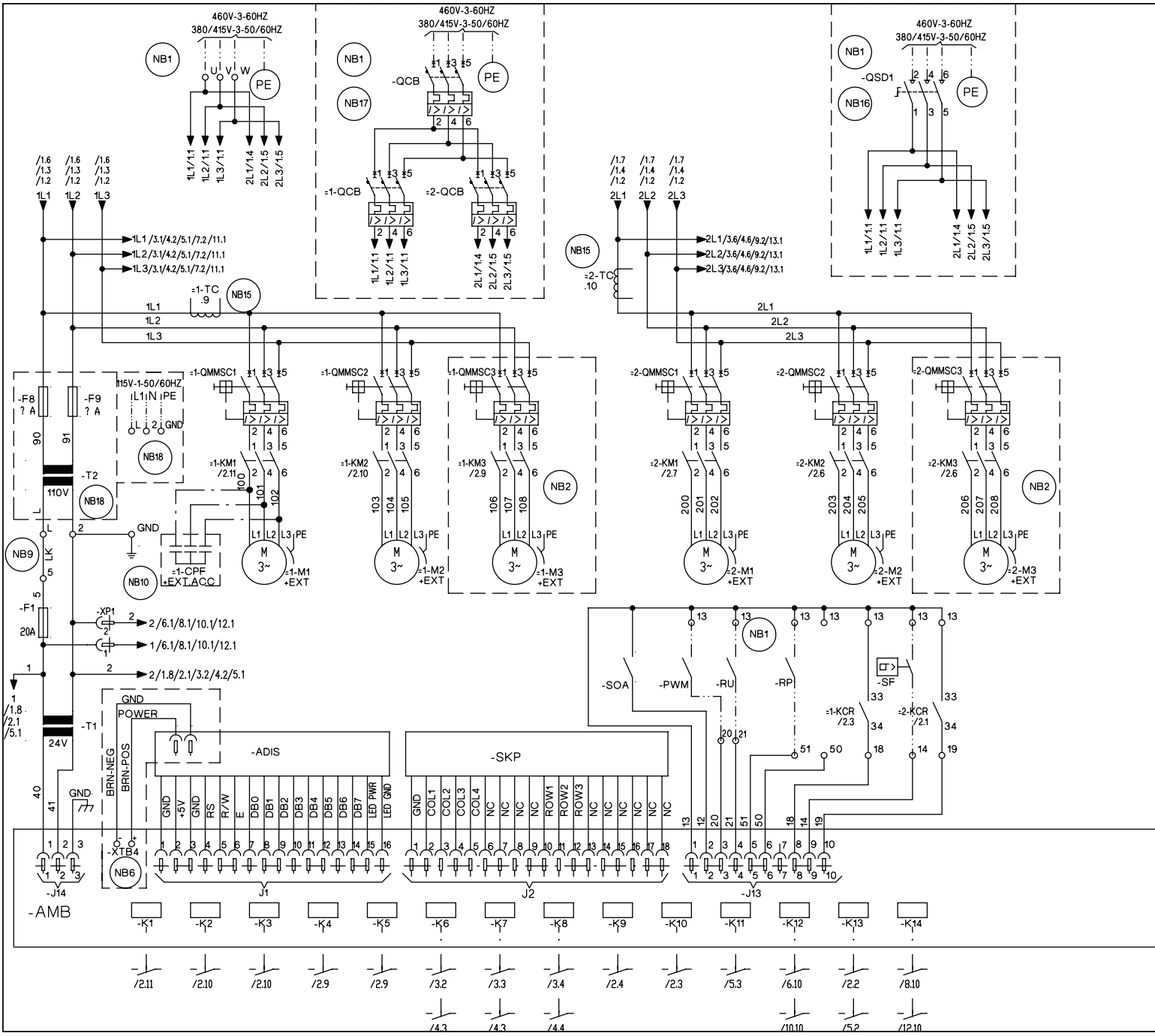
Ultra Quiet Fans – Lower RPM, 8-pole fan motors are used with steeper-pitch fans.

Variable Speed Fans - Controls all the fans on the circuit. There is a drive installed for each circuit. Available on both low sound and ultra quiet fans.

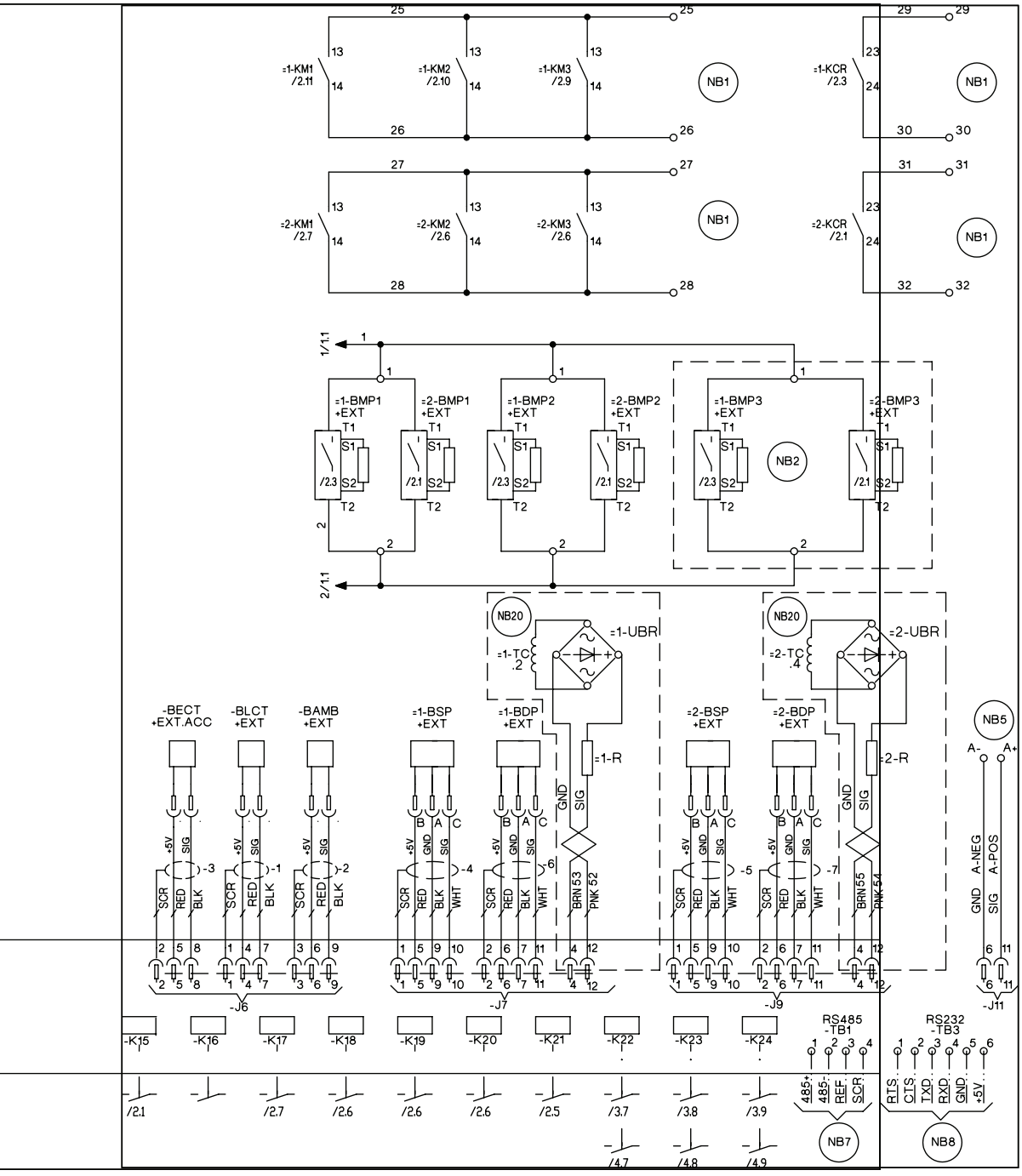
VIBRATION ISOLATION

Vibration Isolators – Level adjusting, spring type 1 inch (25.4mm), 2 inch (50.8 mm) deflection, or neoprene isolators for mounting under unit base rails. (**Field installed**)

Wiring Diagram



Wiring Diagram (Cont'd)



Wiring Diagram (Cont'd)

Designation	DESCRIPTION
ACC	ACCESSORY
- ADIS	DISPLAY BOARD
- AMB	MICRO BOARD

- BAMB	AMBIENT
- BDP	DISCHARGE PRESSURE
- BECT	ENTERING CHILLED TEMP
- BLCT	LEAVING CHILLED TEMPERATURE
NOT FITTED ON REMOTE EVAP UNITS	

-BMP	MOTOR PROTECTOR COMP
- BSP	SUCTION PRESSURE

-CPF	CAPACITOR POWER FACTOR

- ECH	CRANKCASE HEATER
-EEH	EVAPORATOR HEATER
-EPH	PUMP HEATER
-EXT	EXTERNAL TO CONTROL PANEL

- F	FUSE
- FHP	HIGH PRESSURE CUTOUT
-FSI	FAN SPEED INHIBIT TWO SPEED FAN OPTION ONLY

GND	GROUND
G/Y	GREEN / YELLOW

J	PLUG BOARD CONNECTOR

-K	CIRCUIT BOARD RELAY
-KF	FAN CONTACTOR LINE
-KFH	FAN CONTACTOR HIGH SPEED (INCLUDING COIL SUPPRESSOR)
-KFL	FAN CONTACTOR LOW SPEED (INCLUDING COIL SUPPRESSOR)
-KFOL	FAN OVERLOAD
-KFS	RELAY FAN SPEED
-KM	COMPRESSOR CONTACTOR (INCLUDING COIL SUPPRESSOR)
-KCR	CONTROL RELAY
-KP	PUMP CONTACTOR PART (INCLUDING COIL SUPPRESSOR)

- M	COMPRESSOR MOTOR
-MF	MOTOR FAN
-MP	MOTOR PUMP

NU	NOT USED

PE	PROTECTIVE EARTH
PWM	PULSE WIDTH MODULATION TEMP RESET or REMOTE UNLOAD 2nd STEP

Designation	DESCRIPTION
-QCB	CIRCUIT BREAKER
-QMMSC	MANUAL MOTOR STARTER COMP
-QMMSP	MANUAL MOTOR STARTER PUMP
-QSD	SWITCH DISCONNECT

R	RESISTOR
RED	RED
RP	RUN PERMISSIVE
RU	REMOTE UNLOAD Ist STEP

CR	SCREEN
- SF	FLOW SWITCH
- SKP	KEYPAD
- SOA	SWITCH OFF AUTO

- T	TRANSFORMER
-TC	TRANSFORMER CURRENT

-UBR	BRIGDE RECFIFIER

WHT	WHITE

- XTBC	TERMINAL BLOCK CUSTOMER
- XTBF	TERMINAL BLOCK FACTORY

-YHGSV	HOT GAS SOLENOID VALVE (INCLUDING COIL SUPPRESSOR)
- YLLSV	LIQUID LINE SOLENOID VALVE (INCLUDING COIL SUPPRESSOR)
FIELD MOUNTED AND WIRED ON REMOTE EVAP UNITS	

- ZCPR	COMPRESSOR

NB	NOTE WELL {SEE NOTE}

	WIRING AND ITEMS SHOWN THUS ARE STANDARD YORK ACCESSORIES

	WIRING AND ITEMS SHOWN THUS ARE NOT SUPPLIED BY JOHNSON CONTROLS

	ITEMS THUS ENCLOSED FORM A COMPONENTS OR SETS OFCOMPONENTS

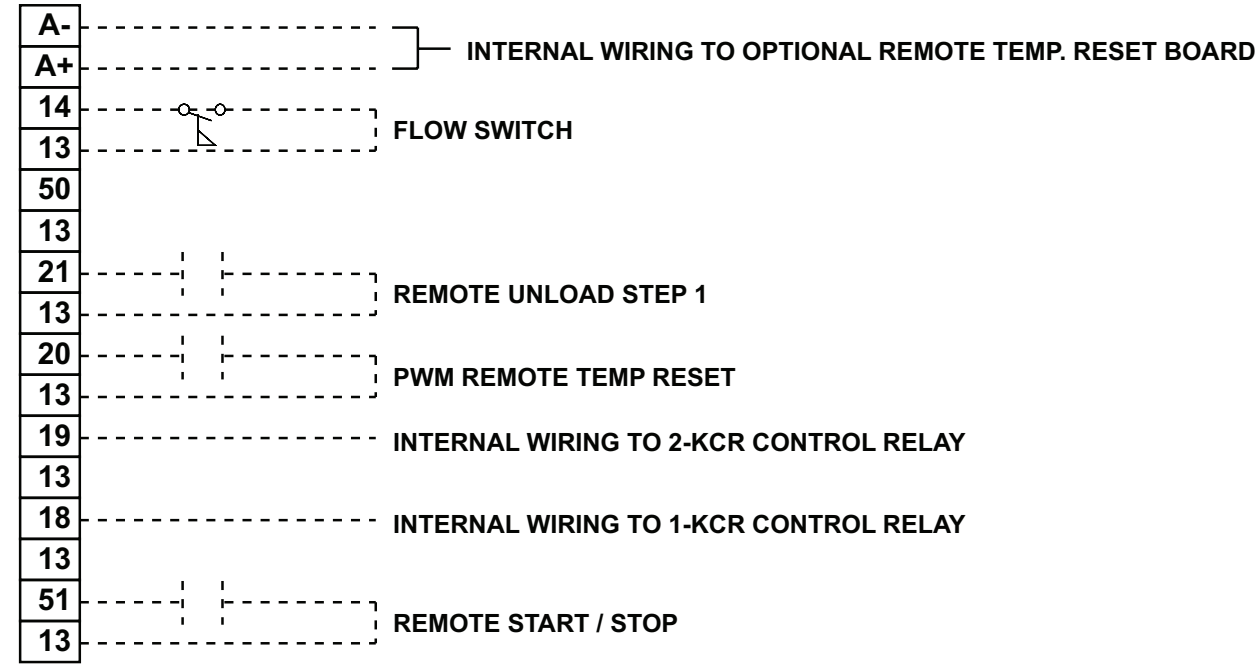
Wiring Diagram (Cont'd)

A. This drawing is based on IEC symbols.
B. Field wiring to be in accordance with the relevant electrical code as well as all other applicable codes and specifications
C. All sources of supply shown on this diagram to be taken from one main isolator, not shown or supplied by the chiller manufacturer .
D. Green and yellow wire is used for earth, multi-coloured cable used for low voltage. Red wire used for AC control, blue wire for neutral, black wire for AC and DC power. Orange wire should be used for interlock control wiring supplied by external source.
E. Legend designation depicts component abbreviations. Number prefix located, if applicable, on schematic circuit, refers to system thereon, e.g.= 1-FHP2 refers to high pressure cutout no 2 on system no 1.
F. All wiring to control section voltage free contacts requires a supply provided by the customer maximum voltage 240 volts. The customer must t ake particular care when deriving the supplies for the voltage free terminals with regard to a common point of isolation. Thus, these circuits when used must be fed via the common point of isolation the voltage to these ci rcuits is removed when the common point of isolation to the unit is opened. This common point of isolation is not supplied. The voltage free contacts are rated at 100VA. All inductive devices {relays} switch by the voltage free contacts must have their coil suppressed using standard r/c suppressors.
G. Customer voltage free contacts connected to terminal 13 must be rated at 30v 5ma
H. No controls {relays etc.} Should be mounted in any section of the control panel. Additionally, control wiring not connected to the control panel should not be run through the panel. If these precautions are not followed, electrical noise could cause malfunctions or damage to the unit and its controls.

1. Refer to instalation commisioning operation and maintenance manual for customer connections and customer connection notes, non compliance to these instructions will invalidate unit warranty.
2. Wiring and components for compressor 3 only fitted when unit has 3 compressors on the system. 1-BMP3 is replaced by a link across terminals 134 & 135. 2-BMP3 is replaced by a link across terminals 234 & 235.
3. FHP2 is only fitted on 0089 and above. When not fitted 1-FHP2 is replaced by a link across terminals 132 & 139. 2-FHP2 is replaced by a link across terminals 232 & 239
4. Fitted on units with hot gas bypass option.
5. EMS option is wired as shown
6. This wiring must be used for old display 031-0110-000
7. Network connection point
8. Printer port
9. Remote emergency stop can be wired between terminal l and 5 after removing link
10. Power factor correction accessory. Power factor correction fitted to each compressor contactor
11. Not fitted on compressors with internal motor protection. For sytem 1 terminals 132 & 133, 133 & 134 And 134 & 135 are linked. For sytem 2 terminals 232 & 233, 233 & 234 and 234 & 235 are linked.
12. Only fitted on systems with 3 or 4 fans
13. Only fitted on systems with 4 fans
14. Only fitted on systems with 5 fans
15. Only fitted on systems with 6 fans
16. Input switch disconnect or circuit breaker option replaces input terminal block
17. Input switch disconnect & system circuit breaker option replaces input terminal block
18. 115V control circiut requires a 115V supply unl ess control circuit transformer-T2 & -F3 are fitted
19. For optional hydro kit. Heater -EPH is fitted and wired as shown. On sinlge pump -KP1, -QMMSP1 and -MP1 are fitted & wired as shown. On two pump hydro kits -KP2, -QMMSP2 & -MP2 are also fitted and wired as shown.
20. Current measurement option wired as shown
21. Only fitted on systems with single speed fans
22. Only fitted on systems with two speed fans
23. Optional compressor manual motors starters.
24. See sheet 3 of connection diagram for power input options

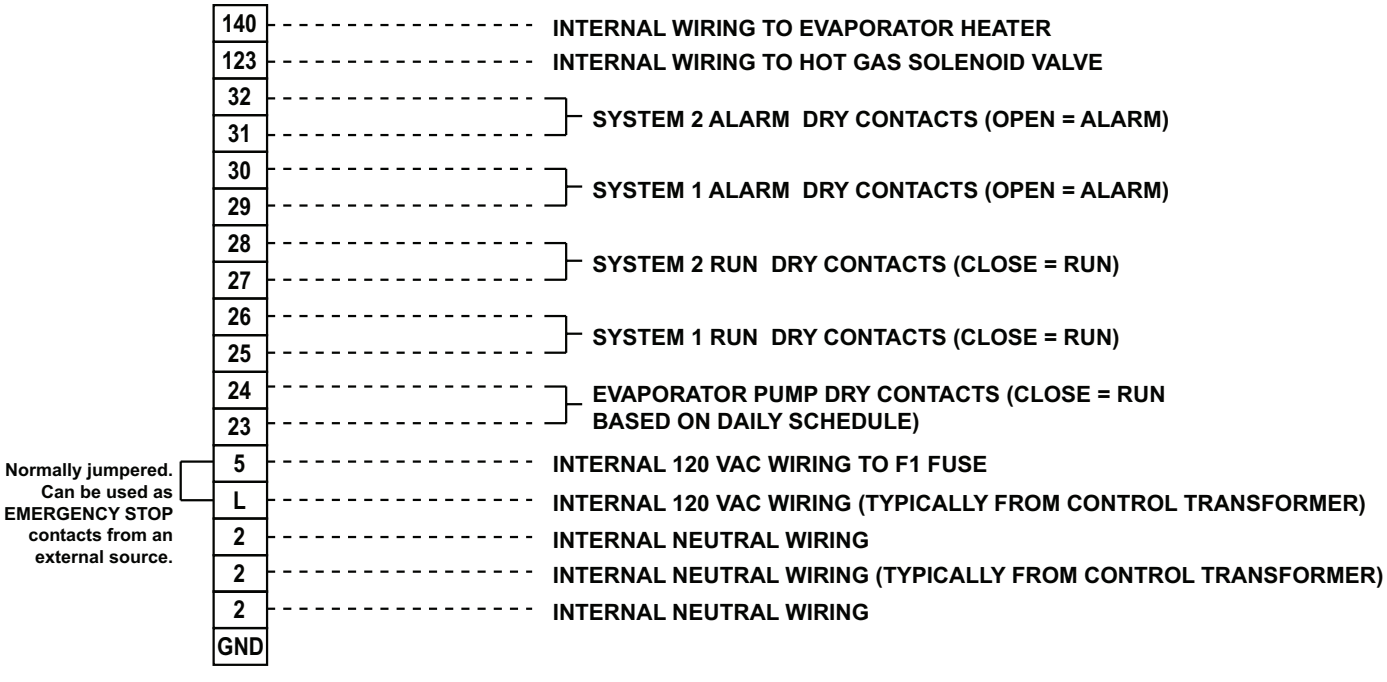
User Control Wiring

USER CONTROL WIRING INPUTS



XTBC1

USER CONTROL WIRING OUTPUTS



XTBC2

Tag: ACC-3 Specification 236423

18 months (1 Year) Parts & Labor Warranty
FOR THE ENTIRE UNIT
YORK INTERNATIONAL CORPORATION
ENGINEERED SYSTEMS

PRODUCT TYPE: Air Cooled Scroll Chillers
YORK CONTRACT NO.:
UNIT MODEL NUMBER: YLAA0175HE
UNIT SERIAL NUMBER:
UNIT TAG ID: ACC-3
UNIT LOCATION:

COMPRESSOR SERIAL NUMBER(S):

PROJECT NAME: Marcus Daly Surgery Remodel
INSTALLATION ADDRESS:
,

Shipping Date

The term of this agreement is 18 months (1 Year), commencing _____ and expires _____.

LIMITED WARRANTY

WHEN PROPERLY ENDORSED, THIS PROTECTION PLAN BETWEEN YORK INTERNATIONAL CORPORATION (YORK) AND CUSTOMER, WARRANTS, TO THE CUSTOMER NAMED HEREIN, FOR THE . IT DOES NOT COVER REFRIGERANT COST, FREIGHT CHARGES, *** UNASSIGNED ***OR ANY OTHER COSTS.

THIS WARRANTY EXCLUDES IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND WE DO NOT ASSUME, OR AUTHORIZE ANY OTHER PERSON TO ASSUME OTHER WARRANTIES FOR US. THIS WARRANTY IS OFFERED AS AN EXTENSION TO THE STANDARD LIMITED WARRANTY (FORM 50.05-NM2) AND IS SUBJECT TO THE SAME LIMITATIONS AND EXCLUSIONS, EXCEPT WHERE NOTED.

THIS PROTECTION PLAN DOES NOT COVER FAILURE OR DAMAGE RESULTING FROM FIRE, FLOOD, ABUSE, OR ACT OF GOD. ALSO EXCLUDED ARE DAMAGES OR FAILURES CAUSED BY INSTALLATION, OPERATION, OR MAINTENANCE CONTRARY TO YORK RECOMMENDATIONS, OR THOSE OF THE MANUFACTURER IF OTHER THAN YORK. IN NO EVENT SHALL YORK BE LIABLE FOR CONSEQUENTIAL, INCIDENTAL, OR INDIRECT DAMAGE, LOSS, OR INJURY. WARRANTY FOR EXCHANGE OR PARTS PROCUREMENT SERVICE SHALL BE AVAILABLE THROUGH THE SERVICER LISTED HEREIN DURING NORMAL WORKING HOURS.

DISTRICT SERVICE OFFICE: _____

OFFERED BY: _____ (York Selling Representative Print/Sign) _____ (Date)

APPROVED BY: _____ (York Area Service Manager Print/Sign) _____ (Date)

ACCEPTED BY: _____ (Customer Signature) _____ (Date)

(Manufacturer's Use Only)

AUTHORIZED BY:  (Manager, Warranty Administration) 2017-10-27 (Date)

Product Code Ref: 8123

66 MONTHS (5 YEARS)PARTS ONLY WARRANTY
FOR THE COMPRESSOR
YORK INTERNATIONAL CORPORATION
ENGINEERED SYSTEMS

PRODUCT TYPE: AIR COOLED SCROLL CHILLERS
YORK CONTRACT NO.:
UNIT MODEL NUMBER: YLAA0175HE
UNIT SERIAL NUMBER:
UNIT TAG ID: ACC-3
UNIT LOCATION:

COMPRESSOR SERIAL NUMBER(S):

PROJECT NAME: MARCUS DALY SURGERY REMODEL
INSTALLATION ADDRESS:
,

_____
Shipping Date

The term of this agreement is 66 months (5 Years), commencing _____ and expires _____.

LIMITED WARRANTY

WHEN PROPERLY ENDORSED, THIS PROTECTION PLAN BETWEEN YORK INTERNATIONAL CORPORATION (YORK) AND CUSTOMER, WARRANTS, TO THE CUSTOMER NAMED HEREIN, FOR THE . IT DOES NOT COVER REFRIGERANT COST, FREIGHT CHARGES, OR ANY OTHER COSTS.

THIS WARRANTY EXCLUDES IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND WE DO NOT ASSUME, OR AUTHORIZE ANY OTHER PERSON TO ASSUME OTHER WARRANTIES FOR US. THIS WARRANTY IS OFFERED AS AN EXTENSION TO THE STANDARD LIMITED WARRANTY (FORM 50.05-NM2) AND IS SUBJECT TO THE SAME LIMITATIONS AND EXCLUSIONS, EXCEPT WHERE NOTED.

THIS PROTECTION PLAN DOES NOT COVER FAILURE OR DAMAGE RESULTING FROM FIRE, FLOOD, ABUSE, OR ACT OF GOD. ALSO EXCLUDED ARE DAMAGES OR FAILURES CAUSED BY INSTALLATION, OPERATION, OR MAINTENANCE CONTRARY TO YORK RECOMMENDATIONS, OR THOSE OF THE MANUFACTURER IF OTHER THAN YORK. IN NO EVENT SHALL YORK BE LIABLE FOR CONSEQUENTIAL, INCIDENTAL, OR INDIRECT DAMAGE, LOSS, OR INJURY. WARRANTY FOR EXCHANGE OR PARTS PROCUREMENT SERVICE SHALL BE AVAILABLE THROUGH THE SERVICER LISTED HEREIN DURING NORMAL WORKING HOURS.

DISTRICT SERVICE OFFICE: _____

OFFERED BY: _____ (York Selling Representative Print/Sign) _____ (Date)

APPROVED BY: _____ (York Area Service Manager Print/Sign) _____ (Date)

ACCEPTED BY: _____ (Customer Signature) _____ (Date)
(Manufacturer's Use Only)

AUTHORIZED BY: _____ (Manager, Warranty Administration) 2017-10-27 (Date)

Product Code Ref: 8521

Tag: ACC-3 Specification 236423

18 MONTHS (1 YEAR)
FOR THE REFRIGERANT
YORK INTERNATIONAL CORPORATION
ENGINEERED SYSTEMS

PRODUCT TYPE: AIR COOLED SCROLL CHILLERS
YORK CONTRACT NO.:
UNIT MODEL NUMBER: YLAA0175HE
UNIT SERIAL NUMBER:
UNIT TAG ID: ACC-3
UNIT LOCATION:

COMPRESSOR SERIAL NUMBER(S):

PROJECT NAME: MARCUS DALY SURGERY REMODEL

INSTALLATION ADDRESS:
,

_____
Shipping Date

The term of this agreement is 18 months (1 Year), commencing _____ and expires _____.

LIMITED WARRANTY

WHEN PROPERLY APPROVED AND AUTHORIZED BELOW, YORK INTERNATIONAL CORPORATION (YORK) WARRANTS TO THE CUSTOMER NAMED HEREIN, THAT YORK WILL PROVIDE THE CUSTOMER FREE OF CHARGE, WITH REPLACEMENT REFRIGERANT IN THE CASE OF ANY REFRIGERANT LOSS DUE TO ACCIDENTAL SYSTEM LEAKS. SERVICES TO RECYCLE CONTAMINATED REFRIGERANT ARE ALSO INCLUDED IN THE EVENT OF SYSTEM CONTAMINATION. THIS WARRANTY IS OFFERED ON PACKAGED STATIONARY WATER CHILLERS WITHIN THE EXTENDED WARRANTY PERIOD STATED ABOVE, AND IS TO BE OFFERED IN CONJUNCTION WITH A YORK 'MAINTENANCE CONTRACT' OR A YORK 'REFRIGERANT CONSERVATION SERVICE CONTRACT.' WE DO NOT AUTHORIZE ANY OTHER ENTITY TO PERFORM WARRANTY SERVICE ON OUR BEHALF. THIS WARRANTY IS OFFERED AS AN EXTENSION TO THE STANDARD LIMITED WARRANTY (FORM 50.05-NM2) AND IS SUBJECT TO THE SAME LIMITATIONS AND EXCLUSIONS STATED THEREIN, WHICH ARE HEREBY INCORPORATED HEREIN BY REFERENCE REMOTE EVAPORATOR, REMOTE CONDENSER, FINNED TUBE, AND MOBILE UNITS ARE EXCLUDED FROM THIS COVERAGE.

THIS WARRANTY DOES NOT COVER REFRIGERANT LOSS RESULTING FROM FIRE, FLOOD, ABUSE, OR ACT OF GOD. ALSO EXCLUDED ARE DAMAGES OR FAILURES CAUSED BY OPERATION OR MAINTENANCE CONTRARY TO THE RECOMMENDATIONS OF THE EQUIPMENT MANUFACTURER. IN NO EVENT SHALL YORK BE LIABLE FOR SPECIAL CONSEQUENTIAL, INCIDENTAL, OR INDIRECT DAMAGE, LOSS OR INJURY OF ANY NATURE. WARRANTY SERVICE SHALL BE PROVIDED THROUGH THE SERVICER LISTED HEREIN DURING NORMAL WORKING HOURS AND AFTER SYSTEM FAULTS HAVE BEEN REPAIRED.

THE WARRANTY AND LIABILITY SET FORTH ABOVE ARE IN LIEU OF ALL OTHER WARRANTIES AND LIABILITIES, EXPRESS OR IMPLIED IN LAW OR IN FACT, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE WARRANTIES CONTAINED HEREIN SET FORTH BUYER'S SOLE AND EXCLUSIVE REMEDY IN THE EVENT OF A DEFECT IN WORKMANSHIP OR MATERIALS.

DISTRICT SERVICE OFFICE: _____

OFFERED BY: _____ (York Selling Representative Print/Sign) _____ (Date)

APPROVED BY: _____ (York Area Service Manager Print/Sign) _____ (Date)

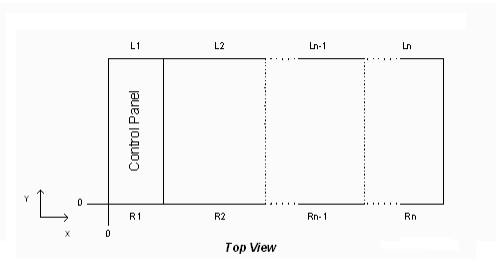
ACCEPTED BY: _____ (Customer Signature) _____ (Date)
(Manufacturer's Use Only)

AUTHORIZED BY: Robert D. Kalczynski (Manager, Warranty Administration) 2017-10-27 (Date)

Product Code Ref: 8199

AVM Report

Project Name	Unit Tag	Date	Chiller Type
Marcus Daly Surgery Remodel	ACC-3	2017-10-27	Air Cooled Scroll Chillers
PIN			**Version**
YLAA0175HE46XFBBCTXHXXBLXCXX45SEXXXXHXXXYAXGXXXDBXXVXXJ1XXXX			E.17.5.0.6206-D.54.0025



Top View

LOCATION	X Distance (in)	Y Distance (in)	JCI PART NUMBER	SAP NUMBER	COLOUR	Operating Weights (lb)
R1	7.6	1.4	N/A	N/A	N/A	776
R2	76.6	1.4	N/A	N/A	N/A	1162
R3	149.1	1.4	N/A	N/A	N/A	1057
R4	212.7	1.4	N/A	N/A	N/A	392
L1	7.6	86.9	N/A	N/A	N/A	1010
L2	76.6	86.9	N/A	N/A	N/A	2112
L3	149.1	86.9	N/A	N/A	N/A	1269
L4	212.7	86.9	N/A	N/A	N/A	392

Total Weight (lb)		Centre of Gravity (in)	
Operating	0	Xg	Infinity
Shipping	0	Yg	Infinity

All values are de-rated by 15% apart from those which have part number. (029-25334-013 and 029-25336-014: 0% de-rated), (029-25335-004: 10% de-rated), (029-25335-001 and 029-25335-003: 25% de-rated)

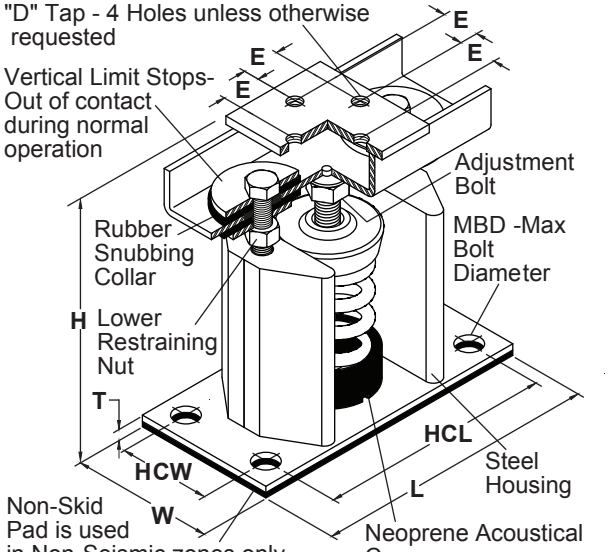
MASON INDUSTRIES, Inc.
Manufacturers of Vibration Control Products
350 Rabro Drive, Hauppauge, NY 11788, 631/348-0282, FAX 631/348-0279, Info@Mason-Ind.com
2101 W. Crescent Ave., Suite D, Anaheim, CA 92801, 714/535-2727, FAX 714/535-5738, Info@MasonAnaheim.com
www.Mason-Ind.com

JOB NAME: Marcus Daly Memorial Hospital Surgery Department Remodel
CUSTOMER: 4G's Plumbing & Heating
CUSTOMER P.O.
MASON M.I.
DWG. NO.

Tag: ACC-3 Specification 236423

SLRSO

1" DEFLECTION B, 1, 2 & 4 SERIES SPRING MOUNTS



Non-Skid Pad is used in Non-Seismic zones only. Remove pad prior to installing in seismic zones. Reduce published height by 1/8" if pad is removed.

Baseplate must be uniformly supported

TYPE SLRSO RATINGS

Size	Rated Capacity (lb)	Rated Defl. (in)	Spring Constant (lb/in)	Max. Horiz. Housing G Rating	Spring Color
SLRSO-B-65	65	2.10	31	21.6	Brown
SLRSO-B-85	85	2.10	40	16.5	Wht/Blk
SLRSO-B-115	115	2.00	57	12.2	Silver
SLRSO-B-150	150	2.00	75	9.3	Orange
SLRSO-B-280	280	1.60	174	5.0	Green
SLRSO-B-450	450	1.31	344	3.1	Red
SLRSO-B-750	750	1.12	670	1.9	White
SLRSO-B-1000	1000	1.00	1000	1.4	Blue
SLRSO-1-1000	1000	1.00	1000	4.4	Black
SLRSO-1-1350	1350	1.00	1350	3.3	Yellow
SLRSO-1-1750	1750	1.00	1750	2.5	Black*
SLRSO-1-2100	2100	1.00	2100	2.1	Yellow*
SLRSO-1-2385	2385	1.00	2385	1.9	Yellow**
SLRSO-1-2650	2650	1.00	2650	1.7	Red*
SLRSO-1-2935	2935	1.00	2935	1.5	Red**
SLRSO-2-3500	3500	1.00	3500	1.8	Black*
SLRSO-2-4200	4200	1.00	4200	1.5	Yellow*
SLRSO-2-4770	4770	1.00	4770	1.3	Yellow**
SLRSO-4-5400	5400	1.00	5400	2.0	Yellow
SLRSO-4-7000	7000	1.00	7000	1.6	Black*
SLRSO-4-8400	8400	1.00	8400	1.3	Yellow*
SLRSO-4-9540	9540	1.00	9540	1.2	Yellow**
SLRSO-4-10600	10600	1.00	10600	1.1	Red*
SLRSO-4-11740	11740	1.00	11740	0.9	Red**

* with RED inner spring ** with GREEN inner spring

SPRING DATA

Size	Spring OD	Free Height	Ratio K_x/K_y	Ratio OD/OH
B	2 3/8	4	0.70-0.80	0.80 - 1.25
C	2 7/8	4 1/8	0.90-1.10	0.92

Illustration shows SLRSO-B housing which contains one (1) B spring. Not shown is SLRSO-1 housing which contains one (1) C2 spring, SLRSO-2 housing which contains two (2) C2 springs and SLRSO-4 which contains four (4) C2 springs.

All springs have an additional travel to solid equal to 50% of the rated deflection.

Housing load ratings expressed in G's are based on tests with bolted connections to steel top and bottom.

TYPE SLRSO DIMENSIONS (inches)

Size	L	W	H	T	MBD	HCW	HCL	D	E
SLRSO-B	8 1/2	4 1/4	8 3/4	3/8	5/8	2 3/4	7	1/2	1 1/8
SLRSO-1	9 1/2	5 1/4	8 3/4	3/8	5/8	3 1/2	7 1/2	5/8	1 3/8
SLRSO-2	14	5 1/4	8 3/4	3/8	5/8	3 1/2	12 1/4	5/8	1 3/8
SLRSO-4	13 3/4	8	8 3/4	3/8	3/4	6 1/4	11	7/8	1 3/8

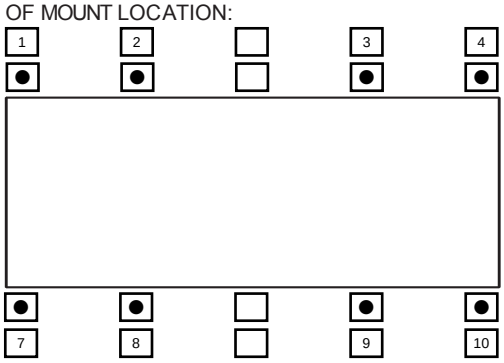
CERTIFICATION DATA

TAG : ACC-3

UNIT : York YLAA Chiller

PLAN VIEW OF MOUNT LOCATION:

Click with mouse for each location >



1 : SLRSO-1-1350	7 : SLRSO-B-1000
2 : SLRSO-1-2385	8 : SLRSO-1-1350
3 : SLRSO-1-1350	9 : SLRSO-1-1350
4 : SLRSO-B-450	10 : SLRSO-B-450
5 :	11 :
6 :	12 :
Sets Required : 1	

384 Gallatin Park Dr. Suite 201, Bozeman, MT 59771
(O) 406.585.7333 (F) 406.585.7666

Marcus Daly Memorial Hospital Surgery Department Remodel

238414/238415 – Electric and Gas Fired Steam Generators – ***RE-SUBMITTAL***

238414/238415 – Electric and Gas Fired Steam Generators: Pure Humidifier

NOTE: PER CONVERSATION WITH AARON S. WITH ACE – H-AHU-10 HAS A MAXIMUM CAPACITY OF 150 LB/HR – NOTED ON PAGE 6 OF THE RE-SUBMITTAL. 120 LBS/HR FOR H-AHU-10 AND 230 LBS/HR FOR H-AHU-9 ARE CALCULATED CAPACITIES.

2 – Spec Section 238415 – TAG: H-AHU9, H-AHU10 – Pure Humidifier GXDDR Gas Heat Exchanger Humidifiers

- ***Operating Pressure at Humidifier Gas Valve – Max 14" W.C.***
- Evaporating chamber and cover constructed of 14 gauge type 304 stainless steel and a 12 gauge type 304 stainless steel face plate (rated for 19" W.C. pressure).
- 304 stainless steel gas heat exchanger with 2" diameter transfer tubes and gas supply inlet.
- Forced draft combustion burner assembly includes 3450 RPM motor, blower, adjustable damper, control panel, combination dual shut-off gas valve/pressure regulator, 24v flame safeguard with flame rod, intermittent proven pilot, pre-purge and air safety switch.
- Stainless steel float type water make-up valve (1/4"-NPT).
- Low water cut-off float switch (burner interlock).
- High temperature thermo cut-out.
- Over flow stand pipe with ¾"-NPT stainless steel ball valve and drain connection.
- NEMA 12 control enclosure (factory mounted and wired) containing:
  - INTAC® controller.
  - Fused control circuit transformer.
  - All interconnecting panel wiring.
  - Main power fuses and fuse holder.
  - Numbered and labeled terminals.
  - Gas valve interlock.
- INTAC® Microprocessor Logic Controller
- Factory mounted and wired control cabinet – control cabinet is mounted on the left side of the humidifier chamber (facing humidifier).
- Support legs – legs sized to support humidifier 24" above the floor. Legs are constructed of 1 ¼" angle iron and include mounting hardware.

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- Factory Insulation – consists of ¾" thick semi-rigid foam duct insulation covered in aluminum foil. All surfaces except front faceplate are insulated.
- DCT-927 self actuated drain tempering kit
- *Designed to operate with reverse osmosis, deionized or demineralized water*
- Sealed combustion air kit – consists of a 5" round adaptor that allows outside air to be piped directly into the intake of the burner for combustion.
- ProtoNode Communications Gateway – gateway provides full BACnet communications via native Modbus.
- Standby water temperature sensing – includes a temperature sensor mounted into humidifier reservoir. System will maintain water temperature at a selected level for fast response upon a call for humidity.
- Schneider Electric HC-201 duct mount high-limit humidistat.
- Cleveland Controls AFS-262-112 air flow switch – pressure differential type.
- Fast-Pac multiple tube assembly – Tube consists of a stainless steel header with ¾"-NPT drain connection and horizontal 1 ½" □ stainless steel injection tubes (see above schedule for length). ***To be hard piped by others***.

* VENTING BY OTHERS
* MANIFOLDS INSTALLED BY OTHERS
* STARTUP BY OTHERS

See attached copy of equipment schedule and additional submittal data.

Specifications 238414, 238415

PURE Humidifier

To: S. Conley Sales **Date:** 11/28/17

Reference No. JK10178 GX

Job No:

Attn: Gary Wambeke

Project: Marcus Daly Surgery

Enclosed are 1 **copies of** "GXDDR" Gas Fired Humidifier

X **Submittals**	**Specifications**
X **Drawing**	X **Operation & maintenance manuals**
Literature	**Wiring Diagram**

Other:

Remarks

Signed: Jennelle Kallenbach

141 Jonathan Blvd. North, Chaska, MN 55318
Tel.: (952) 368-9335 / Fax: (952) 368-9338 / www.purehumidifier.com

PURE Humidifier Co. "GXDDR" Gas Heat Exchanger Humidifier Schedule

Specifications 238414, 238415

The following PURE Humidifier Co. "GXDDR" Gas Heat Exchanger Humidifiers are proposed for the subject project:

Marcus Daly Surgery

Tag	Qty	Model	Capacity (lbs./hr)	Injection Tube
H-AHU9	1	GXDDR-4	230.0 lbs/hr	(1) Nine Tube Fast-Pac @ 74"
H-AHU10	1	GXDDR-4S	120.0 lbs/hr	(1) Six Tube Fast-Pac @ 50"

CALCULATED CAPACITIES

Operating pressure at humidifier gas valve: **Max 14"W.C.**

The above PURE Humidifier Co. "GXDDR" Gas Heat Exchanger Humidifiers are supplied with the following standard equipment:

1. Evaporating chamber and cover constructed of 14 gauge type 304 stainless steel and a 12 gauge type 304 stainless steel face plate (rated for 19" W.C. pressure).
2. Quick release cover clamps. Quarter turn cover clamps allow removal of the cover without removing the securing bolts.
3. 304 stainless steel gas heat exchanger with 2" diameter transfer tubes and gas supply inlet.
4. Forced draft combustion burner assembly includes 3450 RPM motor, blower, adjustable damper, control panel, combination dual shut-off gas valve/pressure regulator, 24v flame safeguard with flame rod, intermittent proven pilot, pre-purge and air safety switch.
5. Stainless steel float type water make-up valve (1/4"-NPT).
6. Low water cut-off float switch (burner interlock).
7. High temperature thermo cut-out.
8. Over flow stand pipe with ¾"-NPT stainless steel ball valve and drain connection.
9. NEMA 12 control enclosure **(factory mounted and wired)** containing:
   a) INTAC® controller.
   b) All interconnecting panel wiring.
   c) Numbered and labeled terminals.
   d) Fused control circuit transformer.
   e) Main power fuses and fuse holder.
   f) Gas valve interlock.
10. INTAC® Microprocessor Logic Controller; controller performs self-diagnostics and controls all water level, fill, drain and safety circuit interlocks with fault indication. Programmable for "Flush", "Standby" and "Normal Operation" functions.
    a) 16 character two line display.
    b) Keypad user interface.
    c) BAS communications.
    d) Adjustable input signal filter
    e) Flash memory
    f) On-Screen alarm/fault messages.
    g) Keypad lock-out system.
    h) Fault alarm contacts.
    i) Low/High humidity deviation alarm contacts.
    j) Adjustable P.I.D. parameters.
    k) Time-to-Service indication.
    l) Adjustable display brightness
11. Factory mounted and wired control cabinet – control cabinet is mounted on the left side of the humidifier chamber (facing humidifier).
12. Support legs – legs sized to support humidifier 24" above the floor. Legs are constructed of 1 ¼" angle iron and include mounting hardware.
13. Factory Insulation – consists of ¾" thick semi-rigid foam duct insulation covered in aluminum foil. All surfaces except front faceplate are insulated.
14. DCT-927 self actuated drain tempering kit – The drain tempering kit is designed to provide drain and condensate water at a temperature of less than 140 ºF.
15. The above humidifiers are designed to operate with reverse osmosis, deionized or demineralized water.

Optional equipment furnished:

16. Sealed combustion air kit – consists of a 5" round adaptor that allows outside air to be piped directly into the intake of the burner for combustion.
17. ProtoNode Communications Gateway – gateway provides full BACnet communications via native Modbus.
18. Standby water temperature sensing – includes a temperature sensor mounted into humidifier reservoir. System will maintain water temperature at a selected level for fast response upon a call for humidity.

19. Schneider Electric HC-201 duct mount high-limit humidistat.
20. Cleveland Controls AFS-262-112 air flow switch – pressure differential type.
21. Fast-Pac multiple tube assembly – Tube consists of a stainless steel header with ¾”-NPT drain connection and horizontal 1 ½”∅ stainless steel injection tubes (see above schedule for length). **To be hard piped by others.**

Specifications 238414, 238415

PURE Humidifier

Submittal Data Sheet Numbers
"GXDDR" Series

Sheet No. **SGXD-2**

This humidifier is a forced combustion type that can be used with natural gas or liquid propane. The burner can be easily removed to access the side entry exchanger for cleaning. It is designed to work with low-pressure gas between 5" W.C. up to 14" W.C.

MAX CAPACITIES

Unit Capacities in Pounds per Hour (kg/hr)†
Weights in lbs. (kg) and Electrical Specification

Standard Water Unit Model No.	Steam Capacity Lb/Hr (kg/Hr)	No. of Burners	*BTU Input	Exhaust Manifold Vent Size (cm)	Shipping Weight (kg)	Operating Weight (kg)	120 Volt, 60 Hz Full Load Amps
GXDDR-3	110 (49.9)	1	150,000	4" (10.2)	201 lbs. (91.2)	420 lbs. (190.5)	5.0
H-AHU-10 → GXDDR-4S	150 (68.0)	1	200,000	4" (10.2)	366 lbs. (166.0)	725 lbs. (328.9)	5.0
H-AHU-9 → GXDDR-4	300 (136.1)	1	400,000	4" (10.2)	390 lbs. (176.9)	710 lbs. (322.1)	5.0
GXDDR-8	600 (272.2)	2	800,000	6" (15.2)	827 lbs. (375.1)	1391 lbs. (630.9)	10.0
GXDDR-12	900 (408.2)	3	1,200,000	8" (20.3)	1125 lbs.(510.3)	2072 lbs. (939.9)	15.0

† 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 reservoir.

* Altitude adjustment:
100% up to 2000'
Over 2000', 4% de-rate per

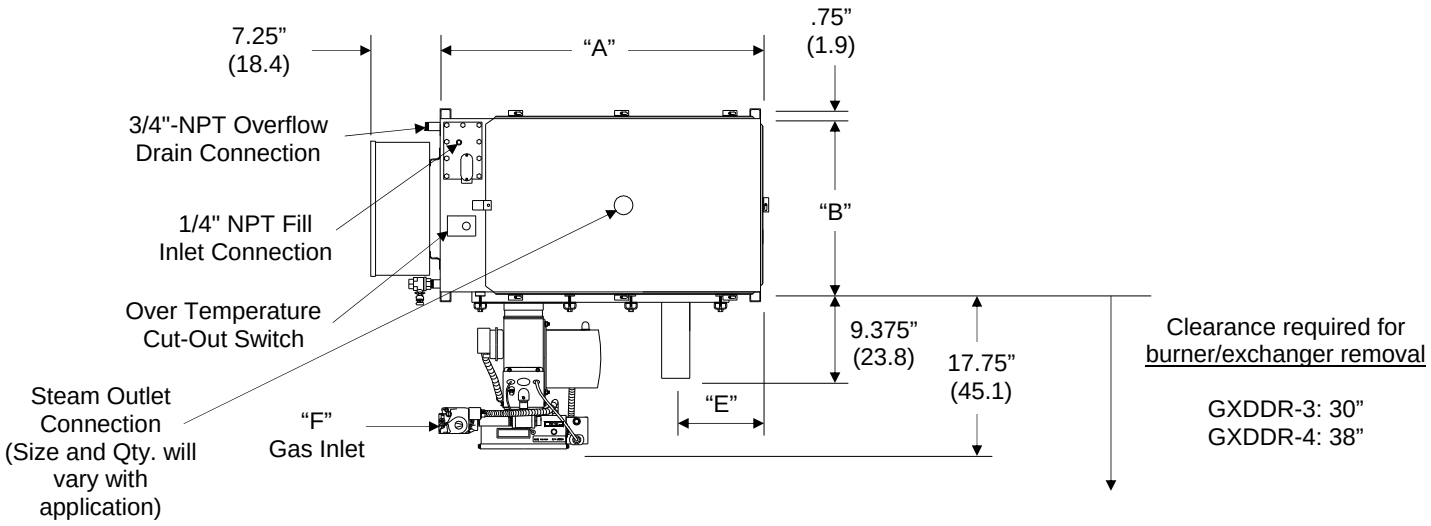
Gas Piping Pressure Drop Data

EQUIVALENT LENGTH OF STRAIGHT PIPE IN FEET									
	20	30	40	20	60	80	100	150	200
CFH GAS WITH .2" PRESSURE DROP									
Pipe Size in Inches									
3/4"	152	120	105	93	84	73	66	54	45
1"	300	250	210	190	180	150	135	110	75
1 1/4"	520	425	360	325	300	260	230	190	165
1 1/2"	800	690	560	500	480	410	370	300	260
2"	1700	1400	1200	1100	1000	850	750	600	540
2 1/2"	3000	2500	2100	1900	1800	1550	1375	1100	950

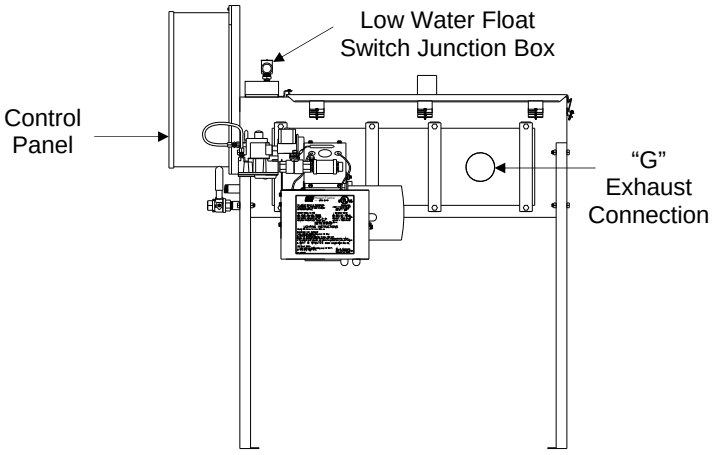
EQUIVALENT LENGTHS OF STANDARD PIPE IN FEET FOR LISTED FITTINGS							
Fitting Type	3/4	1	1 1/4	1 1/2	2	2 1/2	Nominal
Std. Tee	2.4	5.5	7.5	9	12	13.5	Pipe Size
Std. Elbow	4.4	2.7	3.7	4.5	5.5	6.1	in Inches

Gas Input CFH
for GXDDR-Series Humidifiers

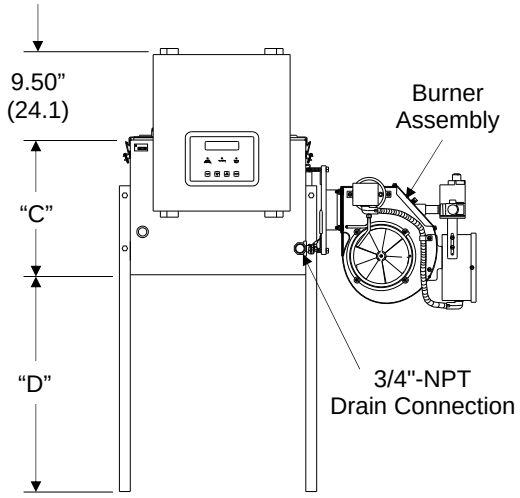
Model	Max BTU/Hr Input	Max CFH (Nat. Gas)	Max CFH (Propane)
GXDDR-3	150,000	150	60
→ GXDDR-4S	200,000	200	80
→ GXDDR-4	400,000	400	160
GXDDR-8	800,000	800	320
GXDDR-12	1,200,000	1200	480



Top View



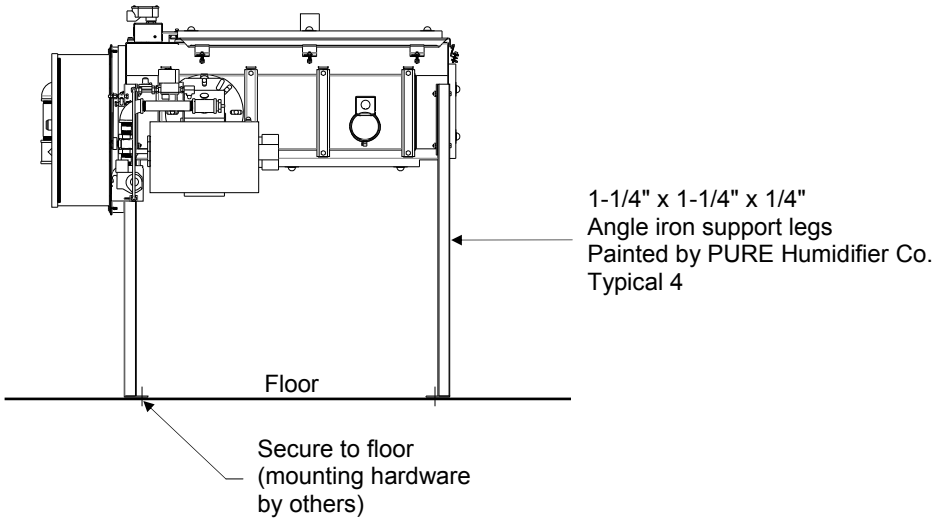
Left Side View



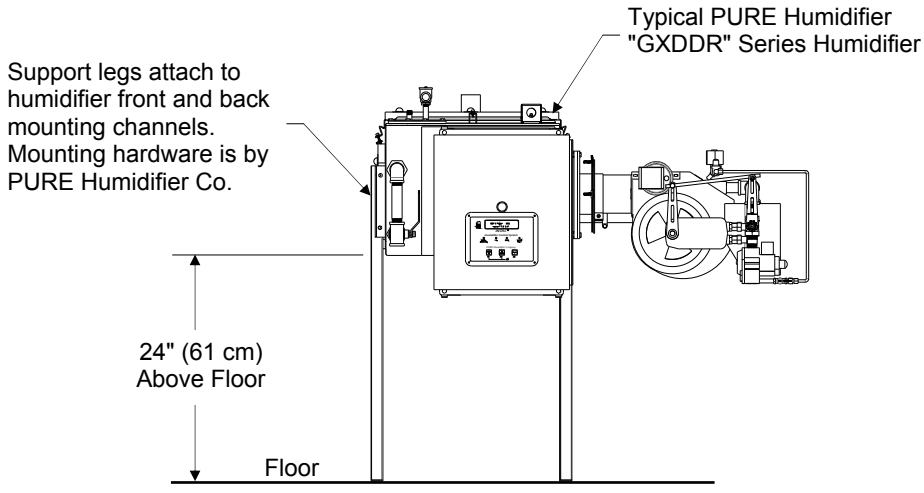
Front View

Unit Dimensions in Inches (cm)

Standard Water Unit Model No.	Dim. "A"	Dim. "B"	Dim. "C"	Dim. "D"	Dim. "E"	Dim. "F"	Dim. "G"
GXDDR-3	34.00" (86.4)	18.25" (46.4)	13.75" (34.9)	24.00" (60.9)	8.50" (21.6)	3/4"-NPT	3.00" (7.62)
GXDDR-4S	54.00" (137.2)	27.50" (69.9)	13.75" (34.9)	24.00" (60.9)	27.125" (68.9)	3/4"-NPT	3.00" (7.62)
GXDDR-4	54.00" (137.2)	27.50" (69.9)	13.75" (34.9)	24.00" (60.9)	27.125" (68.9)	3/4"-NPT	3.00" (7.62)



Left Side View

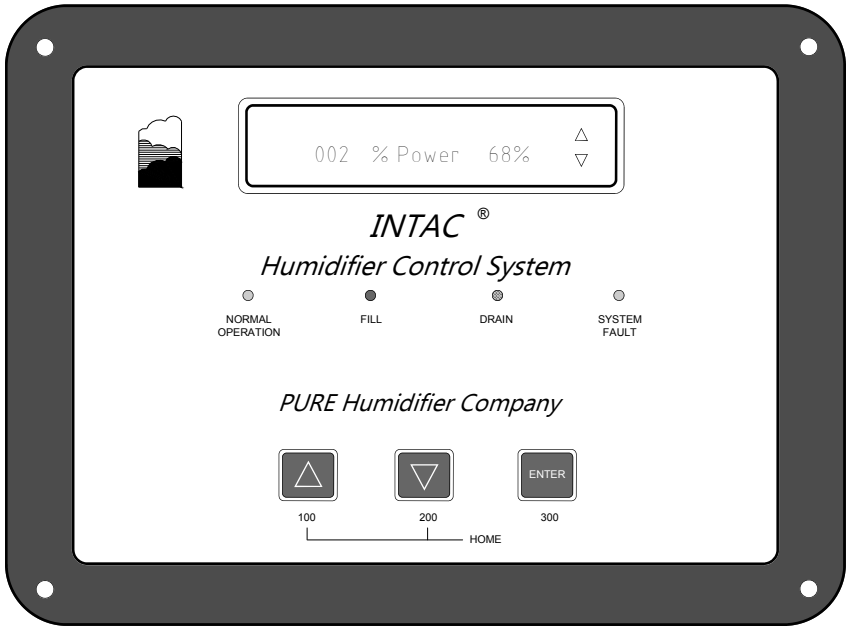


Front View

PURE Humidifier

INTAC® Microprocessor
"GXDDR" Series

Sheet No.
SGXD-8



- Five menus let you adjust Set Point, Operation, PID, BAS Communications, and Control Parameters. In addition, a display loop shows you the operational status as well as additional information screens.

- Accepts all standard control signals for communications interface with the building automation system and is capable of *flash memory* to keep pace with changes in those systems as they occur.

- Designed to meet or exceed CE Standards for "noise" immunity. EFI and RFI will not effect humidifier operation.

- Compatible with all humidity transmitters and temperature sensors as well as all water types; potable, softened, deionized or reverse osmosis.

- User adjustable programming provides precise levels of humidity control for both high limit and controlling sensors.

- Works with all PURE Humidifier units.

- Controller lock-out prevents unauthorized adjustments.

- High/Low humidity deviation alarms.

- Over-temp reservoir shut-down safety interlock.

- Dedicated event input allows you to identify a priority safety switch.

- "Time to Service" messages.

For proper and safe operation this appliance needs air for combustion and ventilation. DO NOT block or obstruct air openings on the appliance, spaces around the appliance, or air openings communicating with the appliance area.

DO NOT block the flow of combustion and ventilation air. To provide for necessary oxygen for proper combustion, opening must be provided to allow outside air to enter the space in which the heater is located. Enclosed spaces, such as equipment rooms, must be vented at the blower for combustion air. The size of air openings must be based on all gas-burning equipment installed in the space involved. Provisions for adequate combustion and ventilation air in accordance with Section 5.3, Air for Combustion and ventilation, of the National Fuel Gas Code, ANSI Z223.1, or Sections 7.2, 7.3 or 7.4 of the CAN/CGA B149 Installation Codes, or applicable provisions of the local building codes.

The burner should be initially set up and serviced at regular intervals (preferably at the beginning of and mid-way through high use period) by a trained serviceman using the proper test instruments. Failure to maintain the correct burner settings may result in inefficient gas consumption, premature wear of burner components, or explosion hazard.

Venting

The GXDDR Series Humidifiers are a category 3 appliance.

The purpose of venting the gas humidifier is to completely remove all products of combustion and ventilation gases to the outside air, without condensation in the stack.

When connecting the humidifier to a gas vent, the installation shall be in accordance with Part 7, Venting of Equipment, of the National Fuel Gas Code, ANSI Z223.1, or Section 7, Venting Systems and Air Supply Appliances, of the CAN/CGA-B149 Installation Codes, the local building codes, and the vent manufacturer's instructions.

Do not reduce the vent diameter, and avoid short turns in the vent piping. Use the same size stack as the exhaust manifold vent size shown on page SGXD-2. Maintain a 1/4-inch-per-foot pitch for horizontal runs. Maintain proper support of vent connections and joints. Observe clearances (in accordance with applicable codes) from all combustible materials, and obtain an approved cap for the stack outlet. The bottom of the cap must be one stack diameter above the top of the stack.

Inspect for proper and tight construction. Any restrictions or obstructions must be removed.

Vent must extend at least 3 feet above its passage through a roof and at least 2 feet above any ridge within 10 feet of the chimney (local codes apply).

Minimum clearance from the vent connector to combustible material is 6 inches unless the combustible materials are protected in accordance with applicable codes. Any condensate formed is acidic and could cause corrosion of the vent materials. Therefore, PURE Humidifier requires humidifiers be connected to vent systems sufficient for use with Category 3 appliances listed to UL Standard 1738 or ULC-S636 (AL29 4C).

This humidifier must not be connected to a chimney flue servicing a separate appliance designed to burn solid fuel.

Never connect this humidifier to a chimney.

Venting into an unlined masonry or concrete chimney is prohibited by code.

Insulation must be added to any vent connector which will be exposed to ambient temperatures of 30°F or less.

Do not insulate vent pipe exposed to outdoor weather conditions (i.e. above roof lines).

Installation of the vent pipe should be as directly as possible, with a minimum number of turns or elbows.

Rigidly support the vent pipe every 5 feet or less with hangers or straps to ensure that there will be no movement or sagging after installation. The humidifier vent box should not be supporting the weight of the vent piping.

No portion of the vent system shall extend into, or pass through any circulation air duct or plenum.

The vent system shall terminate above the roof surface per the National Fuel Gas Code or CAN/CGA.B149 requirements, and shall include a UL or CUL listed vent cap or roof assembly, unless prohibited by local codes.

All vent pipe passing through floors, ceilings, and walls must be installed with the proper clearances from combustible material, and be fire-stopped according to the National Fuel Gas Code requirements and Canadian Standards CAN/CGA.B149.

In replacement installation, where an existing vent system may be used, the vent system must be inspected for condition, size, type of vent material, and height to meet the requirements in these instructions. If the existing vent system is too large, condensation could occur, causing corrosion of the vent system. Installing a replacement vent system may be required. When connecting the humidifier to a gas vent, the installation shall be in accordance with Part 7, Venting of Equipment, of the National Fuel Gas Code, ANSI Z223.1, or Section &, Venting Systems and Air Supply Appliances, of the CAN/CGA.B149 Installation Codes, the local building codes, and the vent manufacturer's instructions.

Horizontally Vented Humidifier

Maintain a minimum upward slope of 1/4-inch per linear foot on all horizontal vent pipe runs. If condensate in venting is noticed, a drain may be required.

Rigidly support the vent pipe at intervals no longer than five feet with hangers or straps to ensure there will be no movement after installation. The humidifier vent box should not be supporting the weight of the vent piping.

Distances from the vent terminal adjacent public walk ways, buildings, and openable windows and building openings should be consistent with the National Fuel Gas Code, ANSI Z223.1, and/or CAN/CGA.B149 Installation Codes.

The vent terminal location must be at sufficient height above ground level to prevent blocking by expected snowfall.

Building materials should be protected from degradation by flue gases.

A minimum horizontal clearance of 4 feet (1.22m) from electric meters, gas meters, regulators, and relief equipment must be maintained.

Horizontal Venting Requirements*

100' maximum equivalent length of vent pipe.
90° Elbow = 10'
45° Elbow = 5'

Maximum of 4 elbows.

Vent pipe is to be rated for Category 3 appliances listed to UL Standard 1738 or ULC-S636 (AL29 4C).

Allow for removal of air intake and exhaust connections for heat exchanger cleaning and regular maintenance.

PURE Humidifier

Sealed Combustion Kit "GXDDR" Series

Sheet No. SGXD-12

Sealed Combustion Air Kit. Consists of a 6" round stainless steel adaptor to connect to field installed combustion air piping. This will separate the combustion air from the room air, allowing only outside air into the intake of the burner for combustion.

Benefits:

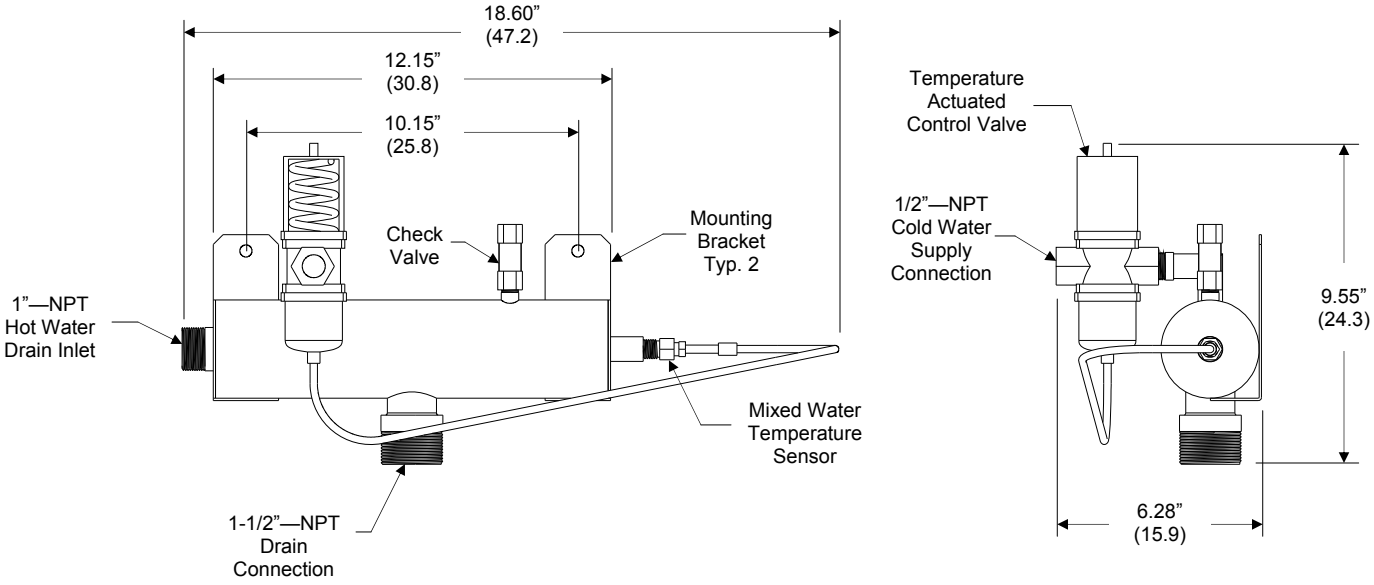
Sealed combustion burners can save energy because they don't steal heated or cooled indoor air.

Sealed combustion burners reduce space heating costs and noise while eliminating problems associated with power-vented combustion.

PURE Humidifier

DCT-927 Drain Water Tempering Kit "GXDDR" Series

Sheet No. SGXD-13



SYSTEM DESCRIPTION

The DCT-927 drain tempering kit is designed to provide drain water temperature of less than 140°F. The DCT-927 can be used with all PURE Humidifier Co. products. NOTE: When utilized with any of PURE's humidifiers, the condensate return must be a vented gravity drain.

The system utilizes a temperature sensor to sense the water temperature and open the temperature-actuated cold water mixing valve. Since the system is temperature-actuated, no power supply is required.

SYSTEM OPERATION

The DCT-927 drain water tempering kit contains an adjustable temperature sensor factory set-point at 135°F. When the temperature sensor senses a temperature higher than the set-point (135°F), it opens temperature-actuated cold water mixing valve. The cold water supply tempers the hot water and ensures a temperature of 140°F or less. The DCT-927 is factory assembled and shipped loose for field installation.

DCT-927 Capacities

	Hot Water In	Cold Water In	Tempered Water Out
Flow Rate GPM (L/m)	6 gpm (22.7 L/m)	6 gpm (22.7 L/m)	12 gpm (45.4 L/m)
Temperature °F (°C)	212°F (100°C)	70°F (21°C)	140°F (60°C)

The information above is based on one humidifier feeding the drain tempering kit.
Cold water supply pressure should be 35 psi (2.4 Bar) minimum and 95 psi (6.6 Bar) maximum.

SPECIFICATIONS

Sensor range: 115-180° F (46-82°C), factory set at 135° F (57°C),
Construction: Chamber: Stainless Steel
Temperature Sensor: Copper
Water Supply Valve: Bronze

ProtoNode

PROTOCOL GATEWAY

Instant Multiprotocol Deployment for OEM

Specifications 238414, 238415

FieldServer Technologies

A Sierra Monitor Company

*ProtoNode is an external, high performance, low cost **Building and Industrial Automation multi-protocol gateway** providing OEMs instant multiprotocol deployment of field protocol, quickly enabling the OEM device to communicate to systems and devices using modern open protocols.*

FieldServer Technologies pre-programs the ProtoNode solution to provide a virtual plug-and-play, easy, complete protocol package for the OEM including: BACnet MS/TP, BACnet/IP, Metasys N2 by JCI, Modbus TCP, Allen Bradley EtherNet/IP, LonWorks and many others. There are no configuration files to download in the field and all configurations are available to the user/installer simply by selecting the proper DIP switches. ProtoNode OEM users have access to the extensive FieldServer driver library.

ProtoNode is the instant answer to a manufacturer's needs to meet customer demands. As an example, a manufacturer might have five different devices, each requiring a variety of protocols to meet their customer's interoperability needs. They desire a single source solution, with multiprotocol, multi-configuration capability, and they need it now! A single ProtoNode Solution can be provided by FieldServer Technologies that has all pretested configuration choices preloaded. Up to 70 different pretested configurations with multiple protocol choices, selectable by DIP switches, can be stored on a single ProtoCarrier solution. A key benefit for the OEM is minimal engineering costs, minimized stocking costs and simplified training and start-up operations!

ProtoNode RER

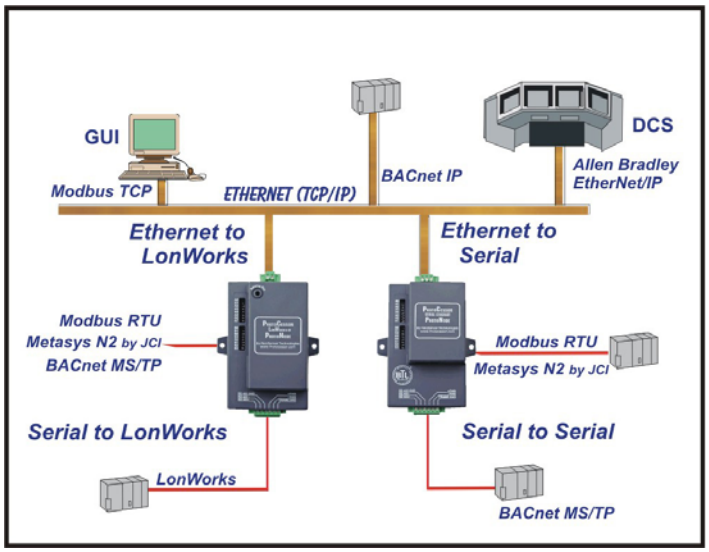
ProtoNode LER

ProtoNode RER is based on an ARM9 processor for fast performance and includes two serial ports (one RS-485 and the other can be RS-232, RS-485 or RS-422) and one Ethernet port. BACnet BTL marked (B-ASC)

ProtoNode LER includes a LONWORKS port plus Ethernet and RS-485 ports. LonMark certified.

ProtoNode Solution:

- ✓ Designed to be full featured, field programmable, and with multiple protocol support for any protocol translation between Serial, Ethernet, or LonWorks environments.
- ✓ Multiple hardware solutions available interfacing with RS-232, RS-485, RS-422, Ethernet or LonWorks.
- ✓ Serial or Ethernet versions support a total of 2400 Host and Field Protocol memory points.
- ✓ LonWorks versions support a total of 1500 Host and Field Protocol memory points.
- ✓ BACnet COV support provides fast data communication while reducing the traffic over a BACnet network.
- ✓ Supports virtual nodes allowing multiple OEM controllers to connect to a single ProtoNode and seen as separate controllers on the various field networks.
- ✓ Easily supports OEM's custom proprietary host serial or Ethernet protocols.
- ✓ Multi-Client and Multi-Server support ensures interoperability between any Industrial and or Building Automation protocols.
- ✓ BTL Marked and LonMark Certified



FieldServer Technologies, 1991 Tarob Court, Milpitas, California 95035 USA **Web:** www.protocessor.com
Tel: 408-964-4433, **FAX:** 408-262-9042, **Toll-Free**: 800-317-8319 **Email:** sales@protocessor.com

Specifications

Supported Electrical Connections

		Interface Connections				
		RS-232[1]	RS-485[2]	RS-422[3]	Ethernet[4]	LonWorks[5]
ProtoNode	FPC-N34		2		1	
	FPC-N35		1		1	1
	FPC-N36		1	1	1	
	FPC-N37			1	1	1
	FPC-N38	1	1		1	
	FPC-N39	1			1	1

[1] Tx/Rx/GND

[2] +/-/Frame Ground

[3] TBD

[4] 10/100 BaseT

[5] FTT10

Power Requirements

Power: 9-30 VDC or 12-24 VAC

Current draw @ 12V

RER @ 12V = 150 mA

LER @ 12V = 279 mA

Environmental

Operating Temp.: -40ºF to 167ºF (-40ºC to 75ºC)

Relative Humidity: 5-90% RH, non-condensing

Enclosure

Dimensions: 4.5 x 3.2 x 1.6 inches (L x W x H)
(11.5 x 8.2 x 4.0 cm)

Warranty

Warranty: Two years return to factory

Approvals

- BACnet Testing Labs (BTL) B-ASC
- LonMark 3.4 Certified - ProtoNode LER Series
- TUV approved to UL 916 standard and CSA C22-2
- RoHS Compliant
- DNP3 Conformance Tested
- OPC Self Certified to Compliance

BACnet Support

- ProtoCarrier-485 with FFP-485 is BTL Listed
- BACnet COV's
- Support up to 2,000 Host & Field points
- DIP switches are for setting MAC Address, Node-ID, Baud Rate on the RS-485 Field protocol

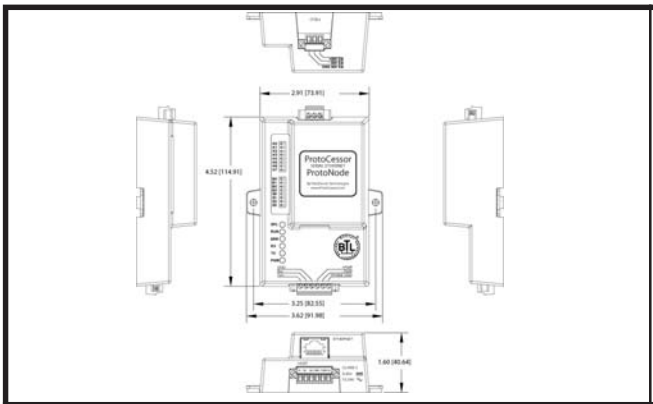
LonMark Certification on the ProtoNode LER

- SPID: 80:00:95:46:00:84:04:07
- Profiles:
  - 0000 - Node object (1)
  - 0001 - Open Loop Sensor Object (5)
  - 0003 - Open Loop Actuator Object (5)

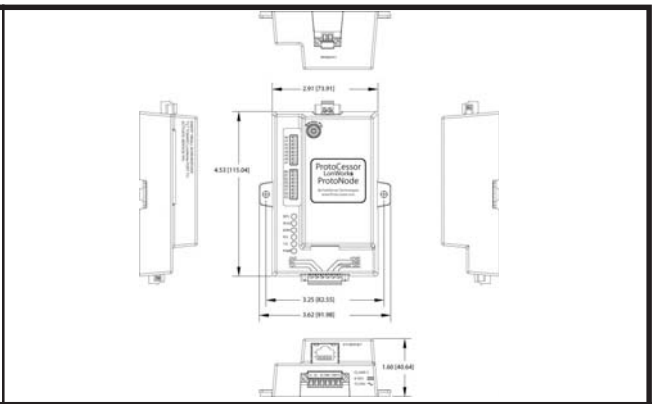
FieldServer Technologies has a full library of over 100 drivers so check with ProtoCessor sales to determine what additional protocols are available to meet specific application needs.

FieldServer Technologies offers a full range of OEM devices to enable manufacturers to easily provide the protocols their customers demand:

- ✓ **ProtoCessor** - embedded protocol translator
- ✓ **ProtoCarrier** - daughter cards to enable addition of ProtoCessor without hardware redesign
- ✓ **ProtoConnect** - semi-custom protocol OEM solution
- ✓ **ProtoNode** - external fully enclosed protocol OEM solution



ProtoNode RER Outline Dimensions



ProtoNode LER Outline Dimensions

6/2012

FieldServer Technologies, 1991 Tarob Court, Milpitas, California 95035 USA **Web:** www.protocessor.com
Tel: 408-964-4433, **FAX:** 408-262-9042, **Toll-Free**: 800-317-8319 **Email:** sales@protocessor.com

HC-201

Schneider Electric

Electric Duct Humidistat, Two-Position
General Instructions

APPLICATION

For low or line voltage on-off control of humidifiers, dehumidifiers, valves, solenoid valves, compressors, relay, etc.

SPECIFICATIONS

Control Dial Settings: 15 to 95% R.H.
Humidity Sensing Element: Nylon ribbon
Differential: 5% R.H.
Environment:
Ambient Temperature Limits,
Shipping & Storage, -40 to 140°F (-40 to 60°C).
Operating, 40 to 125°F (4 to 52°C).
Humidity, 5 to 95% R.H., non-condensing.
Location, NEMA 1, indoor location only.
Electrical Switch: Snap-acting SPDT (See Figure 1).
Ratings, See Table 1.
Connections: Coded screw terminal.
Cover: Metal.
Mounting: The outside surface of return air duct. Mounting template and five mounting screws provided.
Dimensions: 4-3/4" x 6-1/2" x 3-1/2" (121 x 165 x 89). See Figure 2.

Table-1 Maximum Electrical Ratings.

AC Volt 50/60 Hz	FLA	LRA	Resistive Amps	Pilot Duty VA
24	-	-	8	60
120	7.2	43.2	8	345
240	3.6	21.6	8	345

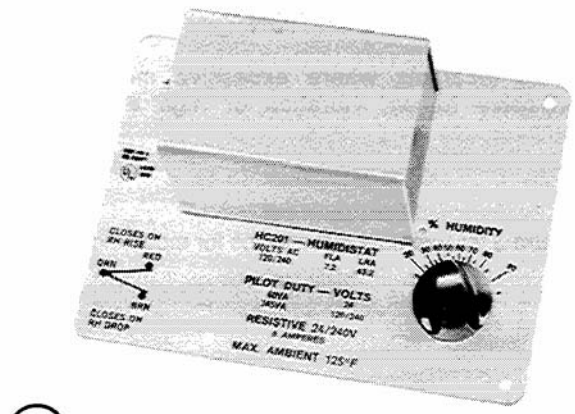


Figure-1 Switch Action and Terminal Identification.

PRE-INSTALLATION

Inspection

Inspect the carton for damage, if damaged notify the appropriate carrier immediately. Inspect the device for obvious damage due to shipping. Return damaged products.

Required Installation Items

- Wiring Diagrams
- Tools (not provided):
  - DVM (digital volt-ohm meter)
  - Appropriate screwdriver for terminal connections and mounting screws
  - Appropriate drill bit for mounting screws
- (5) Mounting screws (provided)
- (1) Cover screw (provided)

Cleveland Controls
Division of UniControl Inc.

Specifications 238414, 238415

Model AFS–262–112

AIR PRESSURE SENSING SWITCH WITH ADJUSTABLE SET POINT RANGE

APPLICATION

Model AFS-262-112 Air Pressure Sensing Switch is a general purpose proving switch designed for HVAC and Energy Management applications. It may be used to sense positive, negative, or differential air pressure. The **AFS-262-112** is equipped with convenient barbed sample line connectors that accept flexible tubing.

GENERAL DESCRIPTION & OPERATION

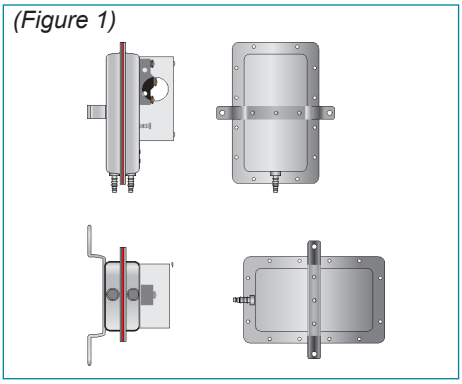
The plated housing contains a diaphragm, a calibration spring and a snap-acting SPDT switch.The barbed sample line connections located on each side of the diaphragm accept flexible tubing.

An enclosure cover guards against accidental contact with the live switch terminal screws and the set point adjusting screw. The enclosure cover will accept a ½" conduit connection.

MOUNTING (SEE FIGURE 1)

Select a mounting location which is free from vibration. The **AFS-262-112** must be mounted with the diaphragm in any vertical plane in order to obtain the lowest specified operating set point. Avoid mounting with the sample line connections in the "up" position. Surface mount via the two 3⁄16" diameter holes in the integral mounting bracket. The mounting holes are 3-⅞" apart.

(Figure 1)



AIR SAMPLING CONNECTION (SEE FIGURE 2)

The **AFS-262-112** is designed to accept flexible tubing by means of barbed ¼" slip-on connections. For sample lines of up to 10 feet, ¼" OD tubing is acceptable. For lines up to 20 feet, use ¼" ID tubing. For lines up to 60 feet, use ½" ID tubing. Locate the sampling probe a minimum of 1.5 duct diameters downstream from the air source. Install the sampling probe as close to the center of the airstream as possible. Refer to Figure 2 to identify the high pressure inlet (H) and the low pressure inlet (L). Select one of the following five application options, and connect the sample lines as recommended.

POSITIVE PRESSURE ONLY: Connect the sample line to inlet H; inlet L remains open to the atmosphere.

NEGATIVE PRESSURE ONLY: Connect the sample line to inlet L; inlet H remains open to the atmosphere.

TWO NEGATIVE SAMPLES: Connect the higher negative sample to inlet L. Connect the lower negative sample to inlet H.

TWO POSITIVE SAMPLES: Connect the higher positive sample to inlet H. Connect the lower positive sample to inlet L.

ONE POSITIVE AND ONE NEGATIVE SAMPLE: Connect the positive sample to inlet H. Connect the negative sample to inlet L.

Cleveland Controls
DIVISION OF UNICONTROL INC.
1111 Brookpark Rd
Cleveland OH 44109

Tel: **216-398-0330**
Fax: **216-398-8558**
Email:**saleshvac@unicontrolinc.com**
Web page: **http://www.clevelandcontrols.com**

ELECTRICAL CONNECTIONS (SEE FIGURE 3)

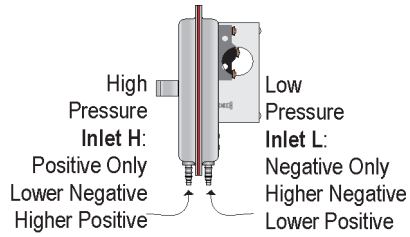
Before pressure is applied to the diaphragm, the switch contacts will be in the normally closed (NC) position. The snap switch has screw top terminals with cup washers. Wire alarm and control applications as shown in Figure 4.

FIELD ADJUSTMENT

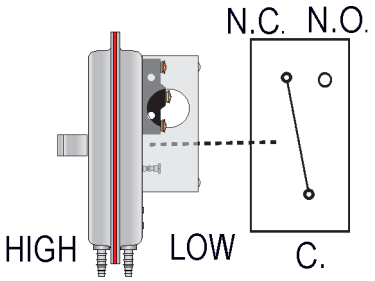
The adjustment range of an **AFS-262-112** Air Switch is 0.05±.02" w.c. to 2.0" w.c. To adjust the set point, turn the adjusting screw counterclockwise until motion has stopped. Next, turn the adjusting screw 4 complete turns in a clockwise direction to engage the spring. From this point, the next ten turns will be used for the actual calibration. **Each full turn represents approximately 0.2" w.c.**

Please note: To properly calibrate an air switch, a digital manometer or other measuring device should be used to confirm the actual set point.

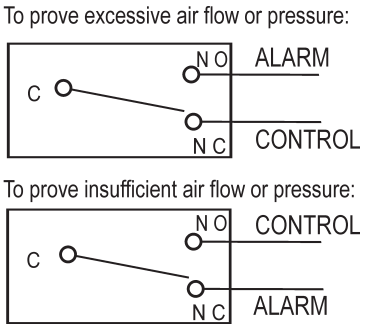
(Figure 2)

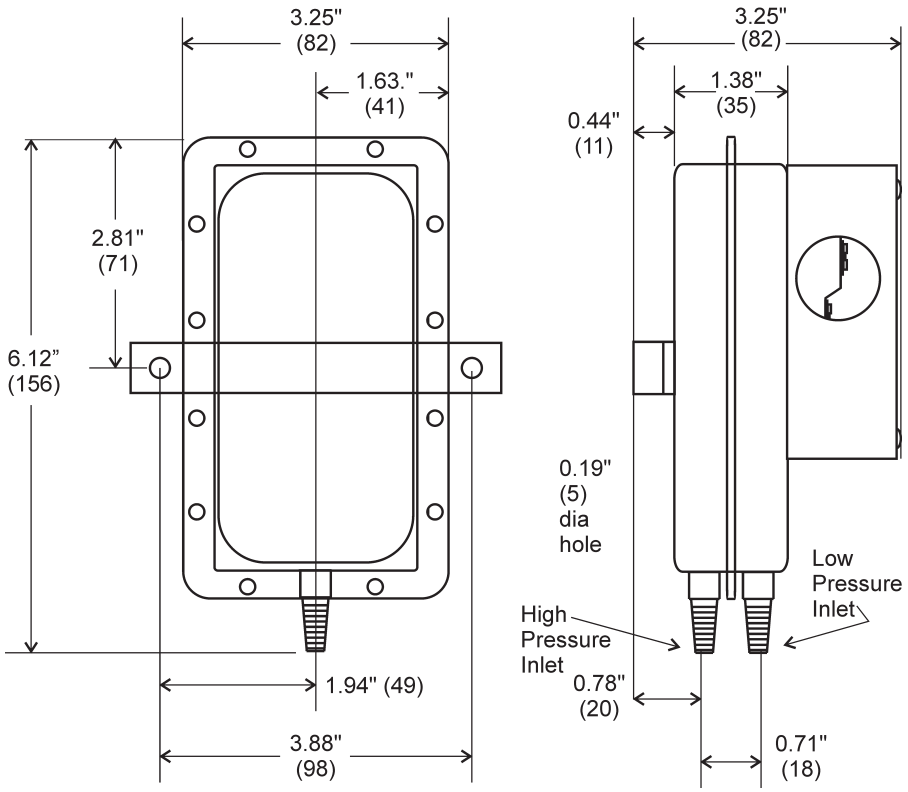


(Figure 3)



(Figure 4)





Nominal Dimensions in Inches (Millimeters)

SPECIFICATIONS

MODEL AFS-262-112 AIR PRESSURE SENSING SWITCH WITH ADJUSTABLE SET POINT RANGE

Mounting Position: Mount with the diaphragm in any vertical plane.

Set Point Range: 0.05 ± 0.02" w.c. to 2.0"w.c.

Field Adjustable "Operate Range": 0.07"w.c. to 2.0" w.c.

Field Adjustable "Release Range": 0.04"w.c. to 1.9" w.c.

Approximate Switching Differential: Progressive, increasing from 0.02 ± 0.01"w.c. at minimum set point to approximately 0.1 " w.c. at maximum set point.

Measured Media: Air, or combustion by-products that will not degrade silicone.

Maximum Pressure: ½ psi (0.03 bar).

Operating Temperature Range: -40F to 180F (-40 to 82C).

Life: 100,000 cycles minimum at ½ psi maximum pressure each cycle and at maximum rated electrical load.

Electrical Rating: 300 VA pilot duty at 115 to 277 VAC, 15 amps noninductive to 277 VAC, 60 Hz.

Contact Arrangement: SPDT.

Electrical Connections: Screw-type terminals with cup washers.

Conduit Opening: ⅞" diameter opening accepts ½" conduit.

Sample Line Connections: Two barbed ¼" connectors will accept ⅛" thru ¼" ID flexible plastic tubing.

Approval: UL, FM, CSA, CE

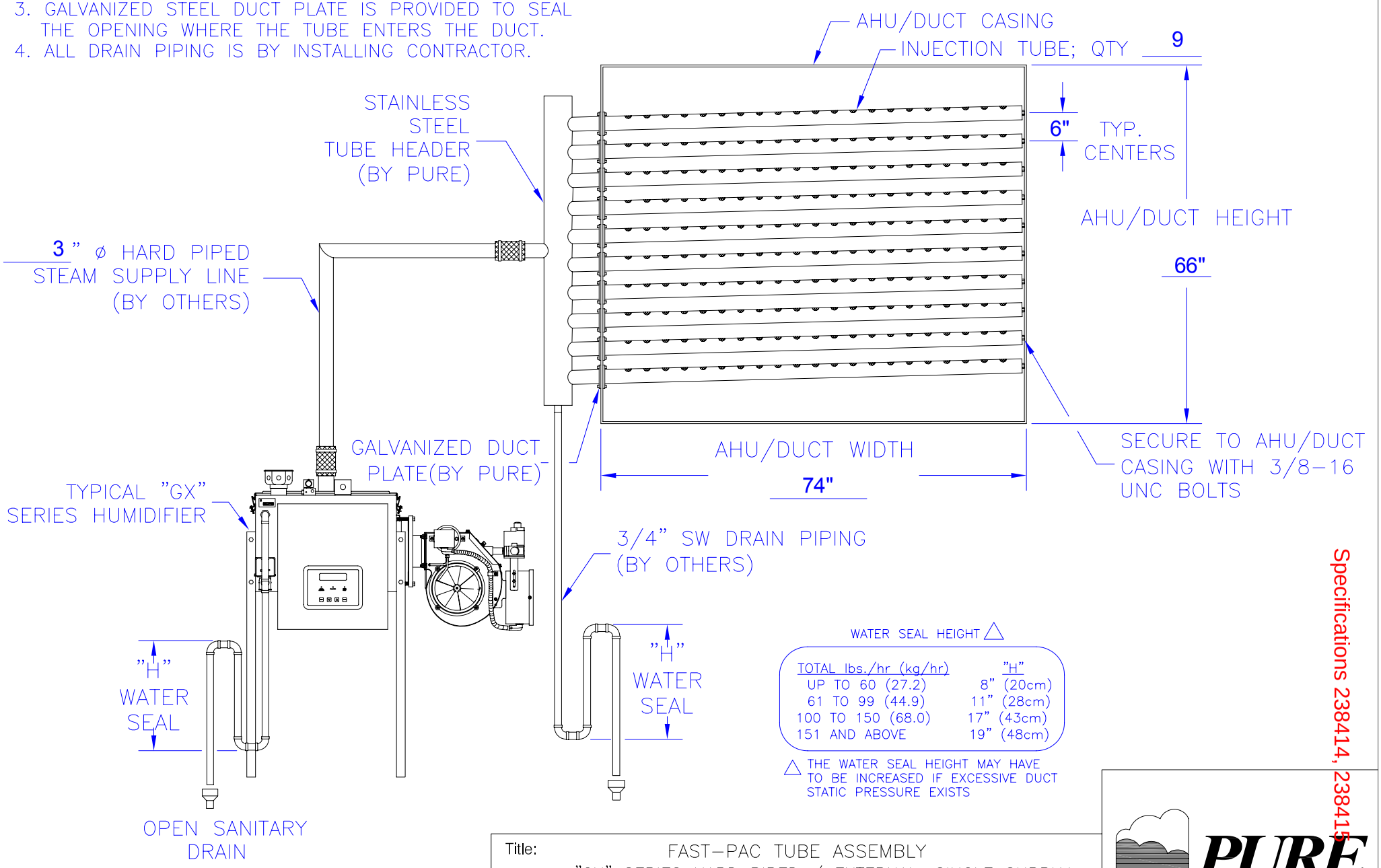
Shipping Weight: 1.2 lbs.

Accessories:

- Sample line probes.
- Orifice plugs (pulsation dampers).

1. STEAM SUPPLY PIPING AND INJECTION TUBE SHOULD BE PITCHED TWO INCHES (2") PER FOOT, BACK TO THE HUMIDIFIER.
2. INSTALL TUBE WITH ORIFICES INJECTING STEAM UP.
3. GALVANIZED STEEL DUCT PLATE IS PROVIDED TO SEAL THE OPENING WHERE THE TUBE ENTERS THE DUCT.
4. ALL DRAIN PIPING IS BY INSTALLING CONTRACTOR.

Tag: H-AHU9



WATER SEAL HEIGHT △

TOTAL lbs./hr (kg/hr)	"H"
UP TO 60 (27.2)	8" (20cm)
61 TO 99 (44.9)	11" (28cm)
100 TO 150 (68.0)	17" (43cm)
151 AND ABOVE	19" (48cm)

△ THE WATER SEAL HEIGHT MAY HAVE TO BE INCREASED IF EXCESSIVE DUCT STATIC PRESSURE EXISTS

Specifications 238414, 238415

Title: FAST-PAC TUBE ASSEMBLY "GX" SERIES HARD PIPED / EXTERNAL, SINGLE SUPPLY			
Scale: No Scale	Date: April 22, 2009	Drwn: P.R.G.	Dwg No: 9003

PURE Humidifier

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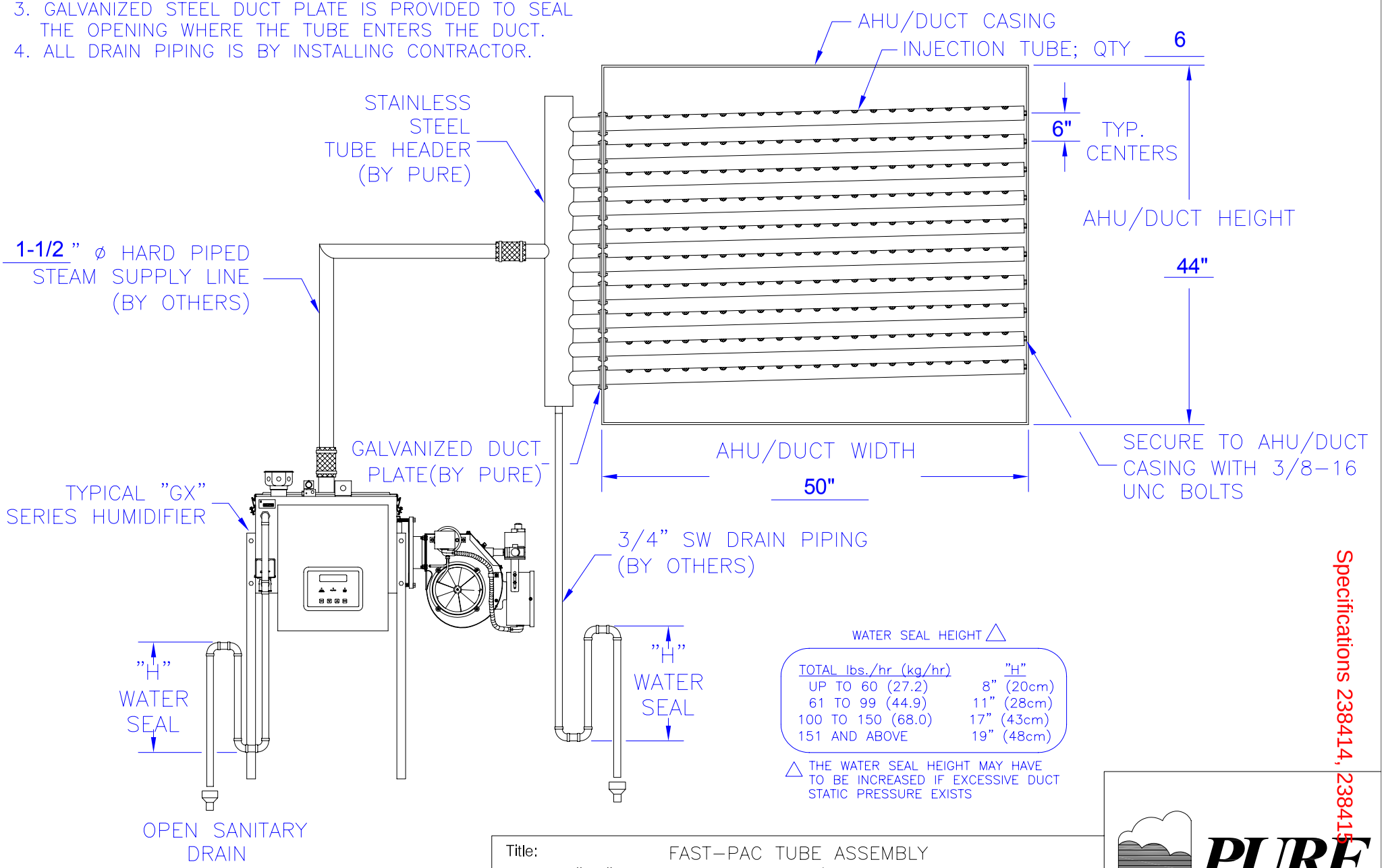
Tag: H-AHU9



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Specifications 238414, 238415

Title:	FAST-PAC TUBE ASSEMBLY "GX" SERIES HARD PIPED / EXTERNAL, SINGLE SUPPLY		
Scale: No Scale	Date: April 22, 2009	Drwn: P.R.G.	Dwg No: 9003

PURE Humidifier

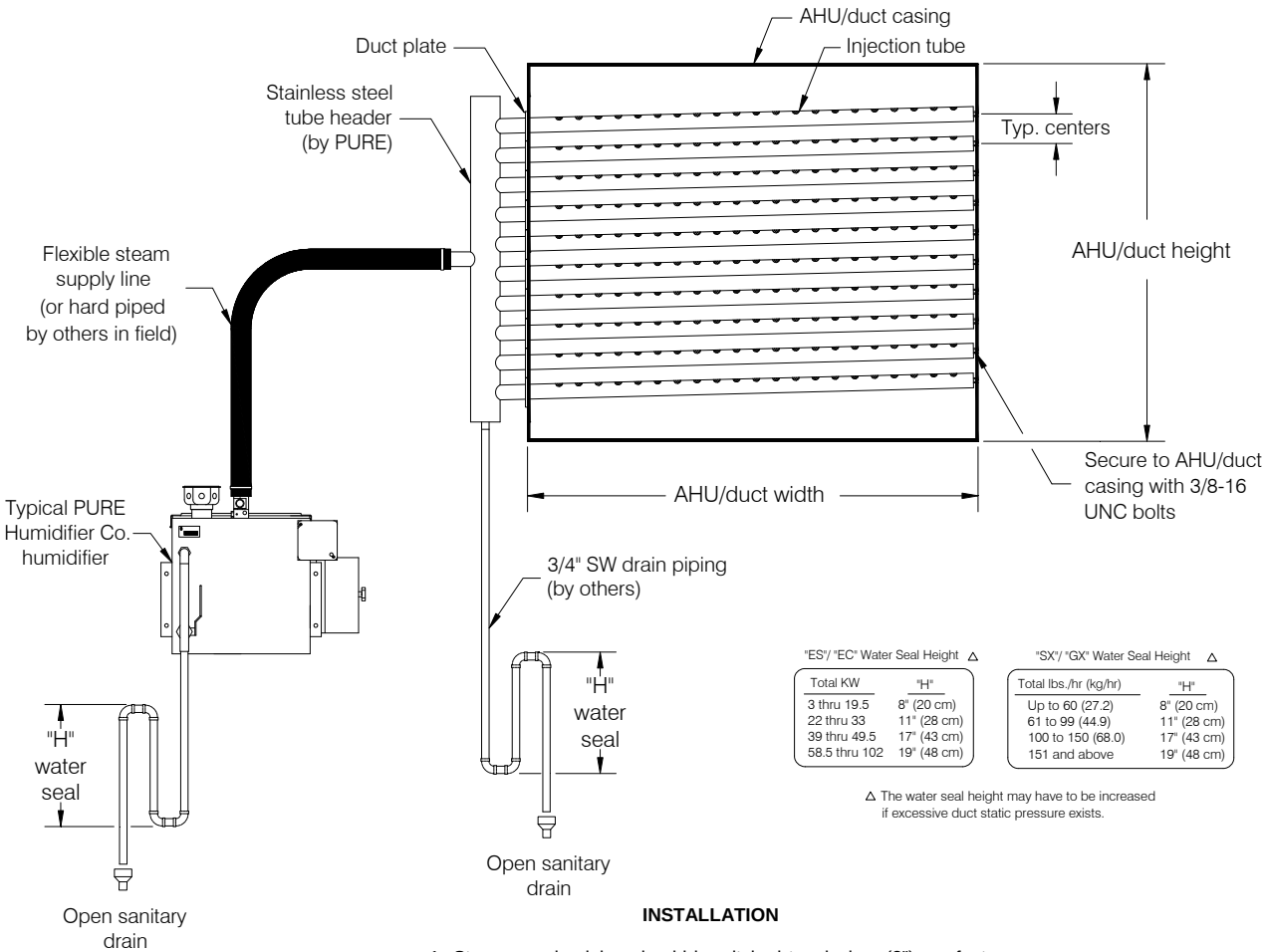
PURE™ Humidifier

READ AND SAVE THESE INSTRUCTIONS

WELDED FAST-PAC EXTERNAL MOUNT MULTIPLE TUBE ASSEMBLY

INSTALLATION AND ASSEMBLY INSTRUCTIONS

Fig. 1



"ES"/ "EC" Water Seal Height △

Total KW	"H"
3 thru 19.5	8" (20 cm)
22 thru 33	11" (28 cm)
39 thru 49.5	17" (43 cm)
58.5 thru 102	19" (48 cm)

"SX"/ "GX" Water Seal Height △

Total lbs./hr (kg/hr)	"H"
Up to 60 (27.2)	8" (20 cm)
61 to 99 (44.9)	11" (28 cm)
100 to 150 (68.0)	17" (43 cm)
151 and above	19" (48 cm)

△ The water seal height may have to be increased if excessive duct static pressure exists.

INSTALLATION

1. Steam supply piping should be pitched two inches (2") per foot, back to the humidifier.
2. Install tube with orifices injecting steam up.
3. All drain piping is done by others.

Welded Multiple Injection Tube Assembly External Mounting Instructions

The multiple tube assembly supplied with the humidifier(s), is designed for rapid dissipation of the steam. The tube assembly is designed for ***external*** AHU or duct mounting.

VERIFY COMPONENTS

Unpack the components from the shipping container. Verify all components are checked off according to the packing list and the *COMPONENTS IDENTIFICATION DRAWING* (Fig. 2). Report any missing pieces to your local PURE Humidifier Co. representative immediately.

LOCATION

1.) Mount the injection tube assembly in the AHU or duct work as shown on the project plans or as indicated by the project engineer.
2.) Install the injection tube with the 3/4"-NPT drain connection, located on the tube header, directed towards the bottom of the AHU or duct.
3.) Install the tube assembly so that the injection tubes are pitched back towards the header with a minimum of two inches (2") of pitch per foot. (welded assemblies have factory installed pitch).
4.) Install the tube assembly with the steam discharge ports facing upwards.
5.) The tube assembly should be centered in the AHU or duct height with an even distance between the bottom tube and the casing floor and the top tube and the casing ceiling.

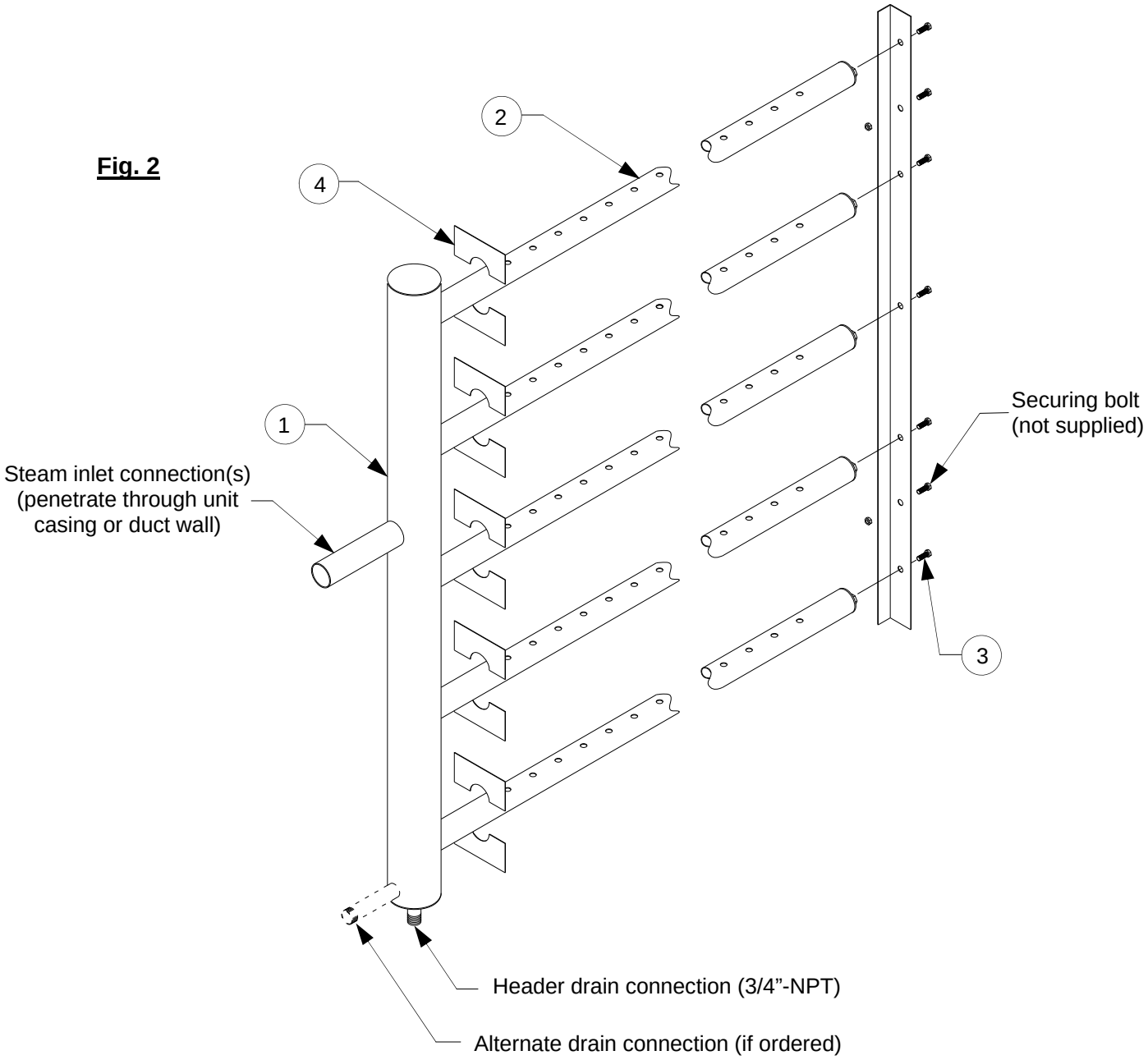
MOUNTING

1.) Layout the center lines for the injection tubes on the AHU or duct wall. The injection tubes have a 1-1/2" outside diameter. Duct plates are provided to seal the opening. The layout should be based on the "Location" instructions listed above (see Fig. 3).
2.) Cut a minimum of a 1-1/2" diameter hole, through the AHU or duct wall, for each injection tube (see Fig. 3).
3.) Slide the injection tubes through the access holes (cut in the steps above). Secure the tubes to the AHU or duct wall with 3/8"-16 UNC fasteners (by others).
4.) Seal the openings where the injection tubes penetrate through the AHU or duct wall with the duct plates provided (see Fig. 3).
5.) Connect steam supply and condensate piping to the humidifier as illustrated in Fig. 1.

External Mount Multiple Injection Tube Assembly
Component Identification

ITEM NO.	DESCRIPTION	QUANTITY
1	Supply/condensate header	1
2	Injection tubes	varies with order
3	Tube mounting bolts	1 per tube
4	Duct plate (supply)	1 per tube

Fig. 2



Header & Support Bracket Mounting Detail

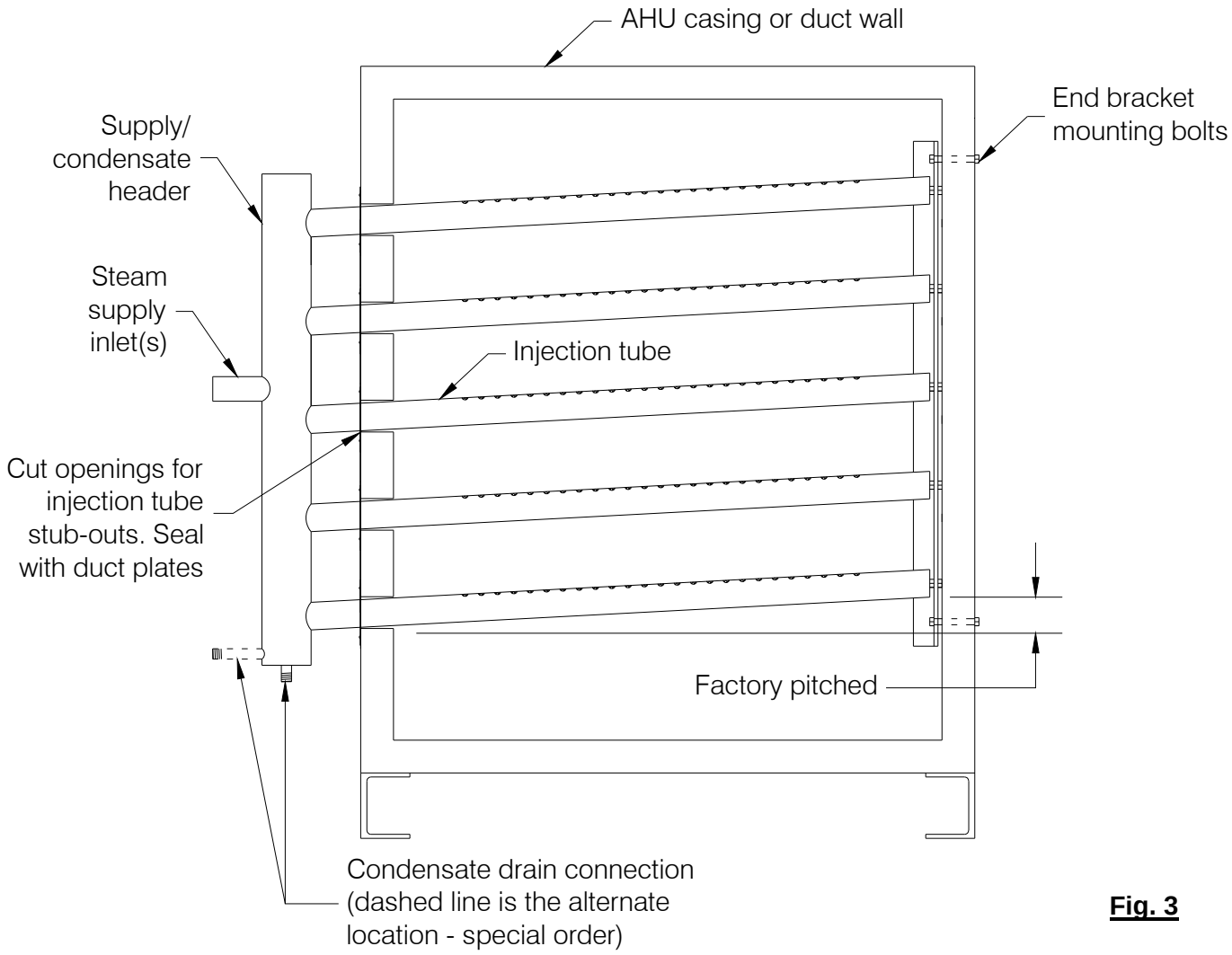


Fig. 3

Notes:

1.) Center the Fast-Pac injection tube assembly in the duct height.

2.) Install the Fast-Pac injection tube assembly so that the header is plumb.

3.) Install injection tubes with the orifices injecting upwards.

4.) All condensate drain piping is by others.

Installation Tips

Condensate Return Line
Condensate from the header cannot be elevated. Do not connect water seals to pressurized condensate return lines.**The drain piping should be copper or stainless steel. The use of PVC piping is not recommended; the humidifier temperature will cause the PVC to soften and fail.**

Laminar air flow
Tube assembly must be installed in a location that allows for laminar air flow across entire grid. A minimum velocity of 300 feet per minute is required to avoid saturation and excessive fog travel.

Plug fan installations
Install tube assembly as close as possible to the upstream coil to ensure laminar airflow and proper absorption.

Insulated ducts
Internally insulated ducts must be lined with a non-absorbent material to avoid saturation. If the duct is lined it must be removed three feet (3') upstream and ten feet (10') downstream of tube assembly.

Final Filters
Tube assembly must be installed a minimum of ten feet (10') upstream of final filters.

VAV Systems
Low velocity will cause long fog trails and steam will rise wetting the top of the AHU/duct casing. Modulating VAV high-limit humidistat is required. A minimum velocity of 300 feet per minute is required to avoid saturation and excessive fog travel.

Controls

Fan Interlock Switch
PURE Humidifier Co. recommends the use of an air flow proving switch or fan interlock to prove air flow prior to humidifier cooperation. Humidifier operation without air flow will result in over-saturation of the air stream. Air flow proving switches are available as optional equipment from your PURE Humidifier Co. representative.

High-Limit Humidistat
PURE Humidifier Co. recommends the use of a duct high-limit humidistat to prevent humidifier operation when the duct humidity level exceeds 85% relative humidity. Humidifier operation above 85% relative humidity can result in over-saturation of the air stream. High-limit humidistats are available as optional equipment from your PURE Humidifier Co. representative. The high limit humidistat should be 8 to 10 feet (244-305 cm) downstream from the humidifier injection tube. Installing the high-limit closer than 8 feet (244 cm) from the humidifier may cause erratic control.

Smoke Alarms and Temperature Sensors
Smoke alarms should be located 12 to 14 feet (365-427 cm) upstream from the humidifier injection tube.

Temperature sensors should be located 12 to 14 feet (365-427 cm) downstream from the humidifier injection tube, or past any visible fog travel that may be greater than this distance.

Troubleshooting

Too Much Humidity

1. Humidity controller out of calibration.
2. Humidifier oversized.
3. Check humidifier (GX, SX, ES, EC) for proper operation.

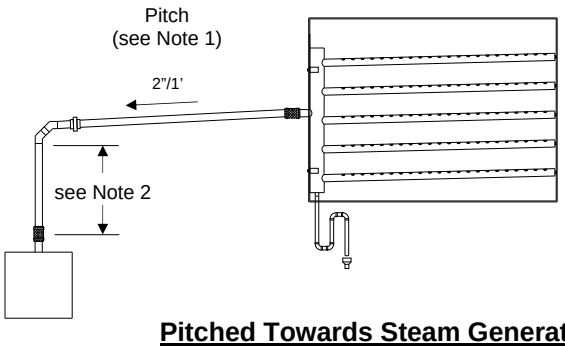
Too Little Humidity

1. Humidity controller out of calibration.
2. Undersized humidifier.
3. Check humidifier (GX, SX, ES, EC) for proper operation.
4. Water seals are not primed.
5. Water seals are blown due to improper supply piping.

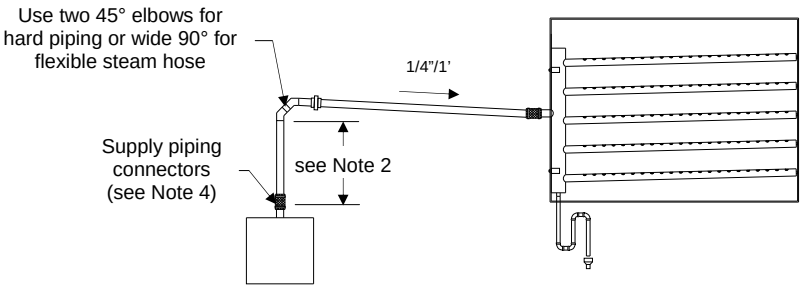
Humidifier Discharges Water

1. Faulty drainage:
    A) Return line pressure greater than humidifier pressure.
    B) Return line flooded.
    C) Vertical lift.

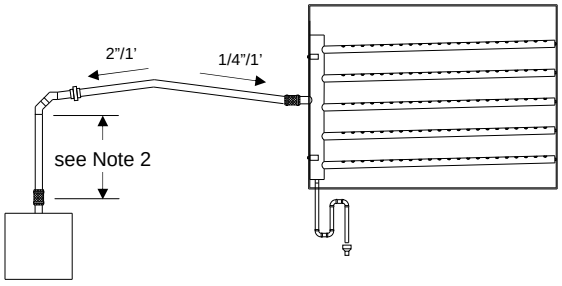
Steam Supply Piping Examples



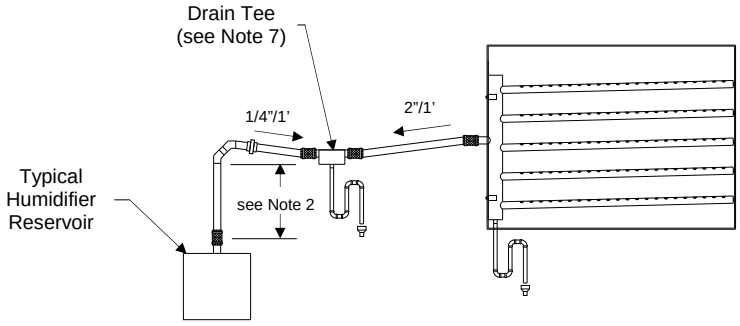
Pitched Towards Steam Generator



Pitched Towards Tube Assembly



Pitched Towards Steam Generator and Tube Assembly



Pitched Towards Drain Tee

Notes:

1. Pitch hard piping or flexible hose 2" per foot if steam is flowing uphill, 1/4" per foot if the steam is flowing downhill. Reference piping examples shown.
2. When feasible to do so, install a minimum one-foot riser from the top of the tank to reduce condensate carryover.
3. Use flex connectors or unions to allow for easy removal of cover.
4. Support flexible hose every 18" to avoid sagging.
5. Hard piping or flexible hose must match reservoir outlet size. Do not use supply piping with a smaller inside diameter than the reservoir outlet.
6. Failure to follow the piping recommendation on this page may result in blown water seals, leaking cover gasket, or dispersion tubes spitting.
7. Install a Drain Tee at any low spots in supply piping run where condensate will accumulate. **All horizontal to vertical up transitions require a water-sealed drip leg.**
8. Reference job specific tube assembly O&M included with your order for complete details.

DISCLAIMER

Product Changes: Changes in products may be required from time to time due to factors beyond the Seller's control, or the need for continuing improvement of products. The Seller reserves the right to make reasonable changes in products, specifications and performance of any kind without notice or liability. The Seller also reserves the right to deliver revised designs or models of products against any order, unless this right is specifically waived in writing by the Seller. The Seller shall have no responsibility whatsoever with respect to changes made by the manufacturer in products sold but not manufactured by the Seller.

PURE Humidifier

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PURE Humidifier

READ AND SAVE THESE INSTRUCTIONS

Deionized, Demineralized, or Reverse Osmosis Water

"GXDDR" Series

Gas Fired Exchanger Humidifier

Installation Instructions

Operation and Maintenance Manual

FOR YOUR SAFETY:
Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

WARNING:
Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Refer to this manual. For assistance or additional information consult a qualified installer, service agency, or the gas supplier.

WARNING:
If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

WHAT TO DO IF YOU SMELL GAS:
Do not try to light any appliance.
Do not touch any electrical switch; do not use any telephone in your building.
Immediately call your gas supplier from a neighbor's telephone.
Follow the gas supplier's instructions. If you can not reach your gas supplier, call the fire department.

IMPORTANT: Read and save this guide for future reference. This guide to be left with equipment owner.

ETL/ETLC Listed # 43438 To "IAS 12-94 Gas Fired Humidifier"

Our results are comforting

PURE Humidifier

Introduction

To the user of PURE Humidifier Co.'s "GXDDR" Series Gas Fired Humidifiers

We at PURE Humidifier Co. thank you for choosing one of our quality products. PURE Humidifier Co. "GXDDR" Series humidifiers are models of simplicity to install, operate and maintain. However, they must be maintained to provide maximum operating efficiency.

PLEASE READ AND FOLLOW ALL INSTRUCTIONS CAREFULLY. PROPER OPERATION AND HUMIDITY CONTROL IS POSSIBLE ONLY WITH PROPER INSTALLATION AND MAINTENANCE.

The "GXDDR" Series Humidifier is specifically designed to operate with deionized, demineralized , or reverse osmosis water. All components that will be in contact with the water are constructed of type 304 stainless steel, incoloy, or corrosion resistant materials.

Use of mineralized (hard or soft) tap water will cause fill valve failure and void the warranty. PURE Humidifier Co.'s "GX" Series should be installed on applications that require tap water.

High chloride content in feed water can cause chloride stress cracking and chloride pitting in stainless components. Chloride stress corrosion cracking (CSCC) and chloride pitting of stainless steel components is not covered by warranty. Do not use hydrochloric acid descalers or bleach to clean the tank. Consult the factory if you are unsure about which chemical descaler to use.

To ensure proper installation of this product, it must be installed by qualified HVAC and electrical contractors, and must be in compliance with local, state, federal, and governing codes. If installed improperly this product may cause damage to property, severe personal injury, or death as a result of electric shock, burns, and/or fire.

Do not adjust any components inside humidifier control box without consulting the factory.

For indoor installation in conditioned spaces only unless supplied with an outdoor enclosure.

REMOVE INTERNAL PACKING MATERIAL FROM AROUND THE FLOAT BALL ASSEMBLY BEFORE STARTING UNIT. FAILURE TO DO SO CAN RESULT IN THE OVER-HEATING OF THE HUMIDIFIER AND POTENTIAL FIRE.

Table of Contents

The PURE Humidifier Co. Warranty

PURE Humidifier Co. guarantees its products to be free from defects in material and workmanship for a period of two years from the date of shipment; provided the product is properly installed, serviced, and put into the service for which it was intended.

Chloride stress corrosion cracking (CSCC) and chloride pitting of stainless steel components is not covered by warranty.

PURE Humidifier Co. is obligated under the terms of this warranty to the repair or replacement of the defective part(s), excluding any labor charges, or to refund the purchase price at our option. PURE Humidifier Co. assumes no obligation for incidental or consequential damages. The above provisions are in lieu of all other guarantees, obligations, liabilities or warranties, expressed or implied.

PURE Humidifier

Safety Precautions & Installation

WARNING:
Improper installation, adjustment, alterations, service, maintenance, or use can cause carbon monoxide poisoning, an explosion, fire, electrical shock, or other conditions which may cause property damage, personal injury or loss of life. Consult a qualified installer, service agency, local gas supplier, or your distributor or branch for information or assistance. The qualified installer or agency must use only factory authorized and listed kits or accessories when modifying this product. A failure to follow this warning can cause electrical shock, fire, personal injury, or loss of life.

Inspect humidifier and accessories upon arrival for damaged, missing, or improper parts. If there is a problem, call PURE Humidifier Co.

Application of this humidifier should have special attention given to vent sizing and material, gas input rate, and unit sizing. Improper installation or misapplication of the humidifier can require excessive servicing or cause permanent component failure.

Installation:

Precautions
The installation must conform to the requirements of the authority having jurisdiction, or in the absence of such requirements, to the National Fuel Gas Code, ANSI Z223.1 (latest edition). In Canada, the installation of this unit must comply with local plumbing or waste water codes and other applicable codes and with the current code CAN/CGS-B149.1 “Installation Code for Natural Gas Burning Appliances and Equipment or CAN/CGA-B149.2 “Installation Code for Propane Burning Applications and equipment.”

Do **not** install in potentially explosive or flammable atmospheres laden with grain dust, sawdust, or similar airborne materials.

Installation of humidifier in high humidity or salt water atmospheres will cause accelerated corrosion, resulting in a reduction of the normal lifespan of the unit.

Humidifier must be located in a conditioned space.

To prevent premature heat exchanger failure, do **not** locate ANY GXDDR unit in areas where chlorinated, halogenated or acid vapors are present in the atmosphere.

Locate the humidifier in an area clear of combustible materials, gasoline, and other flammable vapors and liquids.

When working on equipment, observe precautions in this literature, tags, and labels attached to or shipped with the unit, and other safety precautions that may apply. **Have fire extinguisher available during start-up, adjustment procedures, and service calls.**

Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

Do not lift humidifier by gas controls or gas manifold.

Should overheating occur, or the gas supply fail to shut off, shut off the manual gas valve to the appliance before shutting off the electrical supply.

Do not locate units in tightly sealed rooms or small compartments without provision for adequate combustion air and venting. Combustion air must be supplied to the confined space through a minimum of two permanent openings in the enclosure, with at least one near the bottom. They should provide a free area of one square inch per 1000 BTU per hour input rating of the unit with a minimum of 100 square inches for each opening, whichever is greater. Refer to Venting Installation information on pages 8 & 9.

PURE Humidifier

Installation & Location

Important: Remove all shipping brackets and materials before operating the humidifier. Humidifier flue gases must be vented to the outside atmosphere. Power supply disconnect switch must be in the off position while making wiring connections to prevent electrical shock and equipment damage. All units must be wired in strict accordance with wiring diagram furnished with this unit.
Turn off all gas while installing the supply gas piping and field installed manual gas shut-off valve for the humidifier.

Location

The location selected must provide for electrical service, cold or hot water supply, and sanitary drain.

When selecting a location, try to keep the humidifier within 10 feet (305 cm) of the duct to avoid unnecessary heat losses and condensation within the steam supply line.

Visible “fog” will saturate and condense when it contacts objects such as turning vanes, filters, fans, elbows or take-offs. The warmer the air, the more easily it will dissipate the visible steam. The most active and warmest portion of the duct will provide better mixing of the steam and air. The injection tube should be mounted a minimum of 2 feet (61 cm) downstream from an elbow or other turbulent air-flow area.

Avoid mounting single style injection tube(s) closer than 8-10 feet (244-305 cm) upstream of objects that could become saturated and condense the steam (reference the paragraph above). If the duct layout does not provide a straight unobstructed run of 8-10 feet (244-305 cm), a multiple injection tube system should be considered to reduce the visible steam travel distance.

For Fast-Pac and Insty-Pac multiple tube assemblies please consult factory for job specific non-wetting distances.

Reference Fast-Pac or Insty-Pac O&Ms for full installation details.

CAUTION: Do not humidify upstream of filters. Consult factory.

CAUTION: Smoke detectors should not be located downstream of injection tube assemblies.

Location of Controls

It is important to avoid mounting any controls within the visible steam. The controls should be mounted a minimum of 8-10 feet (244-305 cm) downstream from the humidifier injection tube. Due to the temperature rise that exists within the visible steam dissipation area, thermostats should not be mounted near the injection tube.

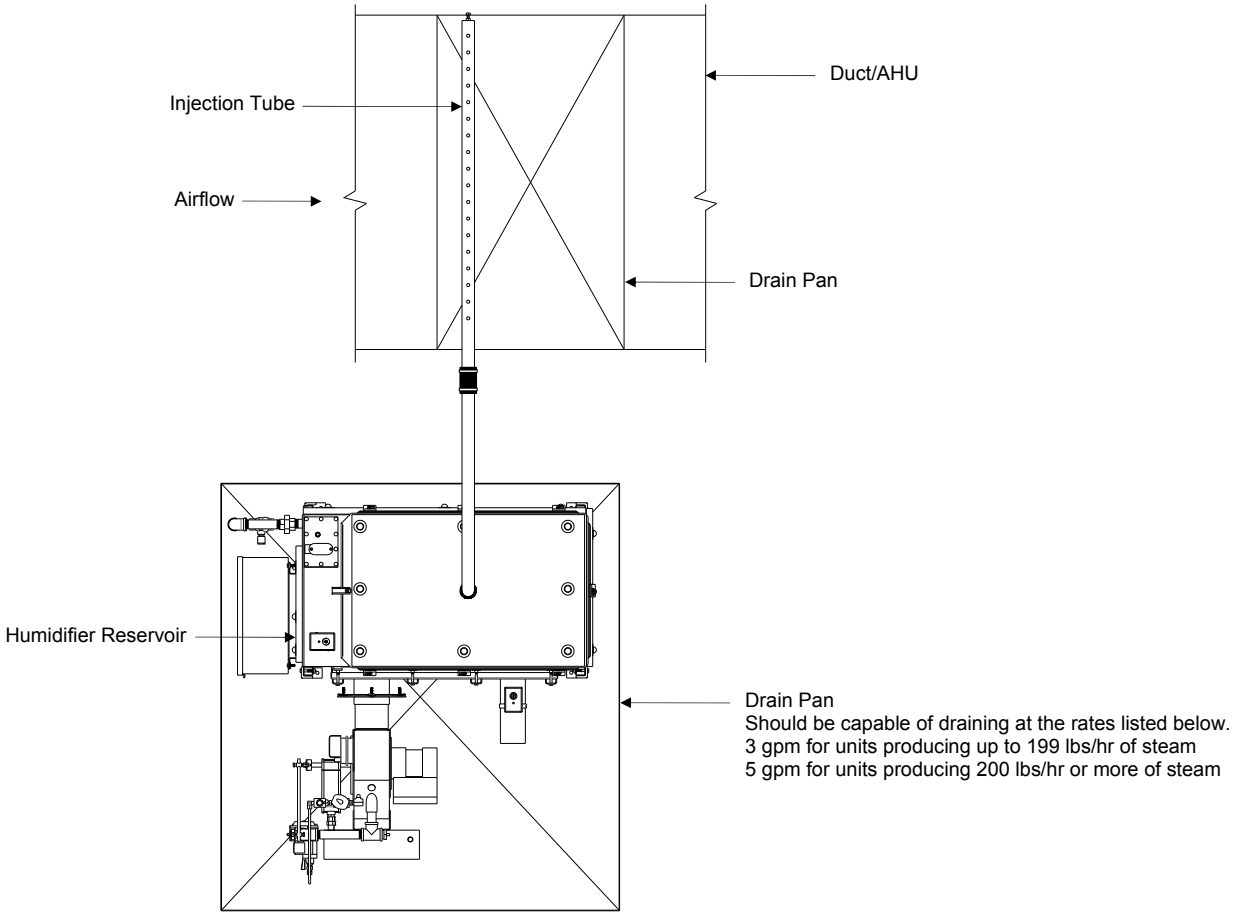
High-limit humidistats should be installed before any duct obstruction to make sure the humidifier is interrupted before saturation can occur on the object. The high-limit should be mounted a minimum of 8-10 feet (244-305 cm) downstream from the injection tube. Installing the high-limit closer than 8 feet (244 cm) from the humidifier may cause erratic control.

PURE Humidifier

Drain Pan Mounting

Drain Pan Mounting

A drain pan is an additional safety feature which may be required to be supplied in the field. In a proper humidifier installation, a drain pan is not required. However, if the humidifier and injection tube are located in an area that contains valuable equipment or is a water sensitive area, PURE Humidifier Co. recommends the addition of a drain pan under the humidifier and under the injection tube. The drain pan should extend past all edges of the humidifier and if installed in the duct, it should extend a minimum of 3 feet (91 cm) downstream from the injection tube. The pan should be of a size which is capable of draining at a rate of 3 gpm for units with a capacity of up 200 lbs/hr, and 5 gpm for units with a capacity over 200 lbs/hr. The pan should be drained to a sanitary drain.



Humidifier Reservoir and Injection Tube Plan View

PURE Humidifier

Electrical, Combustion and Ventilation Air

Electrical

WARNING:
The cabinet **must** have an uninterrupted or unbroken ground according to National Electrical Code, ANSI/ NFPA 70 and Canadian Electrical Code, CSA C22.1, or local codes to minimize personal injury if an electrical fault should occur. This may consist of electrical wire or conduit approved for electrical ground when installed in accordance with existing electrical codes. Do not use gas piping as an electrical ground.

Connect copper ground wire to cabinet ground lug.

Humidifiers should be supplied with 120-volt AC, 60 Hz, 15-amp separately fused electrical service. The humidifier is equipped with a transformer to step down the voltage to 24 VAC control voltage.

When installed, the humidifier must be electrically grounded in accordance with local codes, or in the absence of local codes, with the National Electrical Code ANSI/NFPA No. 70-1987. The electrical conductors shall be a minimum Type MTW (105*C) AWG #14 wire for line voltage (120V), with BLACK WIRE for HOT; WHITE WIRE for NEUTRAL, GREEN WIRE for GROUND; and minimum #18 gauge for control wiring. All electrical components and wiring must be protected from mechanical damage and water. The control system requires an earth ground for proper operation.

The humidifier is adjusted for correct performance. Do not alter fan or operate motors at reduced speed.

The current characteristics, and capacity requirements should be checked against the nameplates. All wiring must be in accordance with all governing codes, and with wiring diagram located inside the control cabinet.

See separate publication for the INTAC® controller furnished with this humidifier.

Combustion and Ventilation Air

CAUTION:
Air for combustion must not be contaminated by halogen compounds, which include fluoride, chloride, bromide and iodide. These elements are found in aerosol sprays, detergents, bleaches, cleaning solvents, salts, air fresheners, and other household products.

CAUTION:
The operation of exhaust fans, kitchen ventilation fans, clothes dryers, or fireplaces could create a negative pressure condition at the humidifier. Make-up air must be provided for the ventilation devices, in addition to that required by the humidifier.

All fuel burning equipment must be supplied with air for combustion of the fuel. Sufficient air MUST be provided to ensure there will not be a negative pressure in the equipment room or space.

Provisions for adequate combustion and ventilation air must be provided in accordance with Section 5.3, Air for Combustion and Ventilation, of the National Fuel Gas Code ANSI Z223.1 1-1988, or applicable provisions of the local building codes. Canadian installations must be installed in accordance with sections 7.2, 7.3, and 7.4 of the CAN/CGA.B149 Installation Codes, and all authorities having jurisdiction.

PURE Humidifier

Gas Piping Installation

CAUTION:
Gas pressure to humidifier controls must never exceed 14" W.C. (1/2 psi).

Contact your local gas service company to ensure that adequate gas service is available, and to review applicable installation codes for your area. All gas piping installations must be in accordance with codes, and ANSI Z233.1, "National Fuel Gas Code," or CAN/ CGA-B149 in Canada.

Do not use flexible connectors.

Piping to units should conform with local and national requirements for type, volume, gas handled, and pressure drop allowed in the line. Refer to tables 1 and 2 to determine the cubic feet per hour (cfh) for the type of gas and size of unit to be installed. Using this value and the length of pipe necessary, determine the pipe diameter. Where several units are served by the same main, the total capacity, gas flow (cfh), and length of main must be considered. The figures shown are for straight lengths of pipe at 0.2" w.c. pressure drop, which is considered normal for low-pressure systems. Note that fittings such as elbows and tees will add to the pipe pressure drop.

After threading and reaming the ends, inspect piping and remove loose dirt and chips.

Support piping so that no strains are imposed on unit or controls.

Use two wrenches when connecting piping to unit controls.

Provide a drip pocket before each unit and in the line where low spots cannot be avoided.

Take-off to unit should come from top or side of main to avoid trapping condensate.

Piping subject to wide temperature variations should be insulated.

Pitch piping up toward unit at least 1/4" per 15' of horizontal run.

Compounds used on threaded joints of gas piping must be resistant to the harmful action of liquefied petroleum gases.

Purge air before lighting unit by disconnecting piping at gas control. **In no case should the line be purged into heat exchanger.**

Install pressure regulator directly upstream of main automatic gas valve(s) and fit drip leg main gas cock upstream of regulator or automatic valve(s).

Install vent lines from main gas regulator (if used) and diaphragm gas valve where applicable. Vent lines should be run to the outside of the building, terminating clear of windows or fresh air intakes. Outside termination of vent should have a screen to prevent insects from building nests in vent pipe.

Install a ground joint union and a manual gas shut-off valve immediately upstream of the unit including a 1/8" NPT plugged tapping accessible for test gauge connection.

Allow at least 5 feet of piping between any high pressure regulator and unit pipe connection.

PURE Humidifier

Gas Piping Installation (Con't)

Gas Leak Testing
When testing the gas supply piping system, the humidifier and its gas shut-off valve must be disconnected during any pressure testing in excess of 14" W.C. (1/2 psi). The humidifier must be isolated from the gas supply piping system by closing its field-installed manual shut-off valve during any pressure testing equal to or greater than 14" W.C. (1/2 psi).

Test gas lines for leaks using a soap solution. Your local gas service company may wish to execute or witness this test. CAUTION: Gas pressure above 14" W.C. may damage the standard diaphragm gas shut-off valve. Do not exceed this value when pressure testing lines unless you cap-off line upstream of main gas cock and pilot take-off.

Check gas supply pressure with all burners running at inlet pressure tap of gas control. The recommended supply pressure should be 7" W.C. on natural gas or 11" W.C. on LP gas. Purging of gas piping should be performed as described in ANSI Z223.1 (latest edition), or in Canada in CAN/CGA-B149 codes.

Minimum supply pressure. Natural - 5" W.C. LP - 5" W.C.

Gas valves outlet pressure (manifold) shall be factory set. **This pressure can be checked at the 3/4" tee after the orifice.** See humidifier label for correct pressure rating.

Table 1 - Gas Input CFH for GXDDR-Series Humidifiers

Model No.	Max BTU/hr Input	Max CFH (Nat. Gas)	Max CFH (Propane)
GXDDR-3	150,000	150	60
GXDDR-4	400,000	400	160
GXDDR-8	800,000	800	320
GXDDR-12	1,200,000	1,200	480

Table 2 - Gas Piping Pressure Drop Data

EQUIVALENT LENGTH OF STRAIGHT PIPE IN FEET									
	20	30	40	20	60	80	100	150	200
CFH GAS WITH .2" PRESSURE DROP									
Pipe Size in Inches									
3/4"	152	120	105	93	84	73	66	54	45
1"	300	250	210	190	180	150	135	110	75
1 1/4"	520	425	360	325	300	260	230	190	165
1 1/2"	800	690	560	500	480	410	370	300	260
2"	1700	1400	1200	1100	1000	850	750	600	540
2 1/2"	3000	2500	2100	1900	1800	1550	1375	1100	950
EQUIVALENT LENGTHS OF STANDARD PIPE IN FEET FOR LISTED FITTINGS									
Fitting Type	3/4	1	1 1/4	1 1/2	2	2 1/2	Nominal		
Std. Tee	2.4	5.5	7.5	9	12	13.5	Pipe Size		
Std. Elbow	4.4	2.7	3.7	4.5	5.5	6.1	in Inches		

PURE Humidifier

Venting Installation

For proper and safe operation this appliance needs air for combustion and ventilation. DO NOT block or obstruct air openings on the appliance, spaces around the appliance, or air openings communicating with the appliance area.

DO NOT block the flow of combustion and ventilation air. To provide for necessary oxygen for proper combustion, opening must be provided to allow outside air to enter the space in which the heater is located. Enclosed spaces, such as equipment rooms, must be vented at the blower for combustion air. The size of air openings must be based on all gas-burning equipment installed in the space involved. Provisions for adequate combustion and ventilation air in accordance with Section 5.3, Air for Combustion and Ventilation, of the National Fuel Gas Code, ANSI Z223.1, or Sections 7.2, 7.3 or 7.4 of the CAN/CGA B149 Installation Codes, or applicable provisions of the local building codes.

The burner should be initially set up and serviced at regular intervals (preferably at the beginning of and mid -way through high use period) by a trained serviceman using the proper test instruments. Failure to maintain the correct burner settings may result in inefficient gas consumption, premature wear of burner components, or explosion hazard.

Venting

The GXDDR Series Humidifiers are Category 3 Appliances.

The purpose of venting the gas humidifier is to completely remove all products of combustion and ventilation gases to the outside air, without condensation in the stack.

When connecting the humidifier to a gas vent or chimney, the installation shall be in accordance with Part 7, Venting of Equipment, of the National Fuel Gas Code, ANSI Z223.1, or Section 7, Venting Systems and Air Supply Appliances, of the CAN/CGA-B149 Installation Codes, the local building codes, and the vent manufacturer's instructions.

Do not reduce the vent diameter, and avoid short turns in the vent piping. Use the exhaust manifold vent size shown on page 15

Allow for removal of air intake and exhaust connections for heat exchanger cleaning and regular maintenance. Maintain a 1/4-inch-per-foot pitch for horizontal runs. Maintain proper support of vent connections and joints. Observe clearances (in accordance with applicable codes) from all combustible materials, and obtain an approved cap for the stack outlet. The bottom of the cap must be one stack diameter above the top of the stack.

Inspect for proper and tight construction. Any restrictions or obstructions must be removed. An existing chimney may require cleaning.

Chimney or vent must extend at least 3 feet above its passage through a roof and at least 2 feet above any ridge within 10 feet of the chimney (local codes apply).

Minimum clearance from the vent connector to combustible material is 6 inches unless the combustible materials are protected in accordance with applicable codes.

PURE Humidifier requires humidifiers be connected to vent systems sufficient for use with Category 3 Appliances (listed to UL Standard 1738 or ULC-S636). Any condensate formed is acidic and could cause corrosion of the vent materials. This humidifier must not be connected to a chimney flue servicing a separate appliance designed to burn solid fuel.

Install a condensate trap at the bottom of exchanger stack.

Never connect this humidifier to a chimney.

Venting into an unlined masonry or concrete chimney is prohibited by code.

Insulation must be added to any vent connector which will be exposed to ambient temperatures of 30°F or less.

Do not insulate vent pipe exposed to outdoor weather conditions (i.e. above roof lines).

Installation of the vent pipe should be as direct as possible, with a minimum number of turns or elbows.

Rigidly support the vent pipe every 5 feet or less with hangers or straps to ensure that there will be no movement or sagging after installation. The humidifier vent box should not be supporting the weight of the vent piping.

PURE Humidifier

Venting Installation (Con't)

No portion of the vent system shall extend into, or pass through, any circulation air duct or plenum.

The vent system shall terminate above the roof surface per the National Fuel Gas Code or CAN/CGA.B149 requirements, and shall include a UL or CUL listed vent cap or roof assembly, unless prohibited by local codes.

All vent pipe passing through floors, ceilings, and walls must be installed with the proper clearances from combustible material, and be fire-stopped according to the National Fuel Gas Code requirements and Canadian Standards CAN/CGA.B149.

In replacement installation, where an existing vent system may be used, the vent system must be inspected for condition, size, type of vent material, and height to meet the requirements in these instructions. If the existing vent system is too large, condensation could occur, causing corrosion of the vent system. Installing a replacement vent system may be required.

Horizontally Vented Humidifier

Maintain a minimum upward slope of 1/4-inch per linear foot on all horizontal vent pipe runs. If condensate in venting is noticed, a condensate trap must be installed.

Rigidly support the vent pipe at intervals no longer than five feet with hangers or straps to ensure there will be no movement after installation. The humidifier exhaust termination should not be supporting the weight of the vent piping.

Distances from the vent terminal adjacent public walk ways, buildings, and openable windows and building openings should be consistent with the National Fuel Gas Code, ANSI Z223.1, and/or CAN/CGA.B149 Installation Codes.

The vent terminal location must be at sufficient height above ground level to prevent blocking by expected snowfall.

Building materials should be protected from degradation by flue gases.

A minimum horizontal clearance of 4 feet (1.22m) from electric meters, gas meters, regulators, and relief equipment must be maintained.

Venting Requirements

100' maximum equivalent length of vent pipe.
90° Elbow = 10'
45° Elbow = 5'

Maximum of 4 elbows.

Vent pipe is to be rated for Category 3 Appliances listed to UL Standard 1738 or ULC-S636 (AL29 4C).

Allow for removal of air intake and exhaust connections for heat exchanger cleaning and regular maintenance.

PURE Humidifier

Sealed Combustion

Sealed Combustion Air Kit. Consists of a 6" round stainless steel adaptor to connect to field installed combustion air piping. Use of this kit will allow the burner to intake combustion air from outside instead of using room air.

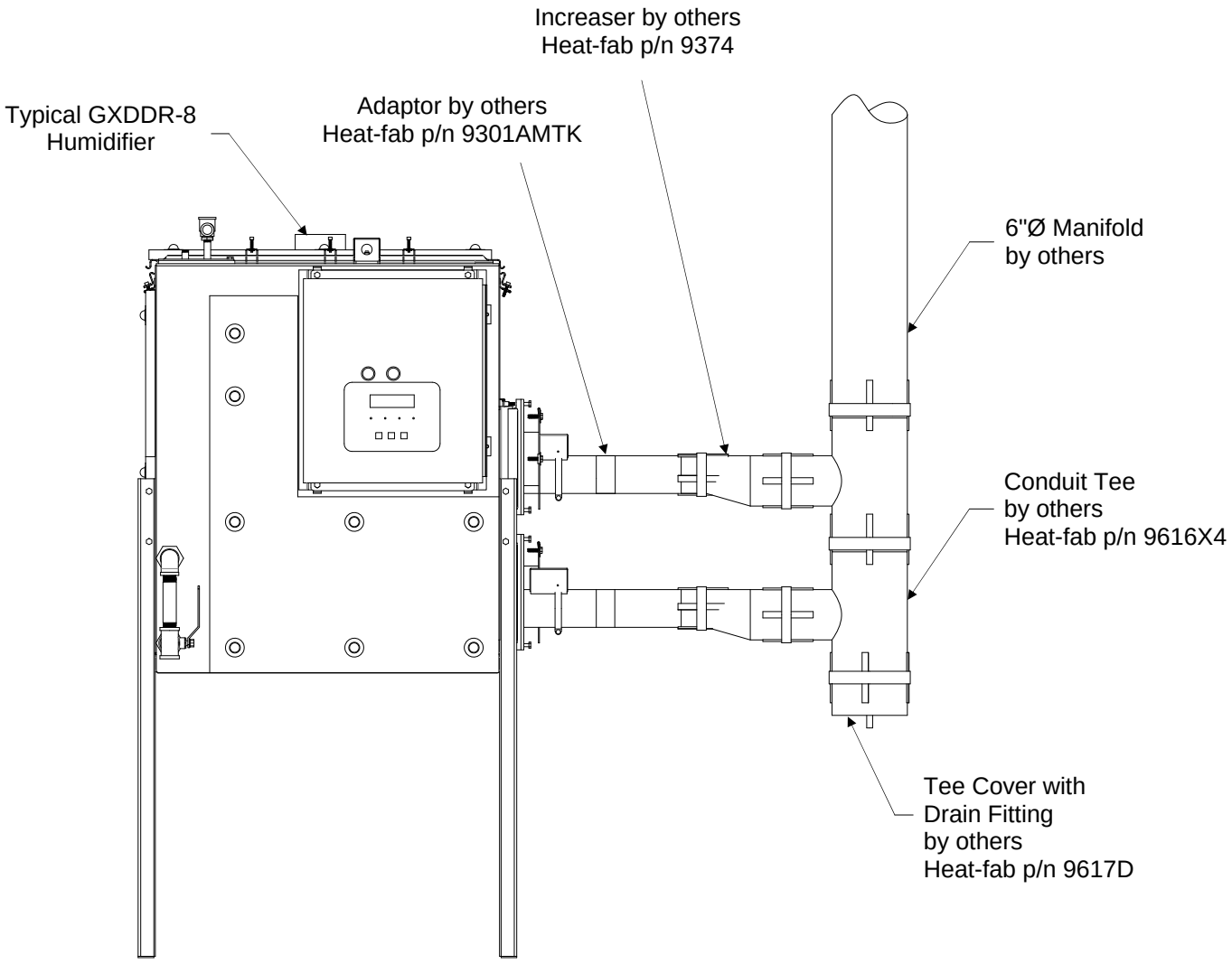
Benefits:

Sealed combustion burners can save energy because they don't steal heated or cooled indoor air.

Sealed combustion burners reduce space heating costs and noise while eliminating problems associated with power-vented combustion.

GXDDR-8 Exhaust Manifold

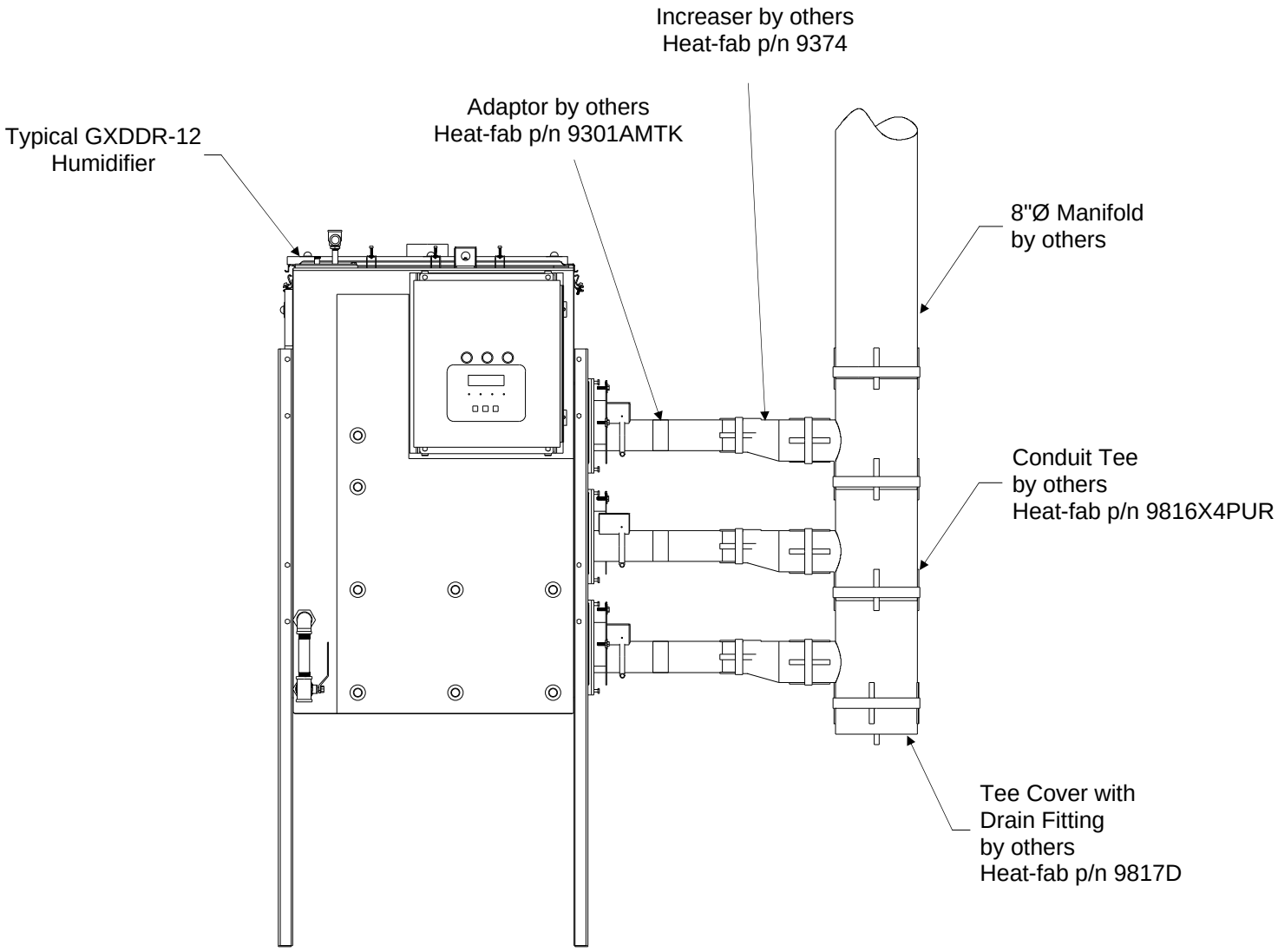
Reference pages 8 & 9 for venting installation instructions.



All exhaust connections and piping to be Category 3 Appliance Listed to UL Standard 1738 or ULC-S636

GXDDR-12 Exhaust Manifold

Reference pages 8 & 9 for venting installation instructions.



All exhaust connections and piping to be Category 3 Appliance Listed to UL Standard 1738 or ULC-S636

PURE Humidifier

Water Supply & Drain Piping

Water Supply Piping

Supply pressure: 35-50 psi

This style humidifier utilizes a float operated fill valve system which is designed for use with deionized, demineralized, or reverse osmosis water. Use of mineralized tap water will cause fill valve failure and will void the humidifier warranty.

Install stainless pipe on make-up water line within 5 ft of humidifier fill valve connection. If plastic pipe is used beyond this point a check valve is required to prevent steam from entering the plastic section in the event that the water treatment system runs out of water.

The water source for use in the GXDDR humidifier should be from a single pass reverse osmosis or dual bed deionizer system. Extremely high purity water **should not** be used. Examples of extremely high purity water are: water treated by a reverse osmosis followed by a mixed bed deionizer, or two mixed bed deionizers in series. Water produced by these multistage systems will typically be produced with conductivity of less than 1 microsiemens. If the source for the humidifier must come from a water "loop" with conductivity of less than 1 microsiemens, install a calcite cartridge filter in the water supply line feeding the GXDDR humidifier tank. The cartridge will need to be replenished periodically. A minimum water pressure of 35 psi (2.4 Bar) should be maintained to provide the proper water level within the humidifier. Adjustment of the float valve will be necessary if the pressure is lower than 35 psi (2.4 Bar). If the water pressure is above 50 psi (3.5 Bar), the valve may not shut off.

REMOVE INTERNAL PACKING MATERIAL FROM AROUND THE FLOAT BALL ASSEMBLY BEFORE STARTING UNIT. FAILURE TO DO SO CAN RESULT IN THE OVER-HEATING OF THE HUMIDIFIER AND POTENTIAL FIRE.

Drain Piping

A water seal as shown in the piping illustration should be installed to prevent steam from escaping through the drain line. The water seal should be of sufficient height to overcome the pressure developed in the humidifier (reference water seal height table) and the duct static pressure.

The drain piping should be stainless steel. The use of PVC piping is not recommended; the humidifier temperature will cause the PVC to soften and fail.

If gravity drain is not possible please use a condensate pump rated for 212°F water or contact a PURE Humidifier Co. Representative to purchase one.

Water Seal Height Δ

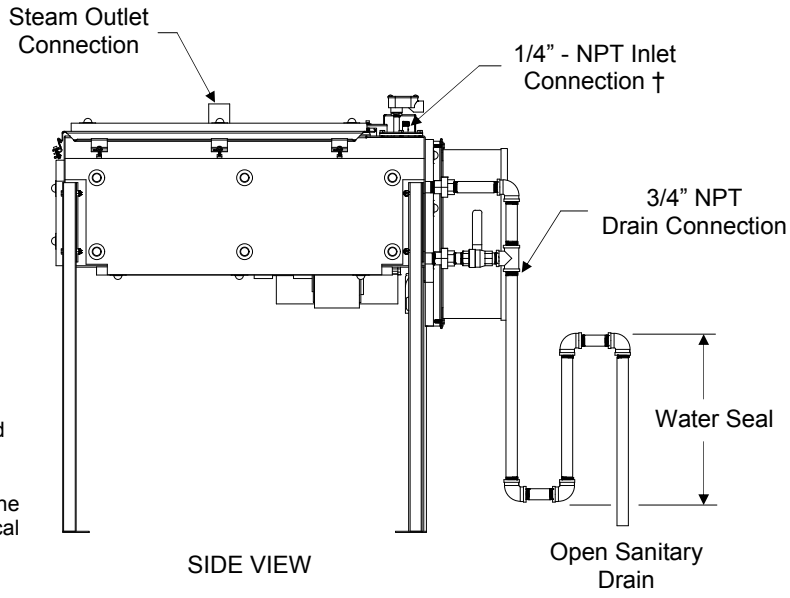
Total lbs./hr (kg./hr)	"H"
Up to 60 (27.2)	8" (20 cm)
61 to 99 (44.9)	11" (28 cm)
100 to 150 (68.0)	17" (43 cm)
151 and up	19" (48 cm)

Δ The water seal height may have to be increased if excessive duct static pressure exists

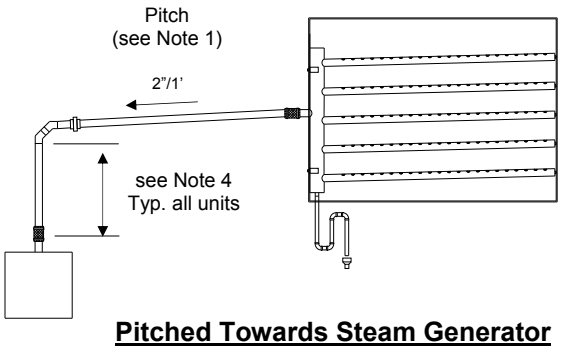
NOTES

1. All drain piping is by others.
2. Drain and overflow connection requires field piping.
3. Do NOT use PVC or other plastic piping that is not rated for 220° F. or higher.

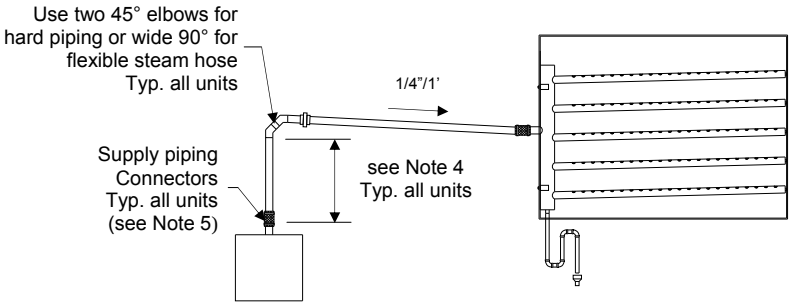
† The humidifier has a 1.5" (4 cm) air gap between the water inlet and humidifier water level. Consult the local code to determine if a vacuum braking device is required.



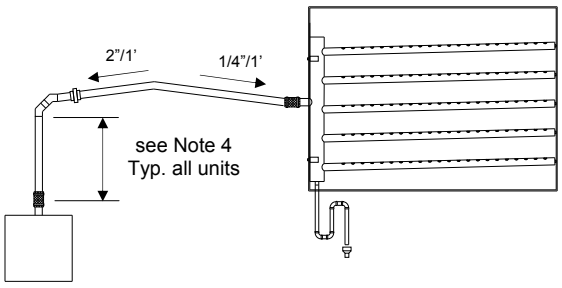
Steam Supply Piping Specification & Examples



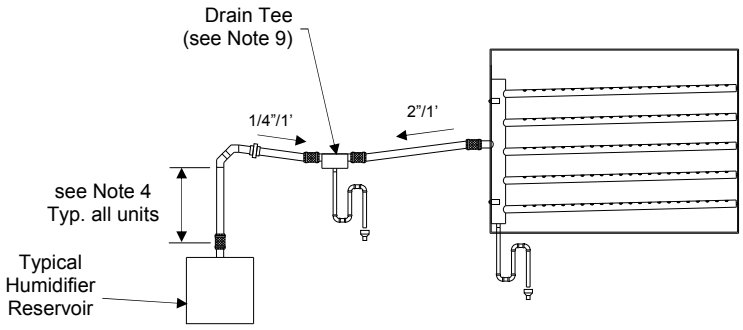
Pitched Towards Steam Generator



Pitched Towards Tube Assembly



Pitched Towards Steam Generator and Tube Assembly



Pitched Towards Drain Tee

Notes:

1. Flexible steam hose can be used for runs up to 10' in length. For runs over 10' in length, use hard piping.
2. Recommended supply piping material: Black iron pipe, copper, or stainless steel.
3. Pitch hard piping or flexible hose 2" per foot or more if steam is flowing uphill, 1/4" per foot if the steam is flowing downhill. Reference piping examples shown.
4. Install a minimum two-foot or greater riser from the top of the tank to reduce condensate carry over.
5. Use flex connectors or unions to allow for easy removal of cover.
6. Support flexible hose every 18" to avoid sagging.
7. Hard piping or flexible hose must match reservoir outlet size. Do not use supply piping with a smaller inside diameter than the reservoir outlet. Longer supply runs may require a larger diameter pipe.
8. Failure to follow the piping recommendation on this page may result in blown water seals, leaking cover gasket, or dispersion tubes spitting.
9. Install a Drain Tee at any low spots in supply piping run where condensate will accumulate.
10. Reference job specific tube assembly O&M included with your order for complete details.

For installations using deionized water fed humidifiers, PURE recommends stainless tubing or pipe to match the outlet diameter connection on the evaporating chamber. Stainless has superior corrosion resistance over copper and is less expensive but slightly harder to install. Stainless tubing is preferable over stainless pipe due to the fact that the tubing is less expensive and requires less heat/condensate during operation. Stainless pipe may be easier to install compared to stainless tubing because fittings are readily available and it does not require welding. As always, the installer should refer the material required by the project documents and/or the authority having jurisdiction.

PURE Humidifier

Capacities, Electrical & Weights

This humidifier is a forced combustion type that can be used with natural gas or liquid propane. The burner can be easily removed to access the side entry exchanger(s) for cleaning. It is designed to work with low-pressure gas between 5" W.C. up to 14" W.C.

Unit Capacities in Pounds per Hour (Kg/Hr)†
Weights in lbs. (kg) and Electrical Specification

Model No.	Steam Capacity Lb/Hr (kg/Hr)	No. of Burners	*BTU Input	#Exhaust Manifold Vent Size (cm)	Shipping Weight (kg)	Operating Weight (kg)	120 Volt, 60 Hz
							Full Load Amps
GXDDR-3	110 (49.9)	1	150,000	4" (10.2)	201 lbs. (91.2)	420 lbs. (190.5)	5.0
GXDDR-4	300 (136.1)	1	400,000	4" (10.2)	390 lbs. (176.9)	710 lbs. (322.1)	5.0
GXDDR-8	600 (272.2)	2	800,000	6" (15.2)	827 lbs. (375.1)	1391 lbs. (630.9)	10.0
GXDDR-12	900 (408.2)	3	1,200,000	8" (20.3)	1125 lbs.(510.3)	2072 lbs. (939.9)	15.0

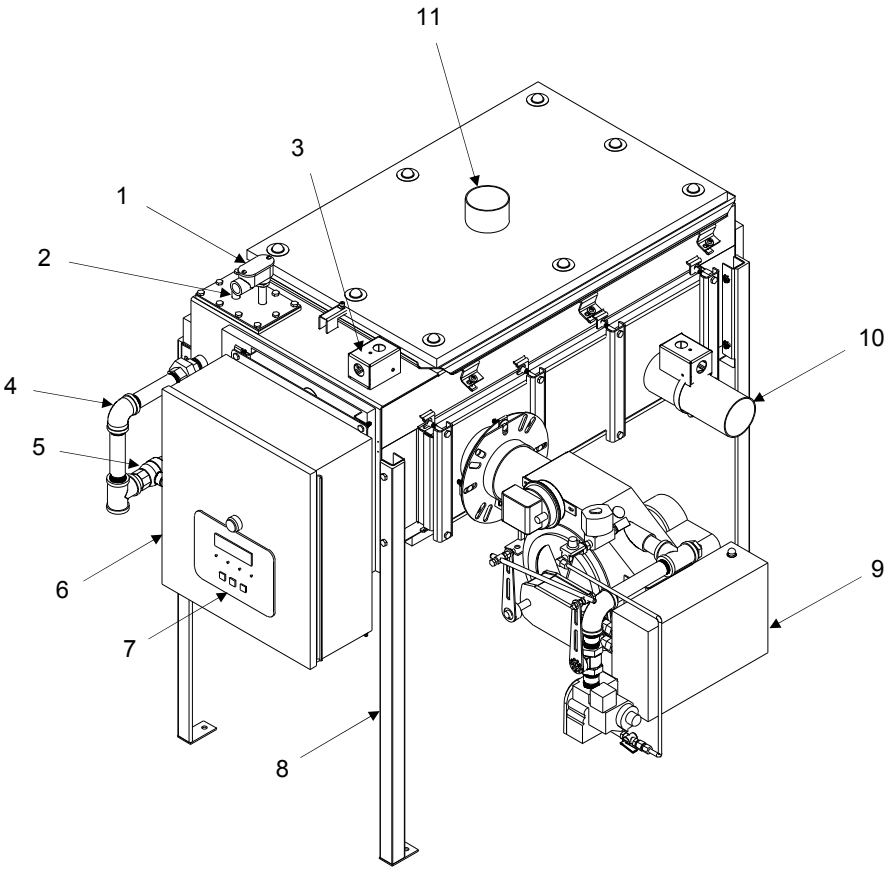
† Actual humidifier capacity may vary due to the heat loss from the humidifier reservoir. The ambient air temperature, air velocity and injection tube system will affect the rate of heat loss from the reservoir.
* Altitude adjustment:
100% up to 2000'
Over 2000', 4% de-rate per 1000'
Vent Size is larger than connection size.

Reservoir Water Volume in Gallons (Liters)

Model No.	Water Volume In Gal (Liters)
GXDDR-3	22 (83.3)
GXDDR-4	48 (181.7)
GXDDR-8	94 (355.8)
GXDDR-12	143 (541.3)

PURE Humidifier

Features



Features

1. Low Water Float Switch Junction Box
2. 1/4”-IPS Fill Inlet Connection
3. Over Temperature Cut-Out Switch
4. Flusher & Overflow Piping
5. 3/4” Ball Valve
6. Control Panel
7. INTAC® Microprocessor
8. Support Legs
9. Burner Assembly
10. Exhaust Connection
11. Steam Outlet Connection

PURE Humidifier

Dimensions

GXDDR-3 & GXDDR-4

Required Clearance:
For recommended service and maintenance purposes the following clearances should be maintained:

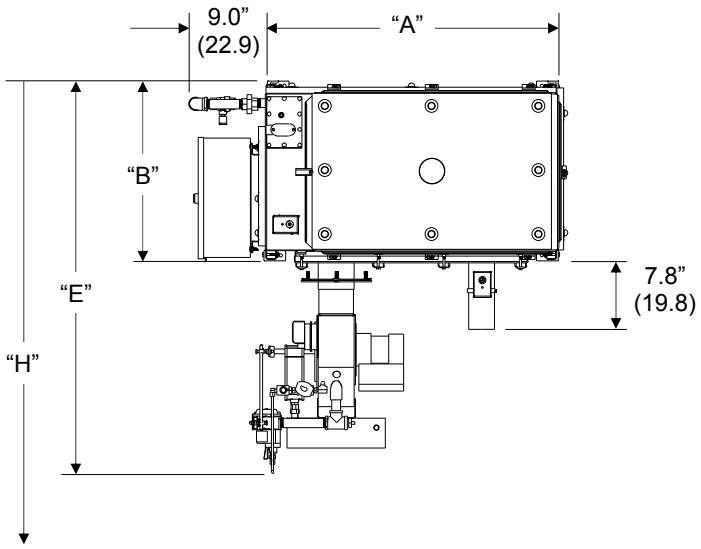
Right side, see Top View for required clearance

Front side, NEC requires 36” clearance to control cabinet

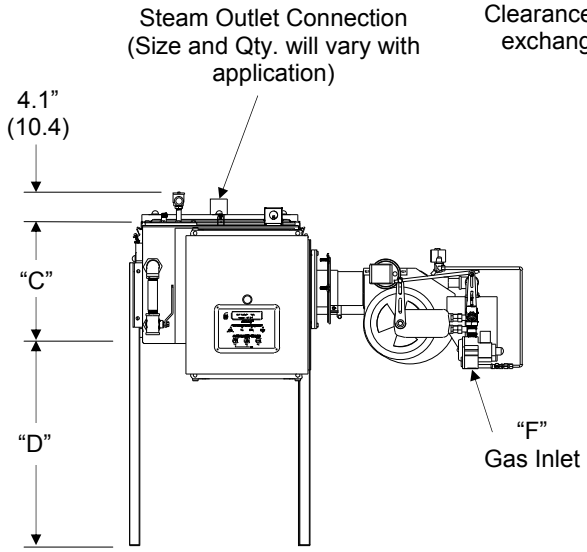
Left side, 6” for access

Rear, 6” for access

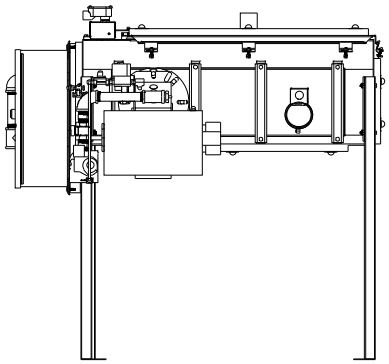
Top, 12” for cover and float plate assembly removal



Top View



Front View



Right Side View

Unit Dimensions in Inches (cm)

Model No.	Dim. “A”	Dim. “B”	Dim. “C”	Dim. “D”	Dim. “E”	Dim. “F”	Dim. “G”	Dim. “H”
GXDDR-3	34.0” (86.4)	21.1” (53.7)	13.8” (34.9)	24.0” (60.9)	45.9” (116.5)	3/4”-NPT	3.0” (7.62)	50.0” (127.0)
GXDDR-4	54.0” (137.2)	30.1” (76.5)	13.8” (34.9)	24.0” (60.9)	54.7” (138.9)	3/4”-NPT	3.0” (7.62)	66” (167.6)

Heat exchangers have a top and bottom. There is a break (crease) on the bottom side of the heat exchanger. Do not install heat exchanger upside-down.
All dimensions are approximate and subject to change at manufacturer’s discretion.

PURE Humidifier

Dimensions

GXDDR-8

Required Clearance:
For recommended service and maintenance purposes the following clearances should be maintained:

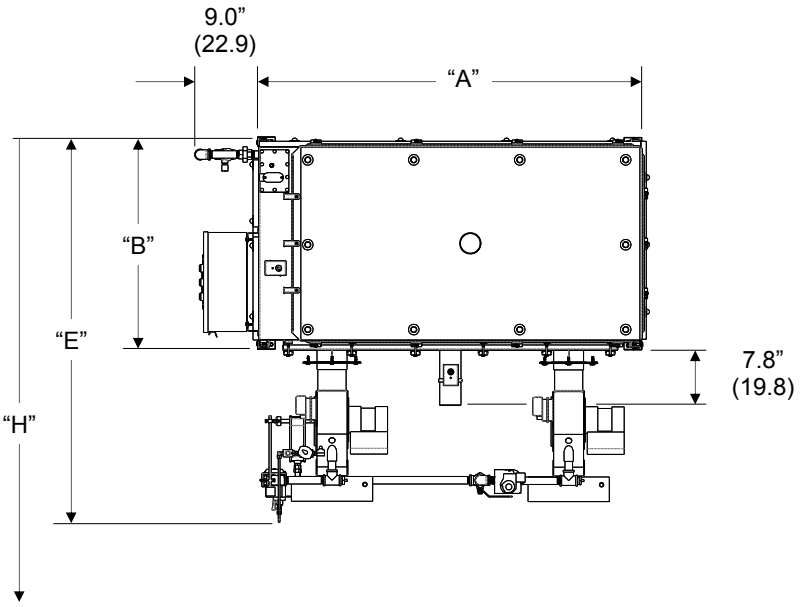
Right side, see Top View for required clearance

Front side, NEC requires 36” clearance to control cabinet

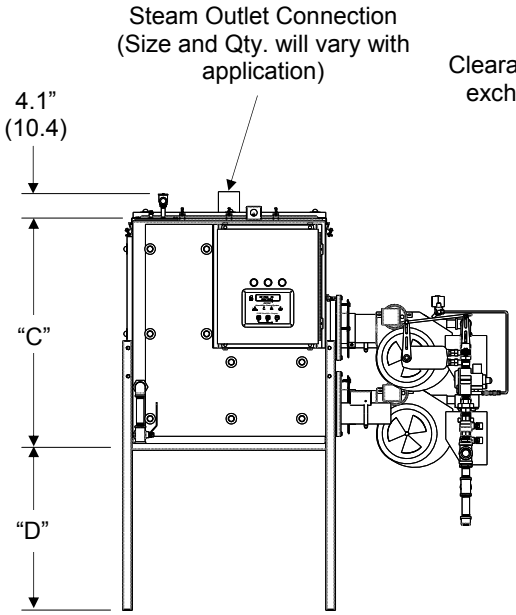
Left side, 6” for access

Rear, 6” for access

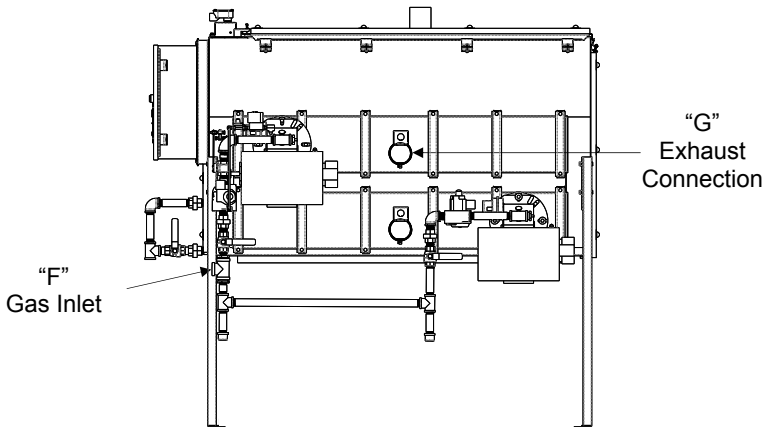
Top, 17” for cover and float plate assembly removal



Top View



Front View



Right Side View

Unit Dimensions in Inches (cm)

Model No.	Dim. “A”	Dim. “B”	Dim. “C”	Dim. “D”	Dim. “E”	Dim. “F”	Dim. “G”	Dim. “H”
GXDDR-8	54.0” (137.2)	30.1” (76.5)	32.5” (82.6)	24.0” (60.9)	54.7” (138.9)	1”-NPT	3.0” (7.6)	66.0” (167.6)

Heat exchangers have a top and bottom. There is a break (crease) on the bottom side of the heat exchanger. Do not install heat exchanger upside-down.
All dimensions are approximate and subject to change at manufacturer’s discretion.

PURE Humidifier

Dimensions

GXDDR-12

Required Clearance:
For recommended service and maintenance purposes the following clearances should be maintained:

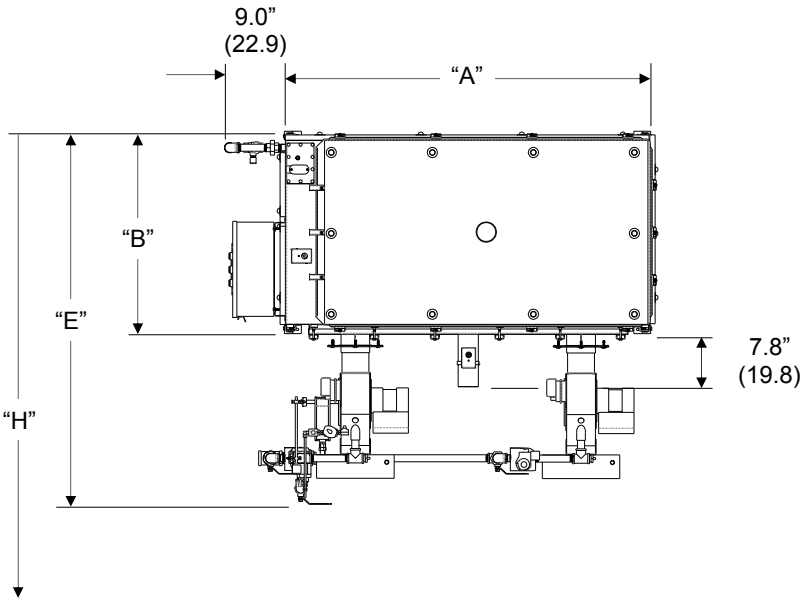
Right side, see Top View for required clearance

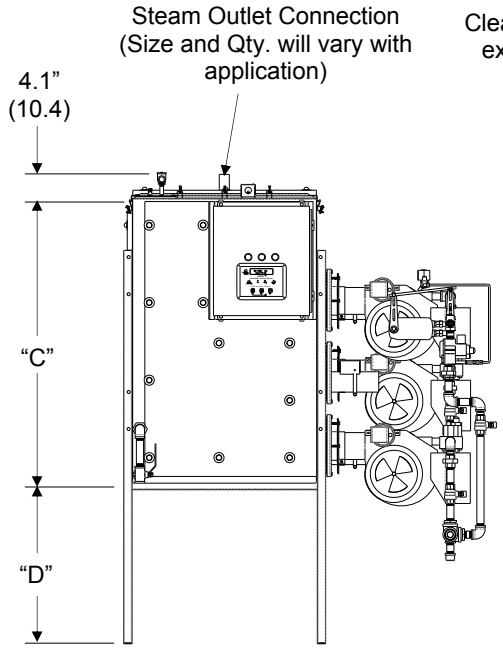
Front side, NEC requires 36” clearance to control cabinet

Left side, 6” for access

Rear, 6” for access

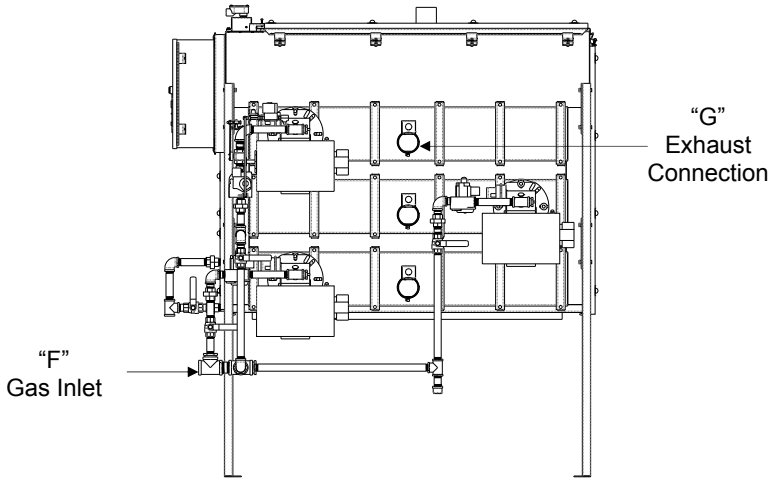
Top, 17” for cover and float plate assembly removal





Front View

Top View



Right Side View

Unit Dimensions in Inches (cm)

Model No.	Dim. “A”	Dim. “B”	Dim. “C”	Dim. “D”	Dim. “E”	Dim. “F”	Dim. “G”	Dim. “H”
GXDDR-12	54.0” (137.2)	30.1” (76.5)	43.5” (110.5)	24.0” (60.9)	55.8” (141.1)	1-1/4”-NPT	3.0” (7.6)	66.0” (167.6)

Heat exchangers have a top and bottom. There is a break (crease) on the bottom side of the heat exchanger. Do not install heat exchanger upside-down.
All dimensions are approximate and subject to change at manufacturer’s discretion.

PURE Humidifier

Modulating Control Operation

Overview

The INTAC® will control up to 3 gas burners.
The INTAC® outputs are defined as:

Blower Output:	Heater Output #1
Burner #1 Enable:	Heater Output #2
Burner #2 Enable:	Heater Output #3
Burner #3 Enable:	Heater Output #4
Burner #1 Proportional Valve Control:	Analog Process Output

	Models		
Setting	GX-3 GX-4 GXDDR-3 GXDDR-4	GX-8 GXDDR-8	GX-12 GXDDR-12
710: Low Fire Set Pt	40%	20%	10%
711: Low Fire Hys	3%	3%	3%
712: Burner 2 Set Pt	NA	75%	50%
713: Burner 2 Hys	NA	3%	3%
714: Burner 3 Set Pt	NA	NA	75%
715: Burner 3 Hys	NA	NA	3%

Gas System Sequence

Items in parentheses are referring to an INTAC® menu number. Refer to INTAC® manual for more detail

1. When % Power (002) is greater than the Low Fire Set Point (710) , the Blower Output and the Burner #1 Enable Output will energize.
2. If configured for at least a two-burner system, when % Power (002) is greater than Burner #2 Set Point (712) Burner #2 Enable will turn on.
3. If configured for a three burner system when % Power (002) is greater than Burner #3 Set Point (714) Burner #3 Enable will turn on.
4. The Analog Process Output is the value determined by the % Power (002) and the number of burners installed. The Analog Process Output is wired to Burner #1 modulating actuator which is mechanically connected to the gas butterfly valve and the air damper. With more than one burner, the process output is multiplied to reflect that Burner #1 is only controlling 1/2 or 1/3 of total system output power.

PURE Humidifier

Modulating Control Operation (cont'd)

% Power	Process Output Value (0-10 vdc)		
(screen 002)	One Burner	Two Burners	Three Burners
0	0 vdc	0 vdc	0 vdc
10	1 vdc	2 vdc	3 vdc
20	2 vdc	4 vdc	6 vdc
30	3 vdc	6 vdc	9 vdc
40	4 vdc	8 vdc	10 vdc
50	5 vdc	10 vdc	10 vdc
60	6 vdc	10 vdc	10 vdc
70	7 vdc	10 vdc	10 vdc
80	8 vdc	10 vdc	10 vdc
90	9 vdc	10 vdc	10 vdc
100	10 vdc	10 vdc	10 vdc

5. When % Power is less than Burner #3 Set Point (714) minus Burner 3 Hysteresis (715), Burner #3 Enable output turns off.
6. When % Power (002) is less than Burner 2 Set Point (712) minus Burner 2 Hysteresis (713), Burner #2 Enable output turns off.
7. When % Power (002) is less than the Low Fire Set Point(710) minus the Low Fire Hysteresis (711) Burner #1 Enable turns off. The blower output will remain on for the Post Purge Timer (716) time. If the % Power increases to a value greater than the Low Fire Set Point (710) during the Post Purge time, the Blower Output will remain on and the sequence will begin again (only after the Post Purge Timer (716) has timed out).
8. Burner #2 can only turn on if Burner #1 is on.
9. Burner #3 can only turn on if Burner #2 is on.
10. If the % Power (002) is equal to zero all burners will be off.
11. Once a burner is enabled and the burner airflow switch is proven, that burner's flame controller will get power. The flame controller will run its own 30 second pre-purge before attempting to light the pilot and energize the main gas valve.
12. Burner #1 also has an end switch on the modulating motor that will close when the air damper is in the high-fire position. The Burner #1 flame controller will initially receive power when the Burner #1 enable relay is closed, its airflow switch is closed and the end switch on the modulation motor is closed.

"GXDDR" Prestart-Up Procedure

Pre-Startup Checklist

Before starting the "GXDDR" PURE Humidifier Co. Gas Fired Humidifier, check the following installation items:

_____ 1. MOUNTING - Verify that the humidifier evaporating chamber is securely supported and that the evaporating chamber is level in both directions. If humidifier is installed above equipment or not located near a floor drain than a drain pan should be installed below the humidifier steam generator.

_____ 2. INJECTION TUBE - Verify that the humidifier injection tube is mounted within the duct with the proper pitch back to the humidifier (2"/5 cm per foot / 31 cm). NOTE: If the humidifier evaporating chamber or the flexible hose (optional) is mounted higher than the injection tube, a drain "tee" is required to drain the condensate out of the injection tube steam line. If it is an Insty-Pac or Fast Pac refer to the respective O&M to determine if they are mounted properly and have the proper p-trap size.

_____ 3. ELECTRICAL - Verify that all wiring connections have been connected in accordance with the wiring diagram. **CAUTION: Live power may exist in the control cabinet. Turn off the main power at the disconnect switch before verifying the electrical connections!**

_____ 4. SAFETY CONTROLS – The supply air duct RH high-limit should be installed at least ten feet downstream from the humidifier tube(s). Any other control sensors should be at least 10 feet downstream from the humidifier tube (s). Smoke detectors should not be installed downstream of the humidifier tube(s). If a smoke detector absolutely has to be installed downstream from the humidifier tubes then it should be installed as far from the tubes as possible.

_____ 5. PIPING: Water Supply - Verify that all piping connections have been completed as recommended and that water pressure is available to the humidifier. Verify that the supply water pressure is 35-50 psi. There should be at least 5 ft of metal pipe and check valve between the tank and any plastic pipe.

REMOVE INTERNAL PACKING MATERIAL FROM AROUND THE FLOAT BALL ASSEMBLY BEFORE STARTING UNIT. FAILURE TO DO SO CAN RESULT IN THE OVER-HEATING OF THE HUMIDIFIER AND POTENTIAL FIRE.

_____ 6. PIPING: Drain - Make sure a water seal of the proper height (refer to steam generator O&M for height) is provided in the drain line.

_____ 7. PIPING: Gas - Make sure a field installed main shut-off is installed before the humidifier burner/gas train. Make sure a union is installed after the main shut-off. Make sure the supply pressure to the humidifier matches the name plate value.

_____ 8. PIPING: Steam Outlet - Refer to page 14 for proper outlet steam piping from the generator to the tube(s). **Any horizontal to vertical up transition in the outlet steam pipe requires a water-sealed drip leg!** Improper outlet steam piping will cause steam to leak from the steam generator. Runs over 20 ft long may require upsizing of the steam pipe.

_____ 9. EXHAUST VENTING: Measure the exhaust vent diameter. See page 15 for the vent size chart. Measure the exhaust vent diameter. A drain tee should be installed at any low point in the exhaust.

Signature:_____ Date:_____

PURE Humidifier

"GXDDR" Start-Up Procedure

Introduction

The burner should be initially set up and serviced at regular intervals (preferably at the beginning of and mid-way through high use period) by a trained serviceman using the proper test instruments.

Start Up Procedure

_____ 1. Make sure the electric power is shut off to the humidifier.

_____ 2. Close the humidifier manual ball valve (located on the left side of the humidifier evaporating chamber faceplate).

_____ 3. Open the water supply on/off control valve and allow the humidifier evaporating chamber to fill to the proper level.

_____ 4. After the humidifier is full of water, turn on the main power to the control cabinet.

_____ 5. Verify the low water safety switch by closing the water supply, opening the drain valve and verifying that the low voltage relay within the control cabinet "pulls-out" when the water level is dropped below the low water shut off switch (you can hear the relay switch "out").

_____ 6. Close the drain valve, open the water supply valve, and allow the humidifier to fill to the proper level. Allow the tank to fill completely and make sure that the make-up water float valve shuts off completely and does not over flow the tank before proceeding.

_____ 7. Make sure all the optional safety switches are satisfied (air-flow proving switch, high-limit humidistat, etc.).

_____ 8. Proceed to "Burner Start Up Procedure".

_____ 9. Check operation of field installed safety switches (air flow proving switch, high-limit humidistat, etc.) to make sure they turn the power off to the pilot relay which is the control circuit power. The safety switches should shut off the humidifier burner(s) whenever one or more of the optional safety switches create an open circuit.

_____ 10. Inspect installation for leaks by operating humidifier at a full, rolling boil. This may take up to 15 minutes from a cold start. Any leaks should be sealed. Just tightening a pressure clamp will not work if the gasket is not properly positioned between the sealing surfaces. If necessary, remove the cover or side-entry plate, reseat gasket and replace cover or side entry plate. A small amount of adhesive (super glue, gorilla glue, spray adhesive, etc.) to hold the gasket in place while repositioning the cover or side-entry plate will aid in this process.

_____ 11. After the unit is producing steam, check and retighten all hose clamp connections in the system and make sure they are torqued to 35 -40 in-lbs.

Signature:_____ Date:_____

PURE Humidifier

"GXDDR" Burner Start-Up Procedure

Burner Start-Up Procedure:

The following procedure may be used by qualified service personnel to start the GXDDR series gas humidifier. It is assumed that all electrical, gas supply and exhaust systems have been installed by qualified professionals per all applicable codes and regulations and have been tested and accepted.

Equipment Needed:

1. Gas Analyzer
2. DC-Microamp meter (Range 0 to 200 microamps)
3. 2 Manometers (Range 0 to 20 inches WC)
4. 3/4" NPT to 1/8 " NPT Hex Reducer

Before Starting:

_____ 1. Verify that the "TYPE" of fuel is correct for the specific orifice installed (Natural Gas or LP Gas).

_____ 2. **Verify that the MAIN SUPPLY gas pressure is correct**. This should be taken at the 1/8" NPT pressure tap on the manual shut-off valve immediately upstream of burner gas train. Use one of the manometers to see that it is **7 inches W.C. for natural gas, 10 inches W.C. for propane**. If the gas pressure is not correct, adjust the regulator feeding the humidifier. If this cannot be done the burner regulator and pilot will require adjustments.

_____ 3. Verify that the electrical supply voltage is correct.

_____ 4. Verify that the exhaust system is installed and is not blocked.

_____ 5. Verify that the gas train piping on the burner is plumb and square. Piping may have shifted during shipment so check to make sure all gas connections are tight.

_____ 6. Check the air damper/gas butterfly valve linkage markings. Make sure all markings are aligned.

_____ 7. Using the 3/4" to 1/8" hex reducer, remove the ¾" plug and **hook up the second manometer to the orifice tee downstream of the combination valve, butterfly modulating valve and/or orifice if one is installed**. This is where manifold pressure will be measured.

Start-Up and Adjustments:

_____ 1. The air damper will be fully open if the burner is to be fired at the maximum rate. Otherwise, depending upon the desired output, the air damper will be in an intermediate position during start-up.

_____ 2.Turn Gas Combination Valve to "Off" position.

_____ 3. Install a dc-microamp meter in series with the Flame Safeguard "Sense" line.

_____ 4. Start burner sequence by changing the RH set point to 100% RH in the INTAC® menu 101. The INTAC® controller should call for 100% output on menu 002 at this point. If the humidifier is being controlled by a building management signal, have the controller call for an input of 10 VDC or 20 mA, which ever is applicable. If it is controlled by an on/off humidistat, set the humidistat to 100% RH.

_____ 5. After automatic 30-second purge cycle, pilot ignition will begin. You will hear the pilot solenoid "click" open. At this time, while the "pilot" light is lit, slowly adjust the pilot regulator and adjust until a maximum flame current is achieved (approximately 1.5 microamps or higher). Repeat the process until pilot lights every time burner is started.

_____ 6. Typically the pilot regulator will be about 2 full rotations out from the "bottom" fully tightened position. The red button on the front of humidifier control panel will reset the burner automatically if the pilot fails to light.

_____ 7. With pilot ignited, turn the Combination Regulator Valve to "On" position.

PURE Humidifier

"GXDDR" Burner Start-Up

_____ 8. Adjust the main burner combination regulator to give a manifold pressure equal to what is specified on the humidifier nameplate. **Manifold pressure measurement should be made at the ¾" orifice tee after the orifice if one is in stalled**. After making a pressure adjustment, allow approximately one minute for the system to find a steady value. (Note: Excessive gas pressure may cause burner to "rumble" or a slight backfire may result. If this occurs, back off the main burner gas pressure slightly until the rumble is not noticeable).

_____ 9. Allow humidifier to warm-up. This may take up to half an hour. After humidifier has warmed-up, recheck the manifold pressure while the unit is still calling for 100% power on menu 002 on the INTAC® display.

_____ 10. Observe the O2 (Excess Oxygen) level. Should be approximately 3 to 7 percent.

_____ 11. Observe the CO (Carbon monoxide) level. Should be under 100ppm.

_____ 12. Observe the flame current is reading slightly higher. (Approximately 3 microamps or higher.)

_____ 13. If the unit has a modulating burner proceed to the "For Modulating Burner Section"

_____ 14. If you have an on/off control, reset RH set point to the proper humidity level or return building management to normal operation. Replace ¾" plug. Make sure orifice is seated properly and the spring installed. Apply quality pipe compound to the ¾ plug threads and screw it back into place.

For Modulating Burners

Burners set up for modulation are tuned in the factory. However, due to different conditions that occur with each particular installation, slight adjustments may have to be made with the gas/ air linkage.
Consult the factory before making adjustments to the linkage.

Once it has been verified that the burner is operating at acceptable levels at high fire, low fire operation should be checked. Make sure that burners two and three are off as well as the manual gas valves. To check the burner's combustion at low fire change the process output setting on INTAC® menu 519 to 3 volts.

Allow the burner to modulate down and let the gas analyzer readings to stabilize. The readings should be as specified in steps 10-12 of the "Start up and Adjustments" section. If the readings are acceptable then change the process output setting on INTAC® menu 519 back to 10 volts. If they are not acceptable or if the burner blows itself out while modulating down, the burner linkage will need adjustment. After adjustments are made, change the INTAC® menu settings back to their original values.

For Multiple Burner Humidifiers

For two and three burner models, only the first burner modulates. The additional burner(s) are of the on/off type. The modulating burner should be checked first. Turn off the manual gas valves to the other burner(s). Proceed with the steps above.

Once the first burner is operating properly proceed with the next burner. Once all burners are operating, recheck the manifold pressures for each of the burners. Also check that the supply pressure has not dropped and is steady.

Return INTAC® settings on menus 101 to the desired humidity set-point or return building management signal back to automatic operation mode.

Signature:_____ Date:_____

PURE Humidifier

Tool Requirements & Torque List

Recommended Maintenance Tool List
7/16” Wrench
3/4” Wrench
Crescent Wrench
11/32” Nut Driver or Socket
3/8” Nut Driver or Socket
5/32” Allen Head
Flat Head Screwdriver
Wire Stripper
Wire Crimper

Torque List	
Cover Bolts	18 inch/pounds MAX
Side Entry Exchanger Bolts	80 inch/pounds MAX
Hose Cuff Screws	35-40 inch/pounds MAX when hot

PURE Humidifier

"GXDDR" Trouble Shooting

Problem	Possible Cause	Recommended Action
Humidifier will not heat	Blown control fuse	Check and replace
	Control transformer not producing 24 vac control voltage	Check transformer output. Verify voltage across terminals J5 #5 and J5 #7
	Safety controls open (air-flow switch, high-limit, etc.)	Verify that all safety controls are completing the safety circuit
	Overtemp protection switch tripped	Indicates the humidifier is running while low on water. The level control circuit has interference or is damaged. Tri-probe wires should be run separate from power wiring. Do not reset the switch until the source of the problem is identified and corrected. Consult factory if you are unsure of the source of the problem.
	Faulty humidity sensor	Verify voltage to and from humidity sensor
Humidifier will not fill	No water pressure	Check water supply
	Drain valve open	Close drain ball valve
	Faulty water float valve	Check float valve seat for dirt
Humidifier does not stop filling or is short cycling	Float valve stuck open	Check float valve seat for dirt Adjust float ball arm
	Drain valve open	Close drain valve
Humidifier says water is low but is hot filling	Low water pressure	Adjust float valve arm upward to allow water to fill high enough above low water cut out switch

PURE Humidifier Co. "GXDDR" Maintenance Instructions

The "GXDDR" Series Humidifier is designed to provide the best possible operation with minimum maintenance. However, the humidifier should be inspected and placed on a dedicated maintenance schedule to ensure continued operation of the humidifier and accessories. **PURE Humidifier Co. recommends that the following items be inspected and/or cleaned on a minimum basis of twice each year.** If excessive mineral build-up occurs, the maintenance schedule should be increased.

Inspect / Maintenance Item	Procedure to Follow
Water Make-Up Float Valve	Check to make sure the fill valve is operating properly. If the valve appears to continually fill, check the valve seat and seal (see trouble shooting instructions).
Low Water Float Switch	Check to make sure the switch will shut the humidifier off when the water level drops too low. Close the water supply and open the drain valve to allow water to drain out for checking. Make sure to reset the drain valve after inspection is completed.
Safety Interlocks (air-flow, high-limit)	Check to make sure the safety interlocks (air-flow, high-limit, etc.) will shut down the humidifier.
Combustion Burners	Inspect and clean flame rod. Inspect air intake for obstructions and clean as required. Burner gas valve has an expected life of 200,000 cycles. Replace the valve at the end of the life cycle.
Humidifier Cover / Tank	Inspect for any leaks. Repair as required. Remove the mineral deposits from floor of the humidifier reservoir. If excessive build-up is found, the cover may need to be removed to facilitate complete cleaning of the humidifier.
Flexible Hose	Inspect for cracks or leaks. It is normal for the hose to become hard and develop a "set".

Cleaning Instructions

All humidifier tanks should be cleaned manually from the side-entry plate or cover. Remove all loose solids with a wet vacuum or putty knife and bucket. Exchanger should also be cleaned and loose build-up removed by hand (if applicable). After removal of solids and replacing the heat exchanger, you may wish to add a de-scaling solution. Heat exchangers have a top and bottom. There is a break (crease) on the bottom side of the heat exchanger. Do not install heat exchanger upside-down. **DO NOT** use Hydrochloric acid-based de-scalers; this will corrode stainless steel. PURE Humidifier Co. recommends the use of a vinegar, citric acid, diluted phosphoric acid, or diluted nitric acid-based cleaner. Follow all precautions on the cleaner packaging. Some cleaners will give off overwhelming and noxious odors, so make sure there is proper ventilation in the working area and the cover is removed so that fumes are not spread throughout the building. After cleaning the tank, flush the tank multiple times to remove any remaining acid. Drain tank completely and allow the tank to air dry for a few hours. This will ensure that the outer protective layer of the stainless steel will passivate and ensure corrosion resistance.

PURE Humidifier

Burner Troubleshooting & Maintenance

Service/Maintenance Suggestions

The burner should be initially set up and serviced at regular intervals (preferably at the beginning of and mid-way through high use period) by a trained serviceman using the proper test instruments.

There is a red reset button/main gas light on the front of the humidifier control panel for each burner. Depressing the button will restart that particular burner's operation. If the pilot valve opens and the main gas light does not come on, the button must be depressed to reset the burner lockout. During start-up this may have to be repeated several times to purge air from the gas line. If the main gas light turns on briefly, then the burner controller will retry automatically after a short time delay.

Burner Fails to Start:
1. Bad fuse or switch open on incoming power source, or motor overload out.
2. Control circuit has an open control such as operating, limit or low water cut-off.
3. Push the reset button on the motor or open the power circuit on the the primary safety control.
4. Loose or faulty wiring. Tighten all terminal screws. Check wiring against wiring diagram furnished with burner.

Burner Motor Runs, But Pilot Does Not Light:
1. Be sure gas is turned on at meter and pilot cock is open.
2. Place hand on pilot valve to "feel" it open. Check gauge at tee in pilot line for gas pressure and prompt opening of pilot valve.
3. Check visually or by sound for spark arcing.
4. Refer to pilot checking procedures.
5. Check air switch and be sure its circuit closes during start.

Burner Motor Runs, Pilot Lights But Main Gas Valve Does Not Open:
1. Burner not enabled by INTAC®
2. Check flame signal. If signal is low, adjust pilot gas pressure and air settings for improved readings.
3. Check gas valve circuit.
4. Shut-off cock or test cock not open.
5. Defective main valve.

Occasional Lockouts For No Apparent Reason:
1. Look for large gas pressure fluctuations. Stabilize pressure.
2. Re-check micoamp readings. If insufficient, check gas pressure and air damper setting. Check electrode setting. If flame signal is low, flame rod may have to be re-positioned.
3. Check ignition cable and electrode porcelain for damage or breaks, which could cause short.
4. Check for loose or broken wires.
5. Read flame monitor lockout code and and follow flame monitor directions.

Burner Will Not Start—Even Though Burner Had Never Failed Before or Had Been Running On Normal Cycling Without Failure:
1. Operating control circuit open.
2. Defective control or loose wiring.
3. Limit circuit open.

The burner must be periodically inspected to insure safety and performance. All maintenance must be performed with the main electrical power off and the main gas shut-off valve off.
1. Inspect blower inlet screen and clean any buildup of lint.
2. Inspect blower wheel blades and clean any buildup of dirt.
3. Inspect ignition electrodes and wiring for any cracks that may cause shorting.
4. Oil the blower motor at the manufacturer's recommended intervals.
5. Verify that the pilot and or direct spark electrodes are still within specifications (set per drawing in this manual).
6. Verify the proper operation of the Primary Safety Control, airflow switch, and operating controls.
7. Check safety gas shut-off valves for gas tightness.

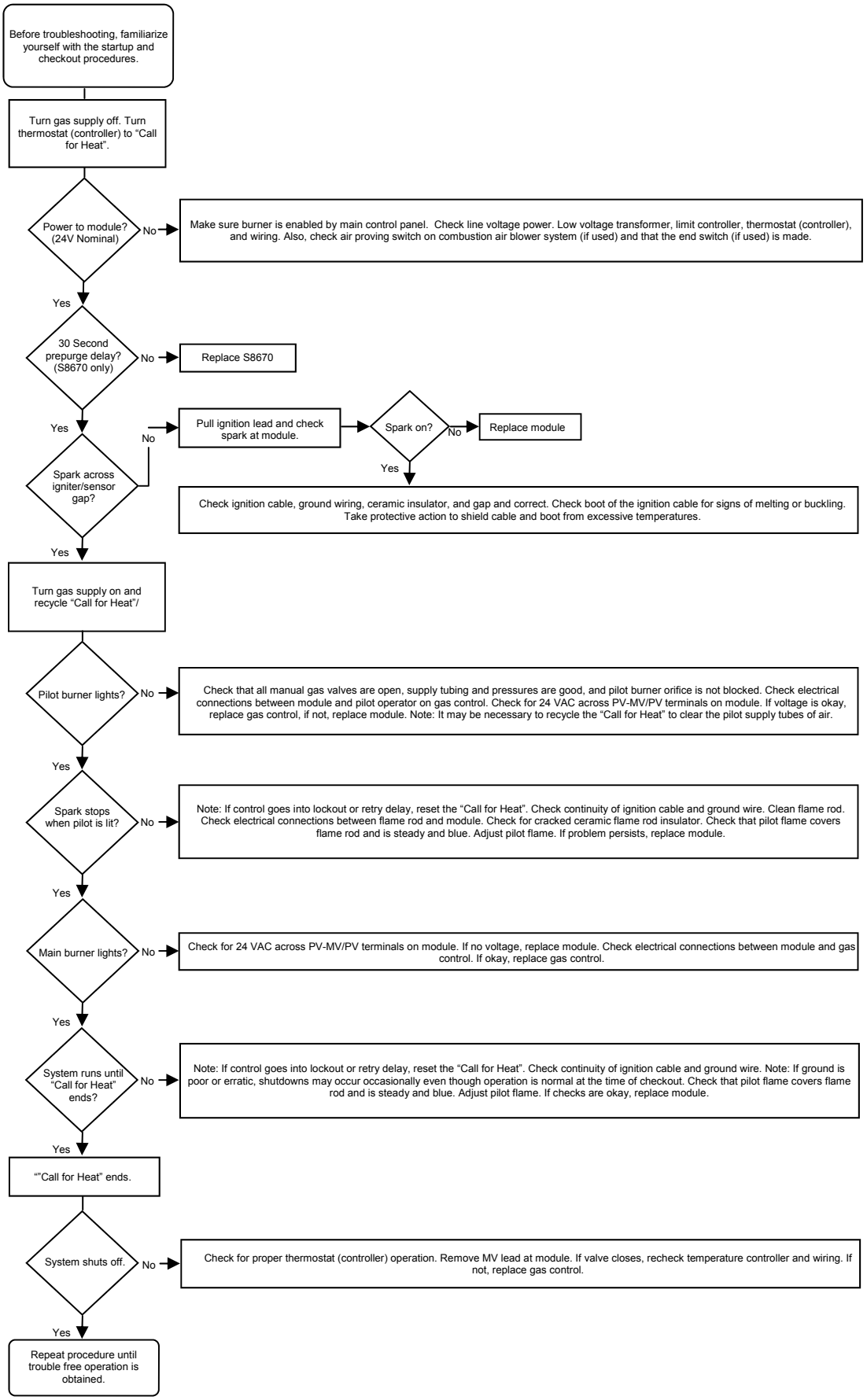
In the event of extended shutdown, the main power should be turned off and the main manual gas shut-off valve should be closed.

EMERGENCY SHUTDOWN: WARNING: Should over-heating occur: (1) shut-off manual gas valve(s) to the humidifier, (2) allow humidifier to cool, (3) check the heat exchanger(s) and remove excessive mineral build-up, (4) make sure the exhaust vent is not blocked with foreign material. **After the required maintenance has been performed,** the manual over-temp reset button on the exhaust and/or on the tank must be depressed.

An additional source of information relative to troubleshooting can be found in the Flame Safeguard Control Manual supplied with the burner.

PURE Humidifier

Burner Flame Controller Troubleshooting Guide



PURE Humidifier

Exchanger Gasket Replacement Instructions

WARNING
Disconnect the humidifier power, gas, exhaust system and allow the humidifier to cool prior to servicing. Drain water level below the level of the exchanger being serviced. Heat exchangers have a top and bottom. There is a break (crease) on the bottom side of the heat exchanger. Do not install heat exchanger upside-down

- Loosen the exchanger cover clamp screws with a 7/16" socket wrench until the locknuts can be slid out from the mounting clamps. Repeat this step for all clamps. Remove exchanger.

- Remove the old gasket and adhesive left of the heat exchanger. Make sure this surface is clean, dry, and free of oil, grease or water. Turpentine may be used to clean the surface areas.

- Spray contact adhesive such as 3M product Super 77 on one side of the new gasket and on the exchanger surface where the gasket is to be applied. Allow both surfaces to dry a minimum of one minute or until the surfaces become tacky to assure proper bonding.

- Square one end of the new gasket on one end of the exchanger and set by applying light to moderate pressure to the gasket. Square the other end of the gasket on the other end of the exchanger. It is common for the gasket to appear too long. Now slowly start setting the gasket from the ends towards the middle of the exchanger. A slight compression of the gasket will occur ensuring proper fit on the ends.

- Apply moderate to heavy pressure on the newly installed gasket all the way around ensuring proper fit. A properly installed gasket will lay flat with no raised areas.

- Reinstall the heat exchanger into the humidifier.

- Loosely install all of the exchanger cover clamps.

- Using a 7/16" torque wrench set at 60 inch/pounds tighten all clamp screws.

- In a reverse manner, reconnect all gas, exhaust and electrical connections. Fill humidifier with water and check for leaks.

- Observe for leaks and tighten slightly if a leak area is found. DO NOT EXCEED 120 inch/pounds.

PURE Humidifier

Cover Gasket Replacement Instructions

Remove the reservoir cover. While looking at the top of the unit, reference Figure A and B to determine which humidifier tank style you have.

Figure A Installation

Fit the gasket around the entire lip of the tank opening. Cut the gasket 1/8" longer than required, this will ensure proper fit when the cover is clamped back on. Slide the gasket onto lip of tank around the entire perimeter, and seal the ends together with a small amount of silicone.

Figure B Installation

Fit the gasket around the entire lip of the tank opening. Cut the gasket 1/8" longer than required, this will ensure proper fit when the cover is clamped back on. Slide the gasket onto lip of tank around the entire perimeter. Notch only the bottom flap of the gasket (reference Fig. C) in the corners of the tank. Seal the ends together with a small amount of silicone.

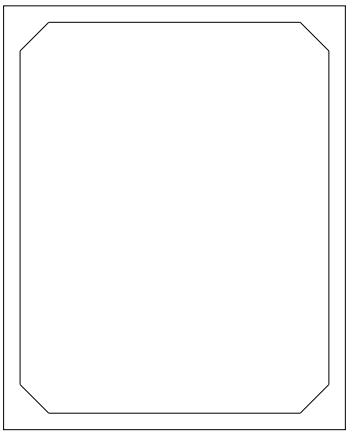


Fig. A
Plan View of Humidifier

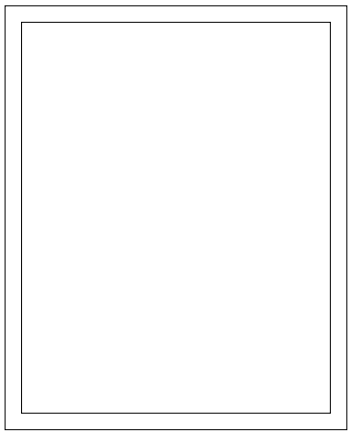
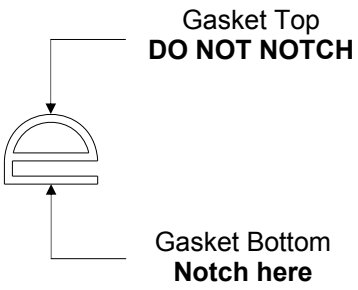
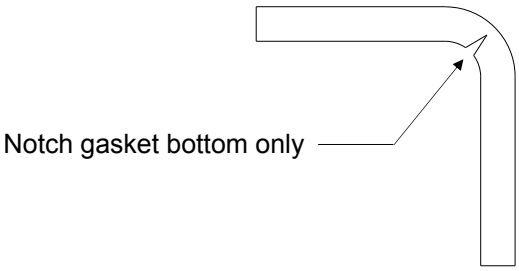


Fig. B
Plan View of Humidifier

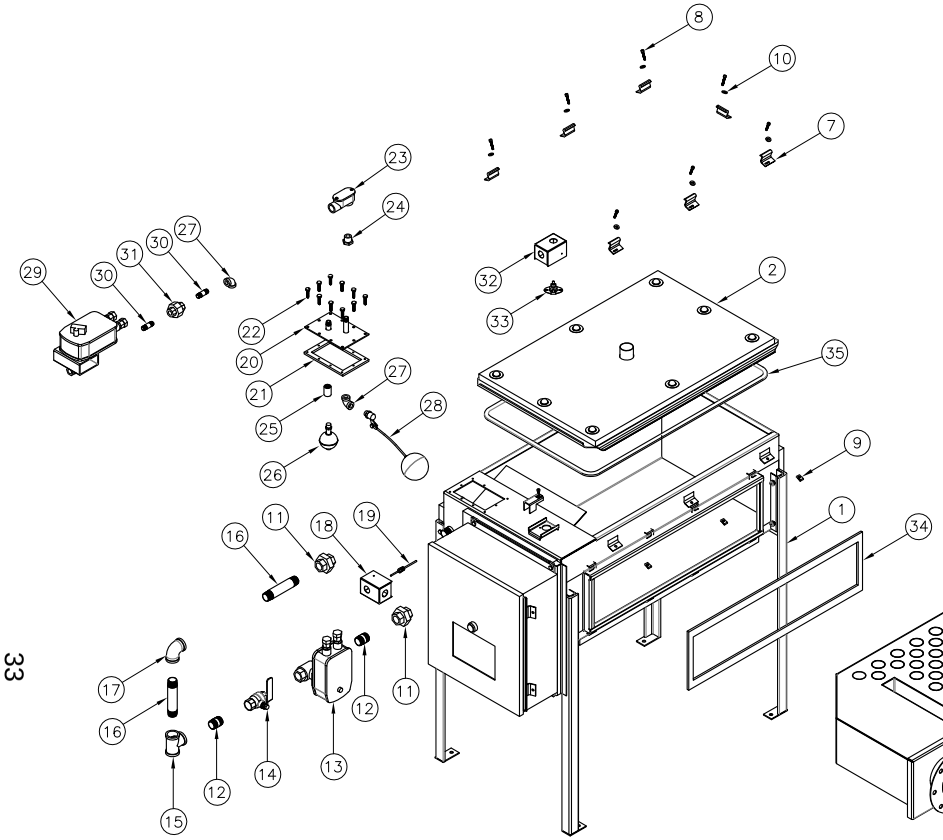


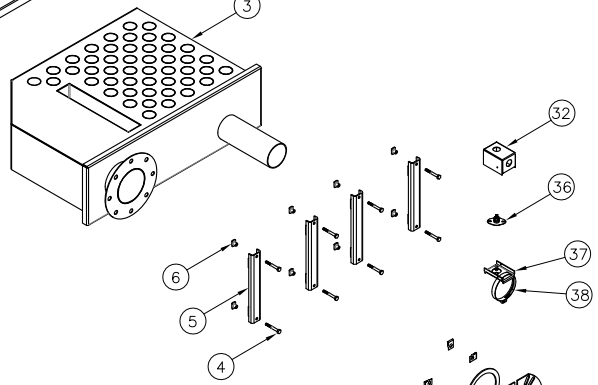
Section View of Gasket

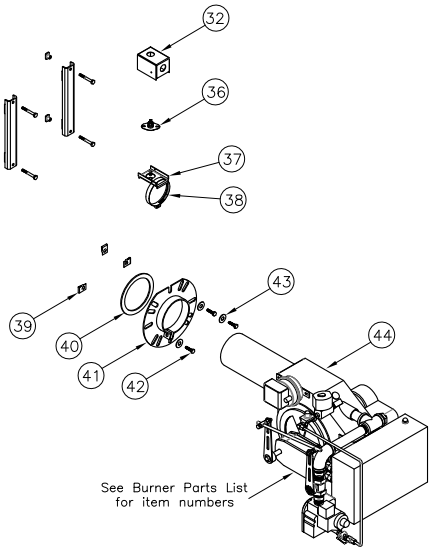


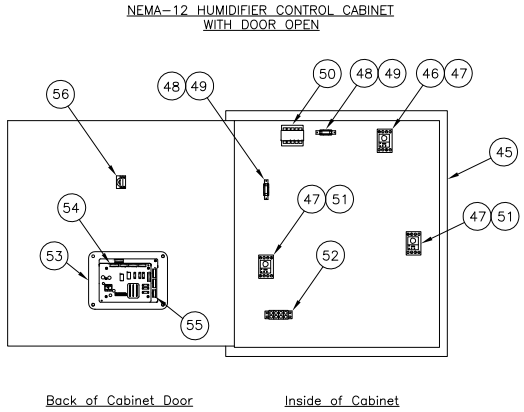
Bottom View of Gasket

Fig. C









See Burner Parts List for item numbers

Specifications 238414, 238415

Title: GXDDR–3 & GXDDR–4 EXPLODED ASSEMBLY			
Scale: No Scale	Date: June 10, 2013	Drwn: J.M.R.	Dwg No: GXDDR–3 EXPLODED ASSEMBLY

PURE Humidifier

Parts List & Two Year Recommended Spare Parts

Item No.	Description	Part No.	Qty Per Unit	Rec. SpareQty
1	GXDDR Tank Assembly	A	1	
2	GXDDR Tank Cover Assembly	A	1	
3	GX Heat Exchanger Assembly	A	1	
4	U-Clamp Bolts 1/4-20 x 2 Zinc Hex	15841	A	
5	U-Clamp Bar Assembly	99136	A	
6	1/4"-20 Weld Nut	15702	A	
7	Cover Clamp	15930	A	
8	Cover Clamp Screws	15522	A	
9	10-24 U-Nut	15524	A	
10	#12 SAE Zinc Washer	n/a	A	
11	3/4" Union Stainless Steel	07114	2	
12	3/4" x 1 1/2" Nipple Stainless Steel	07081	2	
13	3/4" Motorized Drain Valve Stainless Steel	09117	1*	
14	3/4" Ball Valve 316 Stainless Steel	09036	1	
15	3/4" Tee Stainless Steel	07115	1	
16	3/4" x 5" Nipple Stainless Steel	07011	2	
17	3/4" 90° Elbow Stainless Steel	07112	1	
18	Thermocouple Housing - Plain	16071	1*	
19	Type K Thermocouple	15853	1*	
20	DDR Float Plate Assembly	99134	1	
21	DDR Float Plate Gasket	05052	1	
22	10-32 x 3/4" Hex Bolt	15523	10	
23	1/2" Type LB Conduit Body	15079	1	
24	1/4" x 1/2" Hex Reducer	15694	1	
25	1/4" Coupling 304 SST	07001	1	
26	Low Water Float Switch	15048	1	
27	1/4" 90 Elbow 304 Stainless Steel	07002	1/2 *	
28	Water Fill Float Valve and Ball 316 Stainless Steel	09030	1	
29	1/2" Motorized Ball Valve Stainless Steel	09120	1*	
30	1/4" x 1 1/2" Nipple Stainless Steel	07043	2*	
31	1/4" Union Stainless Steel	07189	1*	
32	Overtemp Switch Housing	15072	2	
33	Overtemp Protection Switch	15047	1	
34	Heat Exchanger Gasket	A	1	
35	Cover Gasket	15520	1	
36	Exhaust Over Temperature Switch 450°F Manual Reset	21022	1	
37	Overtemp Switch Plate	99170	1	
38	3" Hose Clamp	15606	1	
39	3/8-16 J Nut	15850	3	
40	Burner Flange Gasket	05901	1	
41	Burner Flange	21072	1	
42	3/8-16 x 1 Hex Bolt	15943	3	
43	3/8 Stainless steel washer	15945	3	
44	Modulating Gas Fired Burner - See Burner Assembly Parts List	A	1	
45	Control Enclosure	12003	1	
46	Time Delay On Relay	12022	1	
47	Relay Base	12020	3	
48	2 amp Fuse	12063	2	
49	Fuse Holder	12085	2	
50	Step-Down Transformer	12160	1	
51	Finder Relay	12018	2	
52	4 Point Terminal Strip	12045	1	
53	INTAC® Microprocessor	12312	1	
54	7 Pin Terminal Connector	12310	4	
55	6 Pin Terminal Connector	12309	5	
56	Push Button Light with NC Relay	21021	1	

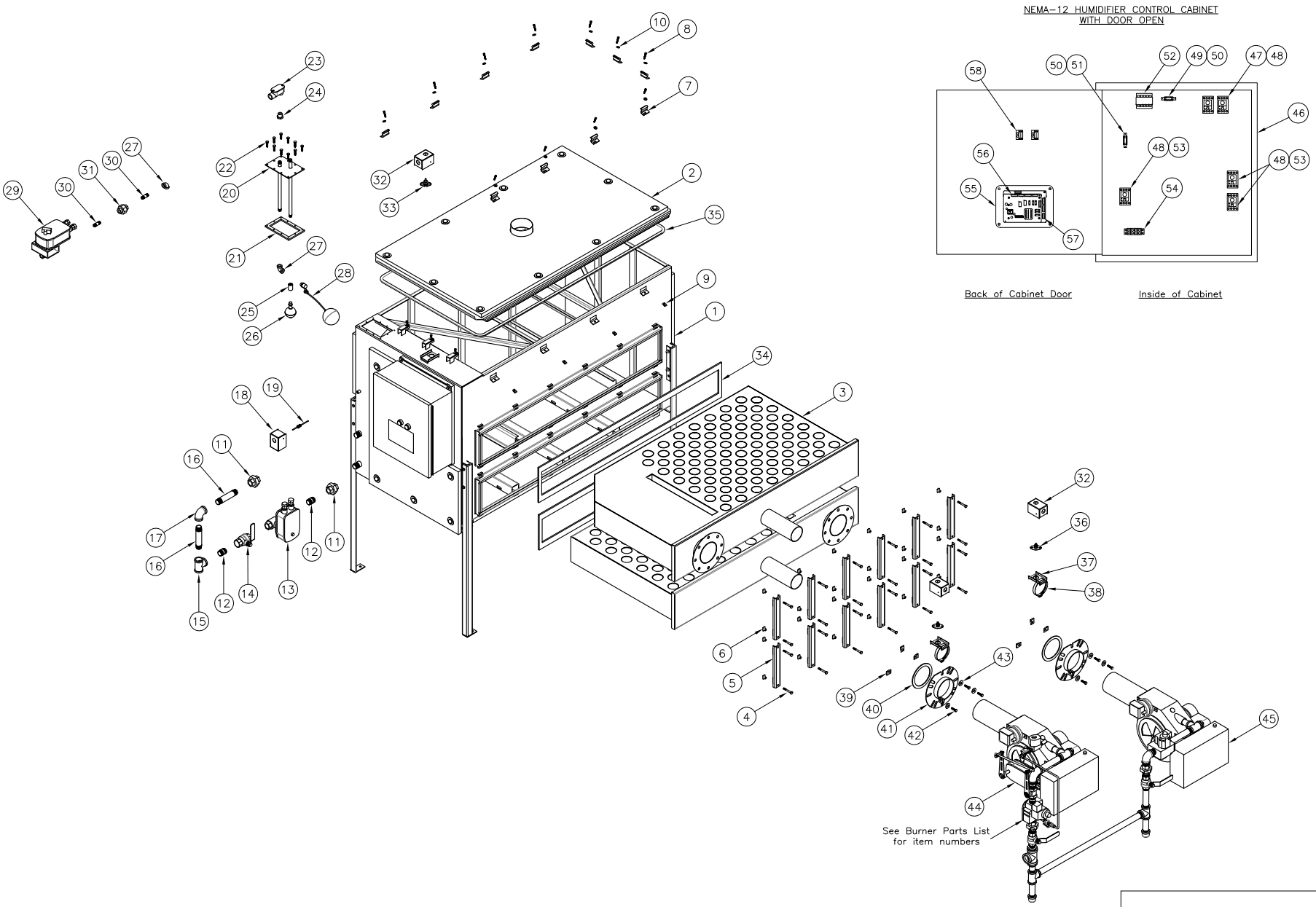
NOTES/CODES:

A = Part Number and quantity vary with model number.

* Optional feature that may not be on all equipment

When ordering replacement or spare parts please have Model and Serial numbers.

8/6/2013



Specifications 238414, 238415

Title: GXDDR–8 EXPLODED ASSEMBLY			
Scale: No Scale	Date: April 30, 2013	Drwn: S.A.M.	Dwg No: GXDDR–8 EXPLODED ASSEMBLY

PURE Humidifier

PURE Humididfier Co. "GXDDR-8"

Parts List & Two Year Recommended Spare Parts

Specifications 238414, 238415

Item No.	Description	Part No.	Qty Per Unit	Rec. SpareQty
1	GXDDR-8 Reservoir Assembly	10025	1	
2	GXDDR-8 Reservoir Cover Assembly	99087	1	
3	GX-4 Heat Exchanger Assembly	A	2	
4	U-Clamp Bolts 1/4-20 x 2 Zinc Hex	15841	24	
5	U-Clamp Bar Assembly	99136	12	
6	1/4"-20 Weld Nut	15702	24	
7	Cover Clamp	15930	11	
8	Cover Clamp Screws 10-24 hex socket	15522	14	
9	10-24 U-Nut	15524	14	
10	#12 SAE Zinc Washer	n/a	14	
11	3/4" Union Stainless Steel	07114	2	
12	3/4" x 1 1/2" Nipple Stainless Steel	07113	2	
13	3/4" Motorized Drain Valve Stainless Steel	09117	1*	
14	3/4" Ball Valve 316 Stainless Steel	09036	1	
15	3/4" Tee Stainless Steel	07115	1	
16	3/4" x 5" Nipple Stainless Steel	07011	2	
17	3/4" 90° Elbow Stainless Steel	07112	1	
18	Thermocouple Housing - Plain	16071	1*	
19	Type K Thermocouple	15853	1*	
20	DDR Float Plate Assembly	95009	1	
21	DDR Float Plate Gasket	05052	1	
22	10-32 x 3/4" Hex Bolt	15523	10	
23	1/2" LB Type Conduit Body	15079	1	
24	1/4" x 1/2" Hex Reducer	15694	1	
25	1/4" Coupling 304 SST	07001	1	
26	Low Water Float Switch	15048	1	
27	1/4" 90 Elbow 304 Stainless Steel	07002	1/2 *	
28	Water Fill Float Valve and Ball 316 Stainless Steel	09030	1	
29	1/2" Motorized Ball Valve Stainless Steel	09120	1*	
30	1/4" x 1 1/2" Nipple Stainless Steel	07043	2*	
31	1/4" Union Stainless Steel	07189	1*	
32	Overtemp Switch Housing	15072	3	
33	Overtemp Protection Switch	15047	1	
34	Heat Exchanger Gasket	05386	2	
35	Cover Gasket	15520	1	
36	Exhaust Over Temperature Switch 450°F Manual Reset	21022	2	
37	Overtemp Switch Plate	99170	2	
38	3" Hose Clamp	15606	2	
39	3/8-16 J-Nut	15850	6	
40	Burner Flange Gasket	05901	2	
41	Burner Flange	21072	2	
42	3/8-16 x 1 Hex Bolt	15943	6	
43	3/8 Stainless steel washer	15945	6	
44	Modulating Gas Fired Burner - See Burner Assembly Parts List	A	1	
45	On/Off Gas Fired Burner - See Burner Assembly Parts List	A	1	
46	Control Enclosure	12003	1	
47	Time Delay On Relay	12022	2	
48	Relay Base	12020	5	
49	2 amp Fuse	12063	1	
50	Fuse Holder	12085	2	
51	4 amp fuse	12065	1	
52	Step-Down Transformer	12245	1	
53	Finder Relay	12018	3	
54	4 Point Terminal Strip	12045	1	
55	INTAC® Microprocessor	12312	1	
56	7 Pin Terminal Connector	12310	4	
57	6 Pin Terminal Connector	12309	5	
58	Push Button Light with NC Relay	21021	2	

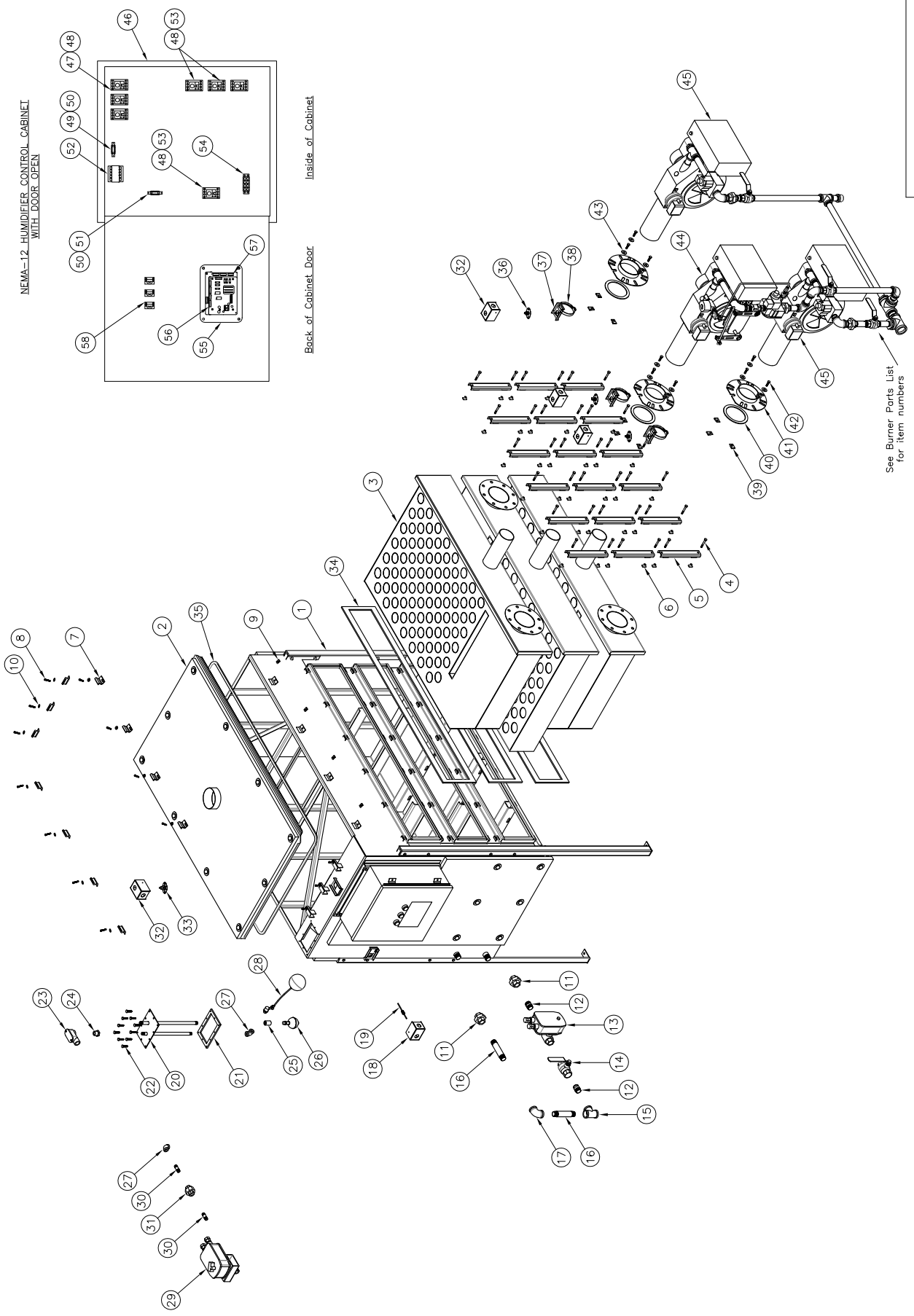
Notes/Codes:

A = Part Number and quantity vary with model number.

* Optional feature that may not be on all equipment.

When ordering replacement or spare parts please have Model and Serial numbers.

8/6/2013



PURE Humidifier

Title: GXDDR-12 EXPLODED ASSEMBLY			
Scale: No Scale	Date: April 30, 2013	Drwn: S.A.M.	Dwg No: GXDDR-12 EXPLODED ASSEMBLY

PURE Humididfier Co. "GXDDR-12"

Parts List & Two Year Recommended Spare Parts

Specifications 238414, 238415

Item No.	Description	Part No.	Qty Per Unit	Rec. SpareQty
1	GXDDR-12 Reservoir Assembly	10027	1	
2	GXDDR-12 Reservoir Cover Assembly	99087	1	
3	GX-4 Heat Exchanger Assembly	A	3	
4	U-Clamp Bolts 1/4-20 x 2 Zinc Hex	15841	36	
5	U-Clamp Bar Assembly	99136	18	
6	1/4"-20 Weld Nut	15702	36	
7	Cover Clamp	15930	14	
8	Cover Clamp Screws 10-24 Hex Socket	15522	14	
9	10-24 U-Nut	15524	14	
10	#12 SAE Zinc Washer	n/a	11	
11	3/4" Union Stainless Steel	07114	2	
12	3/4" x 1 1/2" Close Nipple Stainless Steel	07113	2	
13	3/4" Stainless Steel Motorized Drain Valve	09117	1*	
14	3/4" Ball Valve 316 Stainless Steel	09036	1	
15	3/4" Tee Stainless Steel	07115	1	
16	3/4" x 5" Nipple Stainless Steel	07011	2	
17	3/4" 90° Elbow Stainless Steel	07112	1	
18	Thermocouple Housing - Plain	16071	1*	
19	Type K Thermocouple	15853	1*	
20	DDR Float Plate Assembly	95009	1	
21	DDR Float Plate Gasket	05052	1	
22	10-32 x 3/4" Hex Bolt	15523	10	
23	1/2" Type LB Conduit Box	15079	1	
24	1/4" x 1/2" Hex Reducer	15694	1	
25	1/4" Coupling 304 Stainless Steel	07001	1	
26	Low Water Float Switch	15048	1	
27	1/4" 90° Elbow 304 Stainless Steel	07002	1/2 *	
28	Water Fill Float Valve and Ball 316 Stainless Steel	09030	1	
29	1/2" Motorized Stainless Steel Ball Valve	09120	1*	
30	1/4" x 1 1/2" Nipple Stainless Steel	07043	2*	
31	1/4" Union Stainless Steel	07189	1*	
32	Overtemp Switch Housing	15072	4	
33	Overtemp Protection Switch	15047	1	
34	Heat Exchanger Gasket	05386	3	
35	Cover Gasket	15520	1	
36	Exhaust Over Temperature Switch 450°F Manual Reset	21022	3	
37	Overtemp Switch Plate	99170	3	
38	3" Hose Clamp	15606	3	
39	3/8-16 J-Nut	15850	9	
40	Burner Flange Gasket	05901	3	
41	Burner Flange	21072	3	
42	3/8-16 x 1 Hex Bolt	15943	9	
43	3/8 Stainless steel washer	15945	9	
44	Modulating Gas Fired Burner - See Burner Assembly Parts List	A	1	
45	On/Off Gas Fired Burner - See Burner Assembly Parts List	A	2	
46	Control Enclosure	12003	1	
47	Time Delay On Relay	12022	3	
48	Relay Base	12020	7	
49	2 amp Fuse	12063	1	
50	Fuse Holder	12085	2	
51	4 amp fuse	12065	1	
52	Step-Down Transformer	12245	1	
53	Finder Relay	12018	4	
54	4 Point Terminal Strip	12045	1	
55	INTAC® Microprocessor	12312	1	
56	7 Pin Terminal Connector	12310	4	
57	6 Pin Terminal Connector	12309	5	
58	Push Button Light with NC Relay	21021	3	

Notes/Codes:

A = Part Number and quantity vary with model number.

* Optional feature that may not be on all equipment.

When ordering replacement or spare parts please have Model and Serial numbers.

8/6/2013

BURNER PARTS LIST X4

1	Burner Housing
2	Inlet Ring
3	Blast tube (6”, 9”, 12”)
4	Gun Assembly
5	Flange Gasket
6	Mounting Flange
7	Blower Wheel
8	Motor Plate
9	Blower Motor
10	Air Switch
11	24 Volt Transformer
12	Panel & Door
13	Flame Monitor
14	Grounding Lug
15	Nipple Tapped
16	Gun Head
17	Side Orifice tee
18	Side Orifice Spring
19	Pilot Regulator
20	Pilot Solenoid Valve
21	Combination Gas Valve
22	Main Gas Cock
23	Pilot Gas Cock
24	Pilot Tubing
25	Pilot Assembly
26	Ignition Electrode
27	Flame Rod
28	Back Plate
29	Inner Damper
30	Middle Damper
31	Outer Damper
32	Air Sensing Tube
33	Orifice Kit
34	Direct Spark Transformer
35	Gas Piping Support Bracket
36	Damper Axle
37	Relay
38	5/16” Ball Joint Swivel
39	Mod Motor
40	Butterfly Valve
41	5/16” Linkage Rod
42	Light
43	Axle Bushing
44	1/2” Damper Arm
45	Pie DPR Retainer Washers

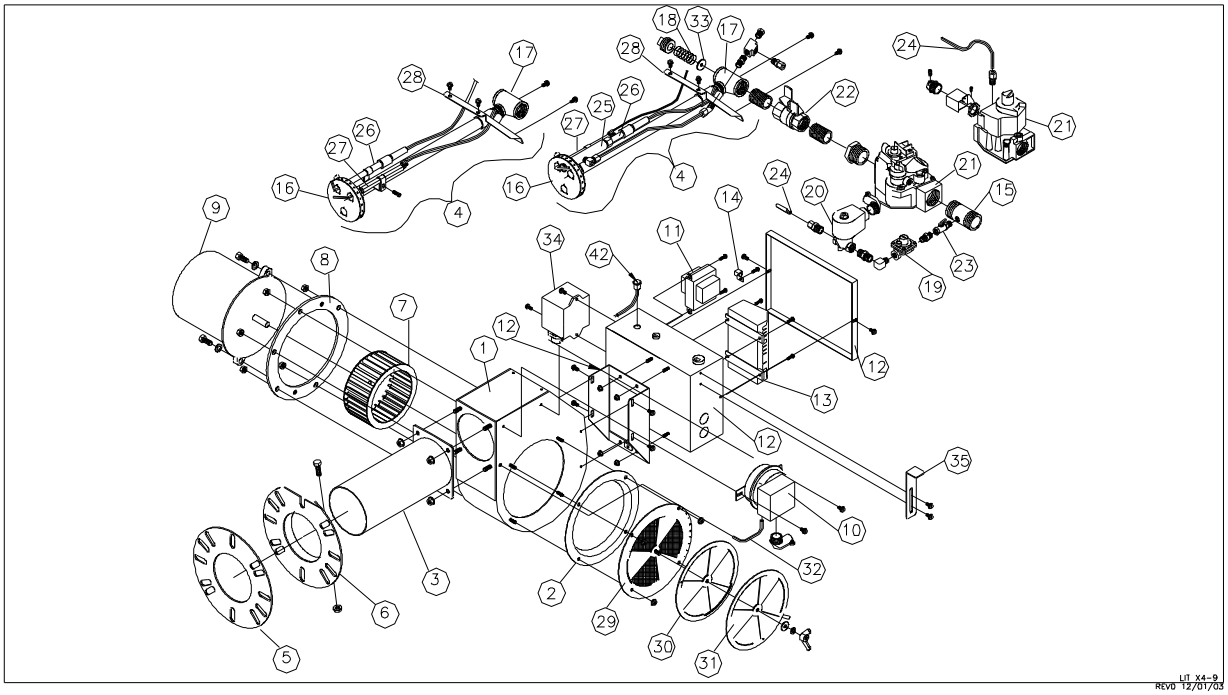


Figure 10: X4 general assembly and parts

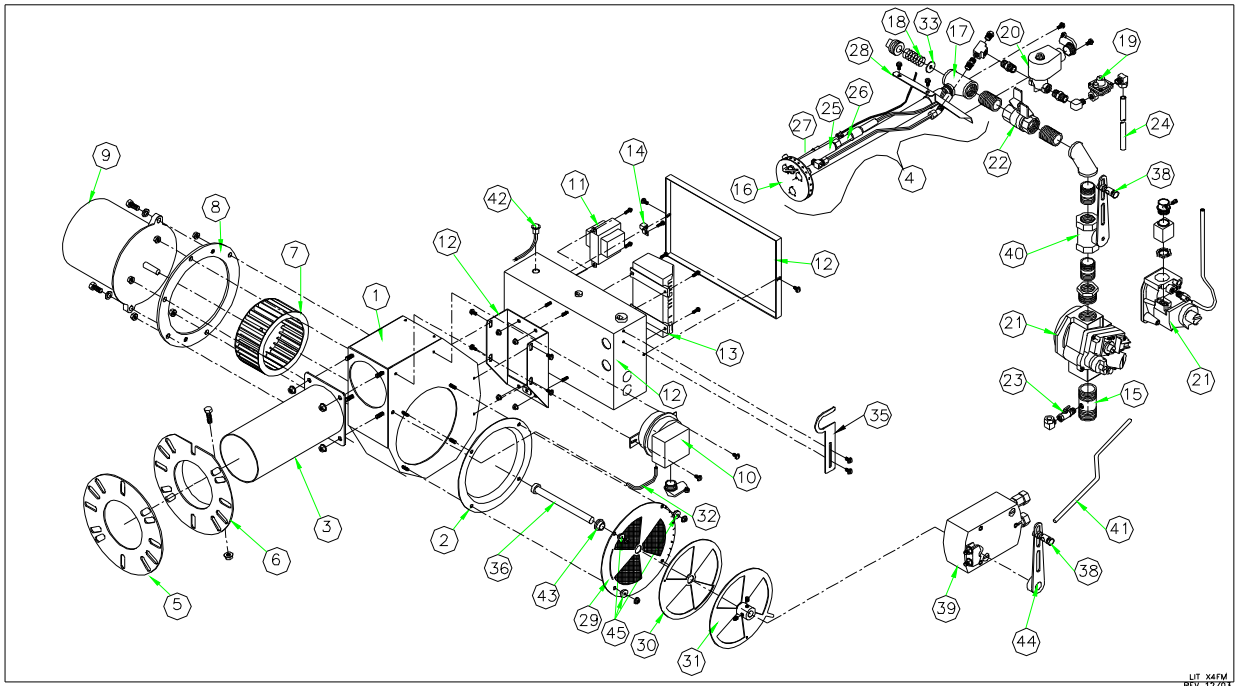


Figure 11: X4M general assembly and parts

PURE Humidifier

Maintenance Notes

Maintenance Performed	Date	By

PURE Humidifier

Maintenance Notes

Maintenance Notes

Maintenance Performed	Date	By

DISCLAIMER

Product Changes: Changes in products may be required from time to time due to the need for continuing improvement of products and due to factors beyond PURE Humidifier Co.'s control. PURE Humidifier Co. reserves the right to make reasonable changes in products, specifications and performance of any kind without notice or liability. PURE Humidifier Co. also reserves the right to deliver revised designs or models of products against any order, unless this right is specifically waived in writing by PURE Humidifier Co. PURE Humidifier Co. shall have no responsibility whatsoever with respect to changes made by the manufacturer in products sold but not manufactured by PURE Humidifier Co.

PURE Humidifier

141 Jonathan Blvd. North
Chaska, MN 55318
Tel: (952) 368-9335 Fax: (952) 368-9338
www.purehumidifier.com

ACE | INC
ASSOCIATED • CONSTRUCTION • ENGINEERING

2040 Harnish Blvd
Billings, MT 59101
406.245.0136 (phone)
406.245.2084 (fax)

SUBMITTAL REVIEW

ASSOCIATED CONSTRUCTION ENGINEERING, INC.

☐ Change as noted
☐ Revise & Resubmit per comments
☐ No re-submittal required
☐ No Exception Taken

Review is for conformance with design concept & compliance with contract documents only. Contractor shall check & verify all quantities, field measurements & shall be responsible for all errors in shop drawings. Contractor shall be responsible for deviations from contract documents unless he has called attention to such deviation and secured written approval. All in accordance with the general conditions.

COMMENTS/REMARKS:.

1. All comments must be addressed in writing, or in a re-submittal where indicated.
2. Any substitutions that result in electrical or other changes are the burden/responsibility of the submitting contractor.

No exceptions taken

-A.S. ACE

REVIEW STATUS:
END OF REVIEW

4G PLUMBING & HEATING, INC.

P.O. Box 17140 Missoula, MT 59808-7140 Fax: (406) 728-6257

PROJECT TITLE:	**Marcus Daly Memorial Hospital Surgery Addition**
DATE:	**December 1, 2017**
ARCHITECT:	**OZ Architect/ACE Engineering**
GENERAL CONTRACTOR:	**Swank Enterprises**
SUBCONTRACTOR:	**4G Plumbing & Heating, Inc.**
SUPPLIER:	**S Conley Sales**
MANUFACTURER'S NAME:	**PURE Humidfiers**
SUBMITTAL NUMBER:	
SPECIFICATION SECTION:	**238414**
SPECIFICATION	**Electric Steam Generators**
COMMENTS:	

Reviewed by 4G
Plumbing & Heating

. . . . . .

Cory Hamminen

384 Gallatin Park Dr. Suite 201, Bozeman, MT 59771
(O) 406.585.7333 (F) 406.585.7666

Marcus Daly Memorial Hospital Surgery Department Remodel

238414 Electric Steam Generators

238414 – Electric Steam Generators: Pure Humidifier

1 – Spec Section 238414 – TAG: H-AHU11 – Pure Humidifier Model EDDDR-5 Electric Humidifier

- 15.0 Lbs/hr Max
- (1) 2 – Tube Fast Pac Injection Tube at 18”
- 480/1/60 Primary Voltage
- 24 vac Control Voltage
- Evaporating Chamber and Cover constructed of 14 Gauge 304 Stainless Steel
- Incoloy Sheathed Electric Immersion Heater
- Stainless steel float type water make-up Valve
- Low Water Cut-Off Float Switch (Heater Interlock)
- High Temp Thermo cut-out
- Overflow Stand-pipe with ¾” NPT SS Ball valve and Drain Connection
- *Designed to work with RO, De-Ionized or Demineralized water*
- INTAC Microprocessor Controller
- Proto Node Communications Gateway – Full BACnet communications via native Modbus
- Time Cycle Modulation Control – 0-100% Modulation of Humidifier output.
- Includes 0-10 vdc wall mount modulating Humidity Sensor
- Schneider Electric HC-201 duct Mount High Limit Humidistat
- Air Flow Switch – Pressure Differential Type
- DCT-927 Self-Actuated Drain Tempering Kit
- Fast-Pac Multiple tube Assembly – ***HARD PIPED BY OTHERS***

2 – Spec Section 238415 – TAG: H-AHU9, H-AHU10 – Pure Humidifier GXDDR Gas Heat Exchanger Humidifiers

- ***Operating Pressure at Humidifier Gas Valve – Max 14” W.C.***
- Evaporating chamber and cover constructed of 14 gauge type 304 stainless steel and a 12 gauge type 304 stainless steel face plate (rated for 19” W.C. pressure).
- 304 stainless steel gas heat exchanger with 2” diameter transfer tubes and gas supply inlet.
- Forced draft combustion burner assembly includes 3450 RPM motor, blower, adjustable damper, control panel, combination dual shut-off gas valve/pressure

Specifications 238414, 238415

PURE Humidifier

To: S. Conley Sales **Date:** 11/28/17

Reference No. JK10178 EC

Job No:

Attn: Gary Wambeke

Project: Marcus Daly Surgery

Enclosed are 1 **copies of** "ECDDR" Electric Humidifier

X **Submittals**	**Specifications**
X **Drawing**	X **Operation & maintenance manuals**
Literature	**Wiring Diagram**

Other:

Remarks

Signed: Jennelle Kallenbach

141 Jonathan Blvd. North, Chaska, MN 55318
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PURE Humidifier Co. “ECDDR” Electric Steam Humidifier Schedule

Specifications 238414, 238415

The following PURE Humidifier Co. “ECDDR” Electric Steam Humidifiers are proposed for the subject project:

Marcus Daly Surgery

Tag	Qty	Model	Capacity (lbs./hr)	Injection Tube
H-AHU11	1	ECDDR-5	15.0 lbs/hr Max	(1) Two Tube Fast-Pac @ 18”

Humidifier Primary Voltage: **480/1/60** Control Circuit Voltage: **24 vac**

The above PURE Humidifier Company Electric Steam Humidifiers are supplied with the following standard equipment:

1. Evaporating chamber and cover constructed of 14 gauge type 304 stainless steel (rated for 19” W.C. pressure).
2. Quick release cover clamps. Quarter turn cover clamps allow removal of the cover without removing the securing bolts.
3. Incoloy sheathed electric immersion heater (80 watts density).
4. Stainless steel float type water make-up valve (1/4”-NPT).
5. Low water cut-off float switch (heater interlock).
6. High temperature thermo cut-out.
7. Over flow stand pipe with ¾”-NPT stainless steel ball valve and drain connection.
8. ETL listed humidifier.
9. Cabinet enclosure is fully welded 18 gauge with a textured baked enamel finish. The bottom panel serves as a drain pan and has a threaded fitting drain connection.
10. Hinged keyed door provides access to electrical subpanel. High voltage wiring and components are isolated from direct contact.
11. The above humidifiers are designed to operate with reverse osmosis, deionized or demineralized water.

Optional equipment furnished:

12. INTAC® Microprocessor Logic Controller; controller performs self-diagnostics and controls all safety circuit interlocks with fault indication.
    - a) 16 character two line display.
    - b) Keypad user interface.
    - c) BAS communications.
    - d) Adjustable input signal filter
    - e) Flash memory
    - f) On-Screen alarm/fault messages.
    - g) Keypad lock-out system.
    - h) Fault alarm contacts.
    - i) Low/High humidity deviation alarm contacts.
    - j) Adjustable P.I.D. parameters.
    - k) Time-to-Service indication.
    - l) Adjustable display brightness
13. ProtoNode Communications Gateway – gateway provides full BACnet communications via native Modbus.
14. Time Cycle Modulation control – provides 0-100% modulation of humidifier output. System includes a 0-10vdc wall mount modulating humidity sensor.
15. Schneider Electric HC-201 duct mount high-limit humidistat.
16. Cleveland Controls AFS-262-112 air flow switch – pressure differential type.
17. DCT-927 self actuated drain tempering kit – The drain tempering kit is designed to provide drain and condensate water at a temperature of less than 140ºF.
18. Fast-Pac multiple tube assembly – Tube consists of a stainless steel header with ¾”-NPT drain connection and horizontal 1 ½”∅ stainless steel injection tubes (see above schedule for length). **To be hard piped by others**.

PURE Humidifier

Capacity & Weights
Electrical Specifications

Sheet No. ECSD-2

Capacity & Weights

"ECDDR" Series

Deionized Water Unit Model No.	Steam Output Capacity †		Humidifier Weight Empty		Full	
	Lbs/hr	Kg/hr	Lbs	Kg	Lbs	Kg
ECDDR-5	15.0	6.8	139.0	63.1	223.0	101.2
ECDDR-10	30.0	13.6	140.0	63.5	224.0	101.6
ECDDR-15	45.0	20.4	141.0	64.0	225.0	102.1
ECDDR-20	60.0	27.2	142.0	64.4	226.0	102.5
ECDDR-25	75.0	34.0	143.0	64.9	227.0	103.0
ECDDR-35	102.0	46.3	146.0	66.2	230.0	104.3

Electrical Specifications

"ECDDR" Series

Deionized Water Unit Model No.	KW	Single Phase Amperage						Three Phase Amperage					Control Circuit Voltage
		No. of Heaters	120V	208V	240V	480V	600V	No. of Heaters	208V	240V	480V	600V	
ECDDR-5	5	Single	41.7*	24.0	20.8	10.4	8.3	Triple	13.9	12.0	6.0	4.8	24 vac
ECDDR-10	10	Double			41.7	20.8	16.7	Triple	27.8	24.1	12.0	9.6	24 vac
ECDDR-15	15	Triple				31.3	25.0	Triple	41.7	36.1	18.1	14.4	24 vac
ECDDR-20	20	Triple				41.7	33.3	Triple			24.1	19.2	24 vac
ECDDR-25	25	Triple					41.7	Triple			30.1	24.1	24 vac
ECDDR-35	34	Triple						Triple			40.9	32.7	24 vac

* ECDDR-5 at 120/1 requires 3 heating elements.

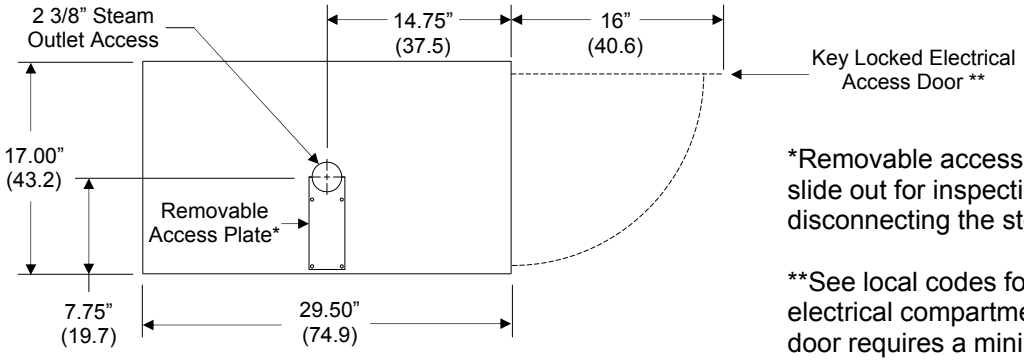
† The above capacities are based on 100% efficiency. Actual humidifier capacity may vary due to the heat loss from the humidifier reservoir. The ambient air temperature, air velocity, and injection tube system will affect the rate of heat loss from the humidifier reservoir.

PURE Humidifier

Dimensions & Layout

"ECDDR" Series

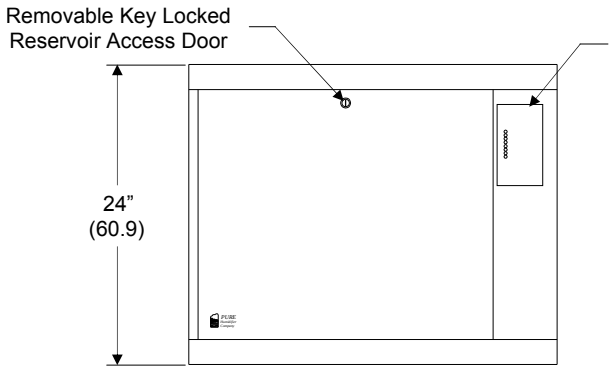
Sheet No. ECSD-3



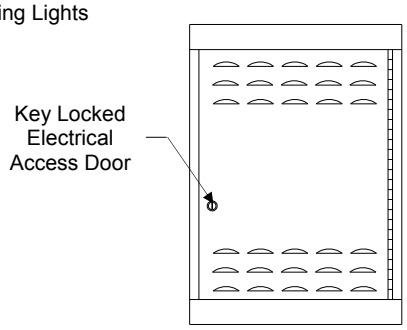
TOP VIEW

*Removable access plate allows reservoir to slide out for inspection and cleaning without disconnecting the steam supply piping.

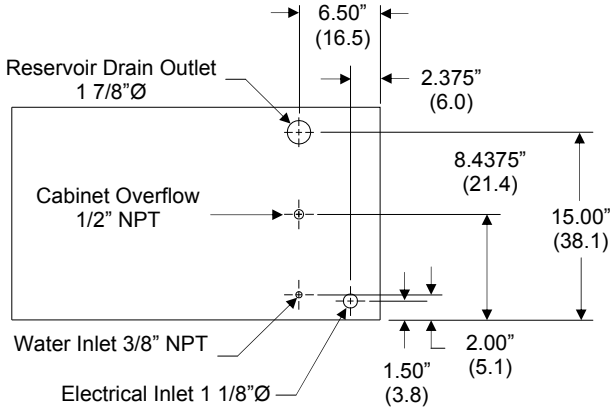
**See local codes for minimum clearance to electrical compartment. The electrical access door requires a minimum clearance of 16" to fully open.



FRONT VIEW



RIGHT SIDE VIEW



BOTTOM VIEW

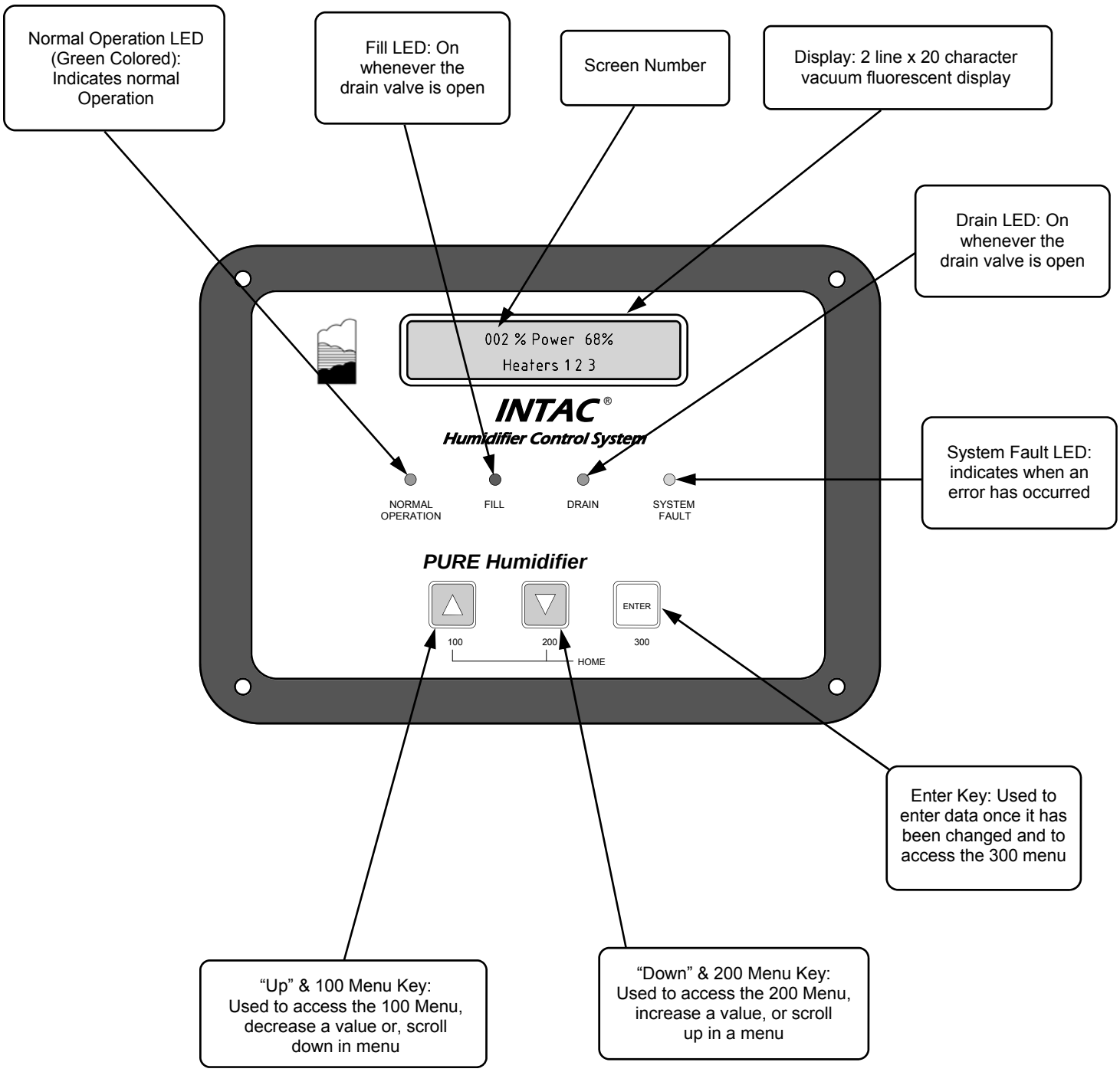
Note: Dimensions are typical for all ECDDR models.

PURE Humidifier

INTAC® Microprocessor

"ECDDR" Series

Sheet No. ECSD-10



100, 200, 300, & 400 KEYS ARE USED TO ACCESS CORRESPONDING MENU

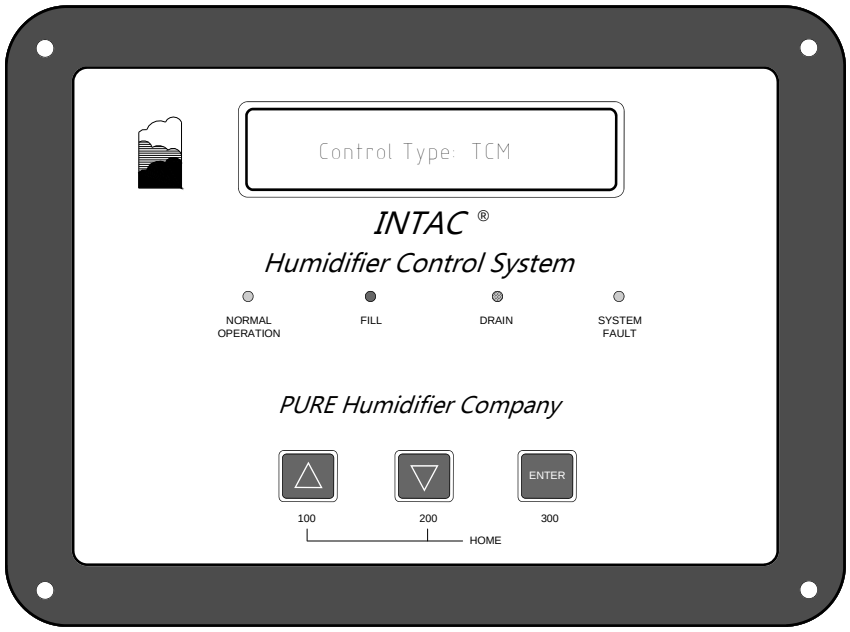
The Home Display is accessed by depressing the 200 & 300 keys simultaneously (Home=Home Display)

PURE Humidifier

INTAC Time Cycle Modulation

"EC" Series

Sheet No. ECS-13



System Description

Time Cycle Modulation provides 0-100% modulating control of the humidifier output by cycling the immersion heaters on and off according to a field adjustable cycle time. TCM provides ±3-4 humidity accuracy.

System Operation

The immersion heater is time cycled by the controller between 0-100% of the cycle time. The cycle rate is adjustable between 30 seconds and 4 minutes depending on the application and control tolerances desired. WattCycle rotates heater usage on multiple heater units to extend heater life.

Field Adjustments

Cycle Rate:	A slower cycle rate extends the contactor life. Faster cycle rates improve control response time.

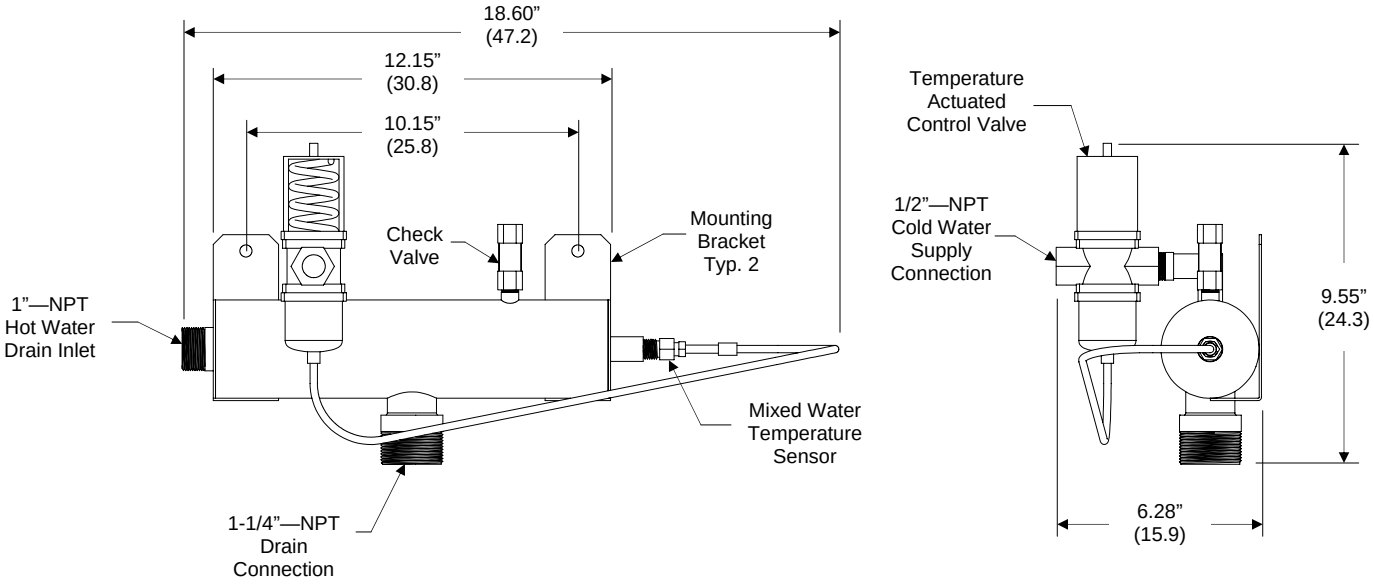
Specification

Input Signal:	0-10 vdc, 4-20 mA (field selectable and adjustable)

PURE Humidifier

DCT-927 Drain Tempering Kit

Sheet No. DCT-927



SYSTEM DESCRIPTION

The DCT-927 drain tempering kit is designed to provide drain water temperature of less than 140°F. The DCT-927 can be used with all PURE Humidifier Co. products. NOTE: When utilized with any of PURE's humidifiers, the condensate return must be a vented gravity drain.

The system utilizes a temperature sensor to sense the water temperature and open the temperature-actuated cold water mixing valve. Since the system is temperature-actuated, no power supply is required.

SYSTEM OPERATION

The DCT-927 drain water tempering kit contains an adjustable temperature sensor factory set-point at 135°F. When the temperature sensor senses a temperature higher than the set-point (135°F), it opens temperature-actuated cold water mixing valve. The cold water supply tempers the hot water and ensures a temperature of 140°F or less. The DCT-927 is factory assembled and shipped loose for field installation.

DCT-927 Capacities

	Hot Water In	Cold Water In	Tempered Water Out
Flow Rate GPM (L/m)	6 gpm (22.7 L/m)	6 gpm (22.7 L/m)	12 gpm (45.4 L/m)
Temperature °F (°C)	212°F (100°C)	70°F (21°C)	140°F (60°C)

The information above is based on one humidifier feeding the drain tempering kit.
Cold water supply pressure should be 35 psi (2.4 Bar) minimum and 95 psi (6.6 Bar) maximum.

SPECIFICATIONS

Sensor range: 115-180° F (46-82°C), factory set at 135° F (57°C),
Construction: Chamber: Stainless Steel
Temperature Sensor: Copper
Water Supply Valve: Bronze

ProtoNode

PROTOCOL GATEWAY

Instant Multiprotocol Deployment for OEM

Specifications 238414, 238415

FieldServer Technologies

A Sierra Monitor Company

*ProtoNode is an external, high performance, low cost **Building and Industrial Automation multi-protocol gateway** providing OEMs instant multiprotocol deployment of field protocol, quickly enabling the OEM device to communicate to systems and devices using modern open protocols.*

FieldServer Technologies pre-programs the ProtoNode solution to provide a virtual plug-and-play, easy, complete protocol package for the OEM including: BACnet MS/TP, BACnet/IP, Metasys N2 by JCI, Modbus TCP, Allen Bradley EtherNet/IP, LonWorks and many others. There are no configuration files to download in the field and all configurations are available to the user/installer simply by selecting the proper DIP switches. ProtoNode OEM users have access to the extensive FieldServer driver library.

ProtoNode is the instant answer to a manufacturer's needs to meet customer demands. As an example, a manufacturer might have five different devices, each requiring a variety of protocols to meet their customer's interoperability needs. They desire a single source solution, with multiprotocol, multi-configuration capability, and they need it now! A single ProtoNode Solution can be provided by FieldServer Technologies that has all pretested configuration choices preloaded. Up to 70 different pretested configurations with multiple protocol choices, selectable by DIP switches, can be stored on a single ProtoCarrier solution. A key benefit for the OEM is minimal engineering costs, minimized stocking costs and simplified training and start-up operations!

ProtoNode RER

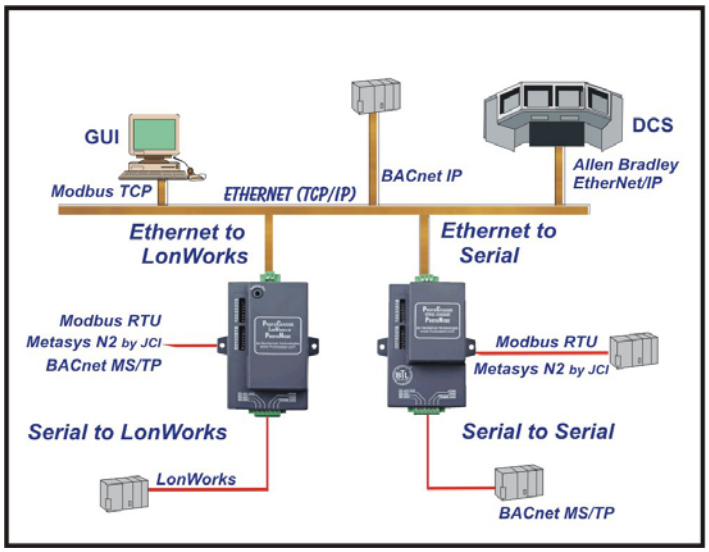
ProtoNode LER

ProtoNode RER is based on an ARM9 processor for fast performance and includes two serial ports (one RS-485 and the other can be RS-232, RS-485 or RS-422) and one Ethernet port. BACnet BTL marked (B-ASC)

ProtoNode LER includes a LONWORKS port plus Ethernet and RS-485 ports. LonMark certified.

ProtoNode Solution:

- ✓ Designed to be full featured, field programmable, and with multiple protocol support for any protocol translation between Serial, Ethernet, or LonWorks environments.
- ✓ Multiple hardware solutions available interfacing with RS-232, RS-485, RS-422, Ethernet or LonWorks.
- ✓ Serial or Ethernet versions support a total of 2400 Host and Field Protocol memory points.
- ✓ LonWorks versions support a total of 1500 Host and Field Protocol memory points.
- ✓ BACnet COV support provides fast data communication while reducing the traffic over a BACnet network.
- ✓ Supports virtual nodes allowing multiple OEM controllers to connect to a single ProtoNode and seen as separate controllers on the various field networks.
- ✓ Easily supports OEM's custom proprietary host serial or Ethernet protocols.
- ✓ Multi-Client and Multi-Server support ensures interoperability between any Industrial and or Building Automation protocols.
- ✓ BTL Marked and LonMark Certified



FieldServer Technologies, 1991 Tarob Court, Milpitas, California 95035 USA **Web:** www.protocessor.com
Tel: 408-964-4433, **FAX:** 408-262-9042, **Toll-Free**: 800-317-8319 **Email:** sales@protocessor.com

Specifications

Supported Electrical Connections

		Interface Connections				
		RS-232[1]	RS-485[2]	RS-422[3]	Ethernet[4]	LonWorks[5]
ProtoNode	FPC-N34		2		1	
	FPC-N35		1		1	1
	FPC-N36		1	1	1	
	FPC-N37			1	1	1
	FPC-N38	1	1		1	
	FPC-N39	1			1	1

[1] Tx/Rx/GND

[2] +/-/Frame Ground

[3] TBD

[4] 10/100 BaseT

[5] FTT10

Power Requirements

Power: 9-30 VDC or 12-24 VAC

Current draw @ 12V

RER @ 12V = 150 mA

LER @ 12V = 279 mA

Environmental

Operating Temp.: -40ºF to 167ºF (-40ºC to 75ºC)

Relative Humidity: 5-90% RH, non-condensing

Enclosure

Dimensions: 4.5 x 3.2 x 1.6 inches (L x W x H)
(11.5 x 8.2 x 4.0 cm)

Warranty

Warranty: Two years return to factory

Approvals

- BACnet Testing Labs (BTL) B-ASC
- LonMark 3.4 Certified - ProtoNode LER Series
- TUV approved to UL 916 standard and CSA C22-2
- RoHS Compliant
- DNP3 Conformance Tested
- OPC Self Certified to Compliance

BACnet Support

- ProtoCarrier-485 with FFP-485 is BTL Listed
- BACnet COV's
- Support up to 2,000 Host & Field points
- DIP switches are for setting MAC Address, Node-ID, Baud Rate on the RS-485 Field protocol

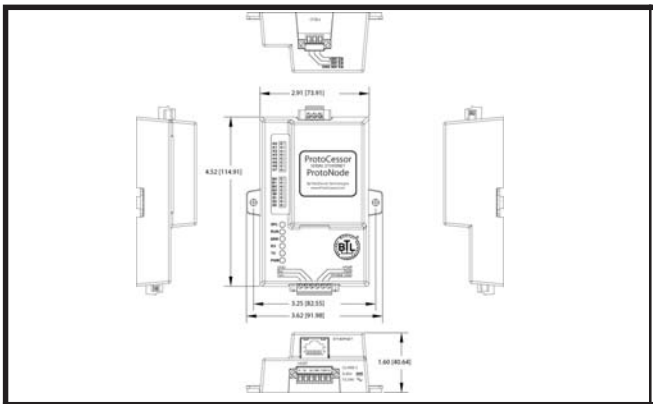
LonMark Certification on the ProtoNode LER

- SPID: 80:00:95:46:00:84:04:07
- Profiles:
  - 0000 - Node object (1)
  - 0001 - Open Loop Sensor Object (5)
  - 0003 - Open Loop Actuator Object (5)

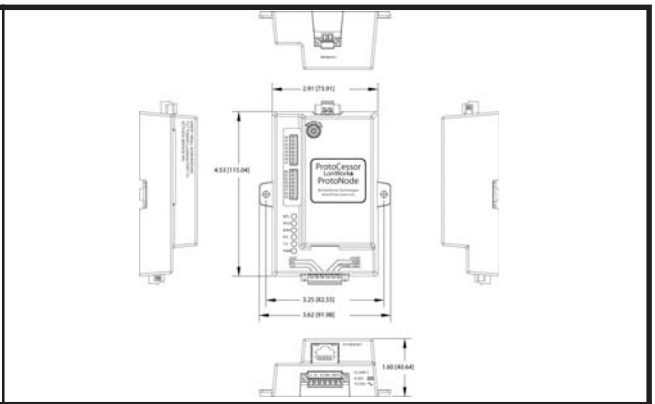
FieldServer Technologies has a full library of over 100 drivers so check with ProtoCessor sales to determine what additional protocols are available to meet specific application needs.

FieldServer Technologies offers a full range of OEM devices to enable manufacturers to easily provide the protocols their customers demand:

- ✓ **ProtoCessor** - embedded protocol translator
- ✓ **ProtoCarrier** - daughter cards to enable addition of ProtoCessor without hardware redesign
- ✓ **ProtoConnect** - semi-custom protocol OEM solution
- ✓ **ProtoNode** - external fully enclosed protocol OEM solution



ProtoNode RER Outline Dimensions



ProtoNode LER Outline Dimensions

6/2012

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Tel: 408-964-4433, **FAX:** 408-262-9042, **Toll-Free**: 800-317-8319 **Email:** sales@protocessor.com

Specifications 238414, 238415

Humidity Transducer

Model HU-224/225

- **Ultra-fast response polymer capacitance sensor**
- **Not affected by condensation, fog, high humidity or contaminants**
- **Highly accurate, repeatable, stable output with negligible hysteresis**
- **Wide 12-40 VDC/12-35 VAC unregulated supply voltage**
- **Two temperature compensated output versions, 4-20 mA 2-wire or field selectable 0-5 VDC/0-10 VDC**
- **Non-interacting zero and span trimmers**
- **NIST traceable ±2% or ±3% calibration**
- **Two enclosure types NEMA 4 (IP-65) duct mount or aesthetically appealing ABS plastic wall mount**
- **Short circuit and reverse polarity protected**
- **Conforms to EMC standards EN50082-1/EN55014/ EN60730-1**

The HU-224/225 is an extremely fast, stable and accurate humidity transducer designed for harsh environments. The polymer capacitance sensor is not affected by harsh contaminants, condensation, fog or extremely high humidity over a prolonged period of time. If dust or other contaminants accumulate on the sensor, the probe can be washed in industrial grade isopropyl alcohol and put back in service without any calibration shift. Each unit is individually calibrated in an environmental test chamber to meet or exceed NIST traceable ±2% or ±3% accuracies. The HU-224/225 is temperature compensated for -30°F to -130°F operation with negligible error. For space humidity, an aesthetically appealing ABS enclosure which may be flush mounted or fits a standard 2" x 4" handy box is available and for duct humidity applications, a rugged NEMA 4 (IP-65) steel enclosure with external mounting bracket is also available. Two enclosure types, field selectable outputs, fully temperature compensated NIST traceable accuracy, non-interacting zero and span adjustments, short circuit and reverse polarity protected output, and a liberal two year warranty are some of the features which make the HU-224/225 the industry's highest performance, most reliable humidity transducer.

MAMAC SYSTEMS®
MONITOR • DECISION • CONTROL

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West Midlands • DY6 8XZ • United Kingdom
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4 Armiger Court, Unit 2
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08-8395-4333 • Fax 08-8395-4433

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Ontario • L3R 0N6 • Canada
905-474-9215 • Fax 905-474-0876

5611 North Bridge Road
03-06 • Eng Cheong Tower
Singapore • 198782
65-3927273 • Fax 65-3927276

HC-201

Schneider Electric

Electric Duct Humidistat, Two-Position
General Instructions

APPLICATION

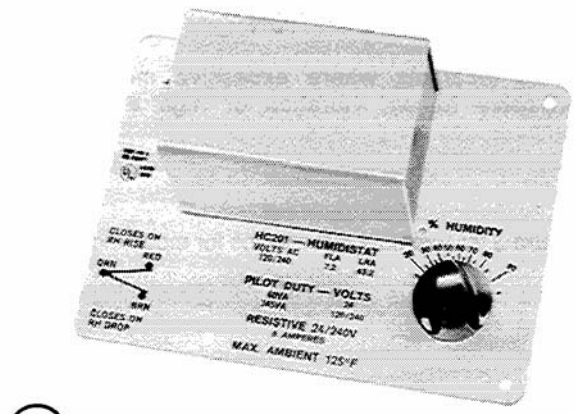
For low or line voltage on-off control of humidifiers, dehumidifiers, valves, solenoid valves, compressors, relay, etc.

SPECIFICATIONS

Control Dial Settings: 15 to 95% R.H.
Humidity Sensing Element: Nylon ribbon
Differential: 5% R.H.
Environment:
Ambient Temperature Limits,
Shipping & Storage, -40 to 140°F (-40 to 60°C).
Operating, 40 to 125°F (4 to 52°C).
Humidity, 5 to 95% R.H., non-condensing.
Location, NEMA 1, indoor location only.
Electrical Switch: Snap-acting SPDT (See Figure 1).
Ratings, See Table 1.
Connections: Coded screw terminal.
Cover: Metal.
Mounting: The outside surface of return air duct. Mounting template and five mounting screws provided.
Dimensions: 4-3/4" x 6-1/2" x 3-1/2" (121 x 165 x 89). See Figure 2.

Table-1 Maximum Electrical Ratings.

AC Volt 50/60 Hz	FLA	LRA	Resistive Amps	Pilot Duty VA
24	-	-	8	60
120	7.2	43.2	8	345
240	3.6	21.6	8	345



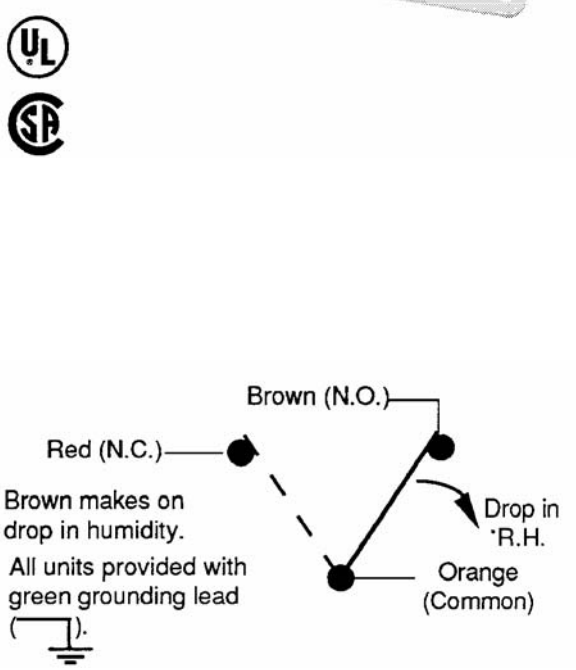


Figure-1 Switch Action and Terminal Identification.

PRE-INSTALLATION

Inspection

Inspect the carton for damage, if damaged notify the appropriate carrier immediately. Inspect the device for obvious damage due to shipping. Return damaged products.

Required Installation Items

- Wiring Diagrams
- Tools (not provided):
  - DVM (digital volt-ohm meter)
  - Appropriate screwdriver for terminal connections and mounting screws
  - Appropriate drill bit for mounting screws
- (5) Mounting screws (provided)
- (1) Cover screw (provided)

Cleveland Controls
Division of UniControl Inc.

Specifications 238414, 238415

Model AFS–262–112

AIR PRESSURE SENSING SWITCH WITH ADJUSTABLE SET POINT RANGE

APPLICATION

Model AFS-262-112 Air Pressure Sensing Switch is a general purpose proving switch designed for HVAC and Energy Management applications. It may be used to sense positive, negative, or differential air pressure. The **AFS-262-112** is equipped with convenient barbed sample line connectors that accept flexible tubing.

GENERAL DESCRIPTION & OPERATION

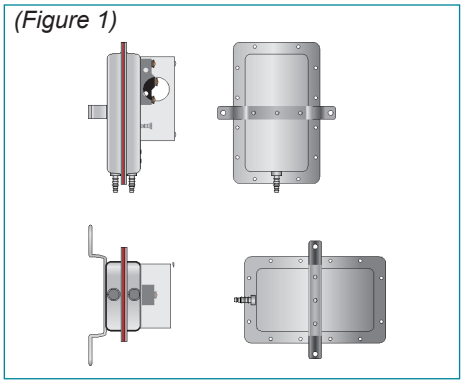
The plated housing contains a diaphragm, a calibration spring and a snap-acting SPDT switch.The barbed sample line connections located on each side of the diaphragm accept flexible tubing.

An enclosure cover guards against accidental contact with the live switch terminal screws and the set point adjusting screw. The enclosure cover will accept a ½" conduit connection.

MOUNTING (SEE FIGURE 1)

Select a mounting location which is free from vibration. The **AFS-262-112** must be mounted with the diaphragm in any vertical plane in order to obtain the lowest specified operating set point. Avoid mounting with the sample line connections in the "up" position. Surface mount via the two 3⁄16" diameter holes in the integral mounting bracket. The mounting holes are 3-⅞" apart.

(Figure 1)



AIR SAMPLING CONNECTION (SEE FIGURE 2)

The **AFS-262-112** is designed to accept flexible tubing by means of barbed ¼" slip-on connections. For sample lines of up to 10 feet, ¼" OD tubing is acceptable. For lines up to 20 feet, use ¼" ID tubing. For lines up to 60 feet, use ½" ID tubing. Locate the sampling probe a minimum of 1.5 duct diameters downstream from the air source. Install the sampling probe as close to the center of the airstream as possible. Refer to Figure 2 to identify the high pressure inlet (H) and the low pressure inlet (L). Select one of the following five application options, and connect the sample lines as recommended.

POSITIVE PRESSURE ONLY: Connect the sample line to inlet H; inlet L remains open to the atmosphere.

NEGATIVE PRESSURE ONLY: Connect the sample line to inlet L; inlet H remains open to the atmosphere.

TWO NEGATIVE SAMPLES: Connect the higher negative sample to inlet L. Connect the lower negative sample to inlet H.

TWO POSITIVE SAMPLES: Connect the higher positive sample to inlet H. Connect the lower positive sample to inlet L.

ONE POSITIVE AND ONE NEGATIVE SAMPLE: Connect the positive sample to inlet H. Connect the negative sample to inlet L.

Cleveland Controls
DIVISION OF UNICONTROL INC.
1111 Brookpark Rd
Cleveland OH 44109

Tel: **216-398-0330**
Fax: **216-398-8558**
Email:**saleshvac@unicontrolinc.com**
Web page: **http://www.clevelandcontrols.com**

ELECTRICAL CONNECTIONS (SEE FIGURE 3)

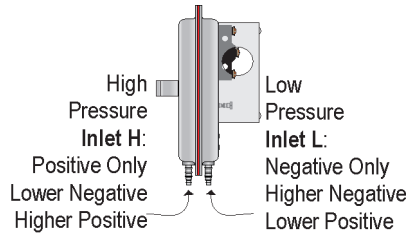
Before pressure is applied to the diaphragm, the switch contacts will be in the normally closed (NC) position. The snap switch has screw top terminals with cup washers. Wire alarm and control applications as shown in Figure 4.

FIELD ADJUSTMENT

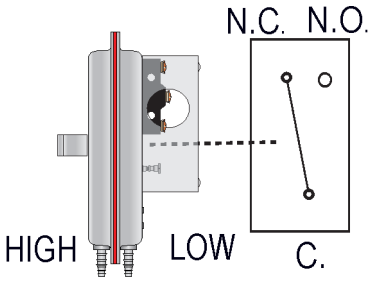
The adjustment range of an **AFS-262-112** Air Switch is 0.05±.02" w.c. to 2.0" w.c. To adjust the set point, turn the adjusting screw counterclockwise until motion has stopped. Next, turn the adjusting screw 4 complete turns in a clockwise direction to engage the spring. From this point, the next ten turns will be used for the actual calibration. **Each full turn represents approximately 0.2" w.c.**

Please note: To properly calibrate an air switch, a digital manometer or other measuring device should be used to confirm the actual set point.

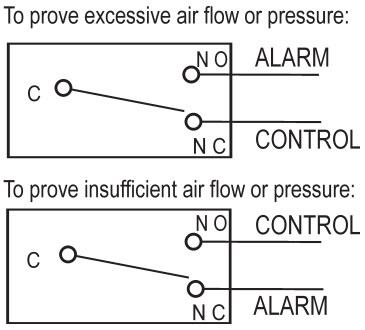
(Figure 2)

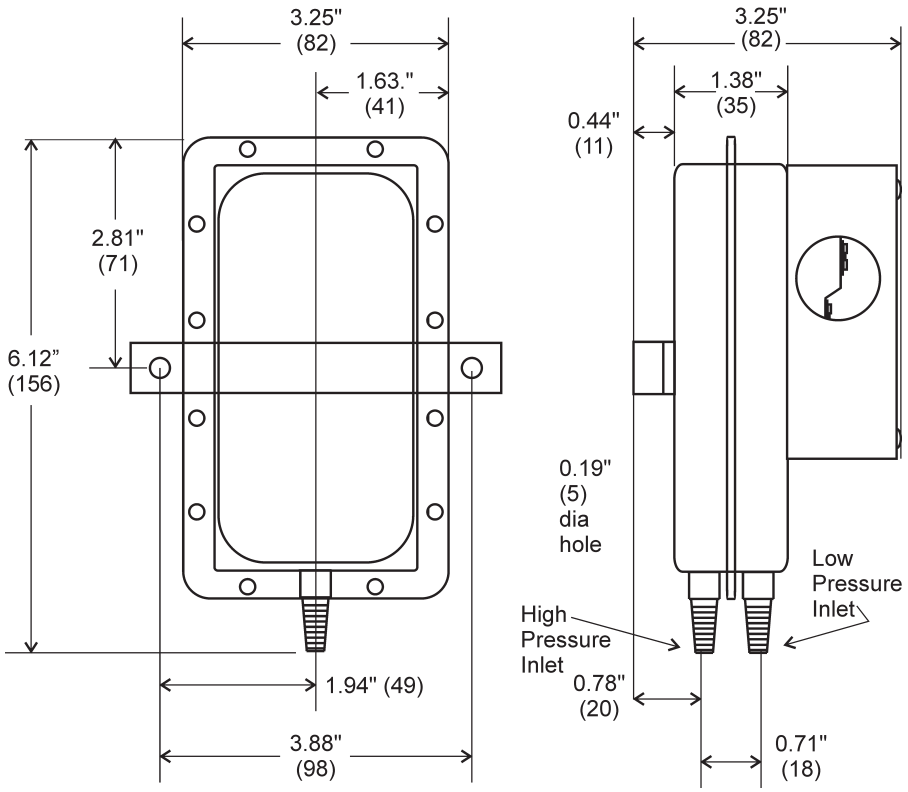


(Figure 3)



(Figure 4)





Nominal Dimensions in Inches (Millimeters)

SPECIFICATIONS

MODEL AFS-262-112 AIR PRESSURE SENSING SWITCH WITH ADJUSTABLE SET POINT RANGE

Mounting Position: Mount with the diaphragm in any vertical plane.

Set Point Range: 0.05 ± 0.02" w.c. to 2.0"w.c.

Field Adjustable "Operate Range": 0.07"w.c. to 2.0" w.c.

Field Adjustable "Release Range": 0.04"w.c. to 1.9" w.c.

Approximate Switching Differential: Progressive, increasing from 0.02 ± 0.01"w.c. at minimum set point to approximately 0.1 " w.c. at maximum set point.

Measured Media: Air, or combustion by-products that will not degrade silicone.

Maximum Pressure: ½ psi (0.03 bar).

Operating Temperature Range: -40F to 180F (-40 to 82C).

Life: 100,000 cycles minimum at ½ psi maximum pressure each cycle and at maximum rated electrical load.

Electrical Rating: 300 VA pilot duty at 115 to 277 VAC, 15 amps noninductive to 277 VAC, 60 Hz.

Contact Arrangement: SPDT.

Electrical Connections: Screw-type terminals with cup washers.

Conduit Opening: ⅞" diameter opening accepts ½" conduit.

Sample Line Connections: Two barbed ¼" connectors will accept ⅛" thru ¼" ID flexible plastic tubing.

Approval: UL, FM, CSA, CE

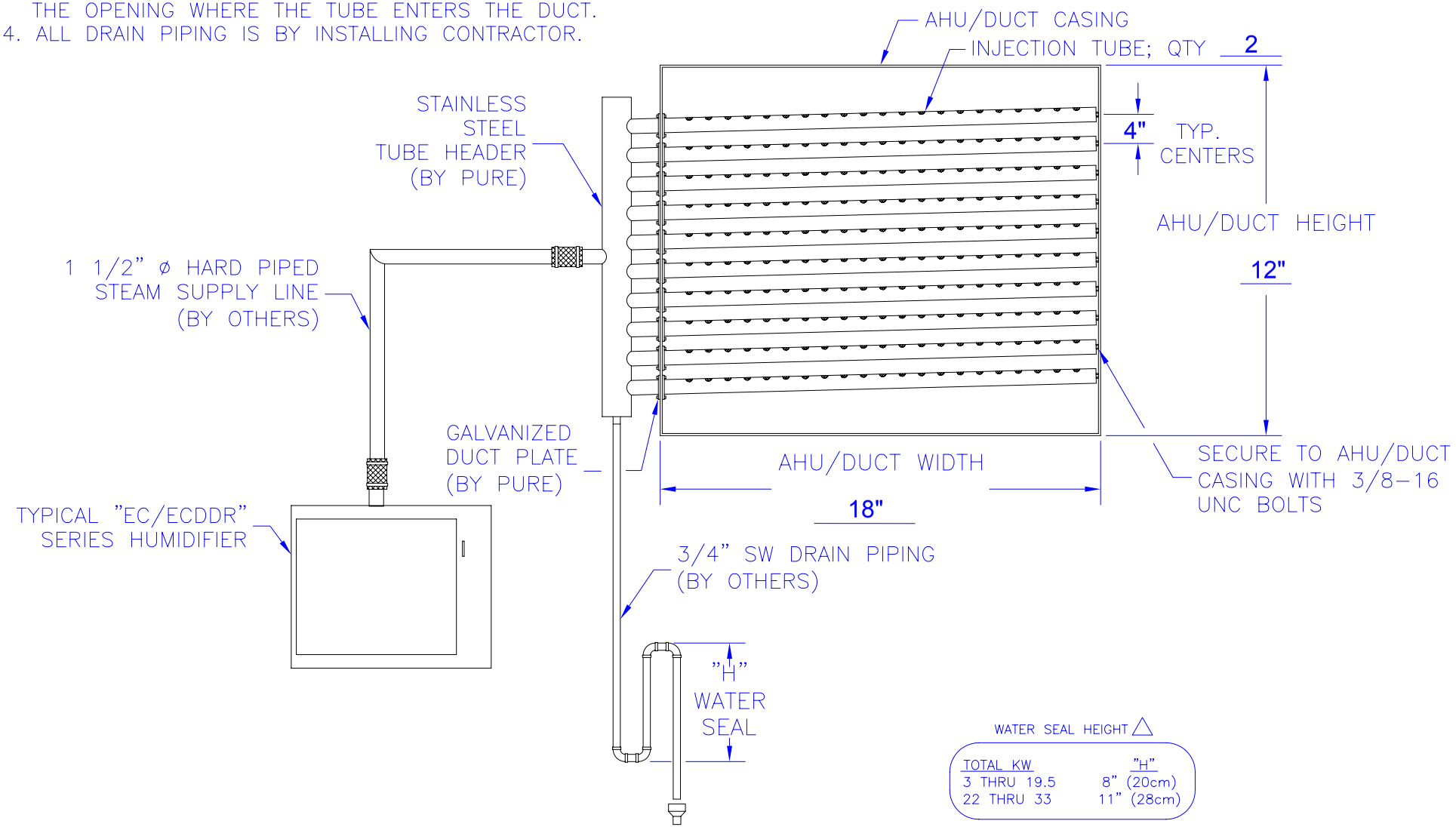
Shipping Weight: 1.2 lbs.

Accessories:

- Sample line probes.
- Orifice plugs (pulsation dampers).

Tag: H-AHU11

1. STEAM SUPPLY PIPING AND INJECTION TUBE SHOULD BE PITCHED TWO INCHES (2") PER FOOT, BACK TO THE HUMIDIFIER.
2. INSTALL TUBE WITH ORIFICES INJECTING STEAM UP.
3. GALVANIZED STEEL DUCT PLATE IS PROVIDED TO SEAL THE OPENING WHERE THE TUBE ENTERS THE DUCT.
4. ALL DRAIN PIPING IS BY INSTALLING CONTRACTOR.



WATER SEAL HEIGHT △

TOTAL KW	"H"
3 THRU 19.5	8" (20cm)
22 THRU 33	11" (28cm)

△ THE WATER SEAL HEIGHT MAY HAVE TO BE INCREASED IF EXCESSIVE DUCT STATIC PRESSURE EXISTS

Specifications 238414, 238415

Title:	FAST-PAC TUBE ASSEMBLY "EC/ECDDR" SERIES HARD PIPED / EXTERNAL, SINGLE SUPPLY		
Scale: No Scale	Date: April 22, 2009	Drwn: P.R.G.	Dwg No: 7044

PURE Humidifier

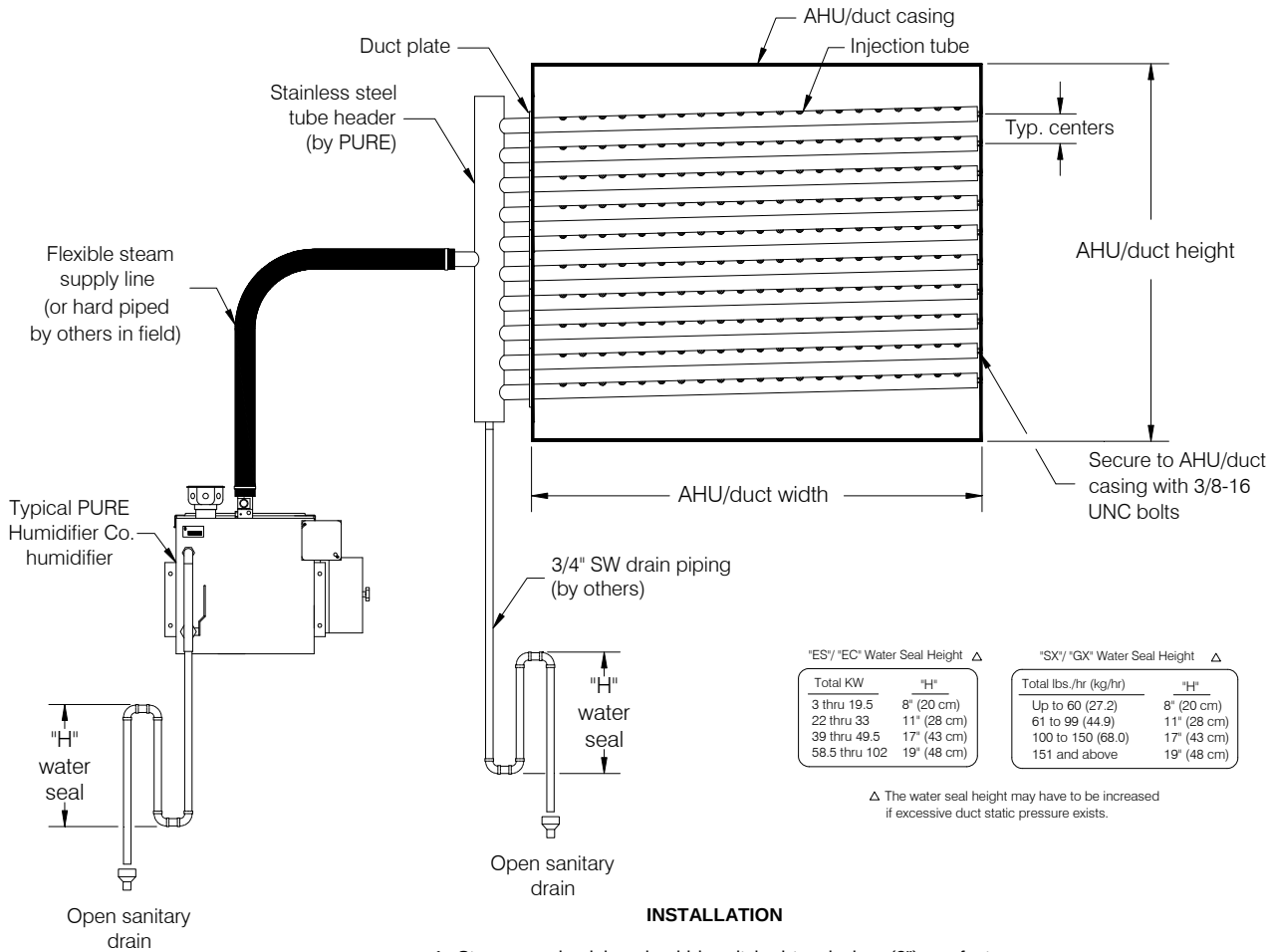
PURE™ Humidifier

READ AND SAVE THESE INSTRUCTIONS

WELDED FAST-PAC EXTERNAL MOUNT MULTIPLE TUBE ASSEMBLY

INSTALLATION AND ASSEMBLY INSTRUCTIONS

Fig. 1



"ES"/ "EC" Water Seal Height △

Total KW	"H"
3 thru 19.5	8" (20 cm)
22 thru 33	11" (28 cm)
39 thru 49.5	17" (43 cm)
58.5 thru 102	19" (48 cm)

"SX"/ "GX" Water Seal Height △

Total lbs./hr (kg/hr)	"H"
Up to 60 (27.2)	8" (20 cm)
61 to 99 (44.9)	11" (28 cm)
100 to 150 (68.0)	17" (43 cm)
151 and above	19" (48 cm)

△ The water seal height may have to be increased if excessive duct static pressure exists.

INSTALLATION

1. Steam supply piping should be pitched two inches (2") per foot, back to the humidifier.
2. Install tube with orifices injecting steam up.
3. All drain piping is done by others.

Welded Multiple Injection Tube Assembly External Mounting Instructions

The multiple tube assembly supplied with the humidifier(s), is designed for rapid dissipation of the steam. The tube assembly is designed for ***external*** AHU or duct mounting.

VERIFY COMPONENTS

Unpack the components from the shipping container. Verify all components are checked off according to the packing list and the *COMPONENTS IDENTIFICATION DRAWING* (Fig. 2). Report any missing pieces to your local PURE Humidifier Co. representative immediately.

LOCATION

1.) Mount the injection tube assembly in the AHU or duct work as shown on the project plans or as indicated by the project engineer.
2.) Install the injection tube with the 3/4"-NPT drain connection, located on the tube header, directed towards the bottom of the AHU or duct.
3.) Install the tube assembly so that the injection tubes are pitched back towards the header with a minimum of two inches (2") of pitch per foot. (welded assemblies have factory installed pitch).
4.) Install the tube assembly with the steam discharge ports facing upwards.
5.) The tube assembly should be centered in the AHU or duct height with an even distance between the bottom tube and the casing floor and the top tube and the casing ceiling.

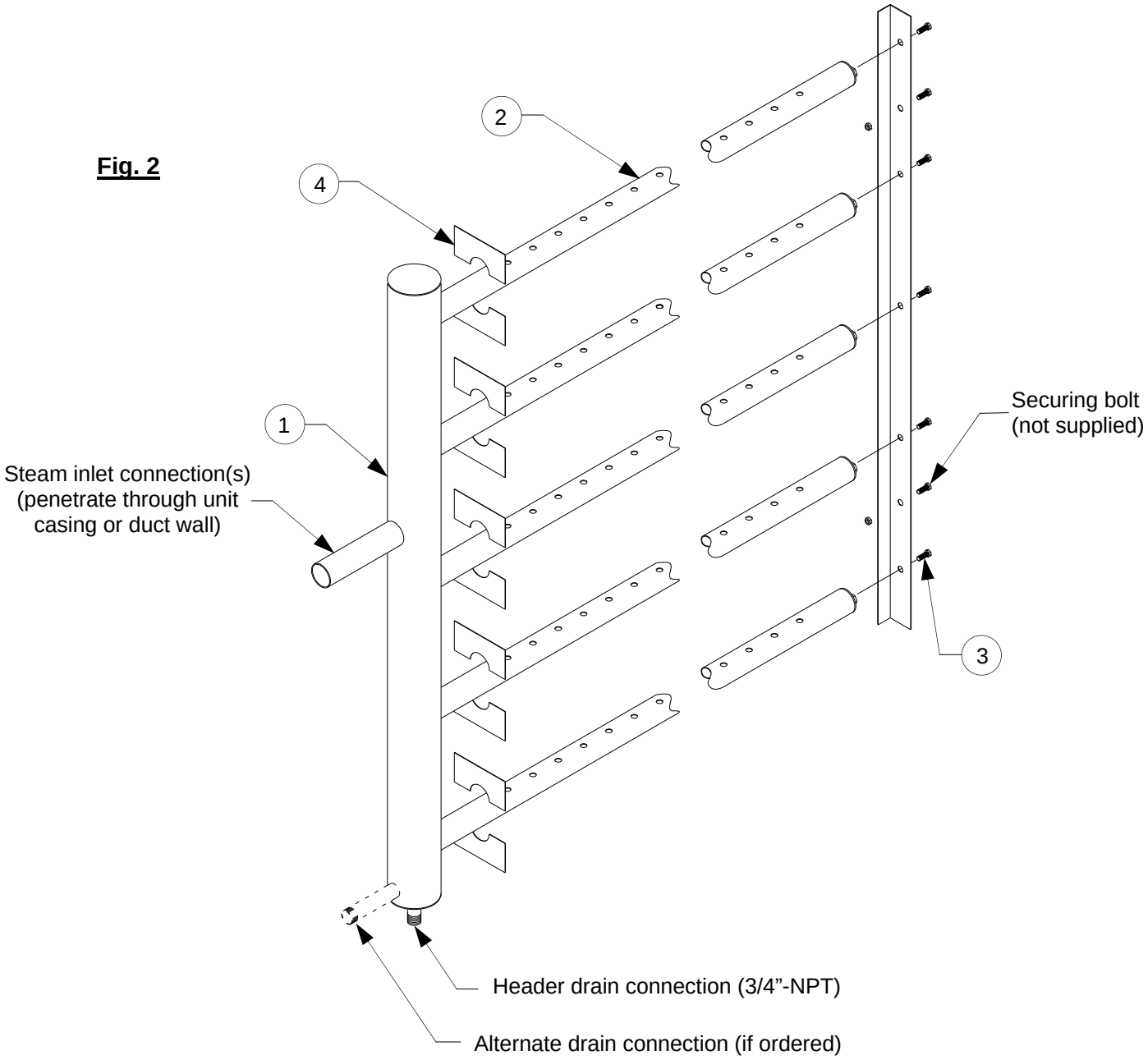
MOUNTING

1.) Layout the center lines for the injection tubes on the AHU or duct wall. The injection tubes have a 1-1/2" outside diameter. Duct plates are provided to seal the opening. The layout should be based on the "Location" instructions listed above (see Fig. 3).
2.) Cut a minimum of a 1-1/2" diameter hole, through the AHU or duct wall, for each injection tube (see Fig. 3).
3.) Slide the injection tubes through the access holes (cut in the steps above). Secure the tubes to the AHU or duct wall with 3/8"-16 UNC fasteners (by others).
4.) Seal the openings where the injection tubes penetrate through the AHU or duct wall with the duct plates provided (see Fig. 3).
5.) Connect steam supply and condensate piping to the humidifier as illustrated in Fig. 1.

External Mount Multiple Injection Tube Assembly
Component Identification

ITEM NO.	DESCRIPTION	QUANTITY
1	Supply/condensate header	1
2	Injection tubes	varies with order
3	Tube mounting bolts	1 per tube
4	Duct plate (supply)	1 per tube

Fig. 2



Header & Support Bracket Mounting Detail

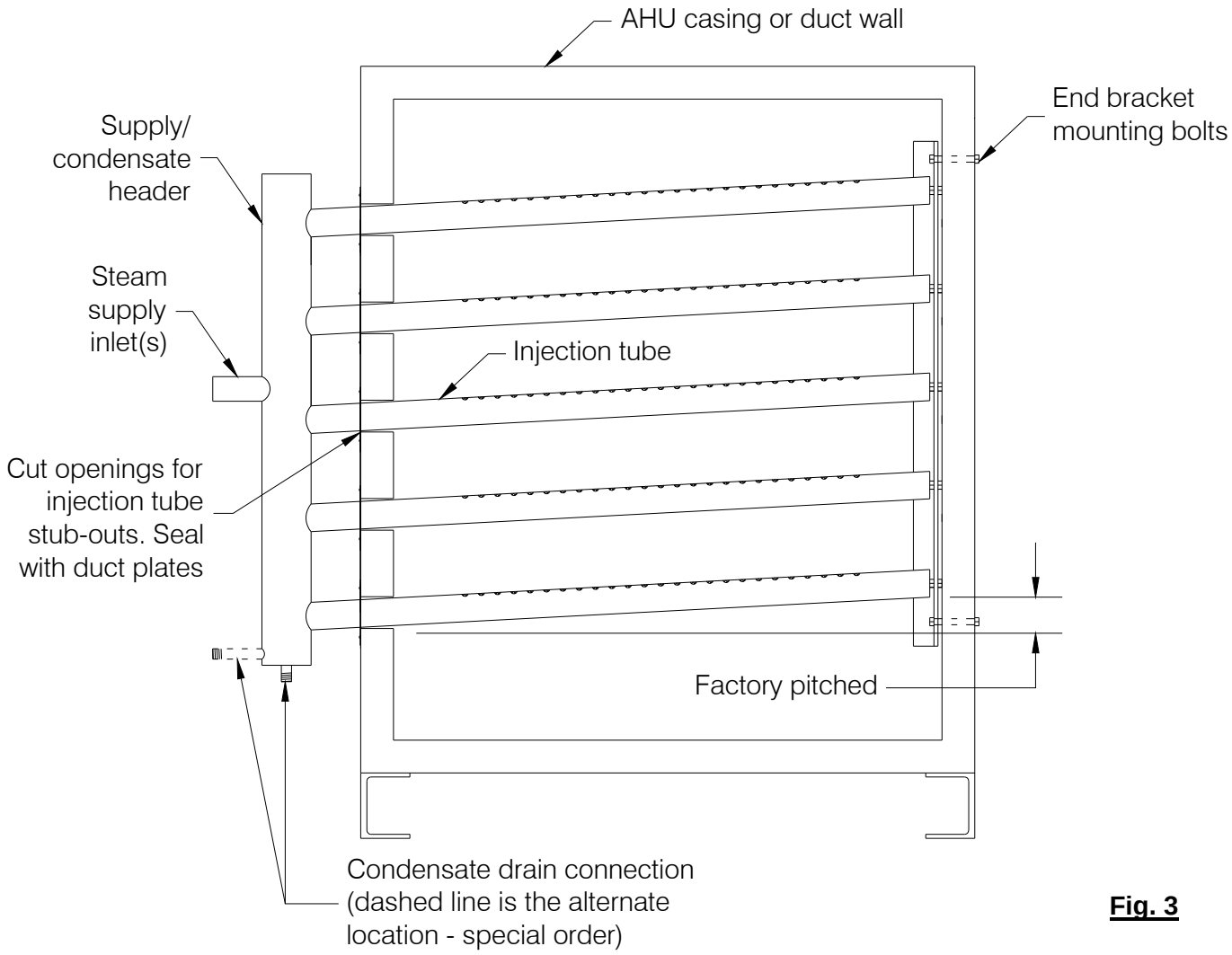


Fig. 3

Notes:

1.) Center the Fast-Pac injection tube assembly in the duct height.

2.) Install the Fast-Pac injection tube assembly so that the header is plumb.

3.) Install injection tubes with the orifices injecting upwards.

4.) All condensate drain piping is by others.

Installation Tips

Condensate Return Line
Condensate from the header cannot be elevated. Do not connect water seals to pressurized condensate return lines.**The drain piping should be copper or stainless steel. The use of PVC piping is not recommended; the humidifier temperature will cause the PVC to soften and fail.**

Laminar air flow
Tube assembly must be installed in a location that allows for laminar air flow across entire grid. A minimum velocity of 300 feet per minute is required to avoid saturation and excessive fog travel.

Plug fan installations
Install tube assembly as close as possible to the upstream coil to ensure laminar airflow and proper absorption.

Insulated ducts
Internally insulated ducts must be lined with a non-absorbent material to avoid saturation. If the duct is lined it must be removed three feet (3') upstream and ten feet (10') downstream of tube assembly.

Final Filters
Tube assembly must be installed a minimum of ten feet (10') upstream of final filters.

VAV Systems
Low velocity will cause long fog trails and steam will rise wetting the top of the AHU/duct casing. Modulating VAV high-limit humidistat is required. A minimum velocity of 300 feet per minute is required to avoid saturation and excessive fog travel.

Controls

Fan Interlock Switch
PURE Humidifier Co. recommends the use of an air flow proving switch or fan interlock to prove air flow prior to humidifier cooperation. Humidifier operation without air flow will result in over-saturation of the air stream. Air flow proving switches are available as optional equipment from your PURE Humidifier Co. representative.

High-Limit Humidistat
PURE Humidifier Co. recommends the use of a duct high-limit humidistat to prevent humidifier operation when the duct humidity level exceeds 85% relative humidity. Humidifier operation above 85% relative humidity can result in over-saturation of the air stream. High-limit humidistats are available as optional equipment from your PURE Humidifier Co. representative. The high limit humidistat should be 8 to 10 feet (244-305 cm) downstream from the humidifier injection tube. Installing the high-limit closer than 8 feet (244 cm) from the humidifier may cause erratic control.

Smoke Alarms and Temperature Sensors
Smoke alarms should be located 12 to 14 feet (365-427 cm) upstream from the humidifier injection tube.

Temperature sensors should be located 12 to 14 feet (365-427 cm) downstream from the humidifier injection tube, or past any visible fog travel that may be greater than this distance.

Troubleshooting

Too Much Humidity

1. Humidity controller out of calibration.
2. Humidifier oversized.
3. Check humidifier (GX, SX, ES, EC) for proper operation.

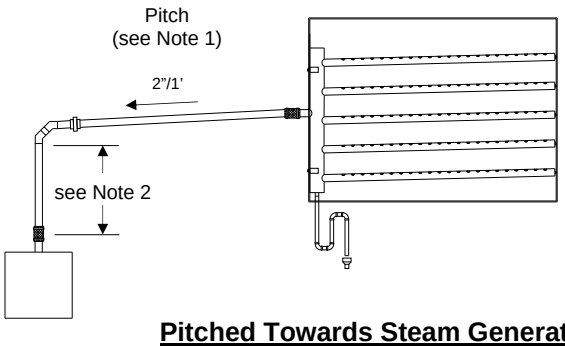
Too Little Humidity

1. Humidity controller out of calibration.
2. Undersized humidifier.
3. Check humidifier (GX, SX, ES, EC) for proper operation.
4. Water seals are not primed.
5. Water seals are blown due to improper supply piping.

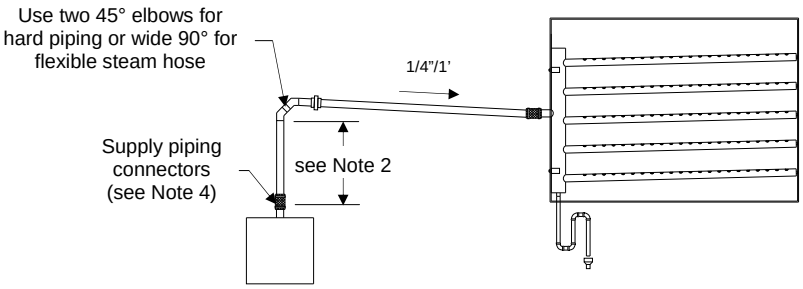
Humidifier Discharges Water

1. Faulty drainage:
    A) Return line pressure greater than humidifier pressure.
    B) Return line flooded.
    C) Vertical lift.

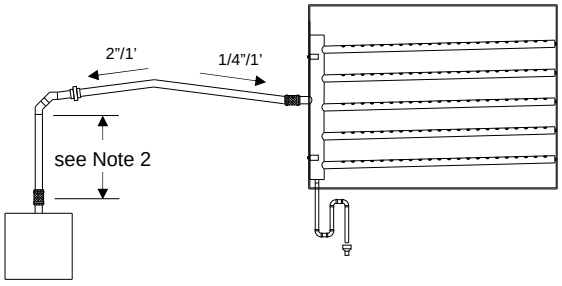
Steam Supply Piping Examples



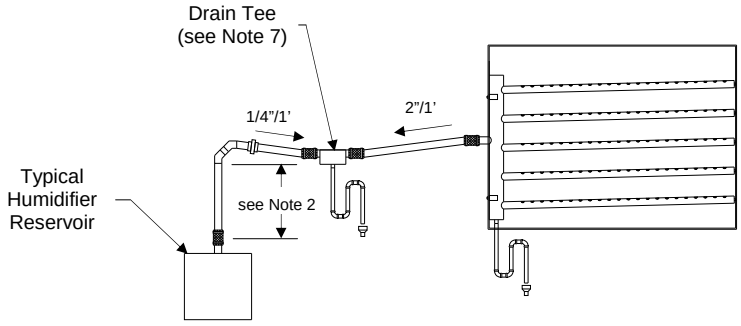
Pitched Towards Steam Generator



Pitched Towards Tube Assembly



Pitched Towards Steam Generator and Tube Assembly



Pitched Towards Drain Tee

Notes:

1. Pitch hard piping or flexible hose 2" per foot if steam is flowing uphill, 1/4" per foot if the steam is flowing downhill. Reference piping examples shown.
2. When feasible to do so, install a minimum one-foot riser from the top of the tank to reduce condensate carryover.
3. Use flex connectors or unions to allow for easy removal of cover.
4. Support flexible hose every 18" to avoid sagging.
5. Hard piping or flexible hose must match reservoir outlet size. Do not use supply piping with a smaller inside diameter than the reservoir outlet.
6. Failure to follow the piping recommendation on this page may result in blown water seals, leaking cover gasket, or dispersion tubes spitting.
7. Install a Drain Tee at any low spots in supply piping run where condensate will accumulate. **All horizontal to vertical up transitions require a water-sealed drip leg.**
8. Reference job specific tube assembly O&M included with your order for complete details.

DISCLAIMER

Product Changes: Changes in products may be required from time to time due to factors beyond the Seller's control, or the need for continuing improvement of products. The Seller reserves the right to make reasonable changes in products, specifications and performance of any kind without notice or liability. The Seller also reserves the right to deliver revised designs or models of products against any order, unless this right is specifically waived in writing by the Seller. The Seller shall have no responsibility whatsoever with respect to changes made by the manufacturer in products sold but not manufactured by the Seller.

PURE Humidifier

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www.purehumidifier.com

PURE Humidifier

READ AND SAVE THESE INSTRUCTIONS

Deionized, Demineralized, or Reverse Osmosis Water

"ECDDR" Series Electric Humidifier

Installation Instructions

Operation and Maintenance Manual

Our results are comforting

Form No: ECDOM-4-17

PURE Humidifier

Introduction

To the user of PURE Humidifier Co.'s Electric Humidifiers

We at PURE Humidifier Co. thank you for choosing one of our quality products. PURE Humidifier Co. Electric Series Humidifiers are models of simplicity to install, operate, and maintain. However, they must be maintained to provide maximum operating efficiency.

PLEASE READ AND FOLLOW ALL INSTRUCTIONS CAREFULLY. PROPER OPERATION AND HUMIDITY CONTROL IS POSSIBLE ONLY WITH PROPER INSTALLATION AND MAINTENANCE.

The "ECDDR" Series Humidifier is specifically designed to operate with deionized, demineralized, or reverse osmosis water. All components that will be in contact with water are constructed of type 304 stainless steel, incoloy, or corrosion resistant materials.

Use of mineralized (hard or soft) tap water will cause fill valve failure and void that warranty. PURE Humidifier Co.'s "EC" Series should be installed on applications that require tap water.

High chloride content in feed water can cause chloride stress cracking and chloride pitting in stainless components. Chloride stress corrosion cracking (CSCC) and chloride pitting of stainless steel components is not covered by warranty. Do not use hydrochloric acid descalers or bleach to clean the tank. Consult the factory if you are unsure about which chemical descaler to use.

To ensure proper installation of this product, it must be installed by qualified HVAC and electrical contractors, and must be in compliance with local, state, federal, and governing codes. If installed improperly this product may cause damage to property, severe personal injury, or death as a result of electric shock, burns, and/or fire.

Do not adjust any components inside humidifier control panel without consulting the factory.

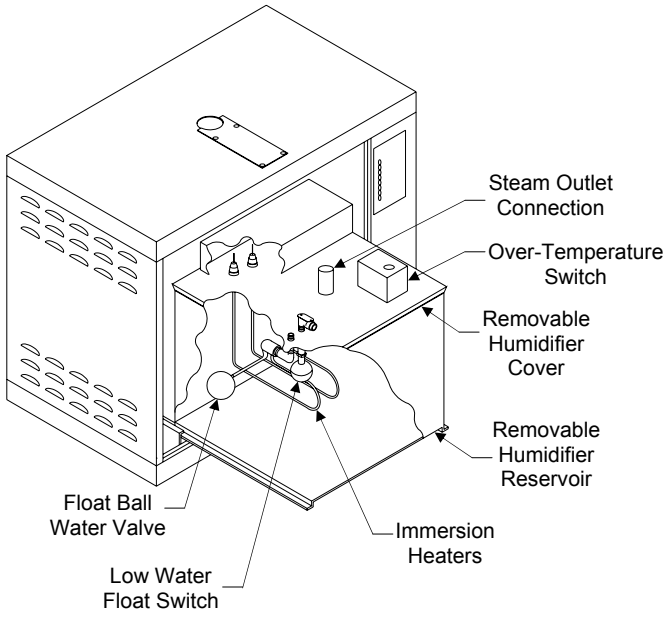
The PURE Humidifier Co. Warranty

PURE Humidifier Co. guarantees its products to be free from defects in material and workmanship for a period of one year from the date of shipment; provided the product is properly installed, serviced, and put into the service for which it was intended.

PURE Humidifier Co. is obligated under the terms of this warranty to the repair or replacement of the defective part(s), excluding any labor charges, or to refund the purchase price at our option. PURE Humidifier Co. assumes no obligation for incidental or consequential damages. The above provisions are in lieu of all other guarantees, obligations, liabilities or warranties, expressed or implied.

Table of Contents

Internal Features of the PURE Humidifier Co. "ECDDR" Series Electric Humidifier



PURE Humidifier

Capacity & Weights
Electrical Specifications

Capacity & Weights

"ECDDR" Series

Deionized Water Unit Model No.	Steam Output Capacity †		Humidifier Weight Empty		Full	
	lbs/hr	kg/hr	lbs	kg	lbs	kg
ECDDR-5	15.0	6.8	139.0	63.1	223.0	101.2
ECDDR-10	30.0	13.6	140.0	63.5	224.0	101.6
ECDDR-15	45.0	20.4	141.0	64.0	225.0	102.1
ECDDR-20	60.0	27.2	142.0	64.4	226.0	102.5
ECDDR-25	75.0	34.0	143.0	64.9	227.0	103.0
ECDDR-35	102.0	46.3	146.0	66.2	230.0	104.3

Electrical Specification

"ECDDR" Series

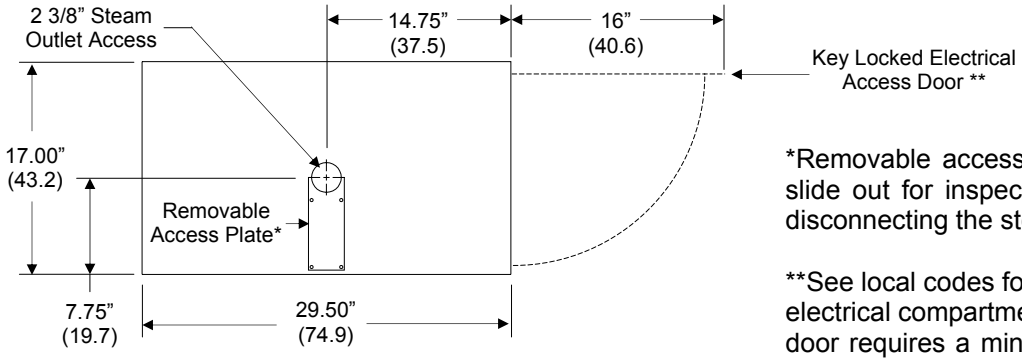
Deionized Water Unit Model No.		Single Phase Amperage						Three Phase Amperage					Control Circuit Voltage
	KW	No. of Heaters	120V	208V	240V	480V	600V	No. of Heaters	208V	240V	480V	600V	
ECDDR-5	5	Single	41.7*	24.0	20.8	10.4	8.3	Triple	13.9	12.0	6.0	4.8	24 vac
ECDDR-10	10	Double			41.7	20.8	16.7	Triple	27.8	24.1	12.0	9.6	24 vac
ECDDR-15	15	Triple				31.3	25.0	Triple	41.7	36.1	18.1	14.4	24 vac
ECDDR-20	20	Triple				41.7	33.3	Triple			24.1	19.2	24 vac
ECDDR-25	25	Triple					41.7	Triple			30.1	24.1	24 vac
ECDDR-35	34	Triple						Triple			40.9	32.7	24 vac

* ECDDR-5 at 120/1 requires 3 heating elements.

† 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.

PURE Humidifier

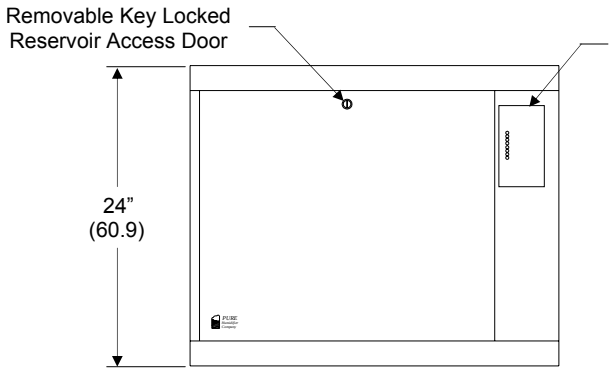
Dimensions & Layout



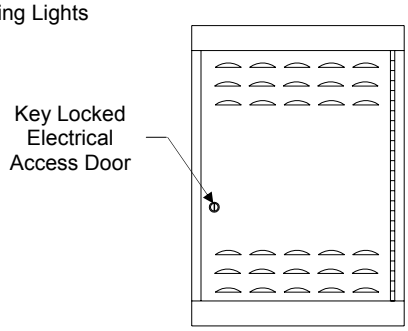
TOP VIEW

*Removable access plate allows reservoir to slide out for inspection and cleaning without disconnecting the steam supply piping.

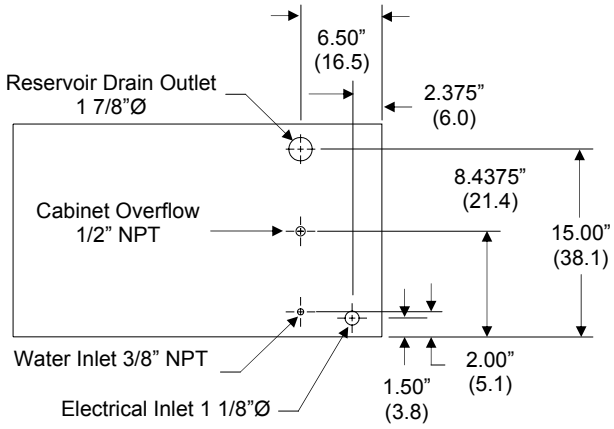
**See local codes for minimum clearance to electrical compartment. The electrical access door requires a minimum clearance of 16" to fully open.



FRONT VIEW



RIGHT SIDE VIEW

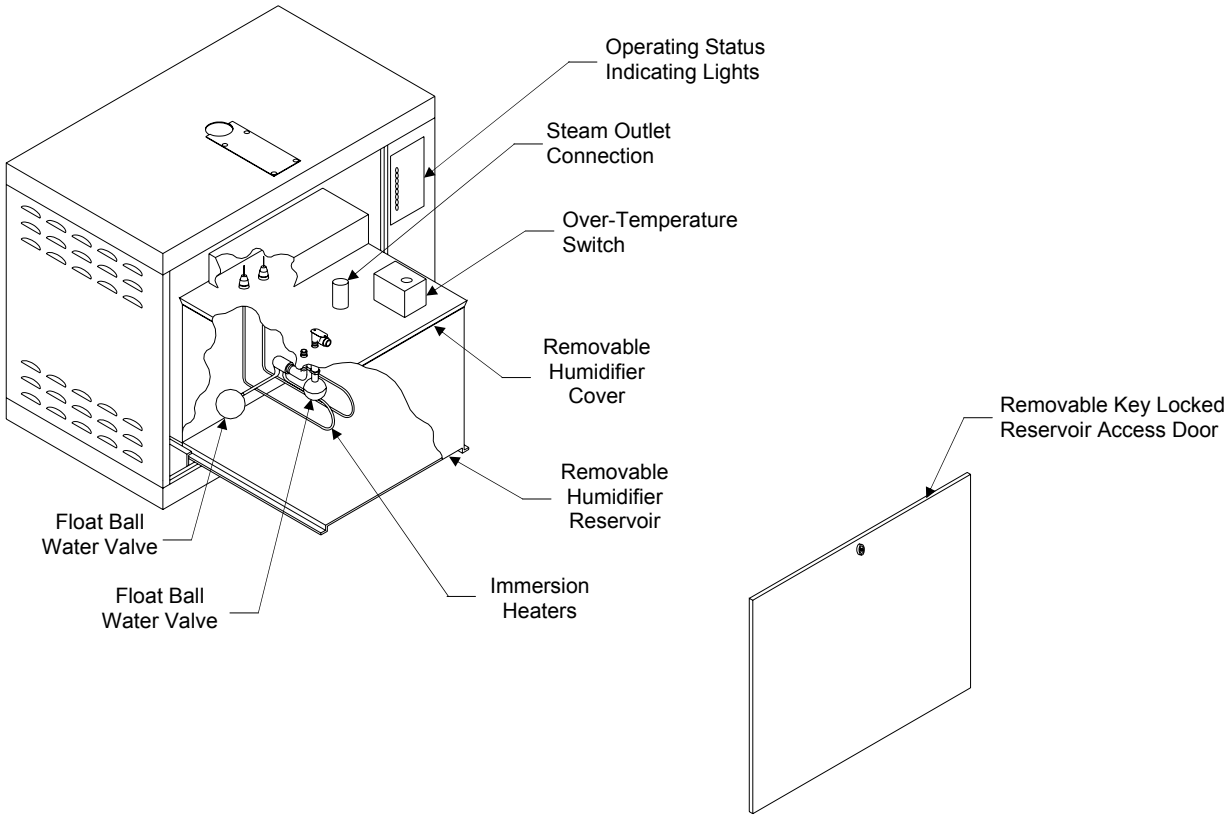


BOTTOM VIEW

Note: Dimensions are typical for all ECDDR models.

PURE Humidifier

Humidifier Layout



Humidifier Features

- On/Off, Time Cycle Modulation* or SCR* control
- Visible status and diagnostic LED indicator lights
- Stainless steel float type water make-up valve
- Low water cut-off float switch
- High efficiency incoloy immersion water heaters
- 18 gauge steel cabinet with baked enamel paint finish
- Internal stainless steel evaporating reservoir mounted on slides for easy removal
- Key locked doors for both reservoir and electrical access
- Easy and simple installation options
- Dispersion methods include Insty-Pac*, Fast-Pac* hose kit*, or blower pack assembly* for room distribution
- Manual reset over-temperature safety switch
- INTAC® microprocessor control system*

* Optional features

PURE Humidifier

Location & Mounting

Location

The location selected must provide for electrical service, cold or hot water supply, and sanitary drain.

When selecting a location, try to keep the humidifier within 10 feet (305 cm) of the duct to avoid unnecessary heat losses, condensation within the steam supply line and excessive pressure buildup in the reservoir.

Visible “fog” will saturate and condense when it contacts objects such as turning vanes, filters, fans, elbows, or take-offs. The warmer the air, the more easily it will dissipate the visible steam. The most active and warmest portion of the duct will provide better mixing of the steam and air. The injection tube should be mounted a minimum of 2 feet (61 cm) downstream from an elbow or other uneven air flow area.

Avoid mounting single-style injection tube(s) closer than 8 -10 feet (244-305 cm) upstream of objects that could become saturated and condense the steam (reference paragraph above). If the duct layout does not provide a straight, unobstructed run of 8-10 feet (244-305 cm), a multiple injection tube system should be considered to reduce the visible steam travel distance.

For Fast-Pac and Insty-Pac multiple tube assemblies please consult factory for job specific non-wetting distances.

Reference Fast-Pac or Insty-Pac O&M’s for full installation details.

CAUTION: Do not humidify upstream of filters. Consult factory.

CAUTION: Smoke detectors should not be located downstream of injection tube assemblies.

Location of Control Sensors

It is important to avoid mounting any control sensors within the visible steam. The control sensors should be mounted a minimum of 8-10 feet (244-305 cm) downstream from the humidifier injection tube. Due to the temperature rise that exists within the visible steam dissipation area, thermostats should not be mounted near the injection tube. High-limit humidistats should be installed before any duct obstruction to make sure the humidifier is interrupted before saturation can occur on the object. The high-limit should be mounted a minimum of 8-10 feet (244-305 cm) downstream from the injection tube.

Mounting

Mounted from the wall. The humidifier should be mounted dead level in both directions. PURE Humidifier Co. supplies the wall mounting bracket. Bracket is mounted to wall studs first. The bracket must be mounted to wall studs or additional support must be provided in the field. ECDDR cabinet is then hung on the slip-fit bracket.

Drain Pan Mounting

A drain pan is an additional safety feature which may be required to be supplied in the field. In a proper humidifier installation, a drain pan is not required. However, if the humidifier and injection tube are located in an area that contains valuable equipment or is a water sensitive area, PURE Humidifier Co. recommends the addition of a drain pan under the humidifier and under the injection tube. The drain pan should extend past all edges of the humidifier and if installed in the duct, it should extend a minimum of 3 feet (91 cm) downstream from the injection tube. The pan should be of a size which is sufficient to retain sudden drainage of the humidifier’s contents. The pan should be drained to a sanitary drain.

Injection Tube Installation

Single tube units should have the injection tube installed in the center of the duct. Multiple tube units should have the tubes staggered within the duct. See Flexible Hose Kit Installation on page 8 for details.

Injection tube should be pitched 2 inches (5 cm) per foot (31 cm), back to the humidifier. If proper pitch cannot be maintained, or the injection tube is mounted lower than the humidifier, a drain “tee” will be required.

Install the tube with the steam ports injecting steam up. NOTE: If narrow ducts (6”/15 cm or less, in height) are utilized, install the tube with the steam ports injecting with the air flow slightly (2 o’clock position).

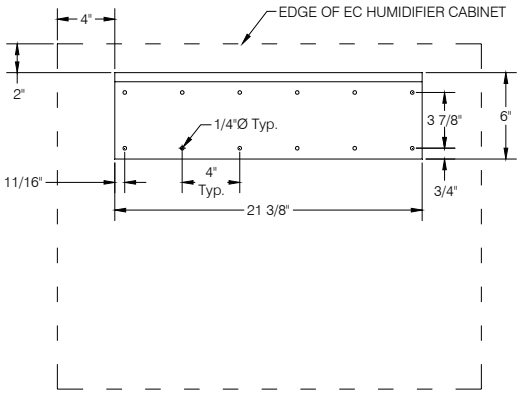
Galvanized steel duct plates are provided to seal the opening where the tube enters the duct.

Multiple Injection Tube Assemblies

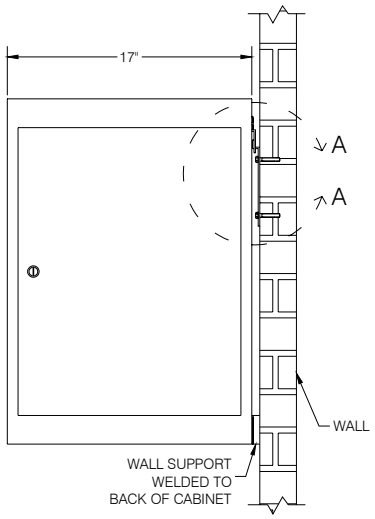
See page 9 for details.

PURE Humidifier

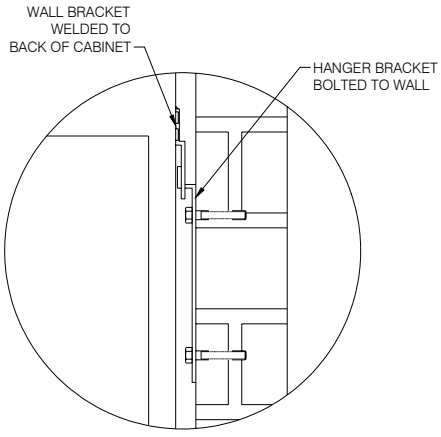
Wall Mounting Detail



HANGER BRACKET HOLE DETAIL
FRONT VIEW



RIGHT SIDE VIEW



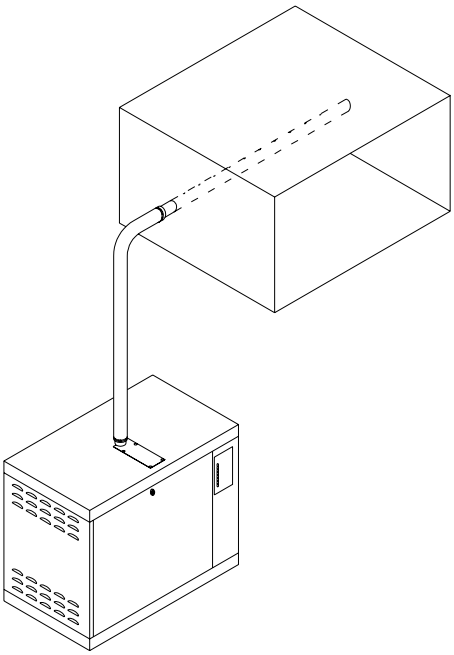
DETAIL
A - A

Mounting

The humidifier should be mounted dead level in both directions. PURE Humidifier Co. supplies a wall mounting bracket. Bracket is mounted to wall studs first. The bracket must be mounted to wall studs or additional support must be provided in the field. ECDDR cabinet is then hung on the slip-fit bracket.

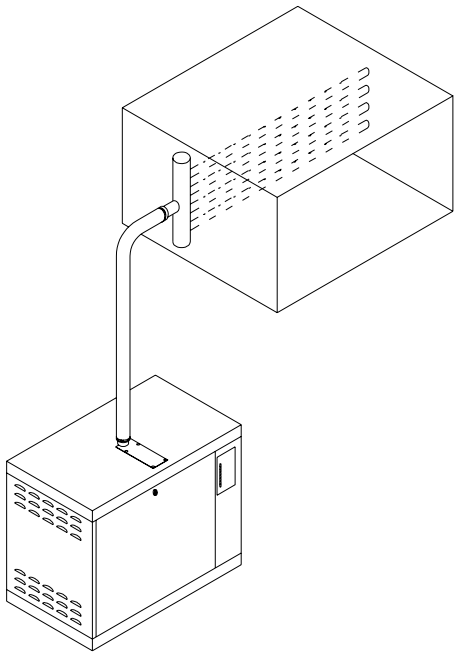
PURE Humidifier

Dispersion Method



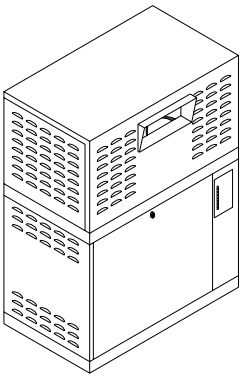
Flexible Hose Kit

Allows remote mounting of the humidifier reservoir from the duct. Also allows the humidifier to be located below a wall-mounted duct. See page 8 for details.



Insty-Pac and Fast-Pac Multiple Injection Tube Assemblies

For applications where you need a short dissipation distance. Allows remote mounting of the humidifier reservoir from the duct. Also allows the humidifier to be located below a wall-mounted duct. See page 9 for details.



Blower Pack for Direct Room Humidification

Allows humidifier to be mounted directly on the wall within the space to be humidified. See page 11 and 12 for details.

PURE Humidifier

Flexible Hose Kit Installation

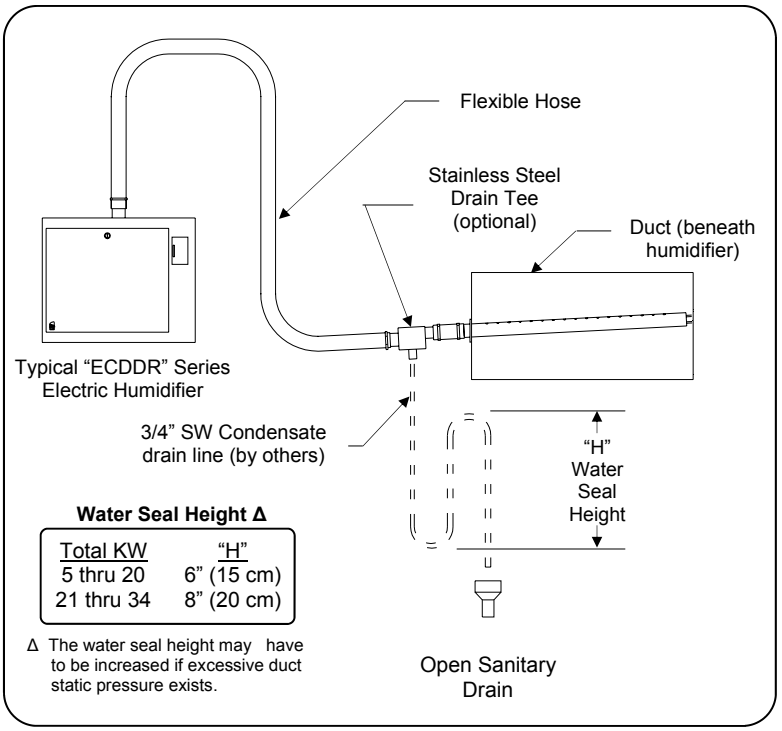
Flexible Hose Kit Installation

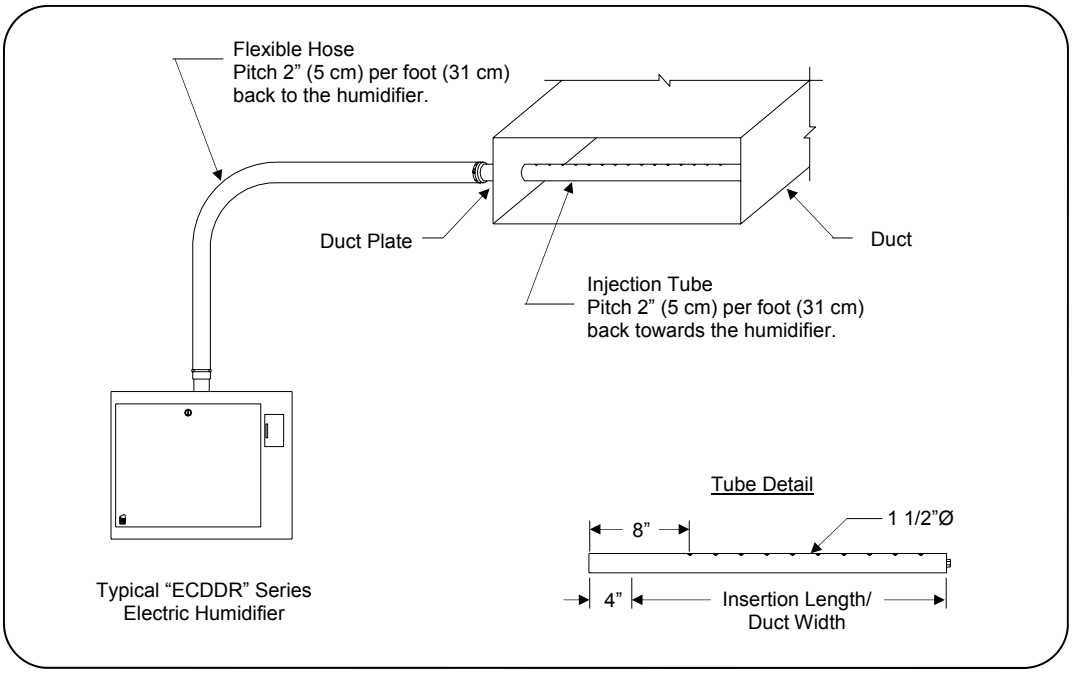
Hose kits should have the injection tube installed in the center of the duct. Hose and injection tube should be pitched back to the humidifier two inches (5 cm) per foot (31 cm). If proper pitch cannot be maintained, or the injection tube is mounted lower than the humidifier, a drain "tee" will be required (reference drain "tee" illustration).

Install the tube with the steam ports injecting steam up. NOTE: If narrow ducts (6"/15 cm or less, in height) are utilized, install the tube with the steam ports injecting slightly with the air flow (2 o'clock position).

The hose connects to the injection tube and humidifier with stainless steel hose clamps (by PURE Humidifier Co.).

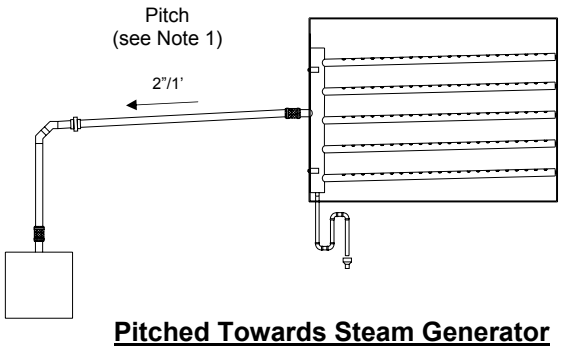
Galvanized steel duct plates are provided to seal the opening where the tube enters the duct.



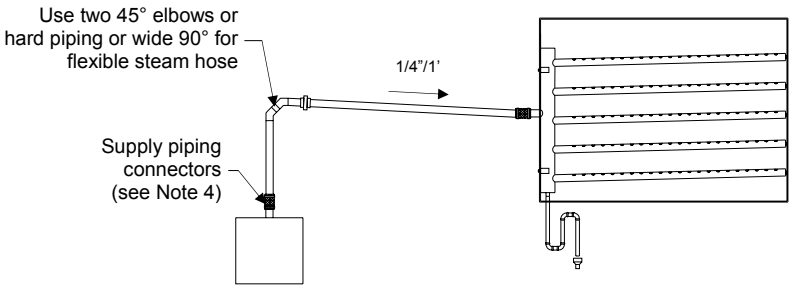


PURE Humidifier

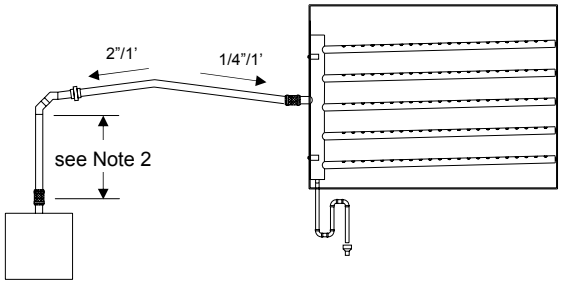
Steam Supply Piping Examples



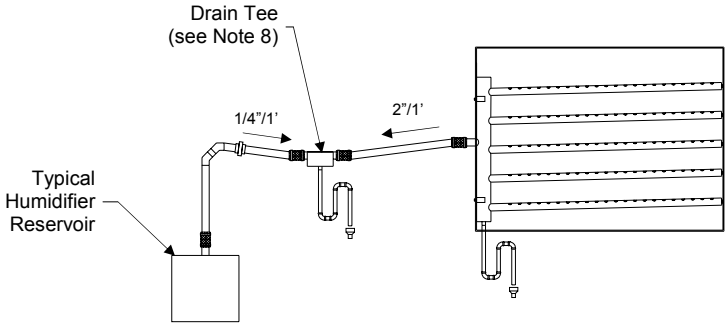
Pitched Towards Steam Generator



Pitched Towards Tube Assembly



Pitched Towards Steam Generator and Tube Assembly



Pitched Towards Drain Tee

Notes:

1. Pitch hard piping or flexible hose 2" per foot if steam is flowing uphill, 1/4" per foot if the steam is flowing downhill. Reference piping examples shown.
2. When feasible to do so, install a minimum one-foot riser from the top of the tank to reduce condensate carry over.
3. Use flex connectors or unions to allow for easy removal of cover.
4. Support flexible hose every 18" to avoid sagging.
5. Hard piping or flexible hose must match reservoir outlet size. Do not use supply piping with a smaller inside diameter than the reservoir outlet.
6. Failure to follow the piping recommendation on this page may result in blown water seals, leaking cover gasket or dispersion tubes spitting.
7. Install a Drain Tee at any low spots in supply piping run where condensate will accumulate.
8. Reference job specific tube assembly O&M included with your order for complete details.

PURE Humidifier

Piping

Water Supply Piping

Supply pressure: 35-50 psi

This style humidifier utilizes a float-operated fill valve system which is designed for use with deionized, demineralized, or reverse osmosis water. Use of mineralized tap water will cause fill valve failure and will void the humidifier warranty.

Install stainless pipe on make-up water line within 5 feet of humidifier fill valve connection. If plastic pipe is used beyond this point a check valve is required to prevent steam from entering the plastic section in the event that the water treatment system runs out of water.

Cold or hot deionized, demineralized, or reverse osmosis water can be supplied to the humidifier. A minimum water pressure of 35 psi (2.4 Bar) should be maintained to provide the proper water level within the humidifier. **DO NOT** exceed the maximum acceptable water pressure of 50 psi (3.5 Bar). If the water pressure is above 50 psi (3.5 Bar) a pressure reducing valve should be installed. Failure to do so will cause the supply water hose to burst due to excessive heat and pressure.

The humidifier has a factory built-in 1.5" (4 cm) air gap between the water inlet and the overflow. Local codes should be checked to see if the addition of a vacuum braking device is required. Water connection is made at the bottom of the humidifier with 3/8" NPT piping.

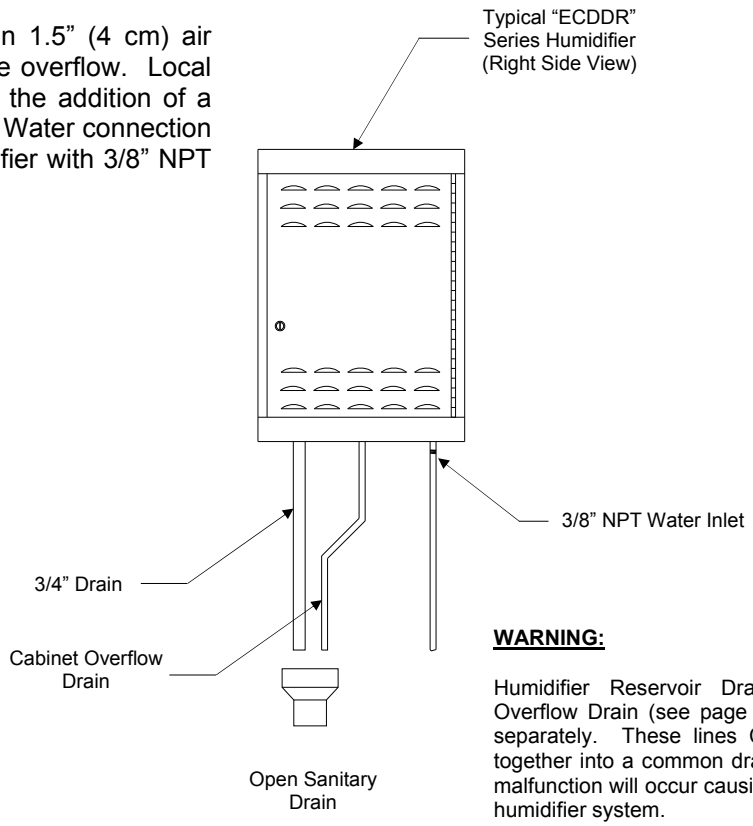
Drain Piping

The "ECDDR" style humidifier requires one 3/4" and one 1/2" stainless steel drain piping connections run to an open drain.

The drain piping should be stainless steel. The use of PVC piping is not recommended; the humidifier water temperature may cause the PVC to soften and fail. Use a drain tempering kit before transition to PVC.

The "ECDDR" humidifier has a factory-piped internal water seal. Prime water seal prior to operation by removing the overflow hose and pouring water into it. Re-attach the overflow hose and tighten hose clamp.

If gravity drain is not possible please use a condensate pump rated for 212°F water or contact a PURE Humidifier Co. representative to purchase one.



WARNING:

Humidifier Reservoir Drain and Cabinet Overflow Drain (see page 3) MUST be run separately. These lines CANNOT be tied together into a common drain line. Draining malfunction will occur causing damage to the humidifier system.

PURE Humidifier

Blower Pack

Optional Blower Pack

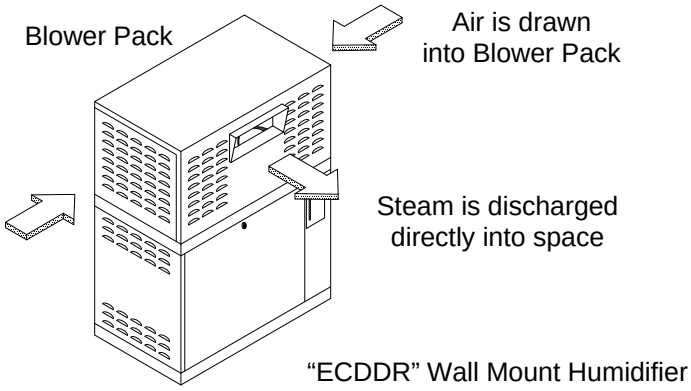
In applications where a ducted air system is not available, PURE offers the optional Blower Pack. The Blower Pack contains a two-speed adjustable blower that moves the air over the steam discharge outlet and disperses the steam directly into the space (see Fig. 1). The Blower Pack mounts directly on top of the "ECDDR" humidifier or can be remote mounted (see Fig. 2).

Locating Blower Pack

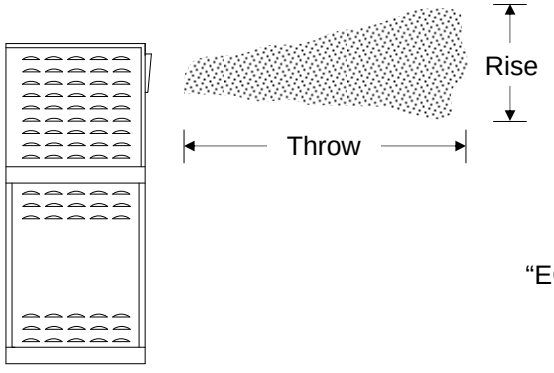
The distance that visible steam will travel after leaving the Blower Pack is dependent upon the relative humidity in the room and the capacity of the humidifier. If this visible steam comes in contact with any solid object (walls, beams, machinery, etc.), it may form condensate and drip. Refer to Fig. 3 and Table 4 (Table 4 is located on page 12) for data on visible steam travel. This will aid you in planning the location of the Blower Pack.

Remote Mounting

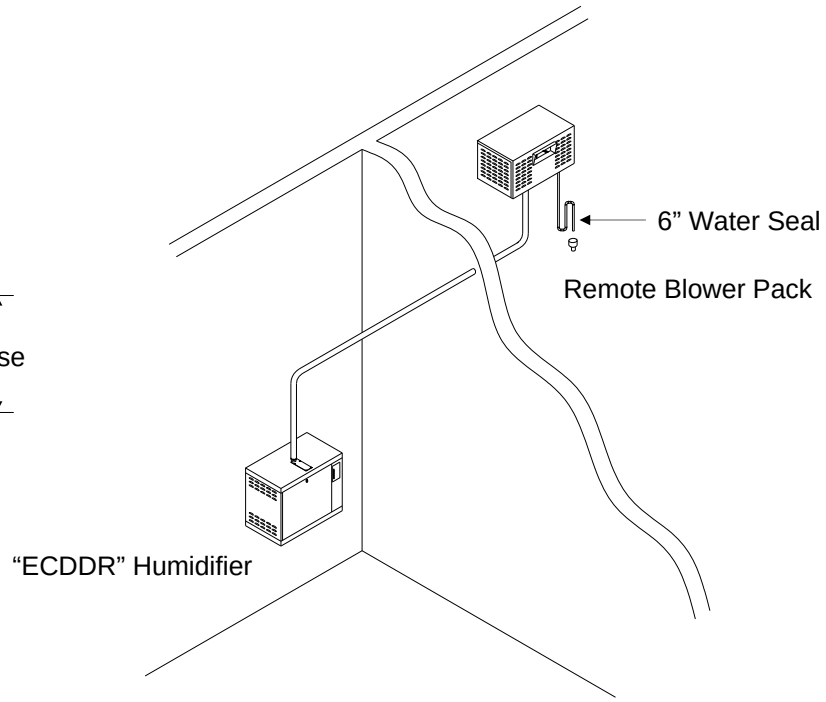
The Blower Pack may be remote-mounted up to ten feet away from the "ECDDR" wall mount humidifier (see Fig. 2).



"ECDDR" With Optional Blower Pack
Fig. 1



Visible Rise and Throw
Fig. 3



Remote-Mounted Blower Pack
Fig. 2

PURE Humidifier

Blower Pack

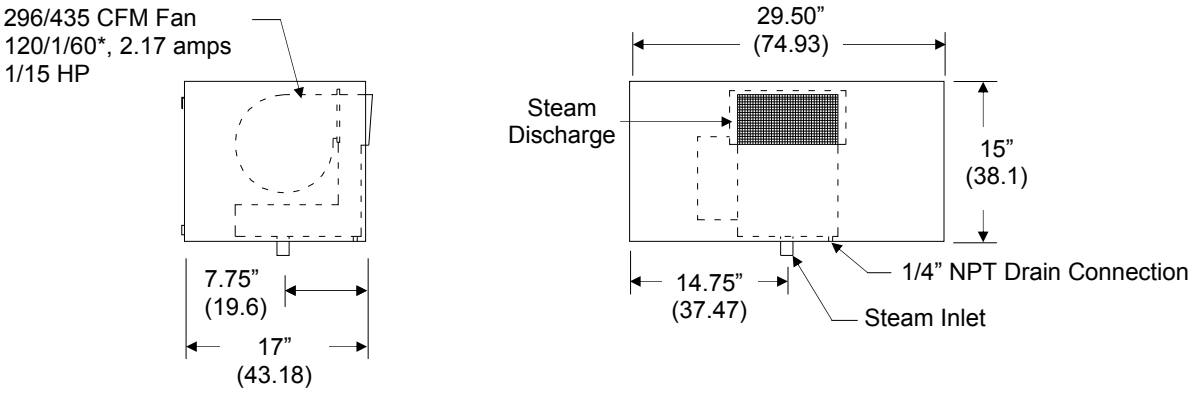
Locating Blower Pack

The distance that visible steam will travel after leaving the Blower Pack is dependent upon the relative humidity in the room and the capacity of the humidifier. If this visible steam comes in contact with any solid object (walls, beams, machinery, etc.) it may form condensate and drip. Refer to Fig. 3 (Fig. 3 is located on page 11) and Table 4 for data on visible steam travel. This will aid you in planning the location of the Blower Pack.

Visible Steam Rise & Throw		Humidifier Model					
		ECDDR-5	ECDDR-10	ECDDR-15	ECDDR-20	ECDDR-25	ECDDR-35
50% RH	Rise (ft)	1’	2’	3’	4’	5.5’	8’
	Throw (ft)	8’	10’	13’	16’	18’	23’
60% RH	Rise (ft)	2’	3’	4’	5’	6’	8’
	Throw (ft)	13’	14’	16’	18’	20’	25’

Throw is the horizontal distance the visible steam travels from the steam discharge.
Rise is the vertical distance the visible steam travels from the steam discharge.
Objects in the direct line of the visible steam or objects that are cooler than the ambient temperature may accumulate condensation.
Note: Data above based on 70°F room temperature.

Table 4



Left Side View **Front View**

Optional Blower Pack Dimensions
Fig. 5
Blower Pack weight is 60 lbs (27.2 kg)
* Blower requires a separate 120/1 circuit (by others)

PURE Humidifier

Pre-Startup Checklist

Pre-Startup Checklist

Before starting the “ECDDR” PURE Humidifier Co. Electric Humidifier, check the following installation items:

_____ 1. MOUNTING - Verify that the humidifier evaporating chamber is securely supported and that the evaporating chamber is level in both directions.

_____ 2. INJECTION TUBE - Verify that the humidifier injection tube is mounted within the duct with the proper pitch back to the humidifier (2”/5 cm per foot / 31 cm). NOTE: If the humidifier evaporating chamber or the flexible hose (optional) is mounted higher than the injection tube, a drain “tee” is required to drain the condensate out of the injection tube steam line. If it is an Insty-Pac or Fast-Pac, refer to the respective O&M to determine if they are mounted properly and have the proper p-trap size.

_____ 3. ELECTRICAL - Verify that all wiring connections have been connected in accordance with the wiring diagram. **CAUTION: Live power may exist in the control cabinet. Turn off the main power at the disconnect switch before verifying the electrical connections!**

_____ 4. SAFETY CONTROLS – The supply air duct RH high-limit should be installed at least 10 feet downstream from the humidifier tube(s). Any other control sensors should be at least 10 feet downstream from the humidifier tube(s). Smoke detectors should not be installed downstream of the humidifier tube(s). If a smoke detector absolutely has to be installed downstream from the humidifier tubes then it should be installed as far from the tubes as possible.

_____ 5. PIPING: Water Supply - Verify that all piping connections have been completed as recommended and that water pressure is available to the humidifier. Verify that the supply water pressure is 35-50 psi. There should be at least 5 feet of metal pipe and check valve between the tank and any plastic pipe.

_____ 6. RESERVOIR: Remove internal packaging around the float ball assembly before starting unit. Failure to do so can result in the over-heating of the humidifier and potential fire.

_____ 7. PIPING: Steam Outlet - Refer to attachment for proper outlet steam piping from the generator to the tube(s). **Any horizontal to vertical transition in the outlet steam pipe requires a water-sealed drip leg!** Improper outlet steam piping will cause steam to leak from the steam generator. Runs over 20 feet long may require upsizing of the steam pipe.

Signature:_____ Date:_____

PURE Humidifier

Non-INTAC® Start-Up Procedure

Start Up Procedure

_____ 1. Prime water seal by removing overflow hose and adding water. Replace and tighten hose clamp.

_____ 2. With the power “off”, set the switch on the control board to the “Stand-by” position (the control board is located within the humidifier control panel door).

_____ 3. Close the humidifier manual ball valve (located inside the humidifier evaporating chamber compartment).

_____ 4. Turn the controlling humidistat to the lowest setting (no call for humidity).

_____ 5. Turn the electric power “on” to the humidifier. The “Power” LED light on the controller should be illuminated.

_____ 6. Set the switch on the control board to the “Normal” position.

_____ 7. Open the water supply valve (by others) and allow the humidifier evaporating chamber to fill to the proper level.

_____ 8. Make sure all the optional safety switches are satisfied (airflow proving switch, high-limit humidistat, etc.).

_____ 9. After the humidifier is full of water, the “Water Level Full” LED will illuminate. Turn humidistat up to call for humidifier demand.

_____ 10. The heater(s) should energize on a call from the humidistat.

_____ 11. Verify the low water safety circuit by closing the water supply and opening the manual drain valve. As the humidifier tank is draining, the “Water Level Full" light should go out and you should hear the contactor drop out when the low water level is reached; this indicates the low water safety circuit is operational. This should only take a couple of minutes maximum.

_____ 12. Close the drain valve and open the water supply, allow the humidifier to fill to the proper level.

_____ 13. Check operation of optional field-installed safety switches (airflow proving switch, high-limit humidistat, etc.) to make sure that they turn the power off to the control circuit. The safety switches should shut-off the humidifier heaters whenever one or more of the optional safety switches create an “open circuit”.

_____ 14. Check heater amperage draw by testing and recording voltage and amperage in each phase. Readings should match the factory heater nameplate.
Amps A:_____ Amps B:_____ Amps C:_____

_____ 15. Inspect installation for leaks by operating humidifier at a full rolling boil. This may take up to 15 minutes from a cold start. Any leaks should be sealed. Just tightening a pressure clamp will not work if the gasket is not properly positioned between the sealing surfaces. If necessary, remove the cover or side-entry plate, reseat gasket and replace cover or side entry plate. A small amount of adhesive (super glue, gorilla glue, spray adhesive, etc.) to hold the gasket in place while repositioning the cover will aid in this process.

_____ 16. After the unit is producing steam, check and retighten all hose clamp connections in the system and make sure they are torqued to 35-40 in-lbs. There are two clamps on the fill line, two on the drain line and two on the steam connections. There may be more located on the steam tube assembly (if used).

Signature:_____ Date:_____

PURE Humidifier

INTAC® Start-Up Procedure

Start-Up Procedure

_____ 1. Prime water seal by removing overflow hose and adding water. Replace and tighten hose clamp.

_____ 2. Make sure the electric power to the humidifier is shut off.

_____ 3. Close the humidifier manual drain ball valve (located on the right side of the humidifier evaporating chamber).

_____ 4. Open the water supply on/off isolation valve provided by others and allow the humidifier evaporating chamber to fill to the proper level.

_____ 5. Turn the electric power "on" to the humidifier. The display on the INTAC® controller should illuminate "Normal Operation".

_____ 6. Set menu 101 "RH Setpoint" to the lowest setting (no call for humidity). If 100 menu shows "No Parameters Available" the procedure must be done through the Building Management System.

_____ 7. After the humidifier is full of water, menu 004 will read "FULL".

_____ 8. Verify the low water safety switch by closing the water supply, opening the drain valve and verifying that the low voltage pilot relay within the control cabinet de-energizes when the water level is dropped below the low water shut off switch (you can hear the relay switch "out"). Menu 004 should now read "LOW"; this indicates that the low water safety circuit is operational. The pilot relay opening would shut down the heating element contactor when the contactor is energized.

_____ 9. Close the drain valve, open the water supply valve, and allow the humidifier to fill to the proper level.

_____ 10. Make sure all the optional safety switches are satisfied (air-flow proving switch, high-limit humidistat, etc.).

_____ 11. Turn menu 101 "RH Setpoint" up to a call for humidity. If a Building Automation System is controlling the humidifier have it call for 100% demand. For Building Automation System verify 0% and 100% demands are displayed as 0% and 100% on the INTAC® display and adjust the input high and low values to match accordingly.

_____ 12. Check operation of optional field-installed safety switches (air flow proving switch, high-limit humidistat, etc.) to make sure that they turn the power off to the low voltage pilot relay. The safety switches should shut off the contactor when one or more of the optional safety switches create an open circuit.

_____ 13. Check heater amperage draw by testing and recording voltage and amperage in each phase. Readings should match the factory heater nameplate.
Amps A:_____ Amps B:_____ Amps C:_____

_____ 14. Inspect installation for leaks by operating humidifier at a full rolling boil. This may take up to 15 minutes from a cold start. Any leaks should be sealed. Just tightening a pressure clamp will not work if the gasket is not properly positioned between the sealing surfaces. If necessary remove the cover and reseat the gasket. A small amount of adhesive (super glue, gorilla glue, spray adhesive, etc.) to hold the gasket in place while repositioning the cover will aid in this process.

_____ 15. After the unit is producing steam, check and retighten all hose clamp connections in the system and make sure they are torqued to 35-40 in-lbs. There are two clamps on the fill line, two on the drain line, and two on the steam connections. There may be more located on the steam tube assembly (if used).

Signature:_____ Date:_____

PURE Humidifier

Maintenance & Cleaning Instructions

PURE Humidifier Co. "ECDDR" Maintenance Instructions

The "ECDDR" Series Electric Humidifier is practically maintenance-free. However, the humidifier should be inspected and placed on a dedicated maintenance schedule to ensure continued operation of the humidifier and its accessories. **PURE Humidifier Co. recommends that the following items be inspected, and/or, cleaned on a minimum basis of twice a year.** If excessive mineral build-up occurs, the maintenance schedule should be increased.

Inspect/Maintenance Item	Procedure to Follow
Water make-up float valve	Check to make sure the fill valve is operating properly. If the valve appears to continually fill, check the valve adjustment or valve seat and seal (see trouble shooting instructions).
Low water float switch	Check to make sure the switch will shut the humidifier off when the water level drops too low. Open the drain valve to allow water to drain out for checking purposes. Make sure to reset the drain valve after inspection is completed.
Safety interlocks (air flow, high-limit)	Check to make sure the safety interlocks (air flow, high-limit, etc.) will shut down the humidifier.
Immersion heaters	Verify the correct amperage is being drawn by the heating element. Reference the wiring diagram for correct amperage.
Humidifier cover/tank	Inspect for any leaks. Repair as required. Remove the heater assembly and remove mineral deposits from floor of the humidifier reservoir. If excessive mineral build-up is found, the cover may need to be removed to facilitate complete cleaning of the humidifier.
Flexible hose	Inspect for cracks or leaks. It is normal for the hose to become hard and develop a "set".

Cleaning Instructions

All humidifier tanks should be cleaned manually from the reservoir cover. Turn off the water supply, disconnect controls by unplugging the molex in the small octagon box, disconnect power wire from contactor and remove conduit connection from cabinet, disconnect all the hose connections from the tank and slide the tank out of the cabinet. Remove all loose solids with a wet vacuum, stainless steel brush, scouring pad, putty knife and/or bucket. Heaters should also be cleaned and loose build-up removed by hand (if applicable). After removal of solids and replacing the cover you may wish to add a de-scaling solution. DO NOT use Hydrochloric acid-based de-scalers; this will corrode stainless steel. PURE Humidifier Co. recommends the use of a vinegar, citric acid, diluted phosphoric acid or diluted nitric acid-based cleaner. Follow all precautions on the cleaner packaging. Some cleaners will give off overwhelming and noxious odors, so make sure there is proper ventilation in the working area and the steam outlet pipe is removed so that fumes are not spread throughout the building. After cleaning the tank, flush the tank multiple times to remove any remaining acid. Drain tank completely and allow the tank to air dry for a few hours. This will ensure that the outer protective layer of the stainless steel will passivate and ensure corrosion resistance.

PURE Humidifier

Cover Gasket Replacement Instructions

Remove the reservoir cover. While looking at the top of the unit, reference Figure A and B to determine which humidifier tank style you have.

Figure A Installation

Fit the gasket around the entire lip of the tank opening. Cut the gasket 1/8" longer than required, this will ensure proper fit when the cover is clamped back on. Slide the gasket onto lip of tank around the entire perimeter, and seal the ends together with a small amount of silicone.

Figure B Installation

Fit the gasket around the entire lip of the tank opening. Cut the gasket 1/8" longer than required, this will ensure proper fit when the cover is clamped back on. Slide the gasket onto lip of tank around the entire perimeter. Notch only the bottom flap of the gasket (reference Fig. C) in the corners of the tank. Seal the ends together with a small amount of silicone.

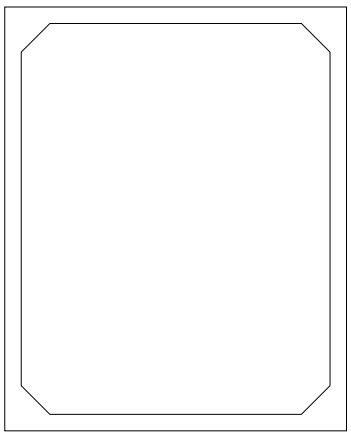


Fig. A
Plan View of Humidifier

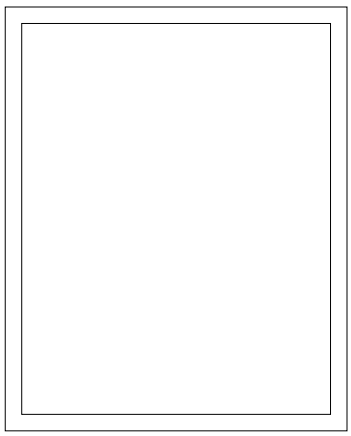
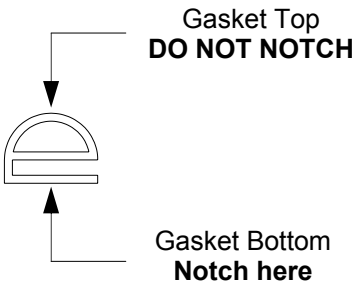
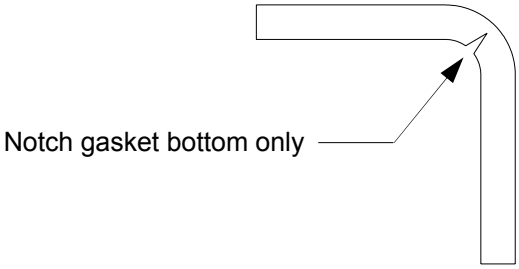


Fig. B
Plan View of Humidifier



Section View of Gasket



Bottom View of Gasket

Fig. C

PURE Humidifier

Trouble Shooting

Problem	Possible Cause	Recommended Action
Humidifier will not heat	Blown heater fuse(s)	Check and replace.
	Control transformer not producing 24 vac control voltage	Check transformer output and verify voltage.
	Safety controls open (air flow switch, high-limit, etc.)	Verify that all safety controls are completing the safety circuit.
	Over-temp switch	The level control circuit has interference or is damaged. Mineral on low water float switch may be preventing the switch from opening on low water condition. Consult factory if you are unsure of the source of the problem.
Humidifier will not fill	Faulty humidity sensor	Verify voltage to and from humidity sensor.
	Faulty immersion heater	Check and verify heater voltage and amperage. Compare to diagram or nameplate label ratings.
	No water pressure	Check water supply.
	Drain valve open	Close drain ball valve.
	No power to the fill valve	Check float valve seat for dirt.
Humidifier will not stop filling or is short cycling	Fill valve stuck open	Check float valve seat for dirt. Adjust float ball arm.
	Drain valve open	Close drain ball valve.

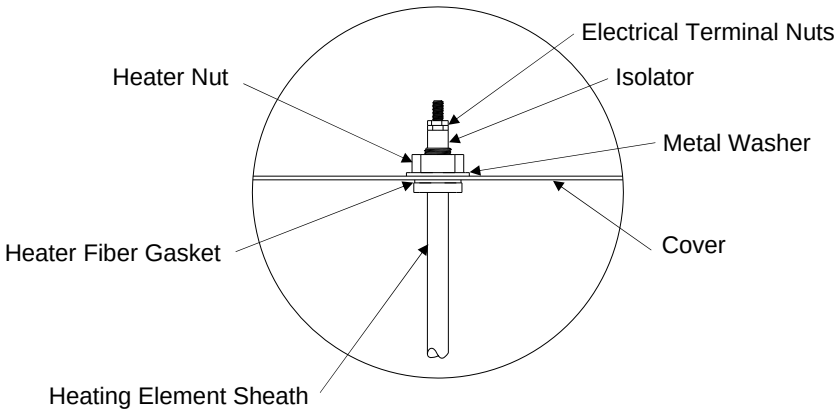
PURE Humidifier

Tool Requirements & Torque List

Recommended Maintenance Tool List
7/16” Wrench or Socket
5/8” Wrench
5/32” Nut Driver or Socket
5/16” Nut Driver or Socket
11/32” Nut Driver or Socket
3/8” Nut Driver or Socket
5/32” Allen head
Flat head screwdriver
Wire stripper
Wire crimper
Pipe Wrench

Torque List	
Cover Bolts	18 inch/pounds MAX
Hose Cuff Screws	35-40 inch/pounds MAX when hot
Heater Nut	18-20 **foot/pounds***
Heater Electrical Terminal	35 inch/pounds
* Use a pliers to hold heater sheath from twisting.	

Heater Assembly Sectional Detail

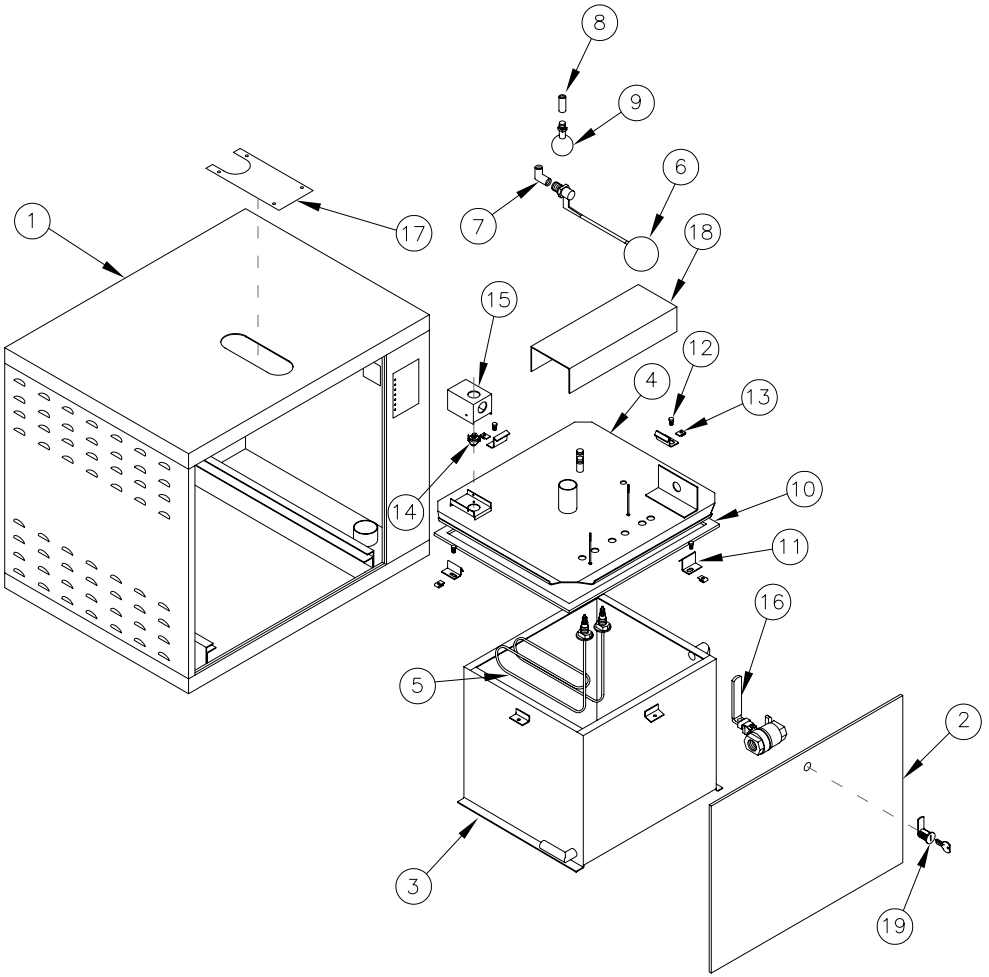


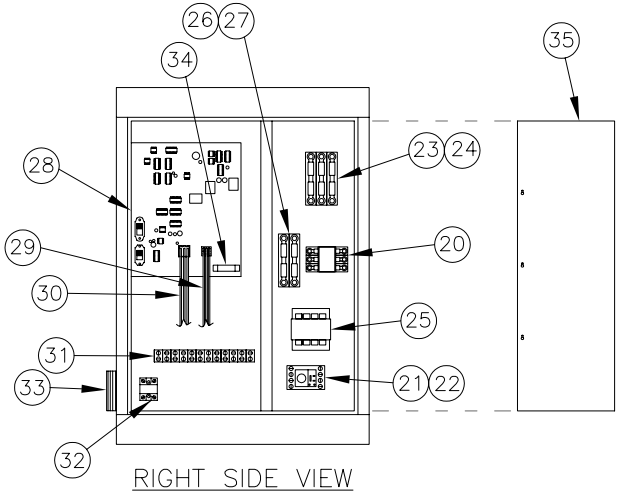
PURE Humidifier

Maintenance Notes

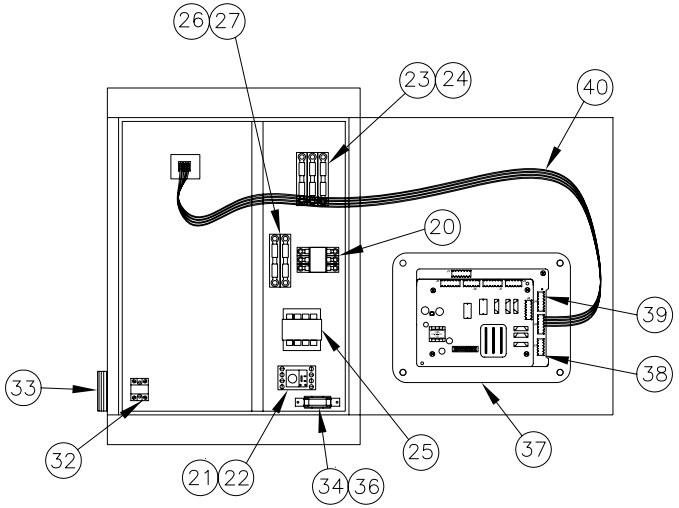
Maintenance Notes

Maintenance Performed	Date	By





RIGHT SIDE VIEW OF ECDDR CABINET WITH STANDARD CONTROLS



RIGHT SIDE VIEW INSIDE OF ECDDR CABINET WITH INTAC® MICROPROCESSOR

BACK OF CABINET DOOR INSIDE OF ECDDR CABINET WITH INTAC® MICROPROCESSOR

Specifications 238414, 238415

Title: ECDDR ASSEMBLY			
Scale: No Scale	Date: March 25, 2010	Drwn: P.R.G.	Dwg No: 1588

PURE Humidifier

PURE Humidifier Co. "ECDDR" Series
Parts List & Two Year Recommended Spare Parts

Item No.	Description	Part No.	Qty Per Unit.	Rec. SpareQty.
1	ECDDR Exterior Cabinet	18001	1	
2	ECDDR Cabinet Door, no lock, see item 19	18002	1	
3	ECDDR Reservoir Assembly	A	1	
4	ECDDR Reservoir Cover Assembly	A	1	
5	Immersion Heating Elements	A	A	
6	Float Valve & Ball, 316 SST	09079	1	
7	1/4" 90 Degree Elbow, 316 SST	07019	1	
8	304 SST Half Coupling	07018	1	
9	Low Water Float Switch	15048	1	
10	Cover Gasket	A	A	
11	Cover Clamp	15930	A	
12	Cover Clamp Screws	15522	A	
13	10-24 U-Nut	15524	A	
14	Overtemp Protection Switch	15047	1	
15	Overtemp Switch Housing	15072	1	
16	1/2" Ball Valve, 316 SST	09089	1	
17	Cabinet Cover Plate	18005	1	
18	Power Supply Cover	18008	1	
19	Door Lock and Keys	12001	1	
20	Heater Contactor	A	1	
21	Pilot Relay	12022	A	
22	Relay Socket	12020	A	
23	Fuse Block	A	1	
24	Heater Fuses	A	3	
25	Step-Down Transformer	A	1	
26	Fuse Holder	A	1	
27	Fuses	A	2	
28	Control Board	A	1	
29	Wiring Harness	A	A	
30	Wiring Harness	18027	1	
31	14 Point Terminal Strip	12044	1	
32	SCR Relay	A	A	
33	SCR Heat Sink	A	A	
34	Secondary Fuse	A	A	
35	Power Supply Cover	18008	1	
	Optional INTAC® Microprocessor Equipped Units			
36	Secondary Fuse Holder	12085	1	
37	INTAC® Microprocessor	A	1	
38	6 Pin Terminal Strip	12309	A	
39	7 Pin Terminal Strip	12310	A	
40	INTAC® EC Wiring Harness	A	1	

NOTES/CODES:

A = Part Number and quantity vary with model number.

When ordering replacement or spare parts, please have the following information available: Model Number, Primary Volage, Serial Number, No. of Heaters & Heater KW and any options (ie, modulating control, insulation etc.)

Some parts shown may not be required for your unit.

PURE Humidifier

141 Jonathan Blvd. North
Chaska, MN 55318
Tel: (952) 368-9335 Fax: (952) 368-9338
www.purehumidifier.com

ACE | INC
ASSOCIATED • CONSTRUCTION • ENGINEERING

2040 Harnish Blvd
Billings, MT 59101
406.245.0136 (phone)
406.245.2084 (fax)

SUBMITTAL REVIEW

ASSOCIATED CONSTRUCTION ENGINEERING, INC.

☐ Change as noted
☐ Revise & Resubmit per comments
☐ No re-submittal required
● No Exception Taken

Review is for conformance with design concept & compliance with contract documents only. Contractor shall check & verify all quantities, field measurements & shall be responsible for all errors in shop drawings. Contractor shall be responsible for deviations from contract documents unless he has called attention to such deviation and secured written approval. All in accordance with the general conditions.

COMMENTS/REMARKS:.

1. All comments must be addressed in writing, or in a re-submittal where indicated.
2. Any substitutions that result in electrical or other changes are the burden/responsibility of the submitting contractor.

No exceptions taken

-A.S. ACE 4/18/2018

REVIEW STATUS:
END OF REVIEW

4G PLUMBING & HEATING, INC.

P.O. Box 17140 Missoula, MT 59808-7140 Fax: (406) 728-6257

PROJECT TITLE: **Marcus Daly Memorial Hospital Surgery Addition**

DATE: **December 1, 2017**

ARCHITECT: **OZ Architect/ACE Engineering**

GENERAL CONTRACTOR: **Swank Enterprises**

SUBCONTRACTOR: **4G Plumbing & Heating, Inc.**

SUPPLIER: **S Conley Sales**

MANUFACTURER'S NAME: **PURE Humidifiers**

SUBMITTAL NUMBER:
SPECIFICATION SECTION: **238415**
SPECIFICATION **Gas Fired Steam Generators**

COMMENTS:

SWANK ENTERPRISES
GENERAL CONTRACTORS
Reviewed by jlake on 12/08/2017

Checking only for conformance with dimension and information pertaining to the fabrication and construction process, all submittals are subject to Architect's & Engineers approval and must conform to the contract documents.

Reviewed by 4G Plumbing & Heating

. . . . . .

Cory Hamminen

384 Gallatin Park Dr. Suite 201, Bozeman, MT 59771
(O) 406.585.7333 (F) 406.585.7666

Marcus Daly Memorial Hospital Surgery Department Remodel

238415 –Gas Fired Steam Generators

238415 Gas Fired Steam Generators: Pure Humidifier

1 – Spec Section 238414 – TAG: H-AHU11 – Pure Humidifier Model EDDDR-5 Electric Humidifier

- 15.0 Lbs/hr Max
- (1) 2 – Tube Fast Pac Injection Tube at 18”
- 480/1/60 Primary Voltage
- 24 vac Control Voltage
- Evaporating Chamber and Cover constructed of 14 Gauge 304 Stainless Steel
- Incoloy Sheathed Electric Immersion Heater
- Stainless steel float type water make-up Valve
- Low Water Cut-Off Float Switch (Heater Interlock)
- High Temp Thermo cut-out
- Overflow Stand-pipe with ¾” NPT SS Ball valve and Drain Connection
- *Designed to work with RO, De-Ionized or Demineralized water*
- INTAC Microprocessor Controller
- Proto Node Communications Gateway – Full BACnet communications via native Modbus
- Time Cycle Modulation Control – 0-100% Modulation of Humidifier output.
- Includes 0-10 vdc wall mount modulating Humidity Sensor
- Schneider Electric HC-201 duct Mount High Limit Humidistat
- Air Flow Switch – Pressure Differential Type
- DCT-927 Self-Actuated Drain Tempering Kit
- Fast-Pac Multiple tube Assembly – ***HARD PIPED BY OTHERS***

2 – Spec Section 238415 – TAG: H-AHU9, H-AHU10 – Pure Humidifier GXDDR Gas Heat Exchanger Humidifiers

- ***Operating Pressure at Humidifier Gas Valve – Max 14” W.C.***
- Evaporating chamber and cover constructed of 14 gauge type 304 stainless steel and a 12 gauge type 304 stainless steel face plate (rated for 19” W.C. pressure).
- 304 stainless steel gas heat exchanger with 2” diameter transfer tubes and gas supply inlet.
- Forced draft combustion burner assembly includes 3450 RPM motor, blower, adjustable damper, control panel, combination dual shut-off gas valve/pressure

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regulator, 24v flame safeguard with flame rod, intermittent proven pilot, pre-purge and air safety switch.

- Stainless steel float type water make-up valve (1/4"-NPT).
- Low water cut-off float switch (burner interlock).
- High temperature thermo cut-out.
- Over flow stand pipe with ¾"-NPT stainless steel ball valve and drain connection.
- NEMA 12 control enclosure (factory mounted and wired) containing:
  - INTAC® controller.
  - Fused control circuit transformer.
  - All interconnecting panel wiring.
  - Main power fuses and fuse holder.
  - Numbered and labeled terminals.
  - Gas valve interlock.
- INTAC® Microprocessor Logic Controller
- Factory mounted and wired control cabinet – control cabinet is mounted on the left side of the humidifier chamber (facing humidifier).
- Support legs – legs sized to support humidifier 24" above the floor. Legs are constructed of 1 ¼" angle iron and include mounting hardware.
- Factory Insulation – consists of ¾" thick semi-rigid foam duct insulation covered in aluminum foil. All surfaces except front faceplate are insulated.
- DCT-927 self actuated drain tempering kit
- *Designed to operate with reverse osmosis, deionized or demineralized water*
- Sealed combustion air kit – consists of a 5" round adaptor that allows outside air to be piped directly into the intake of the burner for combustion.
- ProtoNode Communications Gateway – gateway provides full BACnet communications via native Modbus.
- Standby water temperature sensing – includes a temperature sensor mounted into humidifier reservoir. System will maintain water temperature at a selected level for fast response upon a call for humidity.
- Schneider Electric HC-201 duct mount high-limit humidistat.
- Cleveland Controls AFS-262-112 air flow switch – pressure differential type.
- Fast-Pac multiple tube assembly – Tube consists of a stainless steel header with ¾"-NPT drain connection and horizontal 1 ½" stainless steel injection tubes (see above schedule for length). ***To be hard piped by others***.

* VENTING BY OTHERS
* MANIFOLDS INSTALLED BY OTHERS
* STARTUP BY OTHERS

See attached copy of equipment schedule and additional submittal data.

PURE Humidifier

To: S. Conley Sales **Date:** 11/28/17

Reference No. JK10178 GX

Job No:

Attn: Gary Wambeke

Project: Marcus Daly Surgery

Enclosed are 1 **copies of** "GXDDR" Gas Fired Humidifier

X **Submittals**	**Specifications**
X **Drawing**	X **Operation & maintenance manuals**
Literature	**Wiring Diagram**

Other:

Remarks

Signed: Jennelle Kallenbach

141 Jonathan Blvd. North, Chaska, MN 55318
Tel.: (952) 368-9335 / Fax: (952) 368-9338 / www.purehumidifier.com

PURE Humidifier Co. "GXDDR" Gas Heat Exchanger Humidifier Schedule

Specifications 338414, 338415

The following PURE Humidifier Co. "GXDDR" Gas Heat Exchanger Humidifiers are proposed for the subject project:

Marcus Daly Surgery

Tag	Qty	Model	Capacity (lbs./hr)	Injection Tube
H-AHU9	1	GXDDR-4	230.0 lbs/hr	(1) Nine Tube Fast-Pac @ 74"
H-AHU10	1	GXDDR-4S	120.0 lbs/hr	(1) Six Tube Fast-Pac @ 50"

CALCULATED CAPACITIES

Operating pressure at humidifier gas valve: **Max 14"W.C.**

The above PURE Humidifier Co. "GXDDR" Gas Heat Exchanger Humidifiers are supplied with the following standard equipment:

1. Evaporating chamber and cover constructed of 14 gauge type 304 stainless steel and a 12 gauge type 304 stainless steel face plate (rated for 19" W.C. pressure).
2. Quick release cover clamps. Quarter turn cover clamps allow removal of the cover without removing the securing bolts.
3. 304 stainless steel gas heat exchanger with 2" diameter transfer tubes and gas supply inlet.
4. Forced draft combustion burner assembly includes 3450 RPM motor, blower, adjustable damper, control panel, combination dual shut-off gas valve/pressure regulator, 24v flame safeguard with flame rod, intermittent proven pilot, pre-purge and air safety switch.
5. Stainless steel float type water make-up valve (1/4"-NPT).
6. Low water cut-off float switch (burner interlock).
7. High temperature thermo cut-out.
8. Over flow stand pipe with ¾"-NPT stainless steel ball valve and drain connection.
9. NEMA 12 control enclosure **(factory mounted and wired)** containing:
   a) INTAC® controller.
   b) All interconnecting panel wiring.
   c) Numbered and labeled terminals.
   d) Fused control circuit transformer.
   e) Main power fuses and fuse holder.
   f) Gas valve interlock.
10. INTAC® Microprocessor Logic Controller; controller performs self-diagnostics and controls all water level, fill, drain and safety circuit interlocks with fault indication. Programmable for "Flush", "Standby" and "Normal Operation" functions.
    a) 16 character two line display.
    b) Keypad user interface.
    c) BAS communications.
    d) Adjustable input signal filter
    e) Flash memory
    f) On-Screen alarm/fault messages.
    g) Keypad lock-out system.
    h) Fault alarm contacts.
    i) Low/High humidity deviation alarm contacts.
    j) Adjustable P.I.D. parameters.
    k) Time-to-Service indication.
    l) Adjustable display brightness
11. Factory mounted and wired control cabinet – control cabinet is mounted on the left side of the humidifier chamber (facing humidifier).
12. Support legs – legs sized to support humidifier 24" above the floor. Legs are constructed of 1 ¼" angle iron and include mounting hardware.
13. Factory Insulation – consists of ¾" thick semi-rigid foam duct insulation covered in aluminum foil. All surfaces except front faceplate are insulated.
14. DCT-927 self actuated drain tempering kit – The drain tempering kit is designed to provide drain and condensate water at a temperature of less than 140 ºF.
15. The above humidifiers are designed to operate with reverse osmosis, deionized or demineralized water.

Optional equipment furnished:

16. Sealed combustion air kit – consists of a 5" round adaptor that allows outside air to be piped directly into the intake of the burner for combustion.
17. ProtoNode Communications Gateway – gateway provides full BACnet communications via native Modbus.
18. Standby water temperature sensing – includes a temperature sensor mounted into humidifier reservoir. System will maintain water temperature at a selected level for fast response upon a call for humidity.

19. Schneider Electric HC-201 duct mount high-limit humidistat.
20. Cleveland Controls AFS-262-112 air flow switch – pressure differential type.
21. Fast-Pac multiple tube assembly – Tube consists of a stainless steel header with ¾”-NPT drain connection and horizontal 1 ½”∅ stainless steel injection tubes (see above schedule for length). **To be hard piped by others.**

PURE Humidifier

Specifications 238414, 238415

Submittal Data Sheet Numbers
"GXDDR" Series

Sheet No. **SGXD-2**

This humidifier is a forced combustion type that can be used with natural gas or liquid propane. The burner can be easily removed to access the side entry exchanger for cleaning. It is designed to work with low-pressure gas between 5" W.C. up to 14" W.C.

MAX CAPACITIES

Unit Capacities in Pounds per Hour (kg/hr)†
Weights in lbs. (kg) and Electrical Specification

Standard Water Unit Model No.	Steam Capacity Lb/Hr (kg/Hr)	No. of Burners	*BTU Input	Exhaust Manifold Vent Size (cm)	Shipping Weight (kg)	Operating Weight (kg)	120 Volt, 60 Hz Full Load Amps
GXDDR-3	110 (49.9)	1	150,000	4" (10.2)	201 lbs. (91.2)	420 lbs. (190.5)	5.0
GXDDR-4S	150 (68.0)	1	200,000	4" (10.2)	366 lbs. (166.0)	725 lbs. (328.9)	5.0
GXDDR-4	300 (136.1)	1	400,000	4" (10.2)	390 lbs. (176.9)	710 lbs. (322.1)	5.0
GXDDR-8	600 (272.2)	2	800,000	6" (15.2)	827 lbs. (375.1)	1391 lbs. (630.9)	10.0
GXDDR-12	900 (408.2)	3	1,200,000	8" (20.3)	1125 lbs.(510.3)	2072 lbs. (939.9)	15.0

† 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 reservoir.

* Altitude adjustment:
100% up to 2000'
Over 2000', 4% de-rate per

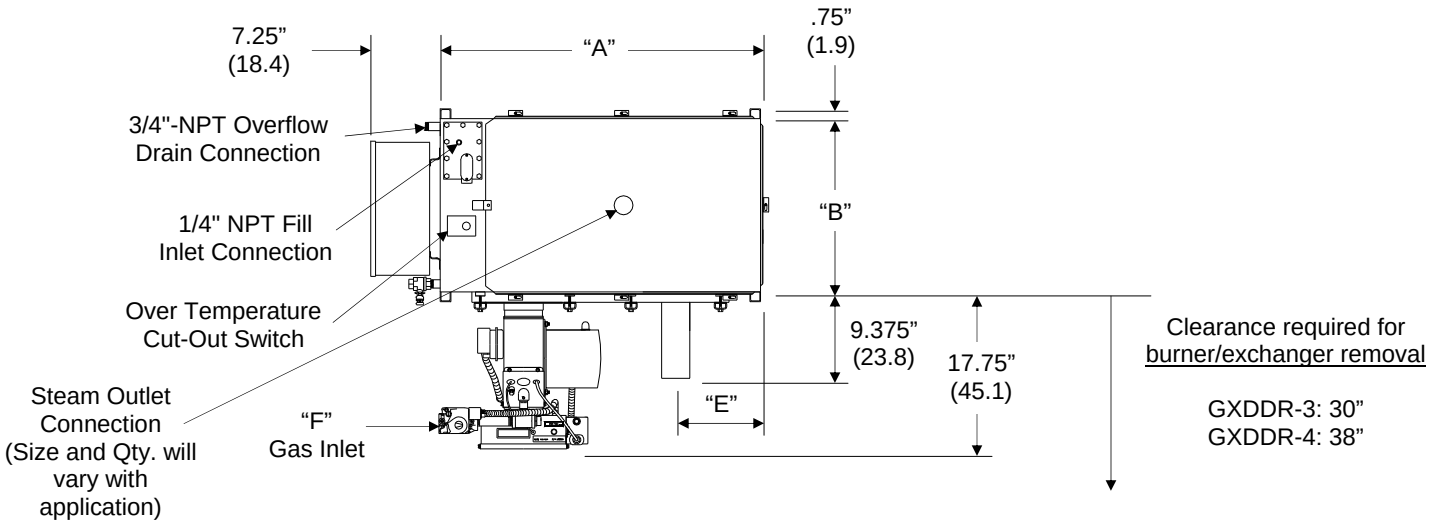
Gas Piping Pressure Drop Data

EQUIVALENT LENGTH OF STRAIGHT PIPE IN FEET									
	20	30	40	20	60	80	100	150	200
CFH GAS WITH .2" PRESSURE DROP									
Pipe Size in Inches									
3/4"	152	120	105	93	84	73	66	54	45
1"	300	250	210	190	180	150	135	110	75
1 1/4"	520	425	360	325	300	260	230	190	165
1 1/2"	800	690	560	500	480	410	370	300	260
2"	1700	1400	1200	1100	1000	850	750	600	540
2 1/2"	3000	2500	2100	1900	1800	1550	1375	1100	950

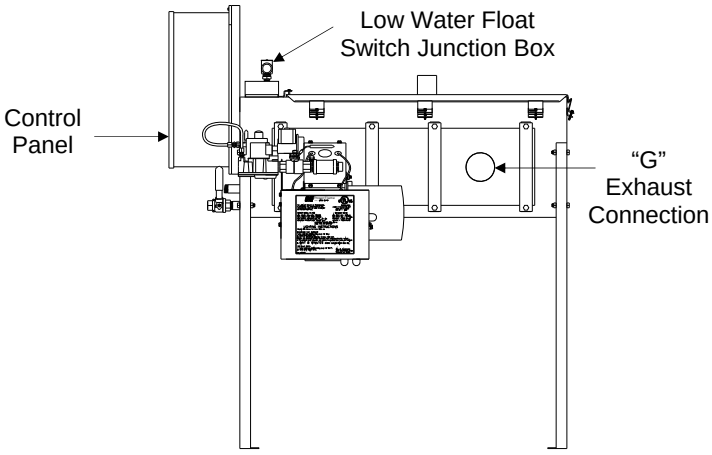
EQUIVALENT LENGTHS OF STANDARD PIPE IN FEET FOR LISTED FITTINGS							
Fitting Type	3/4	1	1 1/4	1 1/2	2	2 1/2	Nominal
Std. Tee	2.4	5.5	7.5	9	12	13.5	Pipe Size
Std. Elbow	4.4	2.7	3.7	4.5	5.5	6.1	in Inches

Gas Input CFH
for GXDDR-Series Humidifiers

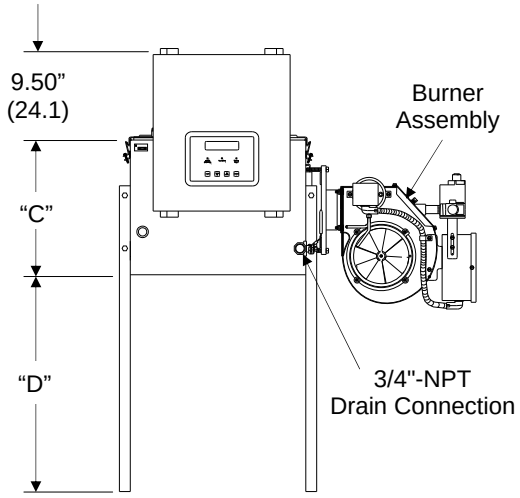
Model	Max BTU/Hr Input	Max CFH (Nat. Gas)	Max CFH (Propane)
GXDDR-3	150,000	150	60
GXDDR-4S	200,000	200	80
GXDDR-4	400,000	400	160
GXDDR-8	800,000	800	320
GXDDR-12	1,200,000	1200	480



Top View



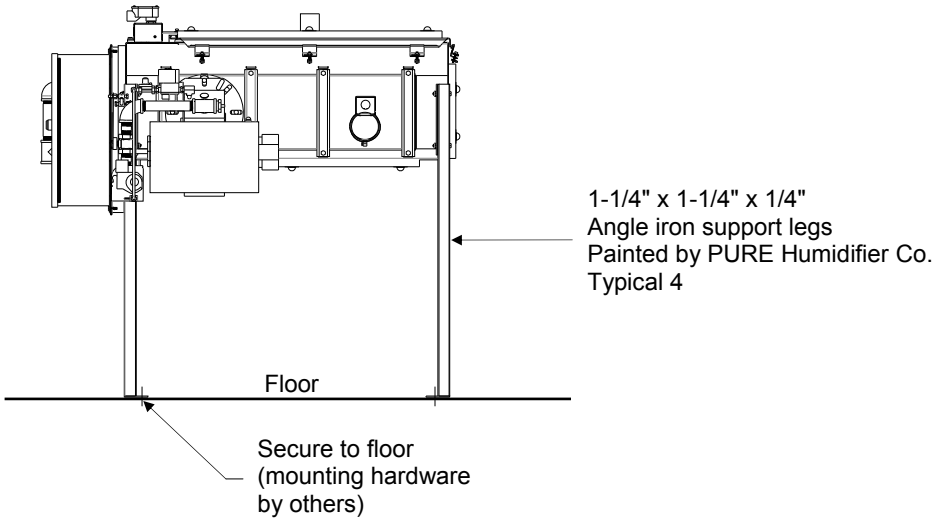
Left Side View



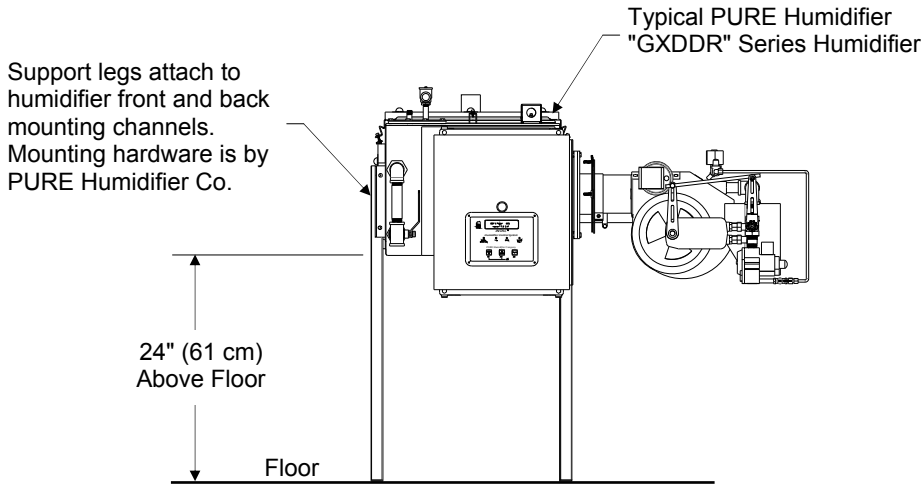
Front View

Unit Dimensions in Inches (cm)

Standard Water Unit Model No.	Dim. "A"	Dim. "B"	Dim. "C"	Dim. "D"	Dim. "E"	Dim. "F"	Dim. "G"
GXDDR-3	34.00" (86.4)	18.25" (46.4)	13.75" (34.9)	24.00" (60.9)	8.50" (21.6)	3/4"-NPT	3.00" (7.62)
GXDDR-4S	54.00" (137.2)	27.50" (69.9)	13.75" (34.9)	24.00" (60.9)	27.125" (68.9)	3/4"-NPT	3.00" (7.62)
GXDDR-4	54.00" (137.2)	27.50" (69.9)	13.75" (34.9)	24.00" (60.9)	27.125" (68.9)	3/4"-NPT	3.00" (7.62)



Left Side View

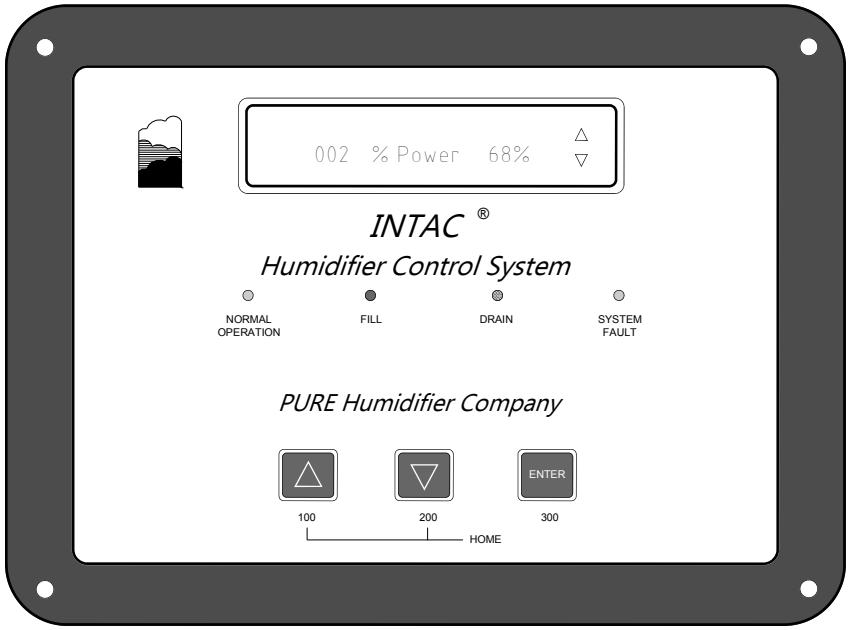


Front View

PURE Humidifier

INTAC® Microprocessor
"GXDDR" Series

Sheet No.
SGXD-8



- Five menus let you adjust Set Point, Operation, PID, BAS Communications, and Control Parameters. In addition, a display loop shows you the operational status as well as additional information screens.

- Accepts all standard control signals for communications interface with the building automation system and is capable of *flash memory* to keep pace with changes in those systems as they occur.

- Designed to meet or exceed CE Standards for "noise" immunity. EFI and RFI will not effect humidifier operation.

- Compatible with all humidity transmitters and temperature sensors as well as all water types; potable, softened, deionized or reverse osmosis.

- User adjustable programming provides precise levels of humidity control for both high limit and controlling sensors.

- Works with all PURE Humidifier units.

- Controller lock-out prevents unauthorized adjustments.

- High/Low humidity deviation alarms.

- Over-temp reservoir shut-down safety interlock.

- Dedicated event input allows you to identify a priority safety switch.

- "Time to Service" messages.

For proper and safe operation this appliance needs air for combustion and ventilation. DO NOT block or obstruct air openings on the appliance, spaces around the appliance, or air openings communicating with the appliance area.

DO NOT block the flow of combustion and ventilation air. To provide for necessary oxygen for proper combustion, opening must be provided to allow outside air to enter the space in which the heater is located. Enclosed spaces, such as equipment rooms, must be vented at the blower for combustion air. The size of air openings must be based on all gas-burning equipment installed in the space involved. Provisions for adequate combustion and ventilation air in accordance with Section 5.3, Air for Combustion and ventilation, of the National Fuel Gas Code, ANSI Z223.1, or Sections 7.2, 7.3 or 7.4 of the CAN/CGA B149 Installation Codes, or applicable provisions of the local building codes.

The burner should be initially set up and serviced at regular intervals (preferably at the beginning of and mid-way through high use period) by a trained serviceman using the proper test instruments. Failure to maintain the correct burner settings may result in inefficient gas consumption, premature wear of burner components, or explosion hazard.

Venting

The GXDDR Series Humidifiers are a category 3 appliance.

The purpose of venting the gas humidifier is to completely remove all products of combustion and ventilation gases to the outside air, without condensation in the stack.

When connecting the humidifier to a gas vent, the installation shall be in accordance with Part 7, Venting of Equipment, of the National Fuel Gas Code, ANSI Z223.1, or Section 7, Venting Systems and Air Supply Appliances, of the CAN/CGA-B149 Installation Codes, the local building codes, and the vent manufacturer's instructions.

Do not reduce the vent diameter, and avoid short turns in the vent piping. Use the same size stack as the exhaust manifold vent size shown on page SGXD-2. Maintain a 1/4-inch-per-foot pitch for horizontal runs. Maintain proper support of vent connections and joints. Observe clearances (in accordance with applicable codes) from all combustible materials, and obtain an approved cap for the stack outlet. The bottom of the cap must be one stack diameter above the top of the stack.

Inspect for proper and tight construction. Any restrictions or obstructions must be removed.

Vent must extend at least 3 feet above its passage through a roof and at least 2 feet above any ridge within 10 feet of the chimney (local codes apply).

Minimum clearance from the vent connector to combustible material is 6 inches unless the combustible materials are protected in accordance with applicable codes. Any condensate formed is acidic and could cause corrosion of the vent materials. Therefore, PURE Humidifier requires humidifiers be connected to vent systems sufficient for use with Category 3 appliances listed to UL Standard 1738 or ULC-S636 (AL29 4C).

This humidifier must not be connected to a chimney flue servicing a separate appliance designed to burn solid fuel.

Never connect this humidifier to a chimney.

Venting into an unlined masonry or concrete chimney is prohibited by code.

Insulation must be added to any vent connector which will be exposed to ambient temperatures of 30°F or less.

Do not insulate vent pipe exposed to outdoor weather conditions (i.e. above roof lines).

Installation of the vent pipe should be as directly as possible, with a minimum number of turns or elbows.

Rigidly support the vent pipe every 5 feet or less with hangers or straps to ensure that there will be no movement or sagging after installation. The humidifier vent box should not be supporting the weight of the vent piping.

No portion of the vent system shall extend into, or pass through any circulation air duct or plenum.

The vent system shall terminate above the roof surface per the National Fuel Gas Code or CAN/CGA.B149 requirements, and shall include a UL or CUL listed vent cap or roof assembly, unless prohibited by local codes.

All vent pipe passing through floors, ceilings, and walls must be installed with the proper clearances from combustible material, and be fire-stopped according to the National Fuel Gas Code requirements and Canadian Standards CAN/CGA.B149.

In replacement installation, where an existing vent system may be used, the vent system must be inspected for condition, size, type of vent material, and height to meet the requirements in these instructions. If the existing vent system is too large, condensation could occur, causing corrosion of the vent system. Installing a replacement vent system may be required. When connecting the humidifier to a gas vent, the installation shall be in accordance with Part 7, Venting of Equipment, of the National Fuel Gas Code, ANSI Z223.1, or Section &, Venting Systems and Air Supply Appliances, of the CAN/CGA.B149 Installation Codes, the local building codes, and the vent manufacturer's instructions.

Horizontally Vented Humidifier

Maintain a minimum upward slope of 1/4-inch per linear foot on all horizontal vent pipe runs. If condensate in venting is noticed, a drain may be required.

Rigidly support the vent pipe at intervals no longer than five feet with hangers or straps to ensure there will be no movement after installation. The humidifier vent box should not be supporting the weight of the vent piping.

Distances from the vent terminal adjacent public walk ways, buildings, and openable windows and building openings should be consistent with the National Fuel Gas Code, ANSI Z223.1, and/or CAN/CGA.B149 Installation Codes.

The vent terminal location must be at sufficient height above ground level to prevent blocking by expected snowfall.

Building materials should be protected from degradation by flue gases.

A minimum horizontal clearance of 4 feet (1.22m) from electric meters, gas meters, regulators, and relief equipment must be maintained.

Horizontal Venting Requirements*

100' maximum equivalent length of vent pipe.
90° Elbow = 10'
45° Elbow = 5'

Maximum of 4 elbows.

Vent pipe is to be rated for Category 3 appliances listed to UL Standard 1738 or ULC-S636 (AL29 4C).

Allow for removal of air intake and exhaust connections for heat exchanger cleaning and regular maintenance.

PURE Humidifier

Sealed Combustion Kit "GXDDR" Series

Sheet No. ***SGXD-12***

Sealed Combustion Air Kit. Consists of a 6" round stainless steel adaptor to connect to field installed combustion air piping. This will separate the combustion air from the room air, allowing only outside air into the intake of the burner for combustion.

Benefits:

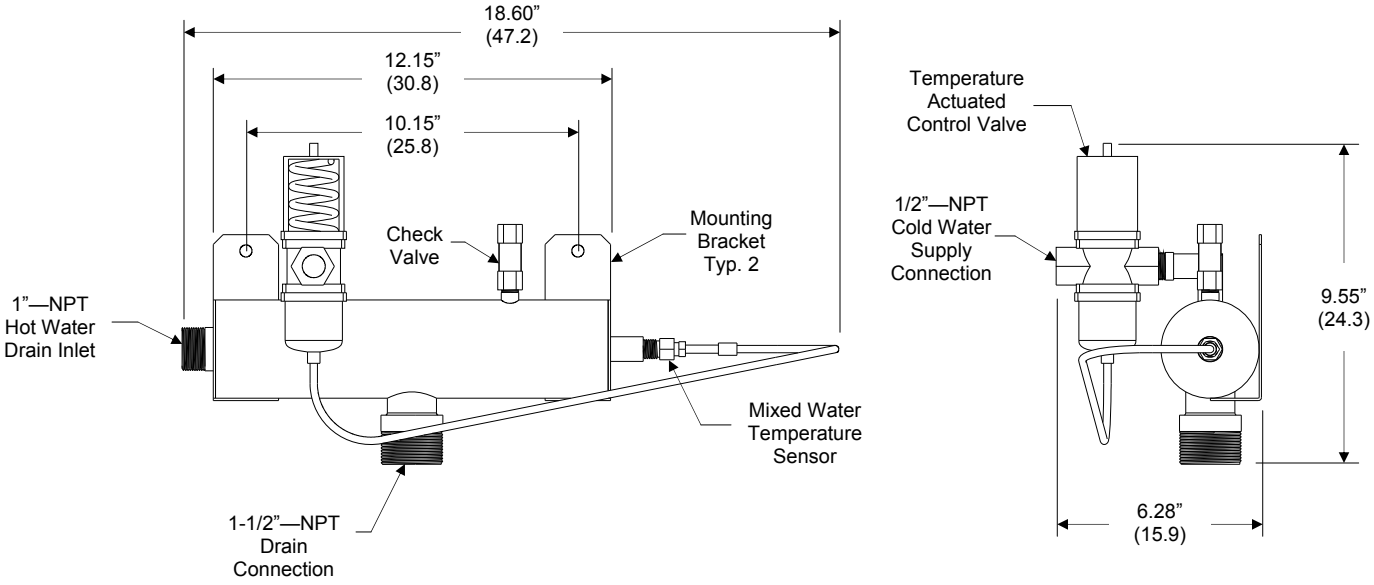
Sealed combustion burners can save energy because they don't steal heated or cooled indoor air.

Sealed combustion burners reduce space heating costs and noise while eliminating problems associated with power-vented combustion.

PURE Humidifier

DCT-927 Drain Water Tempering Kit "GXDDR" Series

Sheet No. SGXD-13



SYSTEM DESCRIPTION

The DCT-927 drain tempering kit is designed to provide drain water temperature of less than 140°F. The DCT-927 can be used with all PURE Humidifier Co. products. NOTE: When utilized with any of PURE's humidifiers, the condensate return must be a vented gravity drain.

The system utilizes a temperature sensor to sense the water temperature and open the temperature-actuated cold water mixing valve. Since the system is temperature-actuated, no power supply is required.

SYSTEM OPERATION

The DCT-927 drain water tempering kit contains an adjustable temperature sensor factory set-point at 135°F. When the temperature sensor senses a temperature higher than the set-point (135°F), it opens temperature-actuated cold water mixing valve. The cold water supply tempers the hot water and ensures a temperature of 140°F or less. The DCT-927 is factory assembled and shipped loose for field installation.

DCT-927 Capacities

	Hot Water In	Cold Water In	Tempered Water Out
Flow Rate GPM (L/m)	6 gpm (22.7 L/m)	6 gpm (22.7 L/m)	12 gpm (45.4 L/m)
Temperature °F (°C)	212°F (100°C)	70°F (21°C)	140°F (60°C)

The information above is based on one humidifier feeding the drain tempering kit.
Cold water supply pressure should be 35 psi (2.4 Bar) minimum and 95 psi (6.6 Bar) maximum.

SPECIFICATIONS

Sensor range: 115-180° F (46-82°C), factory set at 135° F (57°C),
Construction: Chamber: Stainless Steel
Temperature Sensor: Copper
Water Supply Valve: Bronze

ProtoNode

PROTOCOL GATEWAY

Instant Multiprotocol Deployment for OEM

Specifications 238414, 238415

FieldServer Technologies

A Sierra Monitor Company

*ProtoNode is an external, high performance, low cost **Building and Industrial Automation multi-protocol gateway** providing OEMs instant multiprotocol deployment of field protocol, quickly enabling the OEM device to communicate to systems and devices using modern open protocols.*

FieldServer Technologies pre-programs the ProtoNode solution to provide a virtual plug-and-play, easy, complete protocol package for the OEM including: BACnet MS/TP, BACnet/IP, Metasys N2 by JCI, Modbus TCP, Allen Bradley EtherNet/IP, LonWorks and many others. There are no configuration files to download in the field and all configurations are available to the user/installer simply by selecting the proper DIP switches. ProtoNode OEM users have access to the extensive FieldServer driver library.

ProtoNode is the instant answer to a manufacturer's needs to meet customer demands. As an example, a manufacturer might have five different devices, each requiring a variety of protocols to meet their customer's interoperability needs. They desire a single source solution, with multiprotocol, multi-configuration capability, and they need it now! A single ProtoNode Solution can be provided by FieldServer Technologies that has all pretested configuration choices preloaded. Up to 70 different pretested configurations with multiple protocol choices, selectable by DIP switches, can be stored on a single ProtoCarrier solution. A key benefit for the OEM is minimal engineering costs, minimized stocking costs and simplified training and start-up operations!

ProtoNode RER

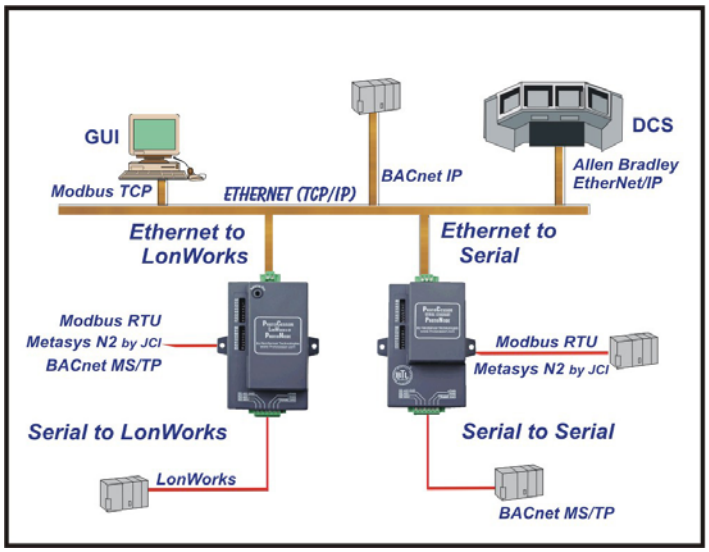
ProtoNode LER

ProtoNode RER is based on an ARM9 processor for fast performance and includes two serial ports (one RS-485 and the other can be RS-232, RS-485 or RS-422) and one Ethernet port. BACnet BTL marked (B-ASC)

ProtoNode LER includes a LONWORKS port plus Ethernet and RS-485 ports. LonMark certified.

ProtoNode Solution:

- ✓ Designed to be full featured, field programmable, and with multiple protocol support for any protocol translation between Serial, Ethernet, or LonWorks environments.
- ✓ Multiple hardware solutions available interfacing with RS-232, RS-485, RS-422, Ethernet or LonWorks.
- ✓ Serial or Ethernet versions support a total of 2400 Host and Field Protocol memory points.
- ✓ LonWorks versions support a total of 1500 Host and Field Protocol memory points.
- ✓ BACnet COV support provides fast data communication while reducing the traffic over a BACnet network.
- ✓ Supports virtual nodes allowing multiple OEM controllers to connect to a single ProtoNode and seen as separate controllers on the various field networks.
- ✓ Easily supports OEM's custom proprietary host serial or Ethernet protocols.
- ✓ Multi-Client and Multi-Server support ensures interoperability between any Industrial and or Building Automation protocols.
- ✓ BTL Marked and LonMark Certified



FieldServer Technologies, 1991 Tarob Court, Milpitas, California 95035 USA **Web:** www.protocessor.com
Tel: 408-964-4433, **FAX:** 408-262-9042, **Toll-Free**: 800-317-8319 **Email:** sales@protocessor.com

Specifications

Supported Electrical Connections

		Interface Connections				
		RS-232[1]	RS-485[2]	RS-422[3]	Ethernet[4]	LonWorks[5]
ProtoNode	FPC-N34		2		1	
	FPC-N35		1		1	1
	FPC-N36		1	1	1	
	FPC-N37			1	1	1
	FPC-N38	1	1		1	
	FPC-N39	1			1	1

[1] Tx/Rx/GND

[2] +/-/Frame Ground

[3] TBD

[4] 10/100 BaseT

[5] FTT10

Power Requirements

Power: 9-30 VDC or 12-24 VAC

Current draw @ 12V

RER @ 12V = 150 mA

LER @ 12V = 279 mA

Environmental

Operating Temp.: -40ºF to 167ºF (-40ºC to 75ºC)

Relative Humidity: 5-90% RH, non-condensing

Enclosure

Dimensions: 4.5 x 3.2 x 1.6 inches (L x W x H)
(11.5 x 8.2 x 4.0 cm)

Warranty

Warranty: Two years return to factory

Approvals

- BACnet Testing Labs (BTL) B-ASC
- LonMark 3.4 Certified - ProtoNode LER Series
- TUV approved to UL 916 standard and CSA C22-2
- RoHS Compliant
- DNP3 Conformance Tested
- OPC Self Certified to Compliance

BACnet Support

- ProtoCarrier-485 with FFP-485 is BTL Listed
- BACnet COV's
- Support up to 2,000 Host & Field points
- DIP switches are for setting MAC Address, Node-ID, Baud Rate on the RS-485 Field protocol

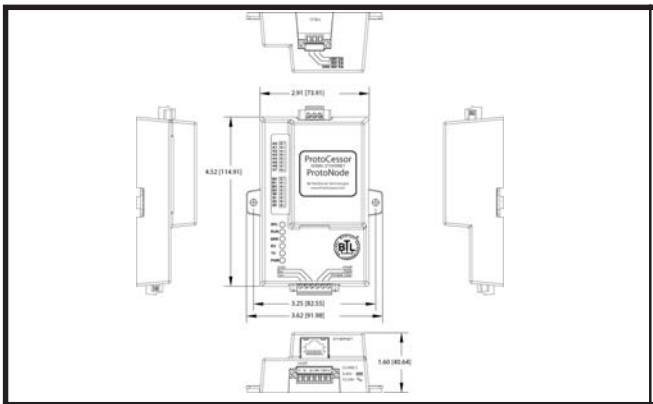
LonMark Certification on the ProtoNode LER

- SPID: 80:00:95:46:00:84:04:07
- Profiles:
  - 0000 - Node object (1)
  - 0001 - Open Loop Sensor Object (5)
  - 0003 - Open Loop Actuator Object (5)

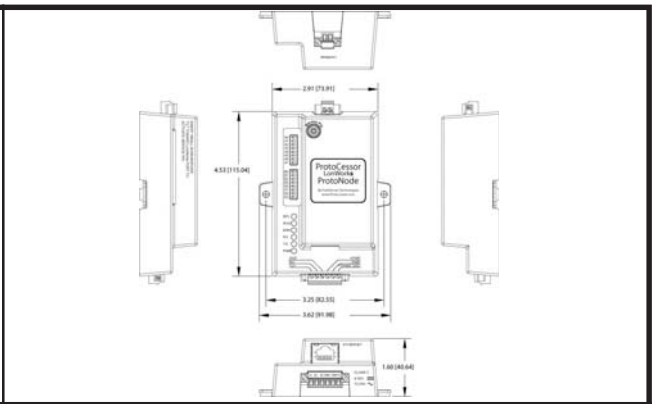
FieldServer Technologies has a full library of over 100 drivers so check with ProtoCessor sales to determine what additional protocols are available to meet specific application needs.

FieldServer Technologies offers a full range of OEM devices to enable manufacturers to easily provide the protocols their customers demand:

- ✓ **ProtoCessor** - embedded protocol translator
- ✓ **ProtoCarrier** - daughter cards to enable addition of ProtoCessor without hardware redesign
- ✓ **ProtoConnect** - semi-custom protocol OEM solution
- ✓ **ProtoNode** - external fully enclosed protocol OEM solution



ProtoNode RER Outline Dimensions



ProtoNode LER Outline Dimensions

6/2012

FieldServer Technologies, 1991 Tarob Court, Milpitas, California 95035 USA **Web:** www.protocessor.com
Tel: 408-964-4433, **FAX:** 408-262-9042, **Toll-Free**: 800-317-8319 **Email:** sales@protocessor.com

HC-201

Schneider Electric

Electric Duct Humidistat, Two-Position
General Instructions

APPLICATION

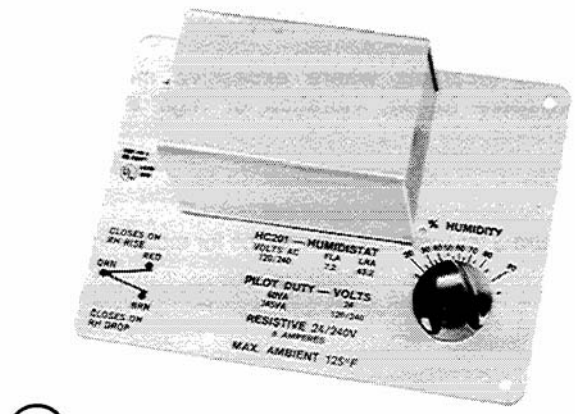
For low or line voltage on-off control of humidifiers, dehumidifiers, valves, solenoid valves, compressors, relay, etc.

SPECIFICATIONS

Control Dial Settings: 15 to 95% R.H.
Humidity Sensing Element: Nylon ribbon
Differential: 5% R.H.
Environment:
Ambient Temperature Limits,
Shipping & Storage, -40 to 140°F (-40 to 60°C).
Operating, 40 to 125°F (4 to 52°C).
Humidity, 5 to 95% R.H., non-condensing.
Location, NEMA 1, indoor location only.
Electrical Switch: Snap-acting SPDT (See Figure 1).
Ratings, See Table 1.
Connections: Coded screw terminal.
Cover: Metal.
Mounting: The outside surface of return air duct. Mounting template and five mounting screws provided.
Dimensions: 4-3/4" x 6-1/2" x 3-1/2" (121 x 165 x 89). See Figure 2.

Table-1 Maximum Electrical Ratings.

AC Volt 50/60 Hz	FLA	LRA	Resistive Amps	Pilot Duty VA
24	-	-	8	60
120	7.2	43.2	8	345
240	3.6	21.6	8	345



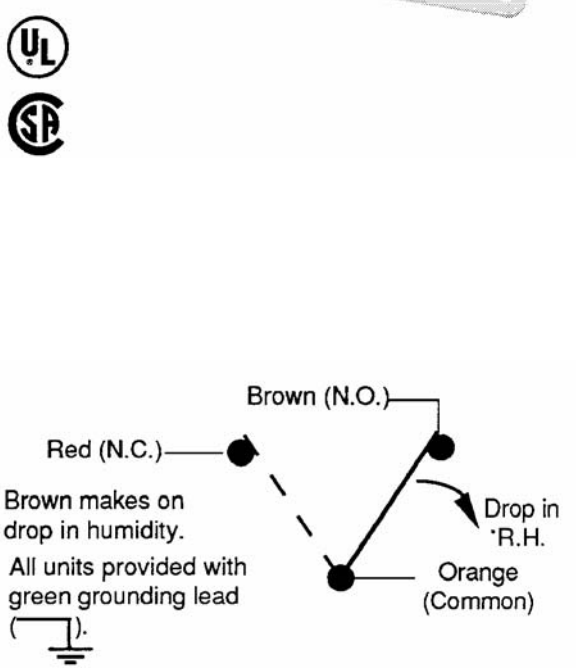


Figure-1 Switch Action and Terminal Identification.

PRE-INSTALLATION

Inspection

Inspect the carton for damage, if damaged notify the appropriate carrier immediately. Inspect the device for obvious damage due to shipping. Return damaged products.

Required Installation Items

- Wiring Diagrams
- Tools (not provided):
  - DVM (digital volt-ohm meter)
  - Appropriate screwdriver for terminal connections and mounting screws
  - Appropriate drill bit for mounting screws
- (5) Mounting screws (provided)
- (1) Cover screw (provided)

Cleveland Controls
Division of UniControl Inc.

Specifications 238414, 238415

Model AFS–262–112

AIR PRESSURE SENSING SWITCH WITH ADJUSTABLE SET POINT RANGE

APPLICATION

Model AFS-262-112 Air Pressure Sensing Switch is a general purpose proving switch designed for HVAC and Energy Management applications. It may be used to sense positive, negative, or differential air pressure. The **AFS-262-112** is equipped with convenient barbed sample line connectors that accept flexible tubing.

GENERAL DESCRIPTION & OPERATION

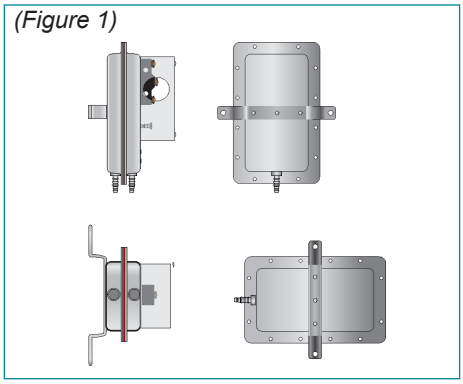
The plated housing contains a diaphragm, a calibration spring and a snap-acting SPDT switch.The barbed sample line connections located on each side of the diaphragm accept flexible tubing.

An enclosure cover guards against accidental contact with the live switch terminal screws and the set point adjusting screw. The enclosure cover will accept a ½" conduit connection.

MOUNTING (SEE FIGURE 1)

Select a mounting location which is free from vibration. The **AFS-262-112** must be mounted with the diaphragm in any vertical plane in order to obtain the lowest specified operating set point. Avoid mounting with the sample line connections in the "up" position. Surface mount via the two 3⁄16" diameter holes in the integral mounting bracket. The mounting holes are 3-⅞" apart.

(Figure 1)



AIR SAMPLING CONNECTION (SEE FIGURE 2)

The **AFS-262-112** is designed to accept flexible tubing by means of barbed ¼" slip-on connections. For sample lines of up to 10 feet, ¼" OD tubing is acceptable. For lines up to 20 feet, use ¼" ID tubing. For lines up to 60 feet, use ½" ID tubing. Locate the sampling probe a minimum of 1.5 duct diameters downstream from the air source. Install the sampling probe as close to the center of the airstream as possible. Refer to Figure 2 to identify the high pressure inlet (H) and the low pressure inlet (L). Select one of the following five application options, and connect the sample lines as recommended.

POSITIVE PRESSURE ONLY: Connect the sample line to inlet H; inlet L remains open to the atmosphere.

NEGATIVE PRESSURE ONLY: Connect the sample line to inlet L; inlet H remains open to the atmosphere.

TWO NEGATIVE SAMPLES: Connect the higher negative sample to inlet L. Connect the lower negative sample to inlet H.

TWO POSITIVE SAMPLES: Connect the higher positive sample to inlet H. Connect the lower positive sample to inlet L.

ONE POSITIVE AND ONE NEGATIVE SAMPLE: Connect the positive sample to inlet H. Connect the negative sample to inlet L.

Cleveland Controls
DIVISION OF UNICONTROL INC.
1111 Brookpark Rd
Cleveland OH 44109

Tel: **216-398-0330**
Fax: **216-398-8558**
Email:**saleshvac@unicontrolinc.com**
Web page: **http://www.clevelandcontrols.com**

ELECTRICAL CONNECTIONS (SEE FIGURE 3)

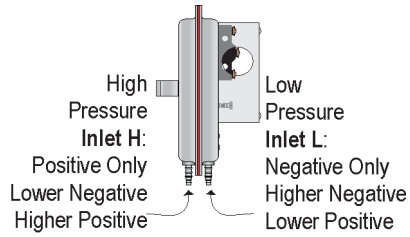
Before pressure is applied to the diaphragm, the switch contacts will be in the normally closed (NC) position. The snap switch has screw top terminals with cup washers. Wire alarm and control applications as shown in Figure 4.

FIELD ADJUSTMENT

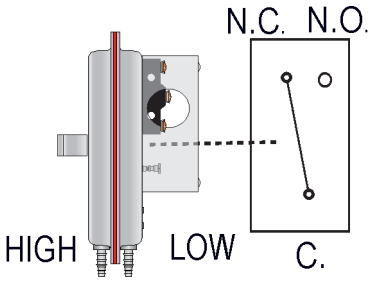
The adjustment range of an **AFS-262-112** Air Switch is 0.05±.02" w.c. to 2.0" w.c. To adjust the set point, turn the adjusting screw counterclockwise until motion has stopped. Next, turn the adjusting screw 4 complete turns in a clockwise direction to engage the spring. From this point, the next ten turns will be used for the actual calibration. **Each full turn represents approximately 0.2" w.c.**

Please note: To properly calibrate an air switch, a digital manometer or other measuring device should be used to confirm the actual set point.

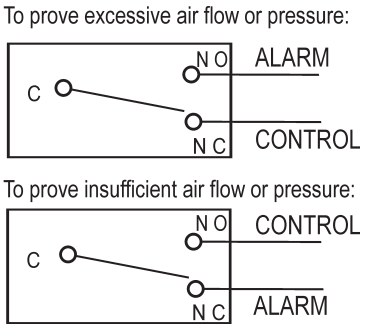
(Figure 2)

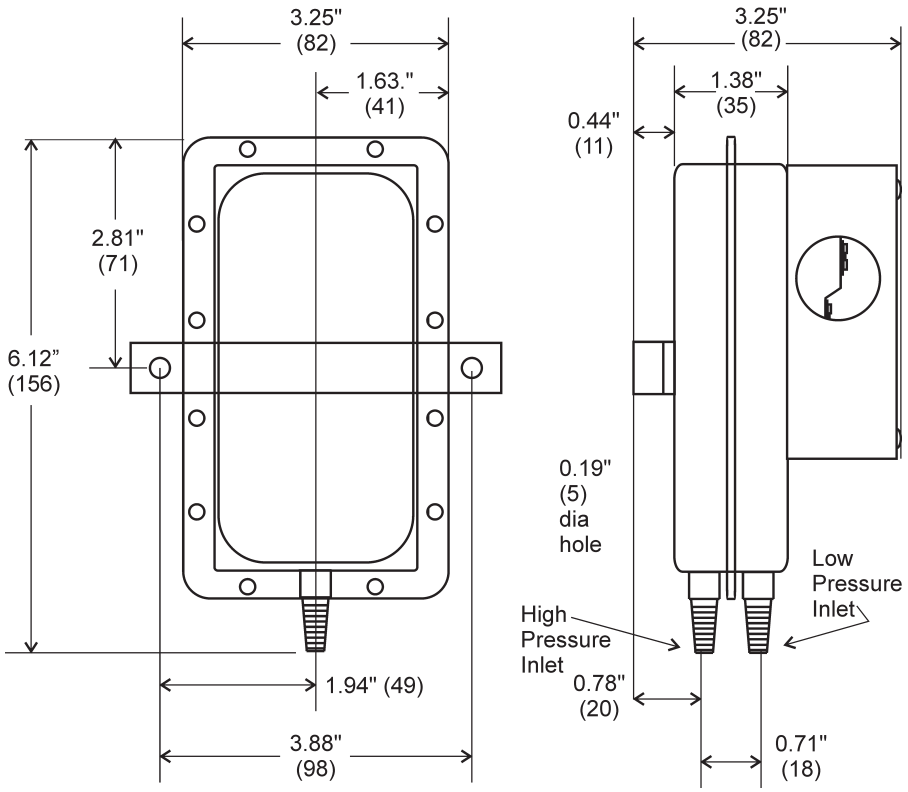


(Figure 3)



(Figure 4)





Nominal Dimensions in Inches (Millimeters)

SPECIFICATIONS

MODEL AFS-262-112 AIR PRESSURE SENSING SWITCH WITH ADJUSTABLE SET POINT RANGE

Mounting Position: Mount with the diaphragm in any vertical plane.

Set Point Range: 0.05 ± 0.02" w.c. to 2.0"w.c.

Field Adjustable "Operate Range": 0.07"w.c. to 2.0" w.c.

Field Adjustable "Release Range": 0.04"w.c. to 1.9" w.c.

Approximate Switching Differential: Progressive, increasing from 0.02 ± 0.01"w.c. at minimum set point to approximately 0.1 " w.c. at maximum set point.

Measured Media: Air, or combustion by-products that will not degrade silicone.

Maximum Pressure: ½ psi (0.03 bar).

Operating Temperature Range: -40F to 180F (-40 to 82C).

Life: 100,000 cycles minimum at ½ psi maximum pressure each cycle and at maximum rated electrical load.

Electrical Rating: 300 VA pilot duty at 115 to 277 VAC, 15 amps noninductive to 277 VAC, 60 Hz.

Contact Arrangement: SPDT.

Electrical Connections: Screw-type terminals with cup washers.

Conduit Opening: ⅞" diameter opening accepts ½" conduit.

Sample Line Connections: Two barbed ¼" connectors will accept ⅛" thru ¼" ID flexible plastic tubing.

Approval: UL, FM, CSA, CE

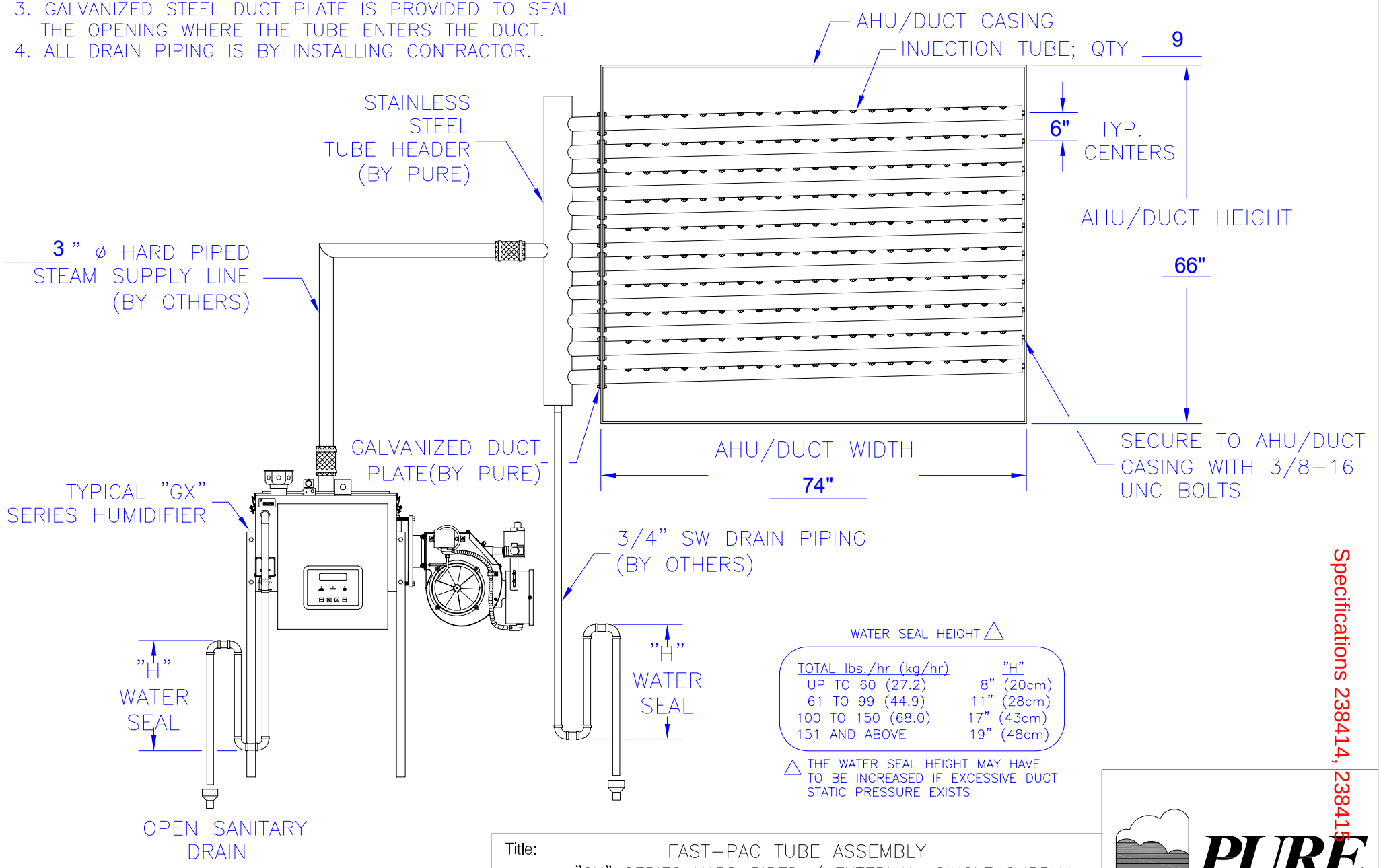
Shipping Weight: 1.2 lbs.

Accessories:

- Sample line probes.
- Orifice plugs (pulsation dampers).

1. STEAM SUPPLY PIPING AND INJECTION TUBE SHOULD BE PITCHED TWO INCHES (2") PER FOOT, BACK TO THE HUMIDIFIER.
2. INSTALL TUBE WITH ORIFICES INJECTING STEAM UP.
3. GALVANIZED STEEL DUCT PLATE IS PROVIDED TO SEAL THE OPENING WHERE THE TUBE ENTERS THE DUCT.
4. ALL DRAIN PIPING IS BY INSTALLING CONTRACTOR.

Tag: H-AHU9



WATER SEAL HEIGHT △

TOTAL lbs./hr (kg/hr)	"H"
UP TO 60 (27.2)	8" (20cm)
61 TO 99 (44.9)	11" (28cm)
100 TO 150 (68.0)	17" (43cm)
151 AND ABOVE	19" (48cm)

△ THE WATER SEAL HEIGHT MAY HAVE TO BE INCREASED IF EXCESSIVE DUCT STATIC PRESSURE EXISTS

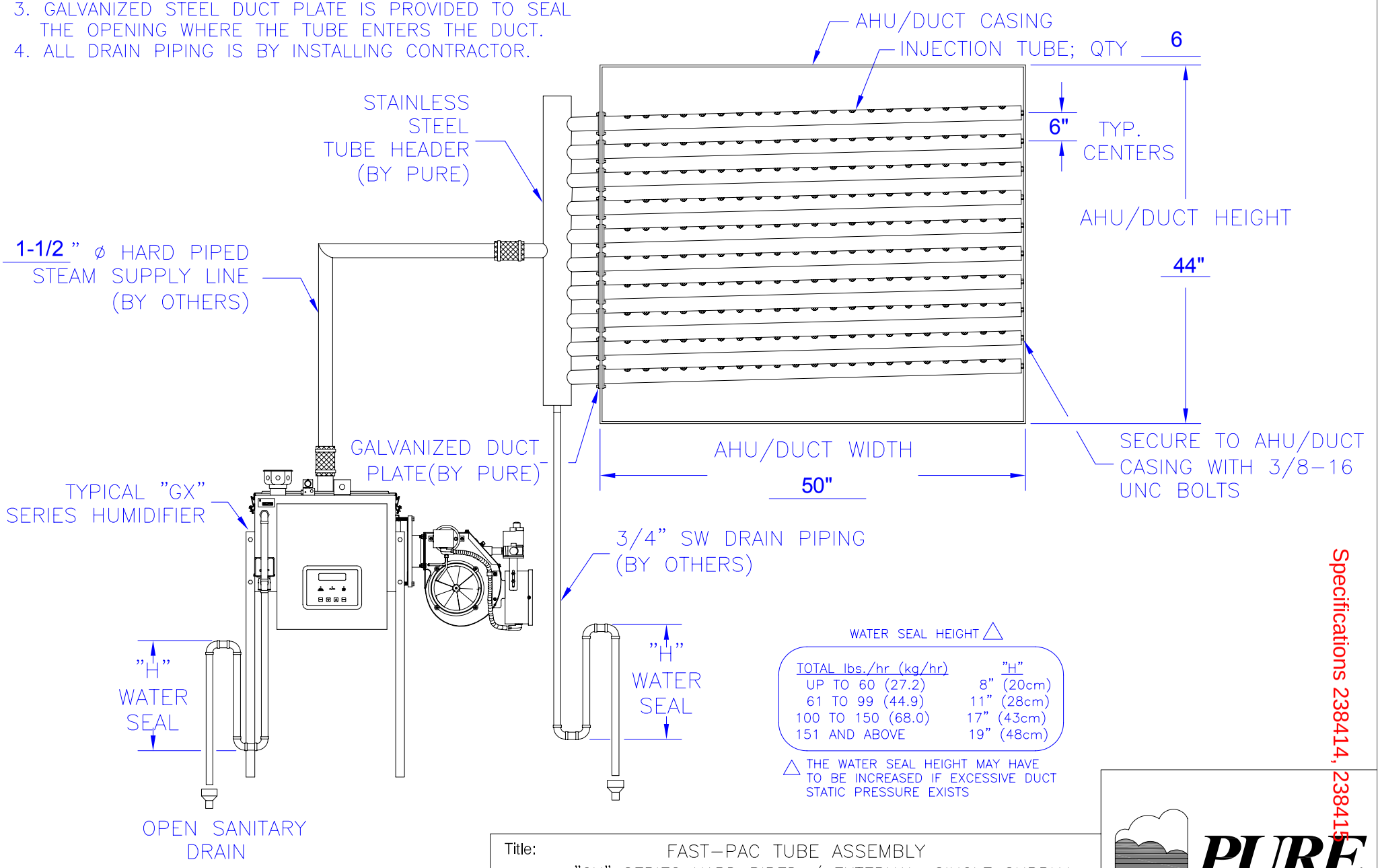
Specifications 238414, 238415

Title: FAST-PAC TUBE ASSEMBLY "GX" SERIES HARD PIPED / EXTERNAL, SINGLE SUPPLY			
Scale: No Scale	Date: April 22, 2009	Drwn: P.R.G.	Dwg No: 9003

PURE Humidifier

1. STEAM SUPPLY PIPING AND INJECTION TUBE SHOULD BE PITCHED TWO INCHES (2") PER FOOT, BACK TO THE HUMIDIFIER.
2. INSTALL TUBE WITH ORIFICES INJECTING STEAM UP.
3. GALVANIZED STEEL DUCT PLATE IS PROVIDED TO SEAL THE OPENING WHERE THE TUBE ENTERS THE DUCT.
4. ALL DRAIN PIPING IS BY INSTALLING CONTRACTOR.

Tag: H-AHU9



WATER SEAL HEIGHT △

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UP TO 60 (27.2)	8" (20cm)
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100 TO 150 (68.0)	17" (43cm)
151 AND ABOVE	19" (48cm)

△ THE WATER SEAL HEIGHT MAY HAVE TO BE INCREASED IF EXCESSIVE DUCT STATIC PRESSURE EXISTS

Specifications 238414, 238415

Title:	FAST-PAC TUBE ASSEMBLY "GX" SERIES HARD PIPED / EXTERNAL, SINGLE SUPPLY		
Scale: No Scale	Date: April 22, 2009	Drwn: P.R.G.	Dwg No: 9003

PURE Humidifier

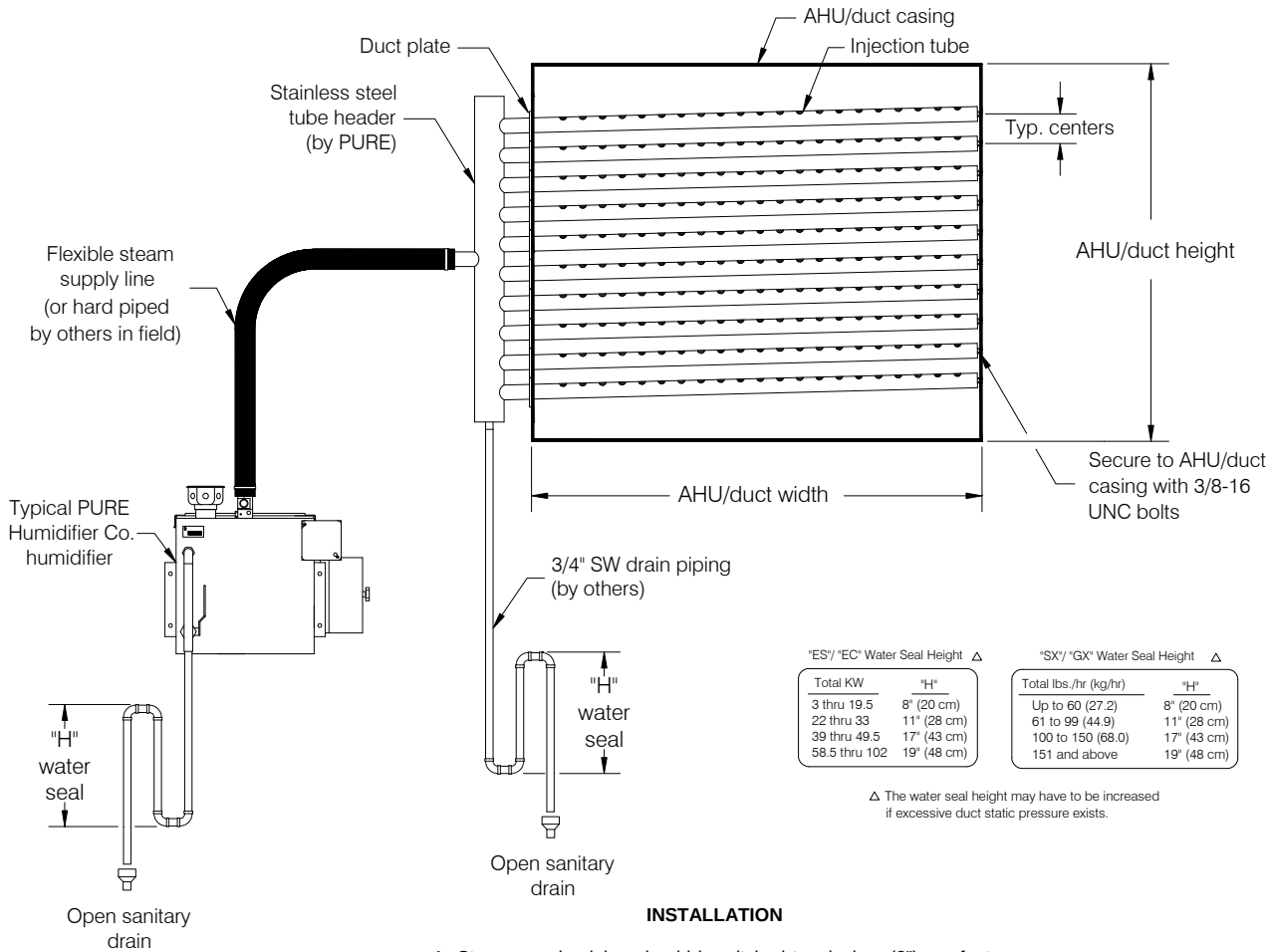
PURE™ Humidifier

READ AND SAVE THESE INSTRUCTIONS

WELDED FAST-PAC EXTERNAL MOUNT MULTIPLE TUBE ASSEMBLY

INSTALLATION AND ASSEMBLY INSTRUCTIONS

Fig. 1



"ES"/ "EC" Water Seal Height △

Total KW	"H"
3 thru 19.5	8" (20 cm)
22 thru 33	11" (28 cm)
39 thru 49.5	17" (43 cm)
58.5 thru 102	19" (48 cm)

"SX"/ "GX" Water Seal Height △

Total lbs./hr (kg/hr)	"H"
Up to 60 (27.2)	8" (20 cm)
61 to 99 (44.9)	11" (28 cm)
100 to 150 (68.0)	17" (43 cm)
151 and above	19" (48 cm)

△ The water seal height may have to be increased if excessive duct static pressure exists.

INSTALLATION

1. Steam supply piping should be pitched two inches (2") per foot, back to the humidifier.
2. Install tube with orifices injecting steam up.
3. All drain piping is done by others.

Welded Multiple Injection Tube Assembly External Mounting Instructions

The multiple tube assembly supplied with the humidifier(s), is designed for rapid dissipation of the steam. The tube assembly is designed for ***external*** AHU or duct mounting.

VERIFY COMPONENTS

Unpack the components from the shipping container. Verify all components are checked off according to the packing list and the *COMPONENTS IDENTIFICATION DRAWING* (Fig. 2). Report any missing pieces to your local PURE Humidifier Co. representative immediately.

LOCATION

1.) Mount the injection tube assembly in the AHU or duct work as shown on the project plans or as indicated by the project engineer.
2.) Install the injection tube with the 3/4"-NPT drain connection, located on the tube header, directed towards the bottom of the AHU or duct.
3.) Install the tube assembly so that the injection tubes are pitched back towards the header with a minimum of two inches (2") of pitch per foot. (welded assemblies have factory installed pitch).
4.) Install the tube assembly with the steam discharge ports facing upwards.
5.) The tube assembly should be centered in the AHU or duct height with an even distance between the bottom tube and the casing floor and the top tube and the casing ceiling.

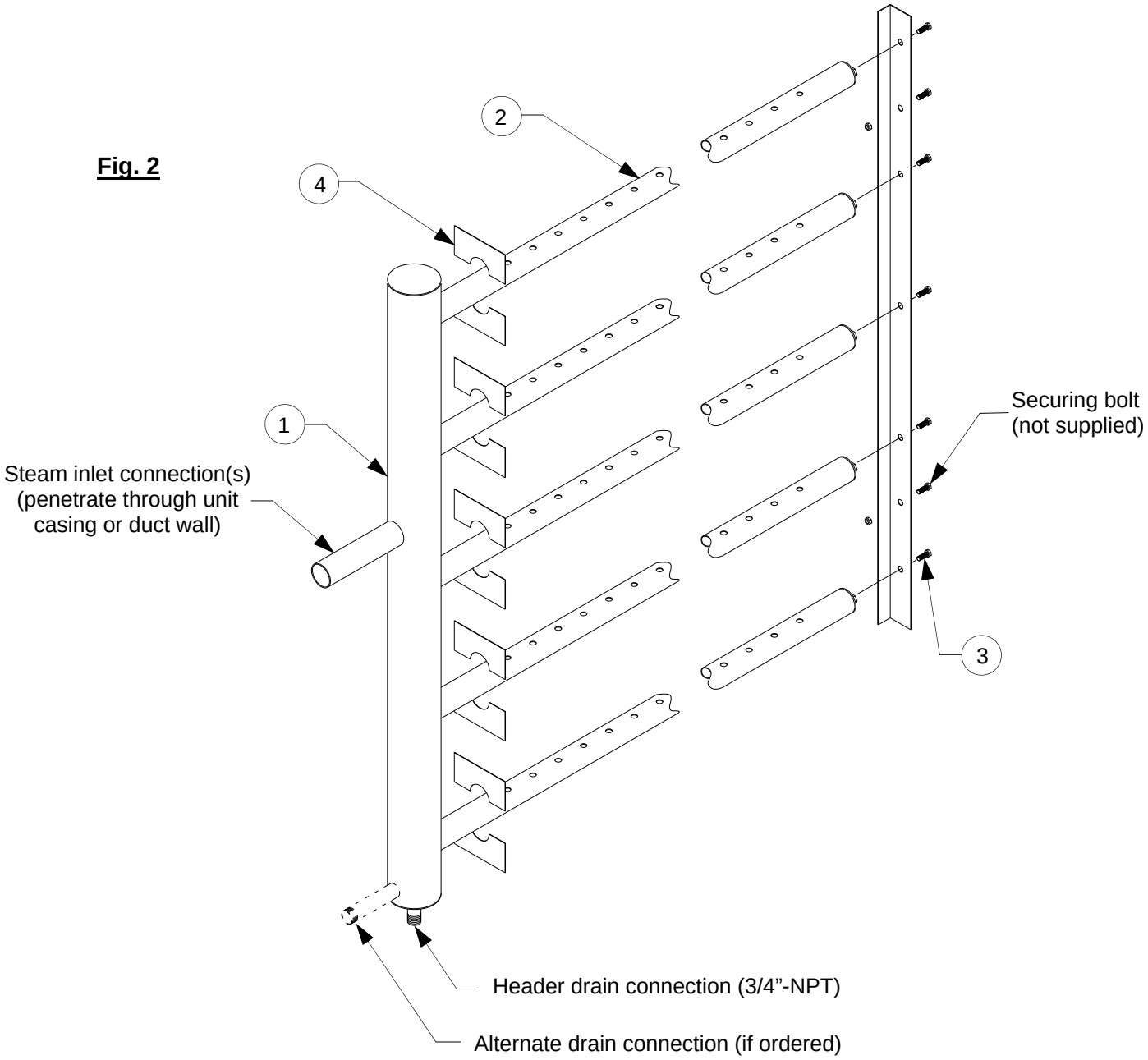
MOUNTING

1.) Layout the center lines for the injection tubes on the AHU or duct wall. The injection tubes have a 1-1/2" outside diameter. Duct plates are provided to seal the opening. The layout should be based on the "Location" instructions listed above (see Fig. 3).
2.) Cut a minimum of a 1-1/2" diameter hole, through the AHU or duct wall, for each injection tube (see Fig. 3).
3.) Slide the injection tubes through the access holes (cut in the steps above). Secure the tubes to the AHU or duct wall with 3/8"-16 UNC fasteners (by others).
4.) Seal the openings where the injection tubes penetrate through the AHU or duct wall with the duct plates provided (see Fig. 3).
5.) Connect steam supply and condensate piping to the humidifier as illustrated in Fig. 1.

External Mount Multiple Injection Tube Assembly
Component Identification

ITEM NO.	DESCRIPTION	QUANTITY
1	Supply/condensate header	1
2	Injection tubes	varies with order
3	Tube mounting bolts	1 per tube
4	Duct plate (supply)	1 per tube

Fig. 2



Header & Support Bracket Mounting Detail

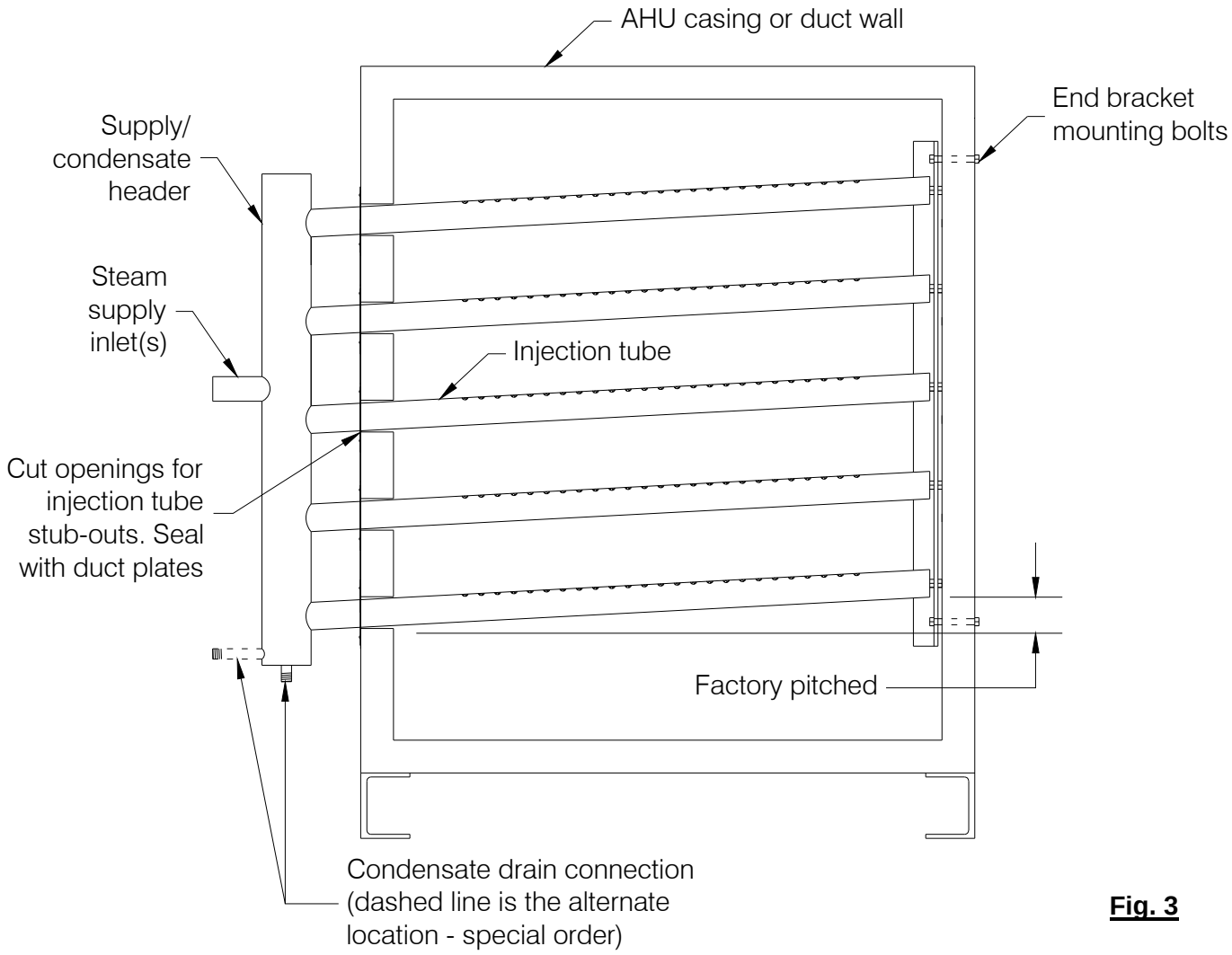


Fig. 3

Notes:

1.) Center the Fast-Pac injection tube assembly in the duct height.

2.) Install the Fast-Pac injection tube assembly so that the header is plumb.

3.) Install injection tubes with the orifices injecting upwards.

4.) All condensate drain piping is by others.

Installation Tips

Condensate Return Line
Condensate from the header cannot be elevated. Do not connect water seals to pressurized condensate return lines.**The drain piping should be copper or stainless steel. The use of PVC piping is not recommended; the humidifier temperature will cause the PVC to soften and fail.**

Laminar air flow
Tube assembly must be installed in a location that allows for laminar air flow across entire grid. A minimum velocity of 300 feet per minute is required to avoid saturation and excessive fog travel.

Plug fan installations
Install tube assembly as close as possible to the upstream coil to ensure laminar airflow and proper absorption.

Insulated ducts
Internally insulated ducts must be lined with a non-absorbent material to avoid saturation. If the duct is lined it must be removed three feet (3') upstream and ten feet (10') downstream of tube assembly.

Final Filters
Tube assembly must be installed a minimum of ten feet (10') upstream of final filters.

VAV Systems
Low velocity will cause long fog trails and steam will rise wetting the top of the AHU/duct casing. Modulating VAV high-limit humidistat is required. A minimum velocity of 300 feet per minute is required to avoid saturation and excessive fog travel.

Controls

Fan Interlock Switch
PURE Humidifier Co. recommends the use of an air flow proving switch or fan interlock to prove air flow prior to humidifier cooperation. Humidifier operation without air flow will result in over-saturation of the air stream. Air flow proving switches are available as optional equipment from your PURE Humidifier Co. representative.

High-Limit Humidistat
PURE Humidifier Co. recommends the use of a duct high-limit humidistat to prevent humidifier operation when the duct humidity level exceeds 85% relative humidity. Humidifier operation above 85% relative humidity can result in over-saturation of the air stream. High-limit humidistats are available as optional equipment from your PURE Humidifier Co. representative. The high limit humidistat should be 8 to 10 feet (244-305 cm) downstream from the humidifier injection tube. Installing the high-limit closer than 8 feet (244 cm) from the humidifier may cause erratic control.

Smoke Alarms and Temperature Sensors
Smoke alarms should be located 12 to 14 feet (365-427 cm) upstream from the humidifier injection tube.

Temperature sensors should be located 12 to 14 feet (365-427 cm) downstream from the humidifier injection tube, or past any visible fog travel that may be greater than this distance.

Troubleshooting

Too Much Humidity

1. Humidity controller out of calibration.
2. Humidifier oversized.
3. Check humidifier (GX, SX, ES, EC) for proper operation.

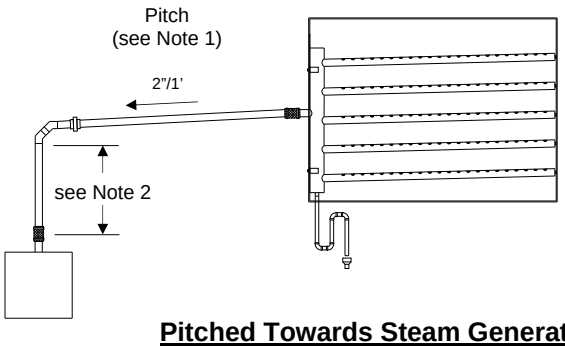
Too Little Humidity

1. Humidity controller out of calibration.
2. Undersized humidifier.
3. Check humidifier (GX, SX, ES, EC) for proper operation.
4. Water seals are not primed.
5. Water seals are blown due to improper supply piping.

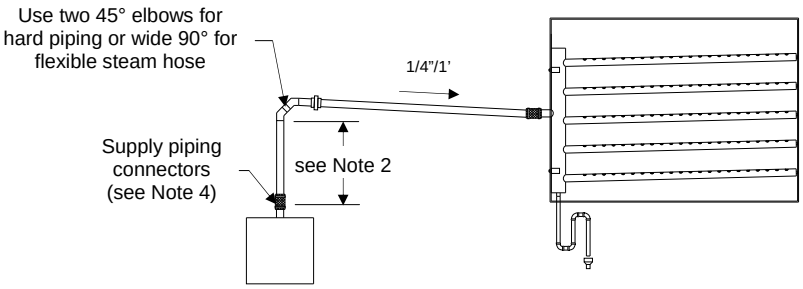
Humidifier Discharges Water

1. Faulty drainage:
    A) Return line pressure greater than humidifier pressure.
    B) Return line flooded.
    C) Vertical lift.

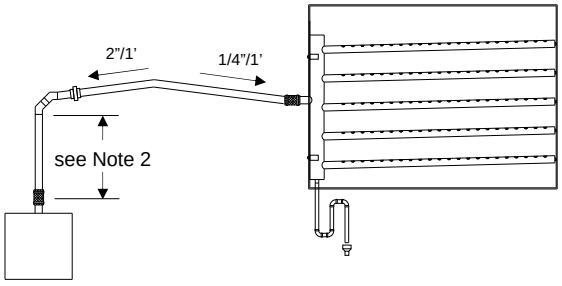
Steam Supply Piping Examples



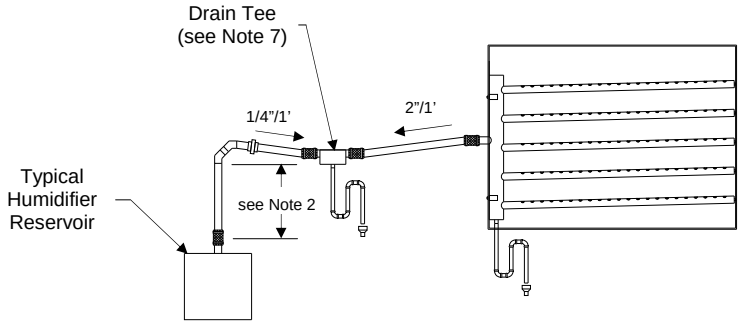
Pitched Towards Steam Generator



Pitched Towards Tube Assembly



Pitched Towards Steam Generator and Tube Assembly



Pitched Towards Drain Tee

Notes:

1. Pitch hard piping or flexible hose 2" per foot if steam is flowing uphill, 1/4" per foot if the steam is flowing downhill. Reference piping examples shown.
2. When feasible to do so, install a minimum one-foot riser from the top of the tank to reduce condensate carryover.
3. Use flex connectors or unions to allow for easy removal of cover.
4. Support flexible hose every 18" to avoid sagging.
5. Hard piping or flexible hose must match reservoir outlet size. Do not use supply piping with a smaller inside diameter than the reservoir outlet.
6. Failure to follow the piping recommendation on this page may result in blown water seals, leaking cover gasket, or dispersion tubes spitting.
7. Install a Drain Tee at any low spots in supply piping run where condensate will accumulate. **All horizontal to vertical up transitions require a water-sealed drip leg.**
8. Reference job specific tube assembly O&M included with your order for complete details.

DISCLAIMER

Product Changes: Changes in products may be required from time to time due to factors beyond the Seller's control, or the need for continuing improvement of products. The Seller reserves the right to make reasonable changes in products, specifications and performance of any kind without notice or liability. The Seller also reserves the right to deliver revised designs or models of products against any order, unless this right is specifically waived in writing by the Seller. The Seller shall have no responsibility whatsoever with respect to changes made by the manufacturer in products sold but not manufactured by the Seller.

PURE Humidifier

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PURE Humidifier

READ AND SAVE THESE INSTRUCTIONS

Deionized, Demineralized, or Reverse Osmosis Water

"GXDDR" Series

Gas Fired Exchanger Humidifier

Installation Instructions

Operation and Maintenance Manual

FOR YOUR SAFETY:
Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

WARNING:
Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Refer to this manual. For assistance or additional information consult a qualified installer, service agency, or the gas supplier.

WARNING:
If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

WHAT TO DO IF YOU SMELL GAS:
Do not try to light any appliance.
Do not touch any electrical switch; do not use any telephone in your building.
Immediately call your gas supplier from a neighbor's telephone.
Follow the gas supplier's instructions. If you can not reach your gas supplier, call the fire department.

IMPORTANT: Read and save this guide for future reference. This guide to be left with equipment owner.

ETL/ETLC Listed # 43438 To "IAS 12-94 Gas Fired Humidifier"

Our results are comforting

PURE Humidifier

To the user of PURE Humidifier Co.'s "GXDDR" Series Gas Fired Humidifiers

We at PURE Humidifier Co. thank you for choosing one of our quality products. PURE Humidifier Co. "GXDDR" Series humidifiers are models of simplicity to install, operate and maintain. However, they must be maintained to provide maximum operating efficiency.

PLEASE READ AND FOLLOW ALL INSTRUCTIONS CAREFULLY. PROPER OPERATION AND HUMIDITY CONTROL IS POSSIBLE ONLY WITH PROPER INSTALLATION AND MAINTENANCE.

The "GXDDR" Series Humidifier is specifically designed to operate with deionized, demineralized , or reverse osmosis water. All components that will be in contact with the water are constructed of type 304 stainless steel, incoloy, or corrosion resistant materials.

Use of mineralized (hard or soft) tap water will cause fill valve failure and void the warranty. PURE Humidifier Co.'s "GX" Series should be installed on applications that require tap water.

High chloride content in feed water can cause chloride stress cracking and chloride pitting in stainless components. Chloride stress corrosion cracking (CSCC) and chloride pitting of stainless steel components is not covered by warranty. Do not use hydrochloric acid descalers or bleach to clean the tank. Consult the factory if you are unsure about which chemical descaler to use.

To ensure proper installation of this product, it must be installed by qualified HVAC and electrical contractors, and must be in compliance with local, state, federal, and governing codes. If installed improperly this product may cause damage to property, severe personal injury, or death as a result of electric shock, burns, and/or fire.

Do not adjust any components inside humidifier control box without consulting the factory.

For indoor installation in conditioned spaces only unless supplied with an outdoor enclosure.

REMOVE INTERNAL PACKING MATERIAL FROM AROUND THE FLOAT BALL ASSEMBLY BEFORE STARTING UNIT. FAILURE TO DO SO CAN RESULT IN THE OVER-HEATING OF THE HUMIDIFIER AND POTENTIAL FIRE.

Introduction

Table of Contents

The PURE Humidifier Co. Warranty

PURE Humidifier Co. guarantees its products to be free from defects in material and workmanship for a period of two years from the date of shipment; provided the product is properly installed, serviced, and put into the service for which it was intended.

Chloride stress corrosion cracking (CSCC) and chloride pitting of stainless steel components is not covered by warranty.

PURE Humidifier Co. is obligated under the terms of this warranty to the repair or replacement of the defective part(s), excluding any labor charges, or to refund the purchase price at our option. PURE Humidifier Co. assumes no obligation for incidental or consequential damages. The above provisions are in lieu of all other guarantees, obligations, liabilities or warranties, expressed or implied.

PURE Humidifier

Safety Precautions & Installation

WARNING:
Improper installation, adjustment, alterations, service, maintenance, or use can cause carbon monoxide poisoning, an explosion, fire, electrical shock, or other conditions which may cause property damage, personal injury or loss of life. Consult a qualified installer, service agency, local gas supplier, or your distributor or branch for information or assistance. The qualified installer or agency must use only factory authorized and listed kits or accessories when modifying this product. A failure to follow this warning can cause electrical shock, fire, personal injury, or loss of life.

Inspect humidifier and accessories upon arrival for damaged, missing, or improper parts. If there is a problem, call PURE Humidifier Co.

Application of this humidifier should have special attention given to vent sizing and material, gas input rate, and unit sizing. Improper installation or misapplication of the humidifier can require excessive servicing or cause permanent component failure.

Installation:

Precautions
The installation must conform to the requirements of the authority having jurisdiction, or in the absence of such requirements, to the National Fuel Gas Code, ANSI Z223.1 (latest edition). In Canada, the installation of this unit must comply with local plumbing or waste water codes and other applicable codes and with the current code CAN/CGS-B149.1 “Installation Code for Natural Gas Burning Appliances and Equipment or CAN/CGA-B149.2 “Installation Code for Propane Burning Applications and equipment.”

Do **not** install in potentially explosive or flammable atmospheres laden with grain dust, sawdust, or similar airborne materials.

Installation of humidifier in high humidity or salt water atmospheres will cause accelerated corrosion, resulting in a reduction of the normal lifespan of the unit.

Humidifier must be located in a conditioned space.

To prevent premature heat exchanger failure, do **not** locate ANY GXDDR unit in areas where chlorinated, halogenated or acid vapors are present in the atmosphere.

Locate the humidifier in an area clear of combustible materials, gasoline, and other flammable vapors and liquids.

When working on equipment, observe precautions in this literature, tags, and labels attached to or shipped with the unit, and other safety precautions that may apply. **Have fire extinguisher available during start-up, adjustment procedures, and service calls.**

Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

Do not lift humidifier by gas controls or gas manifold.

Should overheating occur, or the gas supply fail to shut off, shut off the manual gas valve to the appliance before shutting off the electrical supply.

Do not locate units in tightly sealed rooms or small compartments without provision for adequate combustion air and venting. Combustion air must be supplied to the confined space through a minimum of two permanent openings in the enclosure, with at least one near the bottom. They should provide a free area of one square inch per 1000 BTU per hour input rating of the unit with a minimum of 100 square inches for each opening, whichever is greater. Refer to Venting Installation information on pages 8 & 9.

PURE Humidifier

Installation & Location

Important: Remove all shipping brackets and materials before operating the humidifier. Humidifier flue gases must be vented to the outside atmosphere. Power supply disconnect switch must be in the off position while making wiring connections to prevent electrical shock and equipment damage. All units must be wired in strict accordance with wiring diagram furnished with this unit.
Turn off all gas while installing the supply gas piping and field installed manual gas shut-off valve for the humidifier.

Location

The location selected must provide for electrical service, cold or hot water supply, and sanitary drain.

When selecting a location, try to keep the humidifier within 10 feet (305 cm) of the duct to avoid unnecessary heat losses and condensation within the steam supply line.

Visible “fog” will saturate and condense when it contacts objects such as turning vanes, filters, fans, elbows or take-offs. The warmer the air, the more easily it will dissipate the visible steam. The most active and warmest portion of the duct will provide better mixing of the steam and air. The injection tube should be mounted a minimum of 2 feet (61 cm) downstream from an elbow or other turbulent air-flow area.

Avoid mounting single style injection tube(s) closer than 8-10 feet (244-305 cm) upstream of objects that could become saturated and condense the steam (reference the paragraph above). If the duct layout does not provide a straight unobstructed run of 8-10 feet (244-305 cm), a multiple injection tube system should be considered to reduce the visible steam travel distance.

For Fast-Pac and Insty-Pac multiple tube assemblies please consult factory for job specific non-wetting distances.

Reference Fast-Pac or Insty-Pac O&Ms for full installation details.

CAUTION: Do not humidify upstream of filters. Consult factory.

CAUTION: Smoke detectors should not be located downstream of injection tube assemblies.

Location of Controls

It is important to avoid mounting any controls within the visible steam. The controls should be mounted a minimum of 8-10 feet (244-305 cm) downstream from the humidifier injection tube. Due to the temperature rise that exists within the visible steam dissipation area, thermostats should not be mounted near the injection tube.

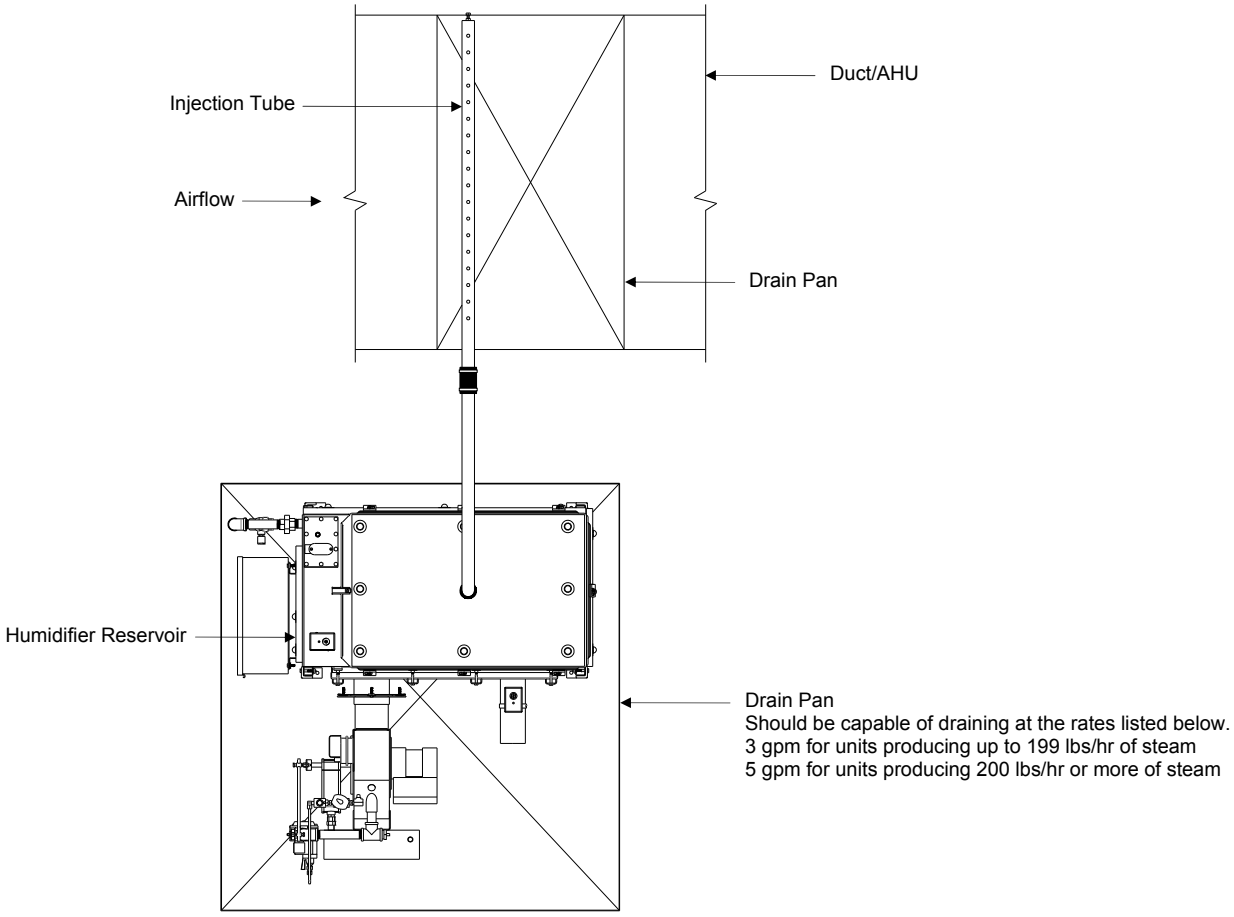
High-limit humidistats should be installed before any duct obstruction to make sure the humidifier is interrupted before saturation can occur on the object. The high-limit should be mounted a minimum of 8-10 feet (244-305 cm) downstream from the injection tube. Installing the high-limit closer than 8 feet (244 cm) from the humidifier may cause erratic control.

PURE Humidifier

Drain Pan Mounting

Drain Pan Mounting

A drain pan is an additional safety feature which may be required to be supplied in the field. In a proper humidifier installation, a drain pan is not required. However, if the humidifier and injection tube are located in an area that contains valuable equipment or is a water sensitive area, PURE Humidifier Co. recommends the addition of a drain pan under the humidifier and under the injection tube. The drain pan should extend past all edges of the humidifier and if installed in the duct, it should extend a minimum of 3 feet (91 cm) downstream from the injection tube. The pan should be of a size which is capable of draining at a rate of 3 gpm for units with a capacity of up 200 lbs/hr, and 5 gpm for units with a capacity over 200 lbs/hr. The pan should be drained to a sanitary drain.



Humidifier Reservoir and Injection Tube Plan View

PURE Humidifier

Electrical, Combustion and Ventilation Air

Electrical

WARNING:
The cabinet **must** have an uninterrupted or unbroken ground according to National Electrical Code, ANSI/ NFPA 70 and Canadian Electrical Code, CSA C22.1, or local codes to minimize personal injury if an electrical fault should occur. This may consist of electrical wire or conduit approved for electrical ground when installed in accordance with existing electrical codes. Do not use gas piping as an electrical ground.

Connect copper ground wire to cabinet ground lug.

Humidifiers should be supplied with 120-volt AC, 60 Hz, 15-amp separately fused electrical service. The humidifier is equipped with a transformer to step down the voltage to 24 VAC control voltage.

When installed, the humidifier must be electrically grounded in accordance with local codes, or in the absence of local codes, with the National Electrical Code ANSI/NFPA No. 70-1987. The electrical conductors shall be a minimum Type MTW (105*C) AWG #14 wire for line voltage (120V), with BLACK WIRE for HOT; WHITE WIRE for NEUTRAL, GREEN WIRE for GROUND; and minimum #18 gauge for control wiring. All electrical components and wiring must be protected from mechanical damage and water. The control system requires an earth ground for proper operation.

The humidifier is adjusted for correct performance. Do not alter fan or operate motors at reduced speed.

The current characteristics, and capacity requirements should be checked against the nameplates. All wiring must be in accordance with all governing codes, and with wiring diagram located inside the control cabinet.

See separate publication for the INTAC® controller furnished with this humidifier.

Combustion and Ventilation Air

CAUTION:
Air for combustion must not be contaminated by halogen compounds, which include fluoride, chloride, bromide and iodide. These elements are found in aerosol sprays, detergents, bleaches, cleaning solvents, salts, air fresheners, and other household products.

CAUTION:
The operation of exhaust fans, kitchen ventilation fans, clothes dryers, or fireplaces could create a negative pressure condition at the humidifier. Make-up air must be provided for the ventilation devices, in addition to that required by the humidifier.

All fuel burning equipment must be supplied with air for combustion of the fuel. Sufficient air MUST be provided to ensure there will not be a negative pressure in the equipment room or space.

Provisions for adequate combustion and ventilation air must be provided in accordance with Section 5.3, Air for Combustion and Ventilation, of the National Fuel Gas Code ANSI Z223.1 1-1988, or applicable provisions of the local building codes. Canadian installations must be installed in accordance with sections 7.2, 7.3, and 7.4 of the CAN/CGA.B149 Installation Codes, and all authorities having jurisdiction.

PURE Humidifier

Gas Piping Installation

CAUTION:
Gas pressure to humidifier controls must never exceed 14" W.C. (1/2 psi).

Contact your local gas service company to ensure that adequate gas service is available, and to review applicable installation codes for your area. All gas piping installations must be in accordance with codes, and ANSI Z233.1, "National Fuel Gas Code," or CAN/ CGA-B149 in Canada.

Do not use flexible connectors.

Piping to units should conform with local and national requirements for type, volume, gas handled, and pressure drop allowed in the line. Refer to tables 1 and 2 to determine the cubic feet per hour (cfh) for the type of gas and size of unit to be installed. Using this value and the length of pipe necessary, determine the pipe diameter. Where several units are served by the same main, the total capacity, gas flow (cfh), and length of main must be considered. The figures shown are for straight lengths of pipe at 0.2" w.c. pressure drop, which is considered normal for low-pressure systems. Note that fittings such as elbows and tees will add to the pipe pressure drop.

After threading and reaming the ends, inspect piping and remove loose dirt and chips.

Support piping so that no strains are imposed on unit or controls.

Use two wrenches when connecting piping to unit controls.

Provide a drip pocket before each unit and in the line where low spots cannot be avoided.

Take-off to unit should come from top or side of main to avoid trapping condensate.

Piping subject to wide temperature variations should be insulated.

Pitch piping up toward unit at least 1/4" per 15' of horizontal run.

Compounds used on threaded joints of gas piping must be resistant to the harmful action of liquefied petroleum gases.

Purge air before lighting unit by disconnecting piping at gas control. **In no case should the line be purged into heat exchanger.**

Install pressure regulator directly upstream of main automatic gas valve(s) and fit drip leg main gas cock upstream of regulator or automatic valve(s).

Install vent lines from main gas regulator (if used) and diaphragm gas valve where applicable. Vent lines should be run to the outside of the building, terminating clear of windows or fresh air intakes. Outside termination of vent should have a screen to prevent insects from building nests in vent pipe.

Install a ground joint union and a manual gas shut-off valve immediately upstream of the unit including a 1/8" NPT plugged tapping accessible for test gauge connection.

Allow at least 5 feet of piping between any high pressure regulator and unit pipe connection.

PURE Humidifier

Gas Piping Installation (Con't)

Gas Leak Testing
When testing the gas supply piping system, the humidifier and its gas shut-off valve must be disconnected during any pressure testing in excess of 14" W.C. (1/2 psi). The humidifier must be isolated from the gas supply piping system by closing its field-installed manual shut-off valve during any pressure testing equal to or greater than 14" W.C. (1/2 psi).

Test gas lines for leaks using a soap solution. Your local gas service company may wish to execute or witness this test. CAUTION: Gas pressure above 14" W.C. may damage the standard diaphragm gas shut-off valve. Do not exceed this value when pressure testing lines unless you cap-off line upstream of main gas cock and pilot take-off.

Check gas supply pressure with all burners running at inlet pressure tap of gas control. The recommended supply pressure should be 7" W.C. on natural gas or 11" W.C. on LP gas. Purging of gas piping should be performed as described in ANSI Z223.1 (latest edition), or in Canada in CAN/CGA-B149 codes.

Minimum supply pressure. Natural - 5" W.C. LP - 5" W.C.

Gas valves outlet pressure (manifold) shall be factory set. **This pressure can be checked at the 3/4" tee after the orifice.** See humidifier label for correct pressure rating.

Table 1 - Gas Input CFH for GXDDR-Series Humidifiers

Model No.	Max BTU/hr Input	Max CFH (Nat. Gas)	Max CFH (Propane)
GXDDR-3	150,000	150	60
GXDDR-4	400,000	400	160
GXDDR-8	800,000	800	320
GXDDR-12	1,200,000	1,200	480

Table 2 - Gas Piping Pressure Drop Data

EQUIVALENT LENGTH OF STRAIGHT PIPE IN FEET									
	20	30	40	20	60	80	100	150	200
CFH GAS WITH .2" PRESSURE DROP									
Pipe Size in Inches									
3/4"	152	120	105	93	84	73	66	54	45
1"	300	250	210	190	180	150	135	110	75
1 1/4"	520	425	360	325	300	260	230	190	165
1 1/2"	800	690	560	500	480	410	370	300	260
2"	1700	1400	1200	1100	1000	850	750	600	540
2 1/2"	3000	2500	2100	1900	1800	1550	1375	1100	950
EQUIVALENT LENGTHS OF STANDARD PIPE IN FEET FOR LISTED FITTINGS									
Fitting Type	3/4	1	1 1/4	1 1/2	2	2 1/2	Nominal		
Std. Tee	2.4	5.5	7.5	9	12	13.5	Pipe Size		
Std. Elbow	4.4	2.7	3.7	4.5	5.5	6.1	in Inches		

PURE Humidifier

Venting Installation

For proper and safe operation this appliance needs air for combustion and ventilation. DO NOT block or obstruct air openings on the appliance, spaces around the appliance, or air openings communicating with the appliance area.

DO NOT block the flow of combustion and ventilation air. To provide for necessary oxygen for proper combustion, opening must be provided to allow outside air to enter the space in which the heater is located. Enclosed spaces, such as equipment rooms, must be vented at the blower for combustion air. The size of air openings must be based on all gas-burning equipment installed in the space involved. Provisions for adequate combustion and ventilation air in accordance with Section 5.3, Air for Combustion and Ventilation, of the National Fuel Gas Code, ANSI Z223.1, or Sections 7.2, 7.3 or 7.4 of the CAN/CGA B149 Installation Codes, or applicable provisions of the local building codes.

The burner should be initially set up and serviced at regular intervals (preferably at the beginning of and mid -way through high use period) by a trained serviceman using the proper test instruments. Failure to maintain the correct burner settings may result in inefficient gas consumption, premature wear of burner components, or explosion hazard.

Venting

The GXDDR Series Humidifiers are Category 3 Appliances.

The purpose of venting the gas humidifier is to completely remove all products of combustion and ventilation gases to the outside air, without condensation in the stack.

When connecting the humidifier to a gas vent or chimney, the installation shall be in accordance with Part 7, Venting of Equipment, of the National Fuel Gas Code, ANSI Z223.1, or Section 7, Venting Systems and Air Supply Appliances, of the CAN/CGA-B149 Installation Codes, the local building codes, and the vent manufacturer's instructions.

Do not reduce the vent diameter, and avoid short turns in the vent piping. Use the exhaust manifold vent size shown on page 15

Allow for removal of air intake and exhaust connections for heat exchanger cleaning and regular maintenance. Maintain a 1/4-inch-per-foot pitch for horizontal runs. Maintain proper support of vent connections and joints. Observe clearances (in accordance with applicable codes) from all combustible materials, and obtain an approved cap for the stack outlet. The bottom of the cap must be one stack diameter above the top of the stack.

Inspect for proper and tight construction. Any restrictions or obstructions must be removed. An existing chimney may require cleaning.

Chimney or vent must extend at least 3 feet above its passage through a roof and at least 2 feet above any ridge within 10 feet of the chimney (local codes apply).

Minimum clearance from the vent connector to combustible material is 6 inches unless the combustible materials are protected in accordance with applicable codes.

PURE Humidifier requires humidifiers be connected to vent systems sufficient for use with Category 3 Appliances (listed to UL Standard 1738 or ULC-S636). Any condensate formed is acidic and could cause corrosion of the vent materials. This humidifier must not be connected to a chimney flue servicing a separate appliance designed to burn solid fuel.

Install a condensate trap at the bottom of exchanger stack.

Never connect this humidifier to a chimney.

Venting into an unlined masonry or concrete chimney is prohibited by code.

Insulation must be added to any vent connector which will be exposed to ambient temperatures of 30°F or less.

Do not insulate vent pipe exposed to outdoor weather conditions (i.e. above roof lines).

Installation of the vent pipe should be as direct as possible, with a minimum number of turns or elbows.

Rigidly support the vent pipe every 5 feet or less with hangers or straps to ensure that there will be no movement or sagging after installation. The humidifier vent box should not be supporting the weight of the vent piping.

PURE Humidifier

Venting Installation (Con't)

No portion of the vent system shall extend into, or pass through, any circulation air duct or plenum.

The vent system shall terminate above the roof surface per the National Fuel Gas Code or CAN/CGA.B149 requirements, and shall include a UL or CUL listed vent cap or roof assembly, unless prohibited by local codes.

All vent pipe passing through floors, ceilings, and walls must be installed with the proper clearances from combustible material, and be fire-stopped according to the National Fuel Gas Code requirements and Canadian Standards CAN/CGA.B149.

In replacement installation, where an existing vent system may be used, the vent system must be inspected for condition, size, type of vent material, and height to meet the requirements in these instructions. If the existing vent system is too large, condensation could occur, causing corrosion of the vent system. Installing a replacement vent system may be required.

Horizontally Vented Humidifier

Maintain a minimum upward slope of 1/4-inch per linear foot on all horizontal vent pipe runs. If condensate in venting is noticed, a condensate trap must be installed.

Rigidly support the vent pipe at intervals no longer than five feet with hangers or straps to ensure there will be no movement after installation. The humidifier exhaust termination should not be supporting the weight of the vent piping.

Distances from the vent terminal adjacent public walk ways, buildings, and openable windows and building openings should be consistent with the National Fuel Gas Code, ANSI Z223.1, and/or CAN/CGA.B149 Installation Codes.

The vent terminal location must be at sufficient height above ground level to prevent blocking by expected snowfall.

Building materials should be protected from degradation by flue gases.

A minimum horizontal clearance of 4 feet (1.22m) from electric meters, gas meters, regulators, and relief equipment must be maintained.

Venting Requirements

100' maximum equivalent length of vent pipe.
90° Elbow = 10'
45° Elbow = 5'

Maximum of 4 elbows.

Vent pipe is to be rated for Category 3 Appliances listed to UL Standard 1738 or ULC-S636 (AL29 4C).

Allow for removal of air intake and exhaust connections for heat exchanger cleaning and regular maintenance.

PURE Humidifier

Sealed Combustion

Sealed Combustion Air Kit. Consists of a 6" round stainless steel adaptor to connect to field installed combustion air piping. Use of this kit will allow the burner to intake combustion air from outside instead of using room air.

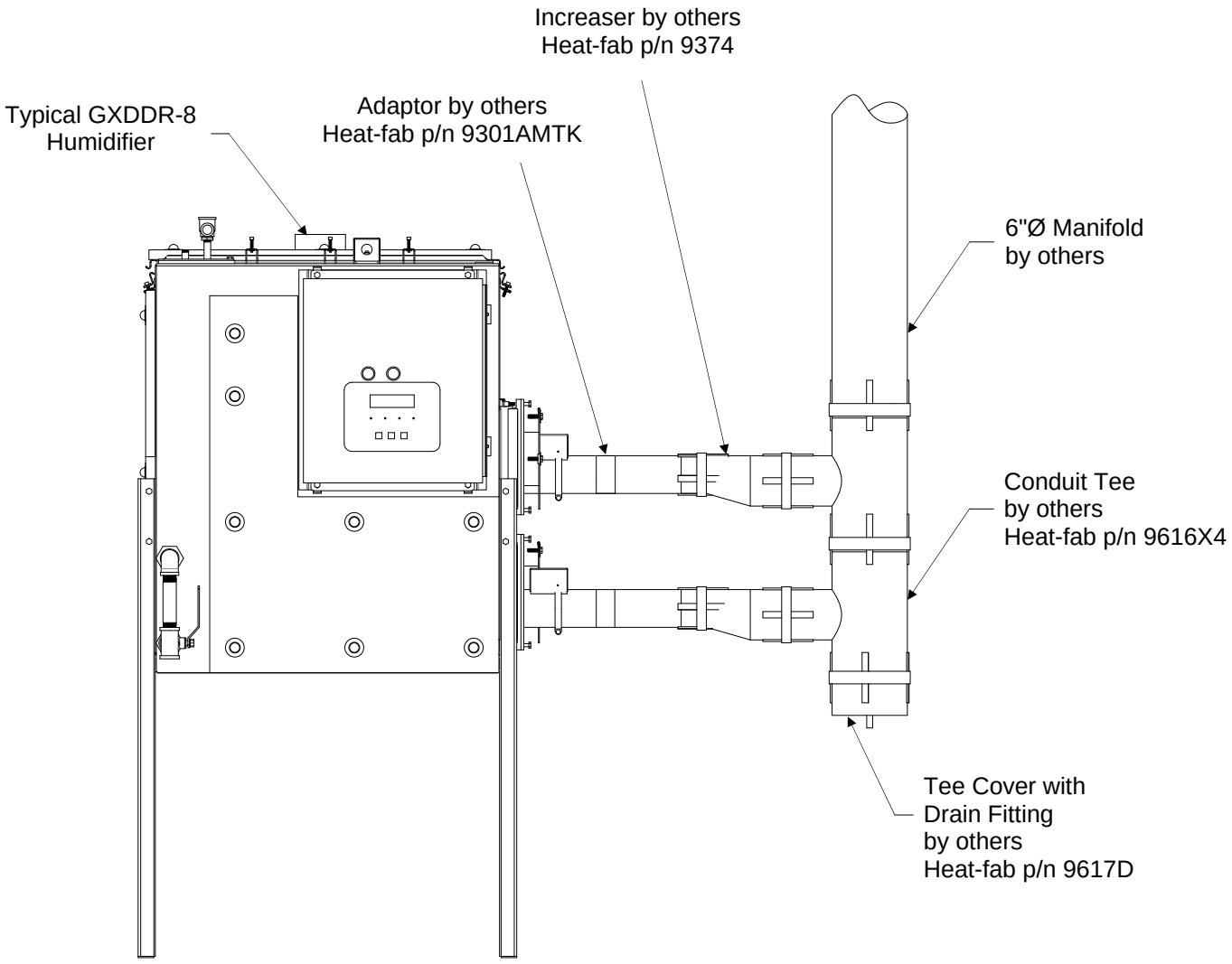
Benefits:

Sealed combustion burners can save energy because they don't steal heated or cooled indoor air.

Sealed combustion burners reduce space heating costs and noise while eliminating problems associated with power-vented combustion.

GXDDR-8 Exhaust Manifold

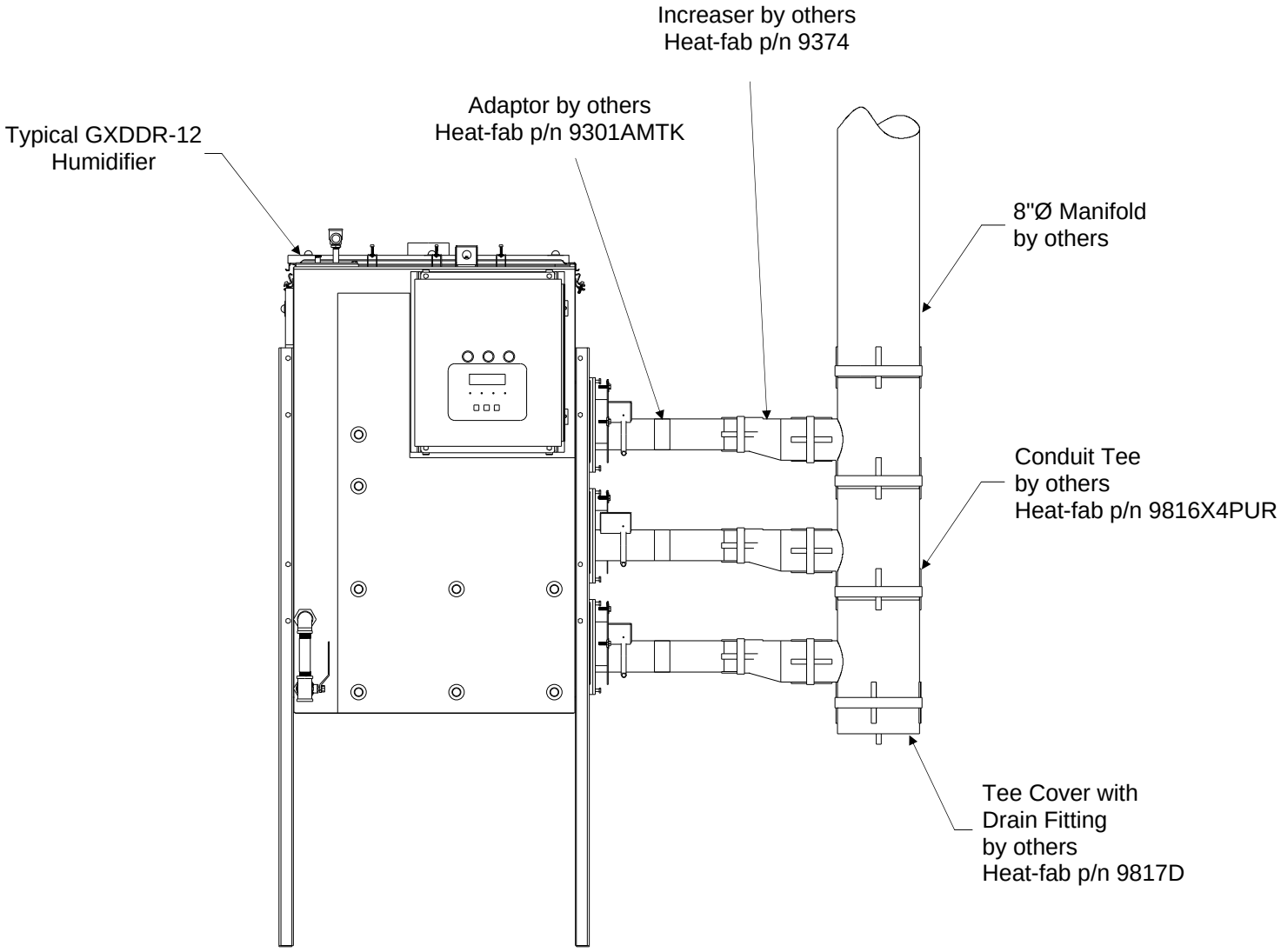
Reference pages 8 & 9 for venting installation instructions.



All exhaust connections and piping to be Category 3 Appliance Listed to UL Standard 1738 or ULC-S636

GXDDR-12 Exhaust Manifold

Reference pages 8 & 9 for venting installation instructions.



All exhaust connections and piping to be Category 3 Appliance Listed to UL Standard 1738 or ULC-S636

PURE Humidifier

Water Supply & Drain Piping

Water Supply Piping

Supply pressure: 35-50 psi

This style humidifier utilizes a float operated fill valve system which is designed for use with deionized, demineralized, or reverse osmosis water. Use of mineralized tap water will cause fill valve failure and will void the humidifier warranty.

Install stainless pipe on make-up water line within 5 ft of humidifier fill valve connection. If plastic pipe is used beyond this point a check valve is required to prevent steam from entering the plastic section in the event that the water treatment system runs out of water.

The water source for use in the GXDDR humidifier should be from a single pass reverse osmosis or dual bed deionizer system. Extremely high purity water **should not** be used. Examples of extremely high purity water are: water treated by a reverse osmosis followed by a mixed bed deionizer, or two mixed bed deionizers in series. Water produced by these multistage systems will typically be produced with conductivity of less than 1 microsiemens. If the source for the humidifier must come from a water "loop" with conductivity of less than 1 microsiemens, install a calcite cartridge filter in the water supply line feeding the GXDDR humidifier tank. The cartridge will need to be replenished periodically. A minimum water pressure of 35 psi (2.4 Bar) should be maintained to provide the proper water level within the humidifier. Adjustment of the float valve will be necessary if the pressure is lower than 35 psi (2.4 Bar). If the water pressure is above 50 psi (3.5 Bar), the valve may not shut off.

REMOVE INTERNAL PACKING MATERIAL FROM AROUND THE FLOAT BALL ASSEMBLY BEFORE STARTING UNIT. FAILURE TO DO SO CAN RESULT IN THE OVER-HEATING OF THE HUMIDIFIER AND POTENTIAL FIRE.

Drain Piping

A water seal as shown in the piping illustration should be installed to prevent steam from escaping through the drain line. The water seal should be of sufficient height to overcome the pressure developed in the humidifier (reference water seal height table) and the duct static pressure.

The drain piping should be stainless steel. The use of PVC piping is not recommended; the humidifier temperature will cause the PVC to soften and fail.

If gravity drain is not possible please use a condensate pump rated for 212°F water or contact a PURE Humidifier Co. Representative to purchase one.

Water Seal Height Δ

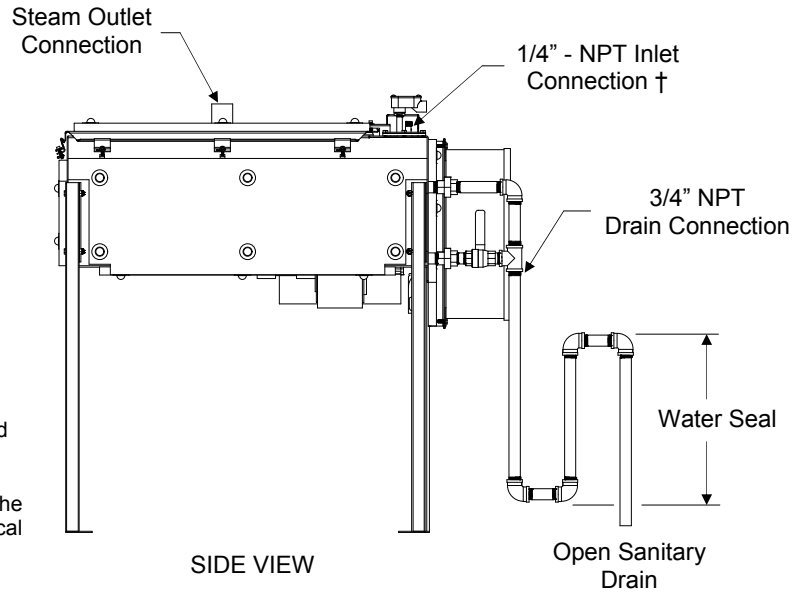
Total lbs./hr (kg./hr)	"H"
Up to 60 (27.2)	8" (20 cm)
61 to 99 (44.9)	11" (28 cm)
100 to 150 (68.0)	17" (43 cm)
151 and up	19" (48 cm)

Δ The water seal height may have to be increased if excessive duct static pressure exists

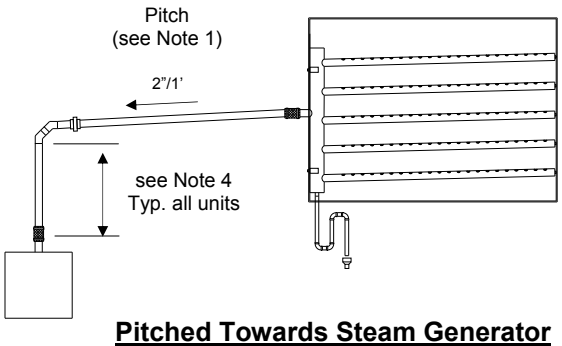
NOTES

1. All drain piping is by others.
2. Drain and overflow connection requires field piping.
3. Do NOT use PVC or other plastic piping that is not rated for 220° F. or higher.

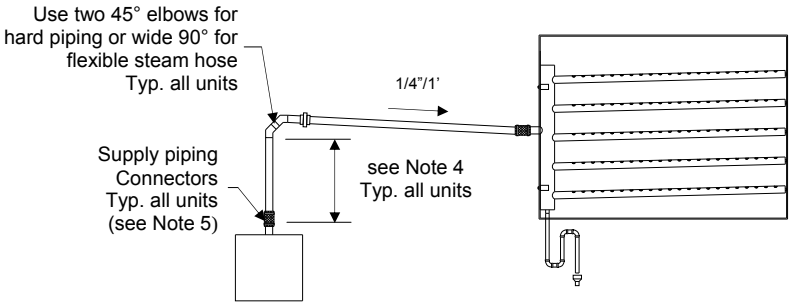
† The humidifier has a 1.5" (4 cm) air gap between the water inlet and humidifier water level. Consult the local code to determine if a vacuum braking device is required.



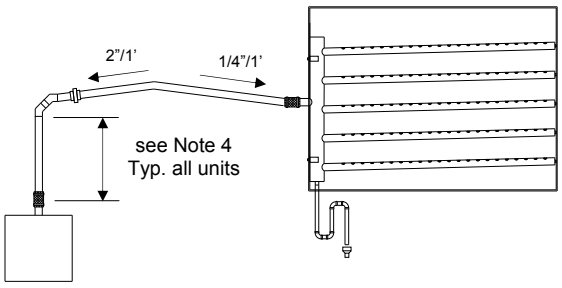
Steam Supply Piping Specification & Examples



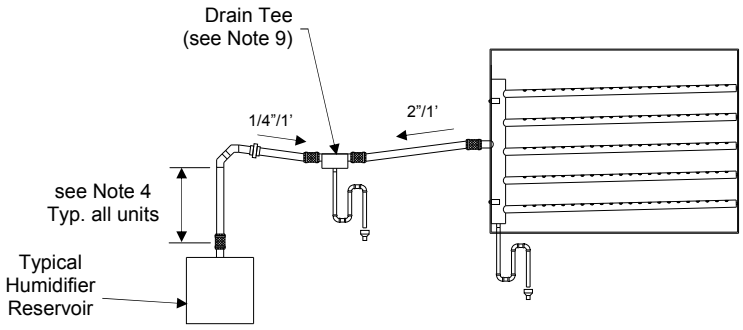
Pitched Towards Steam Generator



Pitched Towards Tube Assembly



Pitched Towards Steam Generator and Tube Assembly



Pitched Towards Drain Tee

Notes:

1. Flexible steam hose can be used for runs up to 10' in length. For runs over 10' in length, use hard piping.
2. Recommended supply piping material: Black iron pipe, copper, or stainless steel.
3. Pitch hard piping or flexible hose 2" per foot or more if steam is flowing uphill, 1/4" per foot if the steam is flowing downhill. Reference piping examples shown.
4. Install a minimum two-foot or greater riser from the top of the tank to reduce condensate carry over.
5. Use flex connectors or unions to allow for easy removal of cover.
6. Support flexible hose every 18" to avoid sagging.
7. Hard piping or flexible hose must match reservoir outlet size. Do not use supply piping with a smaller inside diameter than the reservoir outlet. Longer supply runs may require a larger diameter pipe.
8. Failure to follow the piping recommendation on this page may result in blown water seals, leaking cover gasket, or dispersion tubes spitting.
9. Install a Drain Tee at any low spots in supply piping run where condensate will accumulate.
10. Reference job specific tube assembly O&M included with your order for complete details.

For installations using deionized water fed humidifiers, PURE recommends stainless tubing or pipe to match the outlet diameter connection on the evaporating chamber. Stainless has superior corrosion resistance over copper and is less expensive but slightly harder to install. Stainless tubing is preferable over stainless pipe due to the fact that the tubing is less expensive and requires less heat/condensate during operation. Stainless pipe may be easier to install compared to stainless tubing because fittings are readily available and it does not require welding. As always, the installer should refer the material required by the project documents and/or the authority having jurisdiction.

PURE Humidifier

Capacities, Electrical & Weights

This humidifier is a forced combustion type that can be used with natural gas or liquid propane. The burner can be easily removed to access the side entry exchanger(s) for cleaning. It is designed to work with low-pressure gas between 5" W.C. up to 14" W.C.

Unit Capacities in Pounds per Hour (Kg/Hr)†
Weights in lbs. (kg) and Electrical Specification

Model No.	Steam Capacity Lb/Hr (kg/Hr)	No. of Burners	*BTU Input	#Exhaust Manifold Vent Size (cm)	Shipping Weight (kg)	Operating Weight (kg)	120 Volt, 60 Hz
							Full Load Amps
GXDDR-3	110 (49.9)	1	150,000	4" (10.2)	201 lbs. (91.2)	420 lbs. (190.5)	5.0
GXDDR-4	300 (136.1)	1	400,000	4" (10.2)	390 lbs. (176.9)	710 lbs. (322.1)	5.0
GXDDR-8	600 (272.2)	2	800,000	6" (15.2)	827 lbs. (375.1)	1391 lbs. (630.9)	10.0
GXDDR-12	900 (408.2)	3	1,200,000	8" (20.3)	1125 lbs.(510.3)	2072 lbs. (939.9)	15.0

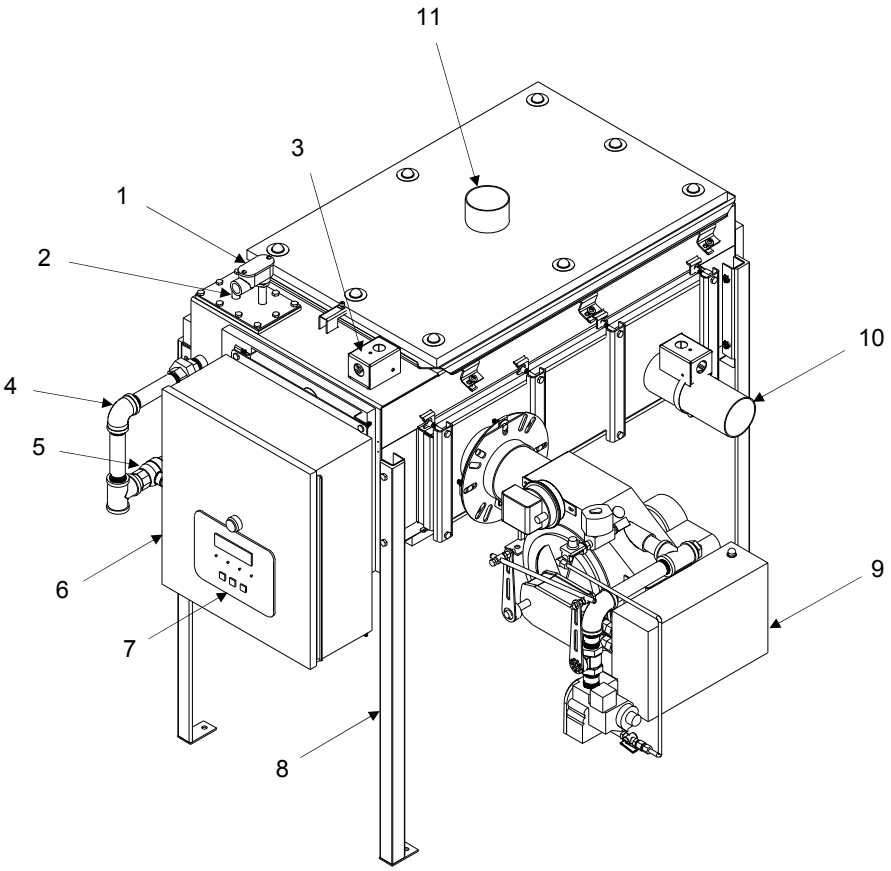
† Actual humidifier capacity may vary due to the heat loss from the humidifier reservoir. The ambient air temperature, air velocity and injection tube system will affect the rate of heat loss from the reservoir.
* Altitude adjustment:
100% up to 2000'
Over 2000', 4% de-rate per 1000'
Vent Size is larger than connection size.

Reservoir Water Volume in Gallons (Liters)

Model No.	Water Volume In Gal (Liters)
GXDDR-3	22 (83.3)
GXDDR-4	48 (181.7)
GXDDR-8	94 (355.8)
GXDDR-12	143 (541.3)

PURE Humidifier

Features



Features

1. Low Water Float Switch Junction Box
2. 1/4”-IPS Fill Inlet Connection
3. Over Temperature Cut-Out Switch
4. Flusher & Overflow Piping
5. 3/4” Ball Valve
6. Control Panel
7. INTAC® Microprocessor
8. Support Legs
9. Burner Assembly
10. Exhaust Connection
11. Steam Outlet Connection

PURE Humidifier

Dimensions

GXDDR-3 & GXDDR-4

Required Clearance:
For recommended service and maintenance purposes the following clearances should be maintained:

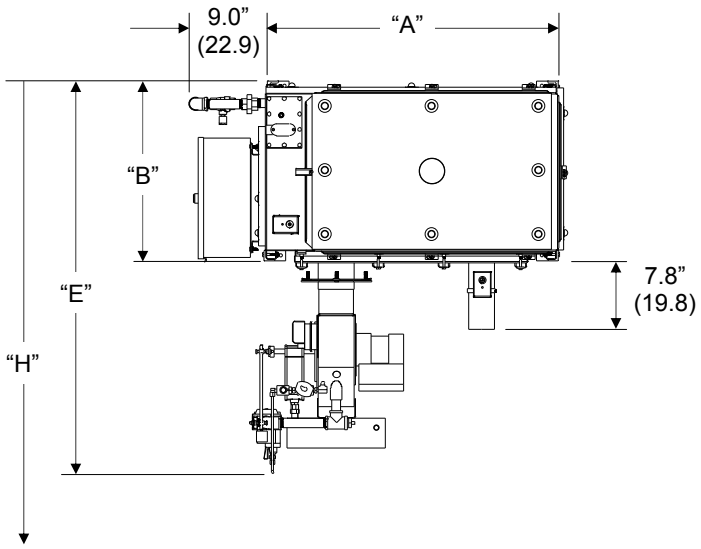
Right side, see Top View for required clearance

Front side, NEC requires 36” clearance to control cabinet

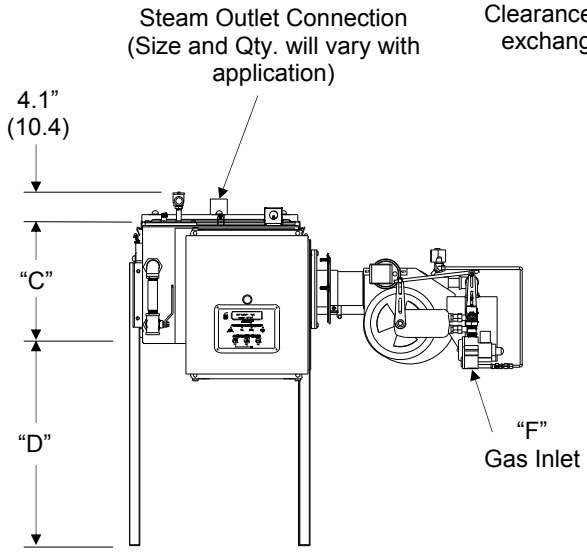
Left side, 6” for access

Rear, 6” for access

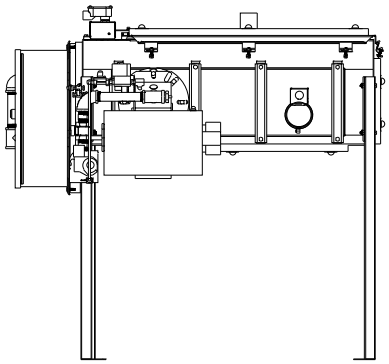
Top, 12” for cover and float plate assembly removal



Top View



Front View



Right Side View

Unit Dimensions in Inches (cm)

Model No.	Dim. “A”	Dim. “B”	Dim. “C”	Dim. “D”	Dim. “E”	Dim. “F”	Dim. “G”	Dim. “H”
GXDDR-3	34.0” (86.4)	21.1” (53.7)	13.8” (34.9)	24.0” (60.9)	45.9” (116.5)	3/4”-NPT	3.0” (7.62)	50.0” (127.0)
GXDDR-4	54.0” (137.2)	30.1” (76.5)	13.8” (34.9)	24.0” (60.9)	54.7” (138.9)	3/4”-NPT	3.0” (7.62)	66” (167.6)

Heat exchangers have a top and bottom. There is a break (crease) on the bottom side of the heat exchanger. Do not install heat exchanger upside-down.
All dimensions are approximate and subject to change at manufacturer’s discretion.

PURE Humidifier

Dimensions

GXDDR-8

Required Clearance:
For recommended service and maintenance purposes the following clearances should be maintained:

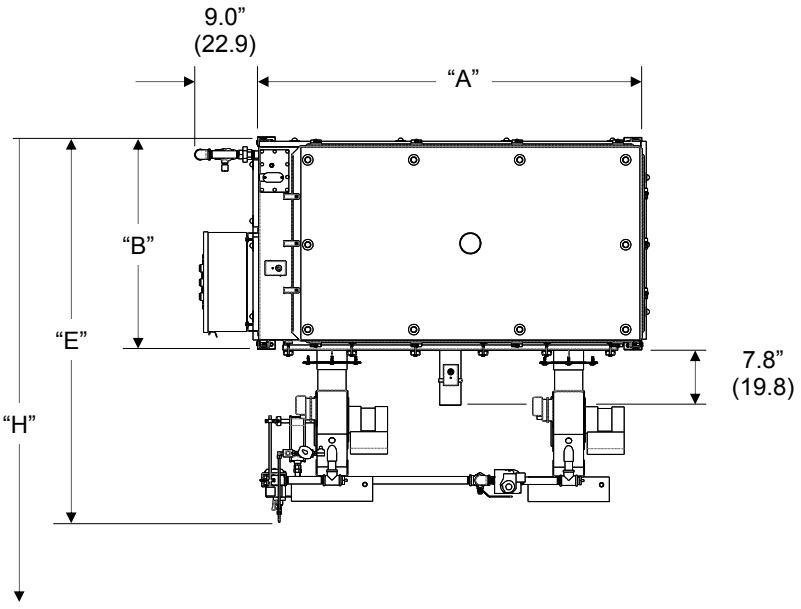
Right side, see Top View for required clearance

Front side, NEC requires 36” clearance to control cabinet

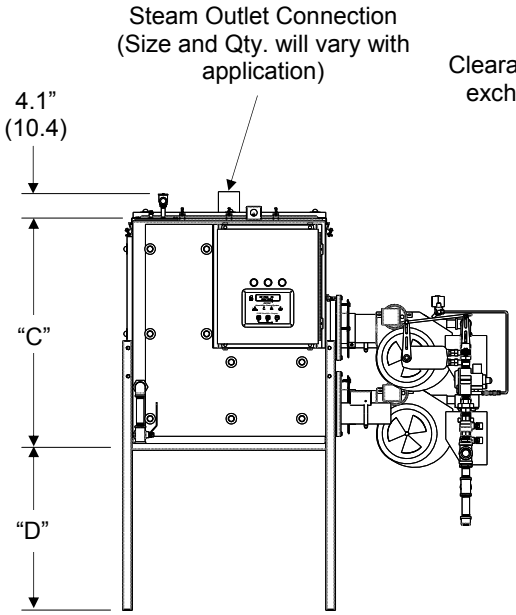
Left side, 6” for access

Rear, 6” for access

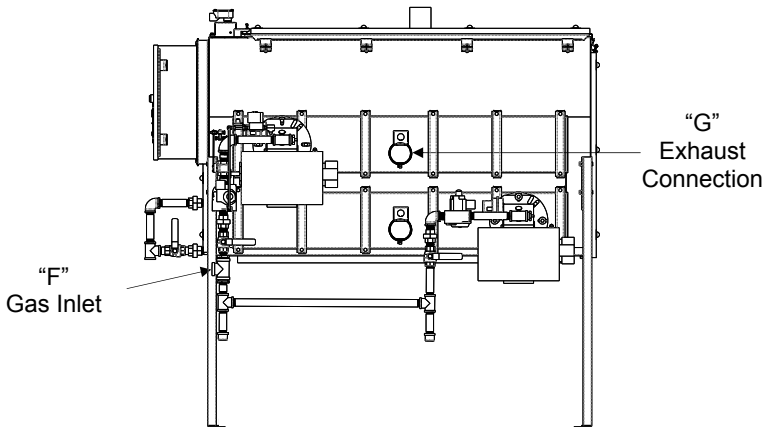
Top, 17” for cover and float plate assembly removal



Top View



Front View



Right Side View

Unit Dimensions in Inches (cm)

Model No.	Dim. “A”	Dim. “B”	Dim. “C”	Dim. “D”	Dim. “E”	Dim. “F”	Dim. “G”	Dim. “H”
GXDDR-8	54.0” (137.2)	30.1” (76.5)	32.5” (82.6)	24.0” (60.9)	54.7” (138.9)	1”-NPT	3.0” (7.6)	66.0” (167.6)

Heat exchangers have a top and bottom. There is a break (crease) on the bottom side of the heat exchanger. Do not install heat exchanger upside-down.
All dimensions are approximate and subject to change at manufacturer’s discretion.

PURE Humidifier

Dimensions

GXDDR-12

Required Clearance:
For recommended service and maintenance purposes the following clearances should be maintained:

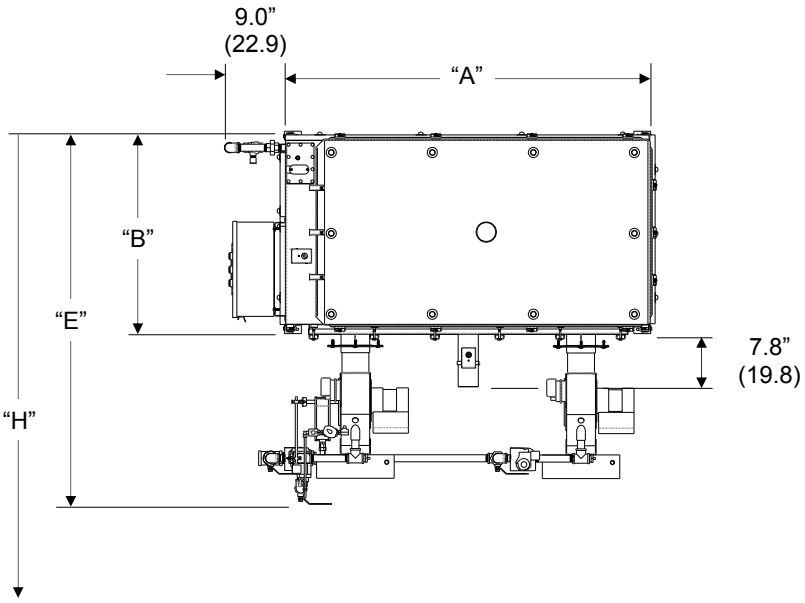
Right side, see Top View for required clearance

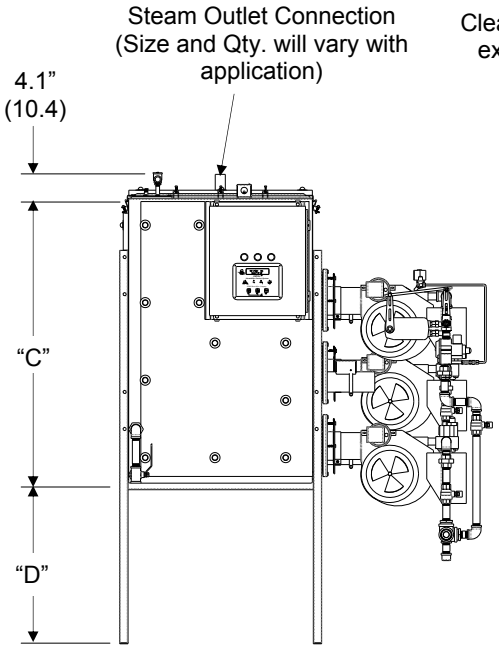
Front side, NEC requires 36” clearance to control cabinet

Left side, 6” for access

Rear, 6” for access

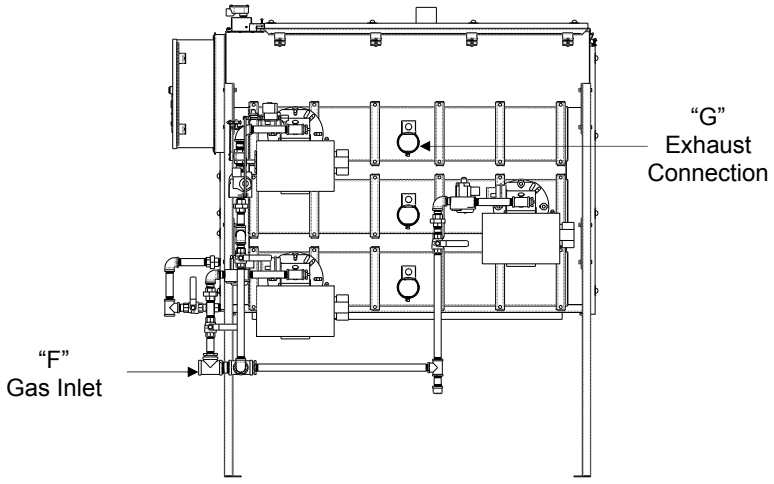
Top, 17” for cover and float plate assembly removal





Front View

Top View



Right Side View

Unit Dimensions in Inches (cm)

Model No.	Dim. “A”	Dim. “B”	Dim. “C”	Dim. “D”	Dim. “E”	Dim. “F”	Dim. “G”	Dim. “H”
GXDDR-12	54.0” (137.2)	30.1” (76.5)	43.5” (110.5)	24.0” (60.9)	55.8” (141.1)	1-1/4”-NPT	3.0” (7.6)	66.0” (167.6)

Heat exchangers have a top and bottom. There is a break (crease) on the bottom side of the heat exchanger. Do not install heat exchanger upside-down.
All dimensions are approximate and subject to change at manufacturer’s discretion.

PURE Humidifier

Modulating Control Operation

Overview

The INTAC® will control up to 3 gas burners.
The INTAC® outputs are defined as:

Blower Output:	Heater Output #1
Burner #1 Enable:	Heater Output #2
Burner #2 Enable:	Heater Output #3
Burner #3 Enable:	Heater Output #4
Burner #1 Proportional Valve Control:	Analog Process Output

	Models		
Setting	GX-3 GX-4 GXDDR-3 GXDDR-4	GX-8 GXDDR-8	GX-12 GXDDR-12
710: Low Fire Set Pt	40%	20%	10%
711: Low Fire Hys	3%	3%	3%
712: Burner 2 Set Pt	NA	75%	50%
713: Burner 2 Hys	NA	3%	3%
714: Burner 3 Set Pt	NA	NA	75%
715: Burner 3 Hys	NA	NA	3%

Gas System Sequence

Items in parentheses are referring to an INTAC® menu number. Refer to INTAC® manual for more detail

1. When % Power (002) is greater than the Low Fire Set Point (710) , the Blower Output and the Burner #1 Enable Output will energize.
2. If configured for at least a two-burner system, when % Power (002) is greater than Burner #2 Set Point (712) Burner #2 Enable will turn on.
3. If configured for a three burner system when % Power (002) is greater than Burner #3 Set Point (714) Burner #3 Enable will turn on.
4. The Analog Process Output is the value determined by the % Power (002) and the number of burners installed. The Analog Process Output is wired to Burner #1 modulating actuator which is mechanically connected to the gas butterfly valve and the air damper. With more than one burner, the process output is multiplied to reflect that Burner #1 is only controlling 1/2 or 1/3 of total system output power.

PURE Humidifier

Modulating Control Operation (cont'd)

% Power	Process Output Value (0-10 vdc)		
(screen 002)	One Burner	Two Burners	Three Burners
0	0 vdc	0 vdc	0 vdc
10	1 vdc	2 vdc	3 vdc
20	2 vdc	4 vdc	6 vdc
30	3 vdc	6 vdc	9 vdc
40	4 vdc	8 vdc	10 vdc
50	5 vdc	10 vdc	10 vdc
60	6 vdc	10 vdc	10 vdc
70	7 vdc	10 vdc	10 vdc
80	8 vdc	10 vdc	10 vdc
90	9 vdc	10 vdc	10 vdc
100	10 vdc	10 vdc	10 vdc

5. When % Power is less than Burner #3 Set Point (714) minus Burner 3 Hysteresis (715), Burner #3 Enable output turns off.
6. When % Power (002) is less than Burner 2 Set Point (712) minus Burner 2 Hysteresis (713), Burner #2 Enable output turns off.
7. When % Power (002) is less than the Low Fire Set Point(710) minus the Low Fire Hysteresis (711) Burner #1 Enable turns off. The blower output will remain on for the Post Purge Timer (716) time. If the % Power increases to a value greater than the Low Fire Set Point (710) during the Post Purge time, the Blower Output will remain on and the sequence will begin again (only after the Post Purge Timer (716) has timed out).
8. Burner #2 can only turn on if Burner #1 is on.
9. Burner #3 can only turn on if Burner #2 is on.
10. If the % Power (002) is equal to zero all burners will be off.
11. Once a burner is enabled and the burner airflow switch is proven, that burner's flame controller will get power. The flame controller will run its own 30 second pre-purge before attempting to light the pilot and energize the main gas valve.
12. Burner #1 also has an end switch on the modulating motor that will close when the air damper is in the high-fire position. The Burner #1 flame controller will initially receive power when the Burner #1 enable relay is closed, its airflow switch is closed and the end switch on the modulation motor is closed.

"GXDDR" Prestart-Up Procedure

Pre-Startup Checklist

Before starting the "GXDDR" PURE Humidifier Co. Gas Fired Humidifier, check the following installation items:

_____ 1. MOUNTING - Verify that the humidifier evaporating chamber is securely supported and that the evaporating chamber is level in both directions. If humidifier is installed above equipment or not located near a floor drain than a drain pan should be installed below the humidifier steam generator.

_____ 2. INJECTION TUBE - Verify that the humidifier injection tube is mounted within the duct with the proper pitch back to the humidifier (2"/5 cm per foot / 31 cm). NOTE: If the humidifier evaporating chamber or the flexible hose (optional) is mounted higher than the injection tube, a drain "tee" is required to drain the condensate out of the injection tube steam line. If it is an Insty-Pac or Fast Pac refer to the respective O&M to determine if they are mounted properly and have the proper p-trap size.

_____ 3. ELECTRICAL - Verify that all wiring connections have been connected in accordance with the wiring diagram. **CAUTION: Live power may exist in the control cabinet. Turn off the main power at the disconnect switch before verifying the electrical connections!**

_____ 4. SAFETY CONTROLS – The supply air duct RH high-limit should be installed at least ten feet downstream from the humidifier tube(s). Any other control sensors should be at least 10 feet downstream from the humidifier tube (s). Smoke detectors should not be installed downstream of the humidifier tube(s). If a smoke detector absolutely has to be installed downstream from the humidifier tubes then it should be installed as far from the tubes as possible.

_____ 5. PIPING: Water Supply - Verify that all piping connections have been completed as recommended and that water pressure is available to the humidifier. Verify that the supply water pressure is 35-50 psi. There should be at least 5 ft of metal pipe and check valve between the tank and any plastic pipe.

REMOVE INTERNAL PACKING MATERIAL FROM AROUND THE FLOAT BALL ASSEMBLY BEFORE STARTING UNIT. FAILURE TO DO SO CAN RESULT IN THE OVER-HEATING OF THE HUMIDIFIER AND POTENTIAL FIRE.

_____ 6. PIPING: Drain - Make sure a water seal of the proper height (refer to steam generator O&M for height) is provided in the drain line.

_____ 7. PIPING: Gas - Make sure a field installed main shut-off is installed before the humidifier burner/gas train. Make sure a union is installed after the main shut-off. Make sure the supply pressure to the humidifier matches the name plate value.

_____ 8. PIPING: Steam Outlet - Refer to page 14 for proper outlet steam piping from the generator to the tube(s). **Any horizontal to vertical up transition in the outlet steam pipe requires a water-sealed drip leg!** Improper outlet steam piping will cause steam to leak from the steam generator. Runs over 20 ft long may require upsizing of the steam pipe.

_____ 9. EXHAUST VENTING: Measure the exhaust vent diameter. See page 15 for the vent size chart. Measure the exhaust vent diameter. A drain tee should be installed at any low point in the exhaust.

Signature:_____ Date:_____

PURE Humidifier

"GXDDR" Start-Up Procedure

Introduction

The burner should be initially set up and serviced at regular intervals (preferably at the beginning of and mid-way through high use period) by a trained serviceman using the proper test instruments.

Start Up Procedure

_____ 1. Make sure the electric power is shut off to the humidifier.

_____ 2. Close the humidifier manual ball valve (located on the left side of the humidifier evaporating chamber faceplate).

_____ 3. Open the water supply on/off control valve and allow the humidifier evaporating chamber to fill to the proper level.

_____ 4. After the humidifier is full of water, turn on the main power to the control cabinet.

_____ 5. Verify the low water safety switch by closing the water supply, opening the drain valve and verifying that the low voltage relay within the control cabinet "pulls-out" when the water level is dropped below the low water shut off switch (you can hear the relay switch "out").

_____ 6. Close the drain valve, open the water supply valve, and allow the humidifier to fill to the proper level. Allow the tank to fill completely and make sure that the make-up water float valve shuts off completely and does not over flow the tank before proceeding.

_____ 7. Make sure all the optional safety switches are satisfied (air-flow proving switch, high-limit humidistat, etc.).

_____ 8. Proceed to "Burner Start Up Procedure".

_____ 9. Check operation of field installed safety switches (air flow proving switch, high-limit humidistat, etc.) to make sure they turn the power off to the pilot relay which is the control circuit power. The safety switches should shut off the humidifier burner(s) whenever one or more of the optional safety switches create an open circuit.

_____ 10. Inspect installation for leaks by operating humidifier at a full, rolling boil. This may take up to 15 minutes from a cold start. Any leaks should be sealed. Just tightening a pressure clamp will not work if the gasket is not properly positioned between the sealing surfaces. If necessary, remove the cover or side-entry plate, reseat gasket and replace cover or side entry plate. A small amount of adhesive (super glue, gorilla glue, spray adhesive, etc.) to hold the gasket in place while repositioning the cover or side-entry plate will aid in this process.

_____ 11. After the unit is producing steam, check and retighten all hose clamp connections in the system and make sure they are torqued to 35 -40 in-lbs.

Signature:_____ Date:_____

PURE Humidifier

"GXDDR" Burner Start-Up Procedure

Burner Start-Up Procedure:

The following procedure may be used by qualified service personnel to start the GXDDR series gas humidifier. It is assumed that all electrical, gas supply and exhaust systems have been installed by qualified professionals per all applicable codes and regulations and have been tested and accepted.

Equipment Needed:

1. Gas Analyzer
2. DC-Microamp meter (Range 0 to 200 microamps)
3. 2 Manometers (Range 0 to 20 inches WC)
4. 3/4" NPT to 1/8 " NPT Hex Reducer

Before Starting:

_____ 1. Verify that the "TYPE" of fuel is correct for the specific orifice installed (Natural Gas or LP Gas).

_____ 2. **Verify that the MAIN SUPPLY gas pressure is correct**. This should be taken at the 1/8" NPT pressure tap on the manual shut-off valve immediately upstream of burner gas train. Use one of the manometers to see that it is **7 inches W.C. for natural gas, 10 inches W.C. for propane**. If the gas pressure is not correct, adjust the regulator feeding the humidifier. If this cannot be done the burner regulator and pilot will require adjustments.

_____ 3. Verify that the electrical supply voltage is correct.

_____ 4. Verify that the exhaust system is installed and is not blocked.

_____ 5. Verify that the gas train piping on the burner is plumb and square. Piping may have shifted during shipment so check to make sure all gas connections are tight.

_____ 6. Check the air damper/gas butterfly valve linkage markings. Make sure all markings are aligned.

_____ 7. Using the 3/4" to 1/8" hex reducer, remove the ¾" plug and **hook up the second manometer to the orifice tee downstream of the combination valve, butterfly modulating valve and/or orifice if one is installed**. This is where manifold pressure will be measured.

Start-Up and Adjustments:

_____ 1. The air damper will be fully open if the burner is to be fired at the maximum rate. Otherwise, depending upon the desired output, the air damper will be in an intermediate position during start-up.

_____ 2.Turn Gas Combination Valve to "Off" position.

_____ 3. Install a dc-microamp meter in series with the Flame Safeguard "Sense" line.

_____ 4. Start burner sequence by changing the RH set point to 100% RH in the INTAC® menu 101. The INTAC® controller should call for 100% output on menu 002 at this point. If the humidifier is being controlled by a building management signal, have the controller call for an input of 10 VDC or 20 mA, which ever is applicable. If it is controlled by an on/off humidistat, set the humidistat to 100% RH.

_____ 5. After automatic 30-second purge cycle, pilot ignition will begin. You will hear the pilot solenoid "click" open. At this time, while the "pilot" light is lit, slowly adjust the pilot regulator and adjust until a maximum flame current is achieved (approximately 1.5 microamps or higher). Repeat the process until pilot lights every time burner is started.

_____ 6. Typically the pilot regulator will be about 2 full rotations out from the "bottom" fully tightened position. The red button on the front of humidifier control panel will reset the burner automatically if the pilot fails to light.

_____ 7. With pilot ignited, turn the Combination Regulator Valve to "On" position.

PURE Humidifier

"GXDDR" Burner Start-Up

_____ 8. Adjust the main burner combination regulator to give a manifold pressure equal to what is specified on the humidifier nameplate. **Manifold pressure measurement should be made at the ¾" orifice tee after the orifice if one is in stalled**. After making a pressure adjustment, allow approximately one minute for the system to find a steady value. (Note: Excessive gas pressure may cause burner to "rumble" or a slight backfire may result. If this occurs, back off the main burner gas pressure slightly until the rumble is not noticeable).

_____ 9. Allow humidifier to warm-up. This may take up to half an hour. After humidifier has warmed-up, recheck the manifold pressure while the unit is still calling for 100% power on menu 002 on the INTAC® display.

_____ 10. Observe the O2 (Excess Oxygen) level. Should be approximately 3 to 7 percent.

_____ 11. Observe the CO (Carbon monoxide) level. Should be under 100ppm.

_____ 12. Observe the flame current is reading slightly higher. (Approximately 3 microamps or higher.)

_____ 13. If the unit has a modulating burner proceed to the "For Modulating Burner Section"

_____ 14. If you have an on/off control, reset RH set point to the proper humidity level or return building management to normal operation. Replace ¾" plug. Make sure orifice is seated properly and the spring installed. Apply quality pipe compound to the ¾ plug threads and screw it back into place.

For Modulating Burners

Burners set up for modulation are tuned in the factory. However, due to different conditions that occur with each particular installation, slight adjustments may have to be made with the gas/ air linkage.
Consult the factory before making adjustments to the linkage.

Once it has been verified that the burner is operating at acceptable levels at high fire, low fire operation should be checked. Make sure that burners two and three are off as well as the manual gas valves. To check the burner's combustion at low fire change the process output setting on INTAC® menu 519 to 3 volts.

Allow the burner to modulate down and let the gas analyzer readings to stabilize. The readings should be as specified in steps 10-12 of the "Start up and Adjustments" section. If the readings are acceptable then change the process output setting on INTAC® menu 519 back to 10 volts. If they are not acceptable or if the burner blows itself out while modulating down, the burner linkage will need adjustment. After adjustments are made, change the INTAC® menu settings back to their original values.

For Multiple Burner Humidifiers

For two and three burner models, only the first burner modulates. The additional burner(s) are of the on/off type. The modulating burner should be checked first. Turn off the manual gas valves to the other burner(s). Proceed with the steps above.

Once the first burner is operating properly proceed with the next burner. Once all burners are operating, recheck the manifold pressures for each of the burners. Also check that the supply pressure has not dropped and is steady.

Return INTAC® settings on menus 101 to the desired humidity set-point or return building management signal back to automatic operation mode.

Signature:_____ Date:_____

PURE Humidifier

Tool Requirements & Torque List

Recommended Maintenance Tool List
7/16” Wrench
3/4” Wrench
Crescent Wrench
11/32” Nut Driver or Socket
3/8” Nut Driver or Socket
5/32” Allen Head
Flat Head Screwdriver
Wire Stripper
Wire Crimper

Torque List	
Cover Bolts	18 inch/pounds MAX
Side Entry Exchanger Bolts	80 inch/pounds MAX
Hose Cuff Screws	35-40 inch/pounds MAX when hot

PURE Humidifier

"GXDDR" Trouble Shooting

Problem	Possible Cause	Recommended Action
Humidifier will not heat	Blown control fuse	Check and replace
	Control transformer not producing 24 vac control voltage	Check transformer output. Verify voltage across terminals J5 #5 and J5 #7
	Safety controls open (air-flow switch, high-limit, etc.)	Verify that all safety controls are completing the safety circuit
	Overtemp protection switch tripped	Indicates the humidifier is running while low on water. The level control circuit has interference or is damaged. Tri-probe wires should be run separate from power wiring. Do not reset the switch until the source of the problem is identified and corrected. Consult factory if you are unsure of the source of the problem.
	Faulty humidity sensor	Verify voltage to and from humidity sensor
Humidifier will not fill	No water pressure	Check water supply
	Drain valve open	Close drain ball valve
	Faulty water float valve	Check float valve seat for dirt
Humidifier does not stop filling or is short cycling	Float valve stuck open	Check float valve seat for dirt Adjust float ball arm
	Drain valve open	Close drain valve
Humidifier says water is low but is hot filling	Low water pressure	Adjust float valve arm upward to allow water to fill high enough above low water cut out switch

PURE Humidifier

"GXDDR" Maintenance

PURE Humidifier Co. "GXDDR" Maintenance Instructions

The "GXDDR" Series Humidifier is designed to provide the best possible operation with minimum maintenance. However, the humidifier should be inspected and placed on a dedicated maintenance schedule to ensure continued operation of the humidifier and accessories. **PURE Humidifier Co. recommends that the following items be inspected and/or cleaned on a minimum basis of twice each year.** If excessive mineral build-up occurs, the maintenance schedule should be increased.

Inspect / Maintenance Item	Procedure to Follow
Water Make-Up Float Valve	Check to make sure the fill valve is operating properly. If the valve appears to continually fill, check the valve seat and seal (see trouble shooting instructions).
Low Water Float Switch	Check to make sure the switch will shut the humidifier off when the water level drops too low. Close the water supply and open the drain valve to allow water to drain out for checking. Make sure to reset the drain valve after inspection is completed.
Safety Interlocks (air-flow, high-limit)	Check to make sure the safety interlocks (air-flow, high-limit, etc.) will shut down the humidifier.
Combustion Burners	Inspect and clean flame rod. Inspect air intake for obstructions and clean as required. Burner gas valve has an expected life of 200,000 cycles. Replace the valve at the end of the life cycle.
Humidifier Cover / Tank	Inspect for any leaks. Repair as required. Remove the mineral deposits from floor of the humidifier reservoir. If excessive build-up is found, the cover may need to be removed to facilitate complete cleaning of the humidifier.
Flexible Hose	Inspect for cracks or leaks. It is normal for the hose to become hard and develop a "set".

Cleaning Instructions

All humidifier tanks should be cleaned manually from the side-entry plate or cover. Remove all loose solids with a wet vacuum or putty knife and bucket. Exchanger should also be cleaned and loose build-up removed by hand (if applicable). After removal of solids and replacing the heat exchanger, you may wish to add a de-scaling solution. Heat exchangers have a top and bottom. There is a break (crease) on the bottom side of the heat exchanger. Do not install heat exchanger upside-down. **DO NOT** use Hydrochloric acid-based de-scalers; this will corrode stainless steel. PURE Humidifier Co. recommends the use of a vinegar, citric acid, diluted phosphoric acid, or diluted nitric acid-based cleaner. Follow all precautions on the cleaner packaging. Some cleaners will give off overwhelming and noxious odors, so make sure there is proper ventilation in the working area and the cover is removed so that fumes are not spread throughout the building. After cleaning the tank, flush the tank multiple times to remove any remaining acid. Drain tank completely and allow the tank to air dry for a few hours. This will ensure that the outer protective layer of the stainless steel will passivate and ensure corrosion resistance.

PURE Humidifier

Burner Troubleshooting & Maintenance

Service/Maintenance Suggestions

The burner should be initially set up and serviced at regular intervals (preferably at the beginning of and mid-way through high use period) by a trained serviceman using the proper test instruments.

There is a red reset button/main gas light on the front of the humidifier control panel for each burner. Depressing the button will restart that particular burner's operation. If the pilot valve opens and the main gas light does not come on, the button must be depressed to reset the burner lockout. During start-up this may have to be repeated several times to purge air from the gas line. If the main gas light turns on briefly, then the burner controller will retry automatically after a short time delay.

Burner Fails to Start:
1. Bad fuse or switch open on incoming power source, or motor overload out.
2. Control circuit has an open control such as operating, limit or low water cut-off.
3. Push the reset button on the motor or open the power circuit on the the primary safety control.
4. Loose or faulty wiring. Tighten all terminal screws. Check wiring against wiring diagram furnished with burner.

Burner Motor Runs, But Pilot Does Not Light:
1. Be sure gas is turned on at meter and pilot cock is open.
2. Place hand on pilot valve to "feel" it open. Check gauge at tee in pilot line for gas pressure and prompt opening of pilot valve.
3. Check visually or by sound for spark arcing.
4. Refer to pilot checking procedures.
5. Check air switch and be sure its circuit closes during start.

Burner Motor Runs, Pilot Lights But Main Gas Valve Does Not Open:
1. Burner not enabled by INTAC®
2. Check flame signal. If signal is low, adjust pilot gas pressure and air settings for improved readings.
3. Check gas valve circuit.
4. Shut-off cock or test cock not open.
5. Defective main valve.

Occasional Lockouts For No Apparent Reason:
1. Look for large gas pressure fluctuations. Stabilize pressure.
2. Re-check micoamp readings. If insufficient, check gas pressure and air damper setting. Check electrode setting. If flame signal is low, flame rod may have to be re-positioned.
3. Check ignition cable and electrode porcelain for damage or breaks, which could cause short.
4. Check for loose or broken wires.
5. Read flame monitor lockout code and and follow flame monitor directions.

Burner Will Not Start—Even Though Burner Had Never Failed Before or Had Been Running On Normal Cycling Without Failure:
1. Operating control circuit open.
2. Defective control or loose wiring.
3. Limit circuit open.

The burner must be periodically inspected to insure safety and performance. All maintenance must be performed with the main electrical power off and the main gas shut-off valve off.
1. Inspect blower inlet screen and clean any buildup of lint.
2. Inspect blower wheel blades and clean any buildup of dirt.
3. Inspect ignition electrodes and wiring for any cracks that may cause shorting.
4. Oil the blower motor at the manufacturer's recommended intervals.
5. Verify that the pilot and or direct spark electrodes are still within specifications (set per drawing in this manual).
6. Verify the proper operation of the Primary Safety Control, airflow switch, and operating controls.
7. Check safety gas shut-off valves for gas tightness.

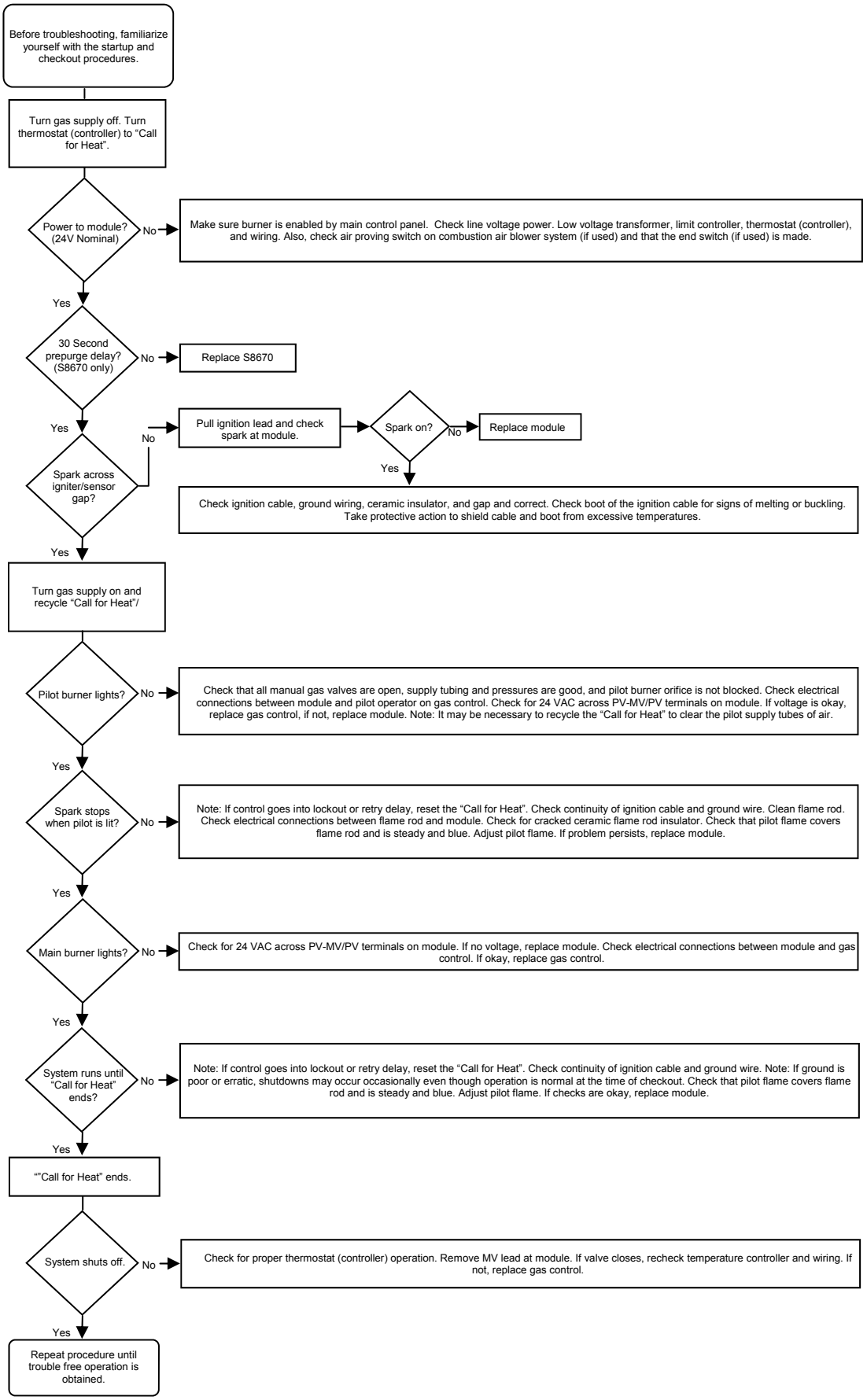
In the event of extended shutdown, the main power should be turned off and the main manual gas shut-off valve should be closed.

EMERGENCY SHUTDOWN: WARNING: Should over-heating occur: (1) shut-off manual gas valve(s) to the humidifier, (2) allow humidifier to cool, (3) check the heat exchanger(s) and remove excessive mineral build-up, (4) make sure the exhaust vent is not blocked with foreign material. **After the required maintenance has been performed,** the manual over-temp reset button on the exhaust and/or on the tank must be depressed.

An additional source of information relative to troubleshooting can be found in the Flame Safeguard Control Manual supplied with the burner.

PURE Humidifier

Burner Flame Controller Troubleshooting Guide



PURE Humidifier

Exchanger Gasket Replacement Instructions

WARNING
Disconnect the humidifier power, gas, exhaust system and allow the humidifier to cool prior to servicing. Drain water level below the level of the exchanger being serviced. Heat exchangers have a top and bottom. There is a break (crease) on the bottom side of the heat exchanger. Do not install heat exchanger upside-down

- Loosen the exchanger cover clamp screws with a 7/16" socket wrench until the locknuts can be slid out from the mounting clamps. Repeat this step for all clamps. Remove exchanger.

- Remove the old gasket and adhesive left of the heat exchanger. Make sure this surface is clean, dry, and free of oil, grease or water. Turpentine may be used to clean the surface areas.

- Spray contact adhesive such as 3M product Super 77 on one side of the new gasket and on the exchanger surface where the gasket is to be applied. Allow both surfaces to dry a minimum of one minute or until the surfaces become tacky to assure proper bonding.

- Square one end of the new gasket on one end of the exchanger and set by applying light to moderate pressure to the gasket. Square the other end of the gasket on the other end of the exchanger. It is common for the gasket to appear too long. Now slowly start setting the gasket from the ends towards the middle of the exchanger. A slight compression of the gasket will occur ensuring proper fit on the ends.

- Apply moderate to heavy pressure on the newly installed gasket all the way around ensuring proper fit. A properly installed gasket will lay flat with no raised areas.

- Reinstall the heat exchanger into the humidifier.

- Loosely install all of the exchanger cover clamps.

- Using a 7/16" torque wrench set at 60 inch/pounds tighten all clamp screws.

- In a reverse manner, reconnect all gas, exhaust and electrical connections. Fill humidifier with water and check for leaks.

- Observe for leaks and tighten slightly if a leak area is found. DO NOT EXCEED 120 inch/pounds.

PURE Humidifier

Cover Gasket Replacement Instructions

Remove the reservoir cover. While looking at the top of the unit, reference Figure A and B to determine which humidifier tank style you have.

Figure A Installation

Fit the gasket around the entire lip of the tank opening. Cut the gasket 1/8" longer than required, this will ensure proper fit when the cover is clamped back on. Slide the gasket onto lip of tank around the entire perimeter, and seal the ends together with a small amount of silicone.

Figure B Installation

Fit the gasket around the entire lip of the tank opening. Cut the gasket 1/8" longer than required, this will ensure proper fit when the cover is clamped back on. Slide the gasket onto lip of tank around the entire perimeter. Notch only the bottom flap of the gasket (reference Fig. C) in the corners of the tank. Seal the ends together with a small amount of silicone.

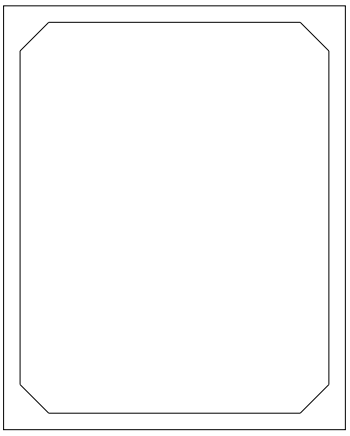


Fig. A
Plan View of Humidifier

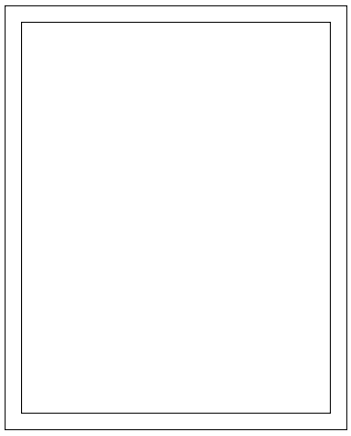
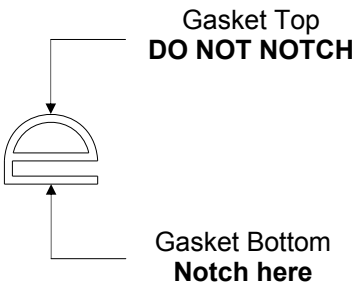
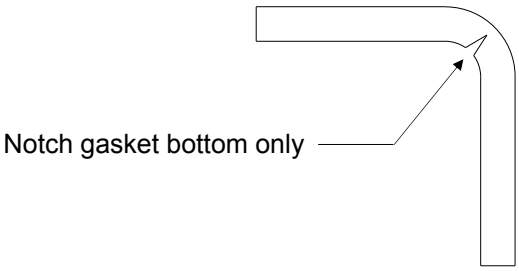


Fig. B
Plan View of Humidifier

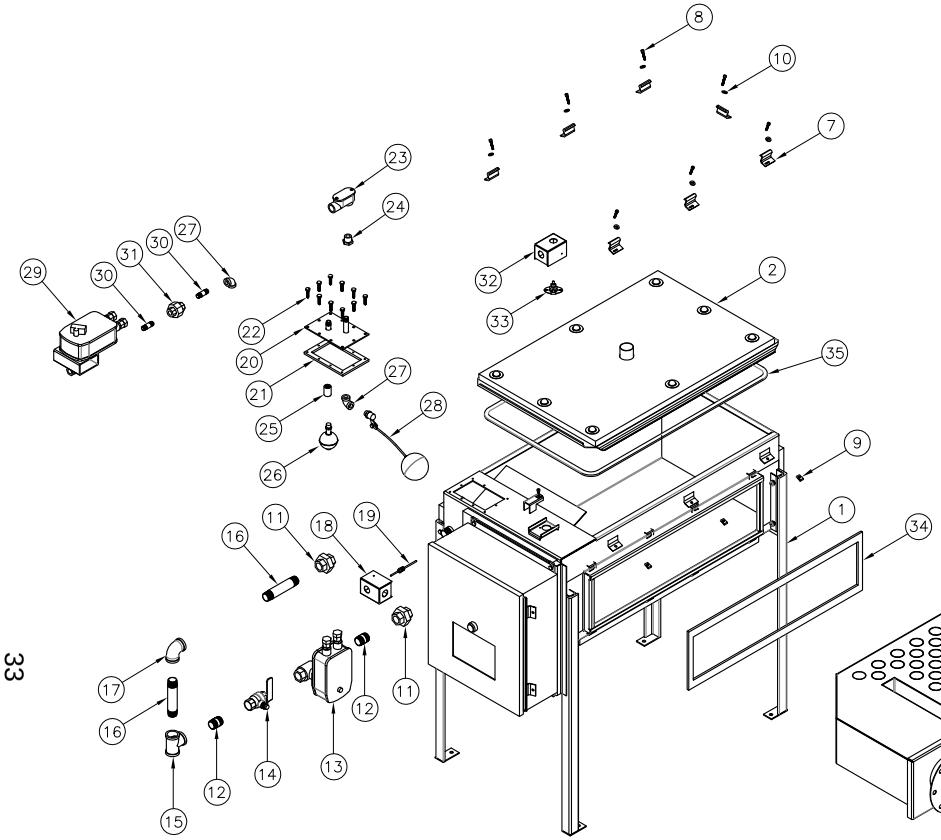


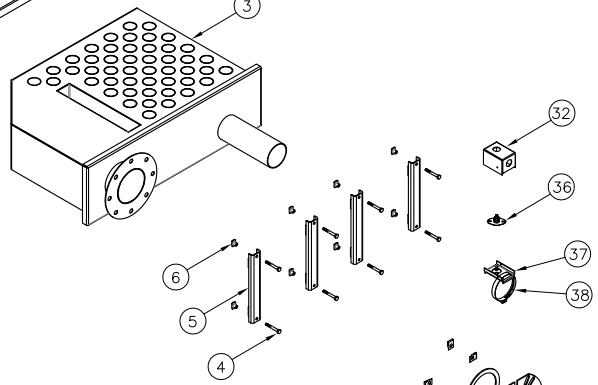
Section View of Gasket

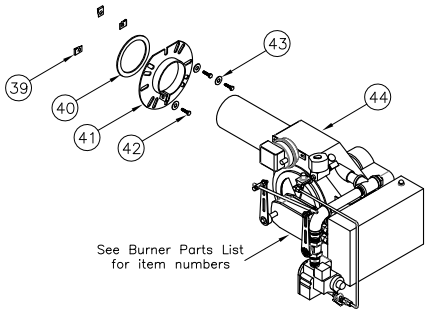


Bottom View of Gasket

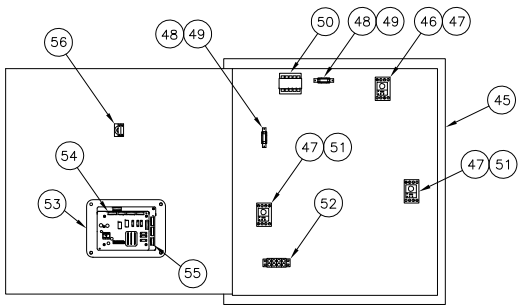
Fig. C







NEMA–12 HUMIDIFIER CONTROL CABINET
WITH DOOR OPEN



Back of Cabinet Door

Inside of Cabinet

Specifications 238414, 238415

Title: GXDDR–3 & GXDDR–4 EXPLODED ASSEMBLY			
Scale: No Scale	Date: June 10, 2013	Drwn: J.M.R.	Dwg No: GXDDR–3 EXPLODED ASSEMBLY

PURE Humidifier

Parts List & Two Year Recommended Spare Parts

Item No.	Description	Part No.	Qty Per Unit	Rec. SpareQty
1	GXDDR Tank Assembly	A	1	
2	GXDDR Tank Cover Assembly	A	1	
3	GX Heat Exchanger Assembly	A	1	
4	U-Clamp Bolts 1/4-20 x 2 Zinc Hex	15841	A	
5	U-Clamp Bar Assembly	99136	A	
6	1/4"-20 Weld Nut	15702	A	
7	Cover Clamp	15930	A	
8	Cover Clamp Screws	15522	A	
9	10-24 U-Nut	15524	A	
10	#12 SAE Zinc Washer	n/a	A	
11	3/4" Union Stainless Steel	07114	2	
12	3/4" x 1 1/2" Nipple Stainless Steel	07081	2	
13	3/4" Motorized Drain Valve Stainless Steel	09117	1*	
14	3/4" Ball Valve 316 Stainless Steel	09036	1	
15	3/4" Tee Stainless Steel	07115	1	
16	3/4" x 5" Nipple Stainless Steel	07011	2	
17	3/4" 90° Elbow Stainless Steel	07112	1	
18	Thermocouple Housing - Plain	16071	1*	
19	Type K Thermocouple	15853	1*	
20	DDR Float Plate Assembly	99134	1	
21	DDR Float Plate Gasket	05052	1	
22	10-32 x 3/4" Hex Bolt	15523	10	
23	1/2" Type LB Conduit Body	15079	1	
24	1/4" x 1/2" Hex Reducer	15694	1	
25	1/4" Coupling 304 SST	07001	1	
26	Low Water Float Switch	15048	1	
27	1/4" 90 Elbow 304 Stainless Steel	07002	1/2 *	
28	Water Fill Float Valve and Ball 316 Stainless Steel	09030	1	
29	1/2" Motorized Ball Valve Stainless Steel	09120	1*	
30	1/4" x 1 1/2" Nipple Stainless Steel	07043	2*	
31	1/4" Union Stainless Steel	07189	1*	
32	Overtemp Switch Housing	15072	2	
33	Overtemp Protection Switch	15047	1	
34	Heat Exchanger Gasket	A	1	
35	Cover Gasket	15520	1	
36	Exhaust Over Temperature Switch 450°F Manual Reset	21022	1	
37	Overtemp Switch Plate	99170	1	
38	3" Hose Clamp	15606	1	
39	3/8-16 J Nut	15850	3	
40	Burner Flange Gasket	05901	1	
41	Burner Flange	21072	1	
42	3/8-16 x 1 Hex Bolt	15943	3	
43	3/8 Stainless steel washer	15945	3	
44	Modulating Gas Fired Burner - See Burner Assembly Parts List	A	1	
45	Control Enclosure	12003	1	
46	Time Delay On Relay	12022	1	
47	Relay Base	12020	3	
48	2 amp Fuse	12063	2	
49	Fuse Holder	12085	2	
50	Step-Down Transformer	12160	1	
51	Finder Relay	12018	2	
52	4 Point Terminal Strip	12045	1	
53	INTAC® Microprocessor	12312	1	
54	7 Pin Terminal Connector	12310	4	
55	6 Pin Terminal Connector	12309	5	
56	Push Button Light with NC Relay	21021	1	

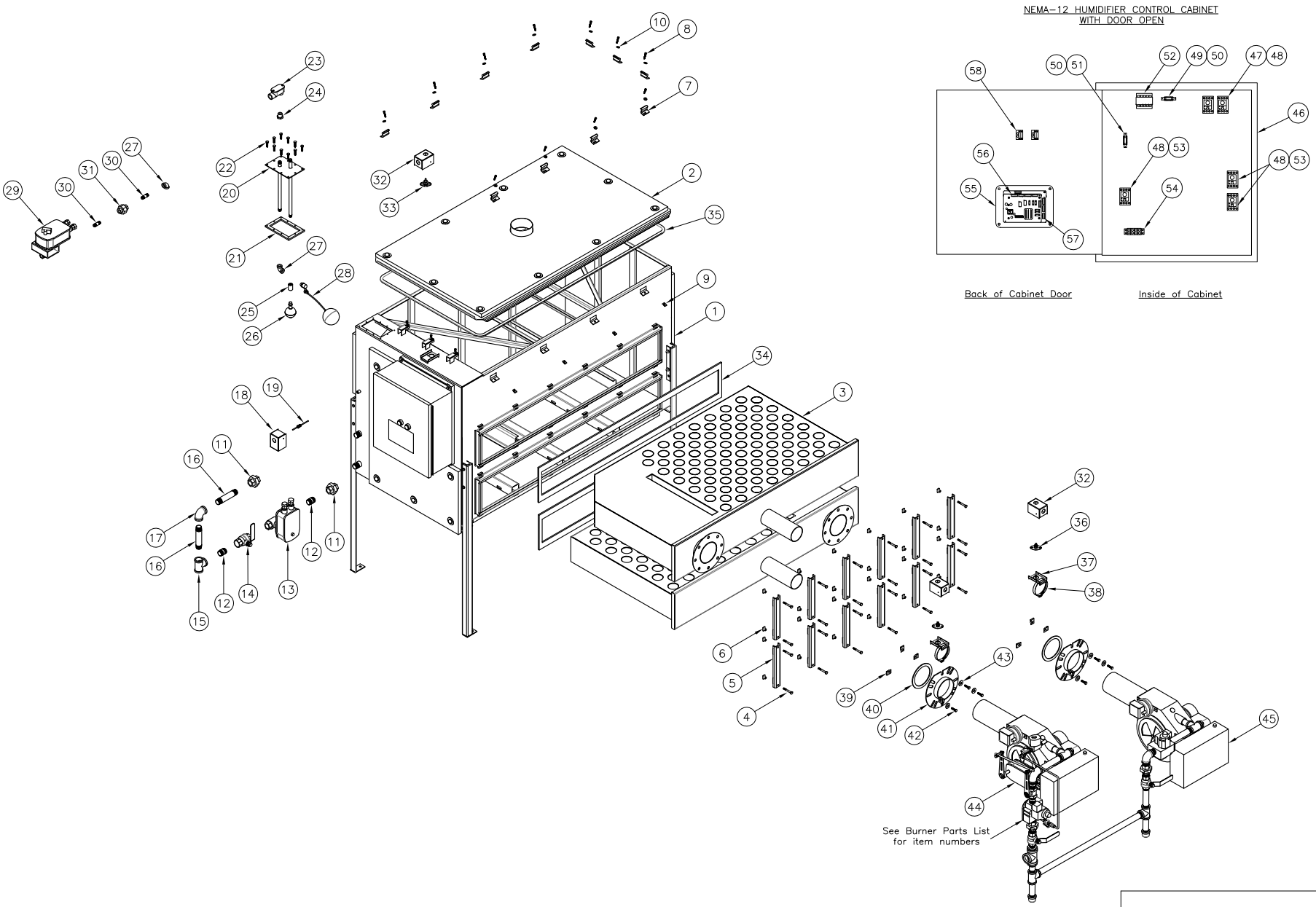
NOTES/CODES:

A = Part Number and quantity vary with model number.

* Optional feature that may not be on all equipment

When ordering replacement or spare parts please have Model and Serial numbers.

8/6/2013



Title: GXDDR–8 EXPLODED ASSEMBLY			
Scale: No Scale	Date: April 30, 2013	Drwn: S.A.M.	Dwg No: GXDDR–8 EXPLODED ASSEMBLY

PURE Humidifier

Specifications 238414, 238415

PURE Humididfier Co. "GXDDR-8"

Parts List & Two Year Recommended Spare Parts

Specifications 238414, 238415

Item No.	Description	Part No.	Qty Per Unit	Rec. SpareQty
1	GXDDR-8 Reservoir Assembly	10025	1	
2	GXDDR-8 Reservoir Cover Assembly	99087	1	
3	GX-4 Heat Exchanger Assembly	A	2	
4	U-Clamp Bolts 1/4-20 x 2 Zinc Hex	15841	24	
5	U-Clamp Bar Assembly	99136	12	
6	1/4"-20 Weld Nut	15702	24	
7	Cover Clamp	15930	11	
8	Cover Clamp Screws 10-24 hex socket	15522	14	
9	10-24 U-Nut	15524	14	
10	#12 SAE Zinc Washer	n/a	14	
11	3/4" Union Stainless Steel	07114	2	
12	3/4" x 1 1/2" Nipple Stainless Steel	07113	2	
13	3/4" Motorized Drain Valve Stainless Steel	09117	1*	
14	3/4" Ball Valve 316 Stainless Steel	09036	1	
15	3/4" Tee Stainless Steel	07115	1	
16	3/4" x 5" Nipple Stainless Steel	07011	2	
17	3/4" 90° Elbow Stainless Steel	07112	1	
18	Thermocouple Housing - Plain	16071	1*	
19	Type K Thermocouple	15853	1*	
20	DDR Float Plate Assembly	95009	1	
21	DDR Float Plate Gasket	05052	1	
22	10-32 x 3/4" Hex Bolt	15523	10	
23	1/2" LB Type Conduit Body	15079	1	
24	1/4" x 1/2" Hex Reducer	15694	1	
25	1/4" Coupling 304 SST	07001	1	
26	Low Water Float Switch	15048	1	
27	1/4" 90 Elbow 304 Stainless Steel	07002	1/2 *	
28	Water Fill Float Valve and Ball 316 Stainless Steel	09030	1	
29	1/2" Motorized Ball Valve Stainless Steel	09120	1*	
30	1/4" x 1 1/2" Nipple Stainless Steel	07043	2*	
31	1/4" Union Stainless Steel	07189	1*	
32	Overtemp Switch Housing	15072	3	
33	Overtemp Protection Switch	15047	1	
34	Heat Exchanger Gasket	05386	2	
35	Cover Gasket	15520	1	
36	Exhaust Over Temperature Switch 450°F Manual Reset	21022	2	
37	Overtemp Switch Plate	99170	2	
38	3" Hose Clamp	15606	2	
39	3/8-16 J-Nut	15850	6	
40	Burner Flange Gasket	05901	2	
41	Burner Flange	21072	2	
42	3/8-16 x 1 Hex Bolt	15943	6	
43	3/8 Stainless steel washer	15945	6	
44	Modulating Gas Fired Burner - See Burner Assembly Parts List	A	1	
45	On/Off Gas Fired Burner - See Burner Assembly Parts List	A	1	
46	Control Enclosure	12003	1	
47	Time Delay On Relay	12022	2	
48	Relay Base	12020	5	
49	2 amp Fuse	12063	1	
50	Fuse Holder	12085	2	
51	4 amp fuse	12065	1	
52	Step-Down Transformer	12245	1	
53	Finder Relay	12018	3	
54	4 Point Terminal Strip	12045	1	
55	INTAC® Microprocessor	12312	1	
56	7 Pin Terminal Connector	12310	4	
57	6 Pin Terminal Connector	12309	5	
58	Push Button Light with NC Relay	21021	2	

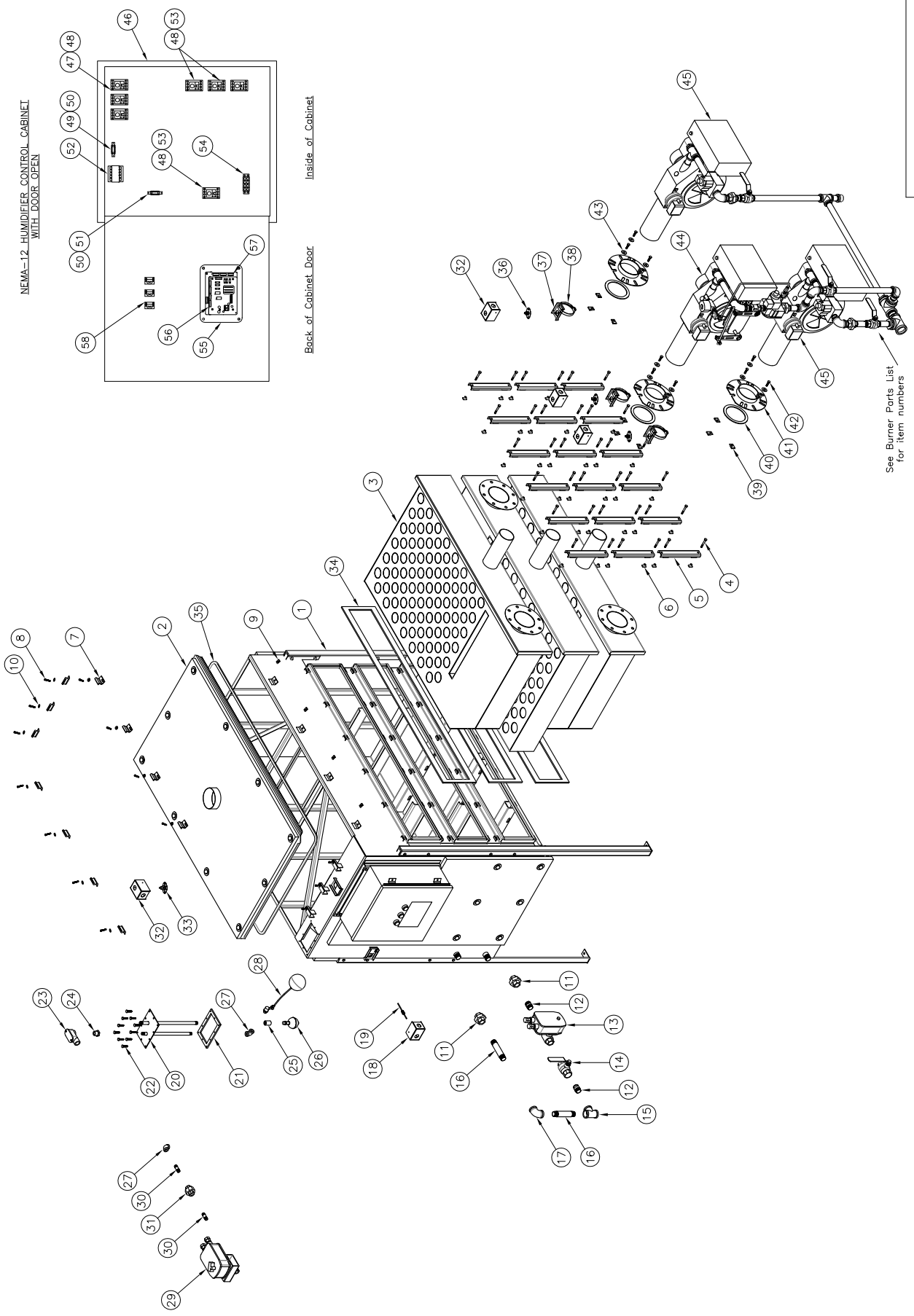
Notes/Codes:

A = Part Number and quantity vary with model number.

* Optional feature that may not be on all equipment.

When ordering replacement or spare parts please have Model and Serial numbers.

8/6/2013



PURE Humidifier

Title: GXDDR-12 EXPLODED ASSEMBLY			
Scale: No Scale	Date: April 30, 2013	Drwn: S.A.M.	Dwg No: GXDDR-12 EXPLODED ASSEMBLY

PURE Humididfier Co. "GXDDR-12"

Parts List & Two Year Recommended Spare Parts

Specifications 238414, 238415

Item No.	Description	Part No.	Qty Per Unit	Rec. SpareQty
1	GXDDR-12 Reservoir Assembly	10027	1	
2	GXDDR-12 Reservoir Cover Assembly	99087	1	
3	GX-4 Heat Exchanger Assembly	A	3	
4	U-Clamp Bolts 1/4-20 x 2 Zinc Hex	15841	36	
5	U-Clamp Bar Assembly	99136	18	
6	1/4"-20 Weld Nut	15702	36	
7	Cover Clamp	15930	14	
8	Cover Clamp Screws 10-24 Hex Socket	15522	14	
9	10-24 U-Nut	15524	14	
10	#12 SAE Zinc Washer	n/a	11	
11	3/4" Union Stainless Steel	07114	2	
12	3/4" x 1 1/2" Close Nipple Stainless Steel	07113	2	
13	3/4" Stainless Steel Motorized Drain Valve	09117	1*	
14	3/4" Ball Valve 316 Stainless Steel	09036	1	
15	3/4" Tee Stainless Steel	07115	1	
16	3/4" x 5" Nipple Stainless Steel	07011	2	
17	3/4" 90° Elbow Stainless Steel	07112	1	
18	Thermocouple Housing - Plain	16071	1*	
19	Type K Thermocouple	15853	1*	
20	DDR Float Plate Assembly	95009	1	
21	DDR Float Plate Gasket	05052	1	
22	10-32 x 3/4" Hex Bolt	15523	10	
23	1/2" Type LB Conduit Box	15079	1	
24	1/4" x 1/2" Hex Reducer	15694	1	
25	1/4" Coupling 304 Stainless Steel	07001	1	
26	Low Water Float Switch	15048	1	
27	1/4" 90° Elbow 304 Stainless Steel	07002	1/2 *	
28	Water Fill Float Valve and Ball 316 Stainless Steel	09030	1	
29	1/2" Motorized Stainless Steel Ball Valve	09120	1*	
30	1/4" x 1 1/2" Nipple Stainless Steel	07043	2*	
31	1/4" Union Stainless Steel	07189	1*	
32	Overtemp Switch Housing	15072	4	
33	Overtemp Protection Switch	15047	1	
34	Heat Exchanger Gasket	05386	3	
35	Cover Gasket	15520	1	
36	Exhaust Over Temperature Switch 450°F Manual Reset	21022	3	
37	Overtemp Switch Plate	99170	3	
38	3" Hose Clamp	15606	3	
39	3/8-16 J-Nut	15850	9	
40	Burner Flange Gasket	05901	3	
41	Burner Flange	21072	3	
42	3/8-16 x 1 Hex Bolt	15943	9	
43	3/8 Stainless steel washer	15945	9	
44	Modulating Gas Fired Burner - See Burner Assembly Parts List	A	1	
45	On/Off Gas Fired Burner - See Burner Assembly Parts List	A	2	
46	Control Enclosure	12003	1	
47	Time Delay On Relay	12022	3	
48	Relay Base	12020	7	
49	2 amp Fuse	12063	1	
50	Fuse Holder	12085	2	
51	4 amp fuse	12065	1	
52	Step-Down Transformer	12245	1	
53	Finder Relay	12018	4	
54	4 Point Terminal Strip	12045	1	
55	INTAC® Microprocessor	12312	1	
56	7 Pin Terminal Connector	12310	4	
57	6 Pin Terminal Connector	12309	5	
58	Push Button Light with NC Relay	21021	3	

Notes/Codes:

A = Part Number and quantity vary with model number.

* Optional feature that may not be on all equipment.

When ordering replacement or spare parts please have Model and Serial numbers.

8/6/2013

BURNER PARTS LIST X4

1	Burner Housing
2	Inlet Ring
3	Blast tube (6”, 9”, 12”)
4	Gun Assembly
5	Flange Gasket
6	Mounting Flange
7	Blower Wheel
8	Motor Plate
9	Blower Motor
10	Air Switch
11	24 Volt Transformer
12	Panel & Door
13	Flame Monitor
14	Grounding Lug
15	Nipple Tapped
16	Gun Head
17	Side Orifice tee
18	Side Orifice Spring
19	Pilot Regulator
20	Pilot Solenoid Valve
21	Combination Gas Valve
22	Main Gas Cock
23	Pilot Gas Cock
24	Pilot Tubing
25	Pilot Assembly
26	Ignition Electrode
27	Flame Rod
28	Back Plate
29	Inner Damper
30	Middle Damper
31	Outer Damper
32	Air Sensing Tube
33	Orifice Kit
34	Direct Spark Transformer
35	Gas Piping Support Bracket
36	Damper Axle
37	Relay
38	5/16” Ball Joint Swivel
39	Mod Motor
40	Butterfly Valve
41	5/16” Linkage Rod
42	Light
43	Axle Bushing
44	1/2” Damper Arm
45	Pie DPR Retainer Washers

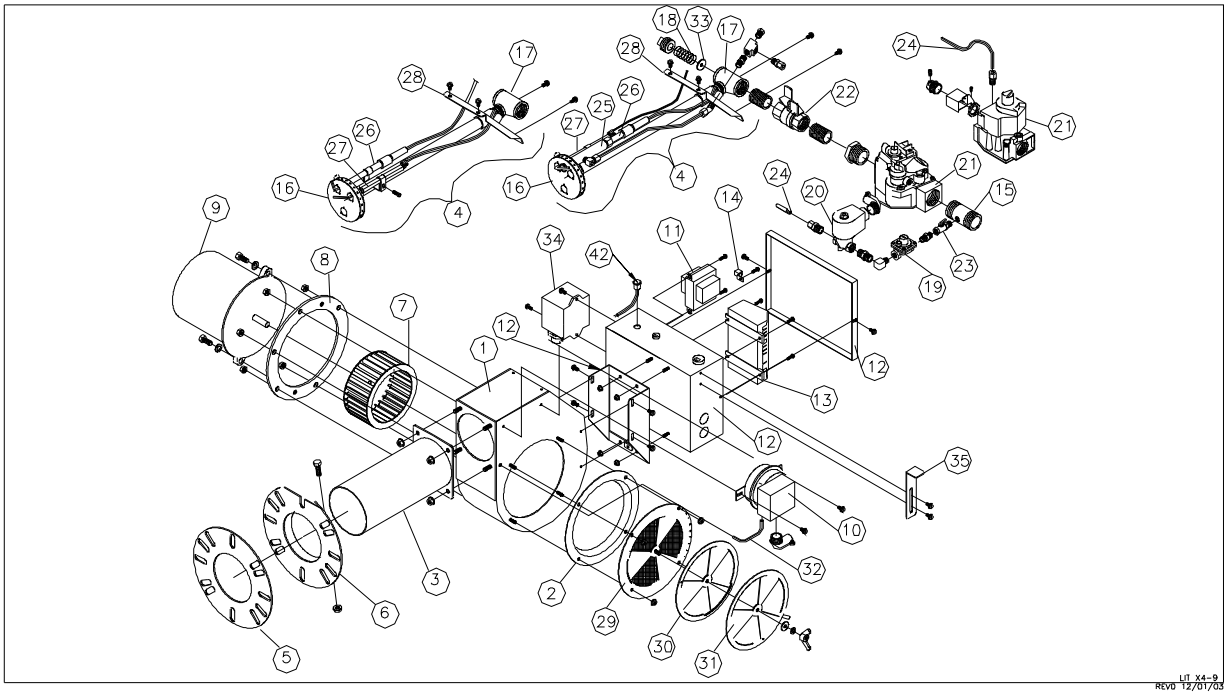


Figure 10: X4 general assembly and parts

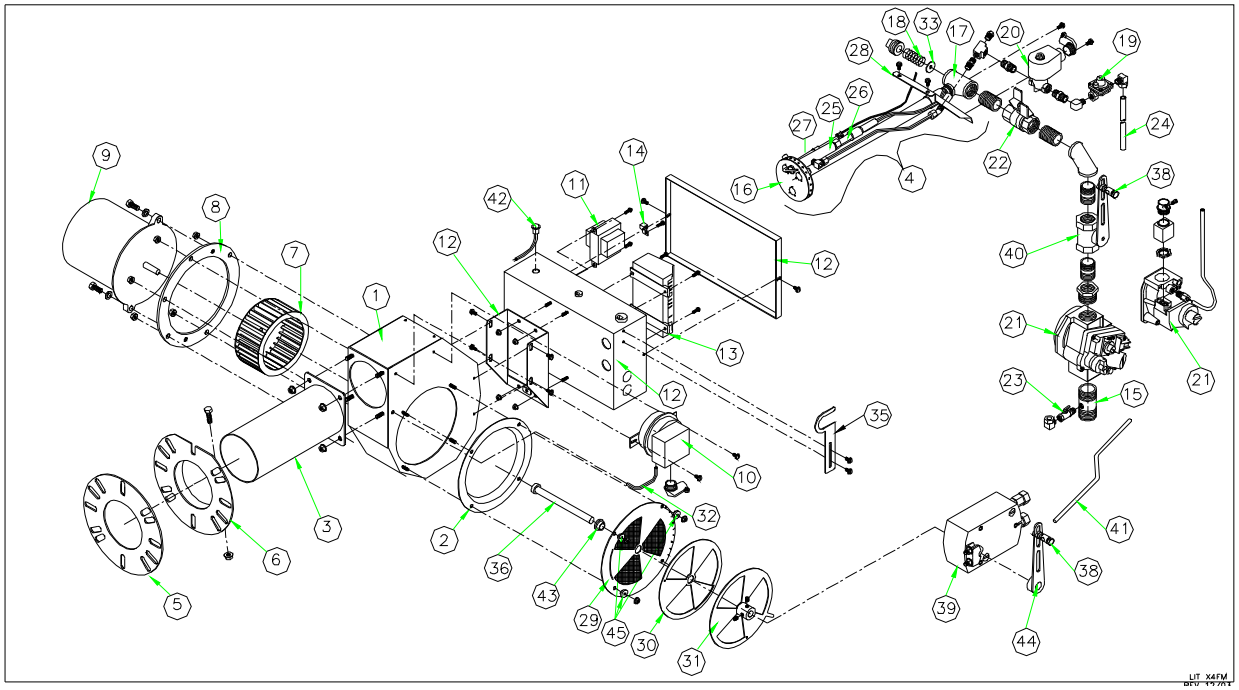


Figure 11: X4M general assembly and parts

PURE Humidifier

Maintenance Notes

Maintenance Performed	Date	By

PURE Humidifier

Maintenance Notes

Maintenance Notes

Maintenance Performed	Date	By

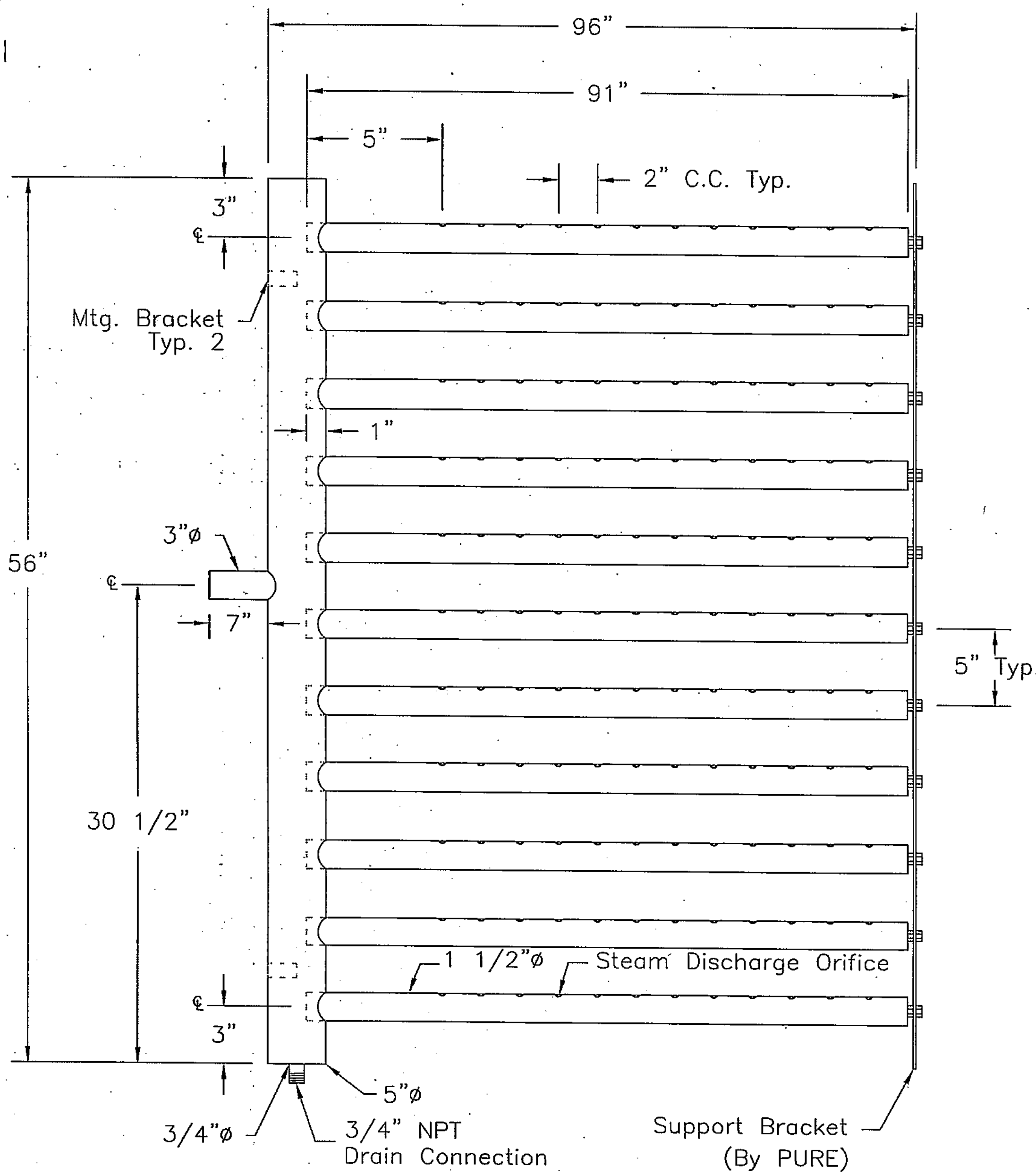
DISCLAIMER

Product Changes: Changes in products may be required from time to time due to the need for continuing improvement of products and due to factors beyond PURE Humidifier Co.'s control. PURE Humidifier Co. reserves the right to make reasonable changes in products, specifications and performance of any kind without notice or liability. PURE Humidifier Co. also reserves the right to deliver revised designs or models of products against any order, unless this right is specifically waived in writing by PURE Humidifier Co. PURE Humidifier Co. shall have no responsibility whatsoever with respect to changes made by the manufacturer in products sold but not manufactured by PURE Humidifier Co.

PURE Humidifier

141 Jonathan Blvd. North
Chaska, MN 55318
Tel: (952) 368-9335 Fax: (952) 368-9338
www.purehumidifier.com

Order No.: 33386
Material: Stainless Steel
Tag: H-AHU9
Qty.: 1



Note:
1. Factory pitch tubes 1" per foot.
2. Tube assembly is based on AHU I.D. of 98" wide X 88" high.
3. 7" long supply connection is based on assumed 4" wall thickness.

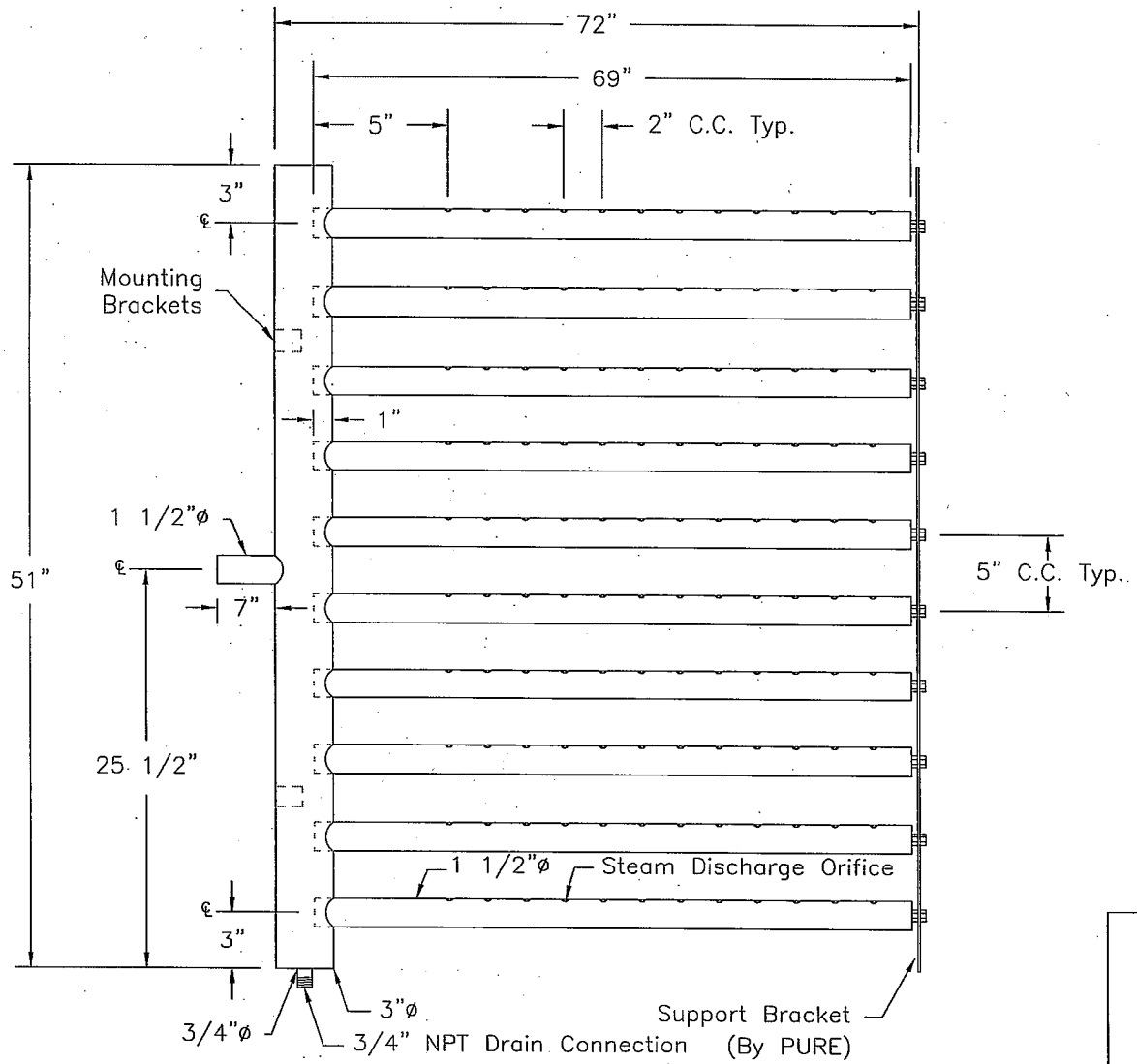
Title: FAST-PAC ELEVEN TUBE ASSEMBLY			
Scale: No Scale	Date: May 31, 2018	Drwn: P.R.G.	Dwg No: 33386-9

☒ Approved as is.
☐ Revise and resubmit as noted.

[signature] 5/31/18
Signed Date

PURE Humidifier

Order No.: 33386
Material: Stainless Steel
Tag: H–AHU10
Qty.: 1



Note:
1. Factory pitch tubes 1" per foot.
2. Tube assembly is based on AHU I.D. of 74" wide X 68" high
3. 7" long supply connection is based on 4" wall thickness.

☒ Approved as is.
☐ Revise and resubmit as noted.

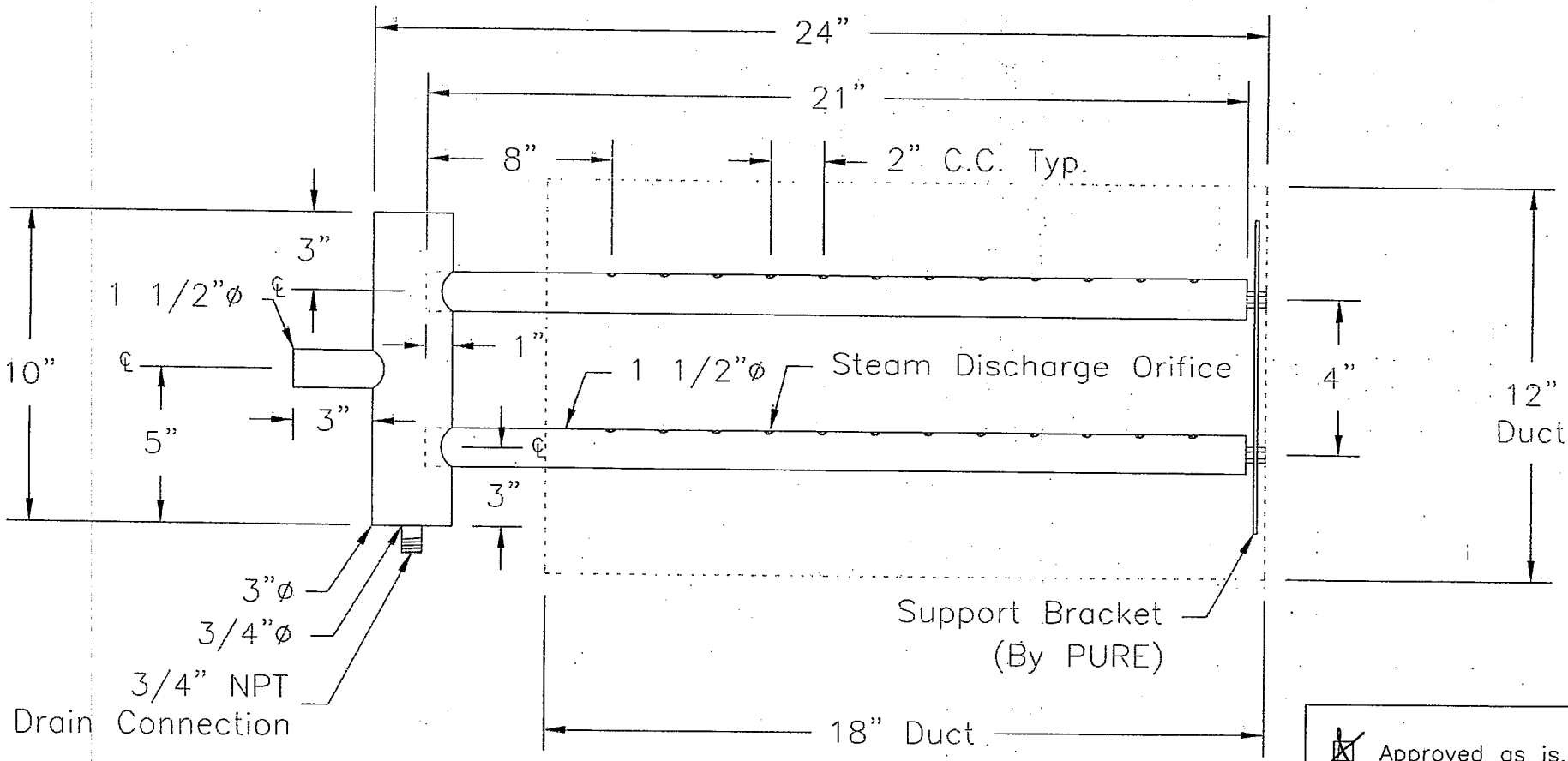
Signed

5/31/18
Date

Title: FAST–PAC TEN TUBE ASSEMBLY			
Scale: No Scale	Date: May 31, 2018	Drwn: P.R.G.	Dwg No: 33386–10

PURE Humidifier

Order No.: 33387
Material: Stainless Steel
Tag: H-AHU11
Qty.: 1



Note:
1. Factory pitch tubes 1" per foot.

☒ Approved as is.
☐ Revise and resubmit as noted.

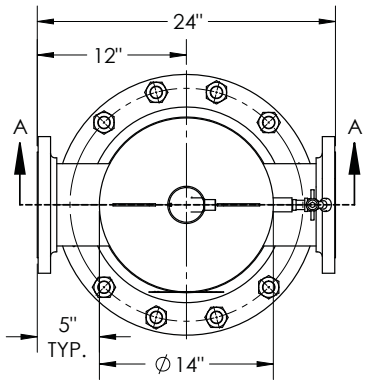
Signed Date 5/31/18

Title: FAST-PAC TWO TUBE ASSEMBLY			
Scale: No Scale	Date: May 3, 2018	Drwn: P.R.G.	Dwg No: 33387-11

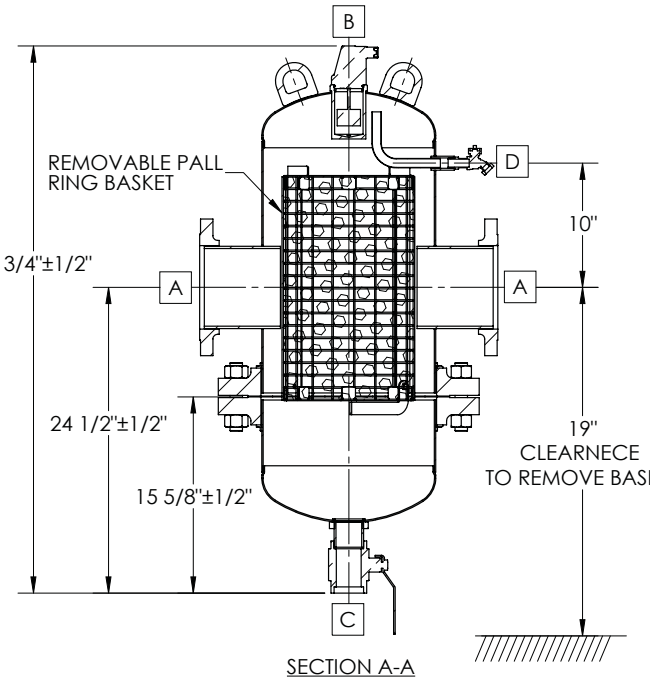
PURE Humidifier

AS-5) Taco 4906ADR-150SP

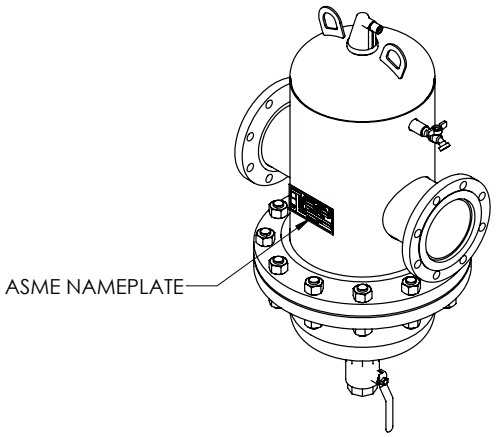
REV	DATE	ECO	DR BY	APP ENG	APP MFG	APP QA
–	11/16/2017	---	RLS	EVG	EVG	–



TOP VIEW



SECTION A-A



ISOMETRIC VIEW

DESIGN DATA		
CONSTRUCTION CODE	ASME SECTION VIII,DIVISION1,LATEST EDITION	
DESIGN PRESSURE	150 PSI	
TEST PRESSURE	195 PSI	
DESIGN TEMPERATURE	240 °F	
MDMT	-20 °F @ 150 PSI	
OPTIMUM FLOW (GPM)	470	
CORROSION ALLOWANCE	0"	
SEISMIC CODE	NONE	
EMPTY WEIGHT	FLOODED WEIGHT	CAPACITY
400 LBS	---	---
EXTERNAL FINISH	STANDARD RED OXIDE PRIMER	
INSULATION	NONE	
MATERIALS OF CONSTRUCTION		
HEADS	CARBON STEEL	
SHELL	CARBON STEEL	
COUPLINGS/FITTINGS	CARBON STEEL	
NOZZLES	CARBON STEEL	
PALL RING BASKET	304 SS	
ATTACHMENTS	CARBON STEEL	
BOLTING	LOW ALLOY CARBON STEEL	
GASKETS/O-RINGS	1/16" GARLOCK IFG5500	
NOZZLE SCHEDULE		
MARK/FUNCTION	SIZE	RATING TYPE
A (SYSTEM CONNECTIONS)	6"	CL150 ANSI RFSO
B (VENT)	3"	G2 BSPP
C (DRAIN/ BLOWDOWN)	2"	CL3000 NPT
D (FLUSH)	1/2"	CL3000 NPT

NOTES:

1. THIS IS NOT A CERTIFIED 'AS-BUILT' DRAWING. DO NOT USE DIMENSIONS FOR CONSTRUCTION.
2. NOZZLES ARE NOT DESIGNED WITH EXTERNAL PIPE LOADS CONSIDERD.
3. FLANGE BOLT PATTERNS MUST STRADDLE PRINCIPLE CENTERLINES.

UNLESS OTHERWISE SPECIFIED:
FRACTIONS±1/4[.397]
.XX ± .02[.508]
.XXX ± .005[.127]
.XXXX ± .0005[.0127]
ANGLES ± 1°
FEATURE CONTROL SYMBOLS PER ANSI Y14.5
FINISHES 125
R.005[.127]TO.015[.38] BREAK SHARP EDGES
INCHES [MM]

CUSTOMER:
REF PART# 4906ADR-S100
SPA# P.O.#---
JOB# NONE

DR BY	APP ENG	APP MFG	APP QA
RLS	EVG	EVG	–

DATE	SCALE	SHEET
11/16/17	1:16	1 OF 1

ECO/Submittal	WGT.	VOL
2975	SEE TABLE	SEE TABLE

Taco Inc. CRANSTON, R.I.

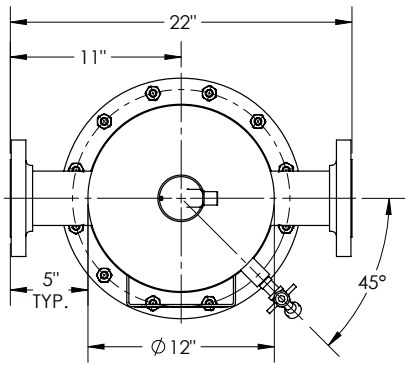
4900 SERIES, AIR/DIRT SEPARATOR
WITH BOTTOM REMOVABLE COVER

SIZE		REV
B	4906ADR–M029	–

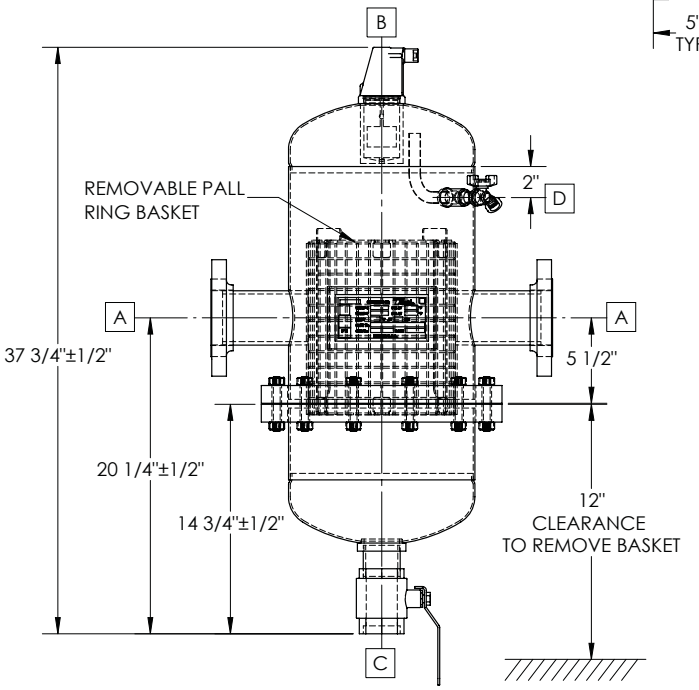
FORMAT REV 9–1–17

AS-6) Taco 4903ADR-150SP

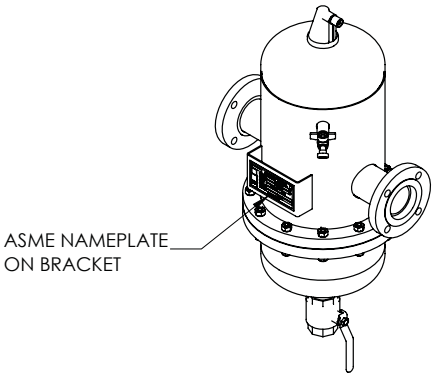
REVISIONS				
BY	REV.	DATE	DESCRIPTION	APPROVED
RLS	-	1/16/2018	SUBMITTAL DRAWING	EVG



TOP VIEW



FRONT VIEW



ISOMETRIC VIEW

DESIGN DATA		
CONSTRUCTION CODE	ASME SECTION VIII,DIVISION1,LATEST EDITION	
DESIGN PRESSURE	150 PSI	
TEST PRESSURE	195 PSI	
DESIGN TEMPERATURE	240 °F	
MDMT	-20 °F @ 150 PSI	
CORROSION ALLOWANCE	0"	
SEISMIC CODE	NONE	
EMPTY WEIGHT	FLOODED WEIGHT	CAPACITY
127 LBS	--- LBS	--- GAL
EXTERNAL FINISH	STANDARD RED OXIDE PRIMER	
INSULATION	NONE	
MATERIALS OF CONSTRUCTION		
HEADS	CARBON STEEL	
SHELL	CARBON STEEL	
COUPLINGS/FITTINGS	CARBON STEEL	
NOZZLES	CARBON STEEL	
PALL RING BASKET	CARBON STEEL/304SS	
ATTACHMENTS	CARBON STEEL	
BOLTING	LOW ALLOY CARBON STEEL	
GASKET	GARLOCK IFG 5500	
NOZZLE SCHEDULE		
MARK/FUNCTION	SIZE	RATING TYPE
A (SYSTEM CONNECTIONS)	3"	CL150 ANSI RFSO
B (VENT)	3"	G2 BSPP
C (BLOWDOWN)	2"	CL3000 NPT
D (FLUSH)	1/2"	CL3000 NPT

NOTES:

1. THIS IS NOT A CERTIFIED 'AS-BUILT' DRAWING. DO NOT USE DIMENSIONS FOR CONSTRUCTION.
2. NOZZLES ARE NOT DESIGNED WITH EXTERNAL PIPE LOADS CONSIDERD.
3. FLANGE BOLT PATTERNS MUST STRADDLE PRINCIPLE CENTERLINE.

UNLESS OTHERWISE SPECIFIED:

FRACTIONS ±1/4

.XX ± .02
.XXX ± .005
.XXXX ± .0005

ANGLES ± 1°

FEATURE CONTROL SYMBOLS PER ANSI Y14.5

FINISHES 125

RADII .005 TO .015 BREAK SHARP EDGES

CUSTOMER: VEMCO INC.
REF. PART # 4903ADR (SPECIAL)
SPA# 0118-010 PO # ---
JOB# ---

DR BY	CHK BY	CHK ENG	APP ENG	APP MFG
RLS	-	EVG	EVG	-

DATE	SCALE	SHEET
1/16/2018	1 : 12	1 OF 1

TFR	WEIGHT	VOL
2997	SEE TABLE	SEE TABLE

Taco Inc. FALL RIVER, MA

AIR-DIRT SEPARATOR
REMOVABLE BOTTOM COVER

SIZE		REV
B	4903ADR-M022	–

FORMAT REV 10-21-06

384 Gallatin Park Dr. Suite 201, Bozeman, MT 59771
(O) 406.585.7333 (F) 406.585.7666

Marcus Daly Memorial Hospital Surgery Department Remodel

Hydronic Unit Heaters

Hydronic Unit Heaters: Reznor

Tags: UH-AHU9, UH-AHU10, UH-159, UH-185, UH-157
WS-18/24 Hydronic Unit Heaters
120/1/60
2-Speed Fan
Discharge Louvers
Spring Isolators (4) Per Unit Heater

****Remote T-Stat Not Included as Specification Calls for DDC System to Enable the Unit Heaters****

See attached copy of equipment schedule and additional submittal data.

REZNOR®

MODEL WS

INDOOR, SUSPENDED, STEAM OR HOT WATER HYDRONIC UNIT HEATER FOR VERTICAL OR HORIZONTAL CONFIGURATION

DESCRIPTION

Reznor® Model WS Steam/Hot Water Suspended Heaters are design-engineered to be technically advanced and esthetically pleasing which makes it the hydronic heater for the 21st century.

This smart new concept in commercial heating units will accommodate all architects who are looking for something new and different.

The heating range of Model WS is 13,000 to 350,000 BTUH. The air volume ranges from 270 to 4,750 CFM.

The heat exchanger is made of one or two rows of steel coils (standard or optional copper coils) with aluminum fins, with approximately 10-1/2 fins per inch (4 fins per cm). The spacing between the fins makes cleaning and maintenance of the heat exchanger easier, which is essential to keep the unit heater efficient.

The standard steel tubing is very strong and long lasting. Steel tubing is designed for hot water applications up to 150 psi.

The copper tubing used for the heating coil is very thick (0.03", 0.75 mm), making Reznor heating coils extremely sturdy and long lasting. The copper tube diameter is 0.867" (22 mm) O.D. The large tube diameter reduces the water pressure drop, which means these units require lower pump pressure than other hydronic heaters. It also allows a very rapid heat radiation. **For steam heating applications copper tube (Option HA12) is required.** Designed for high working steam pressure up to 145 psi (10 bar), every heat exchanger is subjected to a pressure test at over 350 psi (25 bar) before leaving the factory.

The heat exchanger assembly receives a special paint coating which makes the coil long lasting and increases the thermal output.

The Fan/Motor Assembly is made up of three components: the fan, the motor and the fan guard, which also acts as the main support for the fan. This fan guard is galvanized for protection against corrosion, and is mounted onto the main casing with anti-vibration rubber mountings. The fan guard meets OSHA requirements.*

The standard 2-speed motor is a hermetically sealed motor which is maintenance free. The motor is wired for 115/1/60 supply voltage. The motor speed is field adjustable to run at high or low RPMs. Refer to the Technical Data Chart for fan RPM, heating output and CFM ranges.

The flexibility of changing motor speeds allows the installer to adjust the unit to high speed for increased BTUH output, or low speed for reduced noise level. All motors have internal protection as a standard feature.

All Model WS units can be installed for either vertical or horizontal discharge.

The unit cabinet is manufactured from .032" (0.8mm) galvanized pre-painted steel finished in dove gray. Using pre-painted steel helps protect the cabinet against oxidation.

The cabinet is held together by shake-proof screws and molded corner sections to add additional strength and durability. Adjustable louvers are held in place by spring loaded pivots. Vertical louvers are available for field installation.

The optional Air Flow Induction Optimizer is available for horizontally discharged units. The Air Flow Induction Optimizer increases the air flow due to the unique shape of its deflecting louvers which improves the throw of the heated air stream. See the optional accessories section for more information.

Units are packaged into strong corrugated cardboard cartons with strengthened upper and lower side sections. These containers are clearly marked with the model number, size and approximate shipping weight.

Units are manufactured in an ISO 9001 registered facility.

STANDARD FEATURES

STANDARD FEATURES

- Heat exchanger composed of steel tubes and aluminum fins spaced approximately 10-1/2 fins per inch
- Painted tubing heat exchanger and aluminum fins
- Hot water applications
- Fan/Motor Assembly includes galvanized fan guard
- Vertical or horizontal configuration
- Cabinet and louvers constructed of galvanized pre-painted steel
- Cabinet held together by shake-proof screws and molded corner sections
- Spring mounted horizontal louvers
- 115/60 single phase, two speed motor (field adjustable)
- Manufactured in an ISO 9001 registered facility

FACTORY INSTALLED OPTIONS

- Heat exchanger composed of 0.03" thick, .867" O.D copper tubes and aluminum fins spaced approximately 10-1/2 fins per inch
- Up to 145 psi steam applications with copper tubing

FIELD INSTALLED OPTIONS

- Vertical louvers for better air distribution - vertical or horizontal discharge
- Air flow induction louvers increase air flow and throw - horizontal discharge
- Light duty, or heavy duty thermostat
- Thermostat guard cover

OSHA requires that the fan guard spacing for a heater mounted 7 feet off the floor can not exceed 1/2 inch.

HYDRONIC UNIT HEATER DATA SHEET

Program Version: 3.40.1203

Date: 11/20/2017
RezPro Job #: 4925157
Job Name: Marcus Daily
Location: Missoula, MT
Unit Tag:

Reznor Rep: TTAG
Contact: Steve Evans
Phone:
Fax:
Customer:
PO#:

Reznor Model: **WS-18/24**
Options: **HA12: 1 Row Copper Coil**

Number of Units: 5
Voltage/Ph/Hertz: 115/1/60
Elevation:

Performance	High Speed Fan	Low Speed Fan
Fan RPM:	1550 RPM	1100 RPM
Fan Energy:	30 Watts	10 Watts
Amp Rating:	0.6 Amps	0.3 Amps
Air Delivery:	400 CFM	270 CFM
Exit Velocity:	540 FPM	382 FPM
Heat Output:	19.3 MBH	14.1 MBH
Entering Air Temp:	40.0 °F	40.0 °F
Leaving Air Temp:	84.6 °F	88.3 °F
Entering Water Temp:	180.0 °F	180.0 °F
Leaving Water Temp:	160.7 °F	165.9 °F
Water Flow Rate:	2.00 GPM	2.00 GPM
Water PD:	0.13 Feet WC	0.12 Feet WC
Steam Pressure:		
Condensate:		
EDR:		

REZNOR®

TECHNICAL DATA

		Fan Speed	Size 18/24	23/33	44/62	60/85	78/110	96/120	140/175	190/238	300/350
Maximum Heating Capacity[A]	MBH	Low	18	23	44	60	78	96	140	190	300
		High	24	33	62	85	110	120	175	238	350
	Watts	Low	5,276	6,741	12,896	17,586	22,862	28,138	41,034	55,689	87,930
		High	7,034	9,672	18,172	24,914	32,241	35,172	51,293	69,758	102,585
	kcal/hr	Low	4,536	5,796	11,089	15,121	19,657	24,194	35,282	47,883	75,605
		High	6,048	8,317	15,625	21,421	27,722	30,242	44,103	59,980	88,206
Maximum Leaving Air Temperature (L.A.T.)[B]	°F	Low	121°	124°	132°	129°	125°	134°	134°	140°	133°
		High	115°	121°	126°	123°	121°	131°	130°	137°	128°
	°C	Low	49°	51°	56°	54°	52°	57°	57°	62°	56°
		High	46°	49°	52°	51°	49°	55°	54°	58°	53°
Approximate Fan RPM		Low	1,100	1,100	1,100	1,100	1,100	850	850	850	850
		High	1,550	1,600	1,600	1,600	1,600	1,080	1,080	1,080	1,080
Motor HP 115/1/60 Motor		Low	0.014	0.020	0.027	0.048	0.090	0.041	0.070	0.110	0.500
		High	0.040	0.055	0.082	0.150	0.260	0.090	0.160	0.250	1.140
Amp Rating 115/1/60 Motor		Low	0.3	0.4	0.6	1.1	1.7	0.9	1.1	2.2	6.5
		High	0.6	0.9	1.2	1.9	3.0	1.8	2.6	3.4	13.0
Noise Level at 16-1/2 ft (5m) - dB(A)		Low	45	46	49	54	57	47	49	52	61
		High	52	54	58	63	65	52	55	60	67
Approximate Air Volume	cfm	Low	270	330	560	800	1,100	1,200	1,750	2,200	3,800
		High	400	500	860	1,250	1,650	1,550	2,300	2,850	4,750
	m^3/hr	Low	459	561	952	1,359	1,869	2,039	2,973	3,738	6,457
		High	680	850	1,461	2,124	2,804	2,634	3,908	4,842	8,071
Supply Air Velocity	fpm	Low	382	443	522	549	578	500	590	613	755
		High	540	672	802	860	866	642	773	793	936
	m/min	Low	116	135	159	167	176	152	180	187	230
		High	165	205	244	262	264	196	236	242	285
Rows of Coils in Heat Exchanger			1	2	2	2	2	2	2	2	2
Water Content	Gallons		1/4	1/2	11/16	7/8	1	1 3/16	1 9/16	1 7/8	2 15/16
	Liters		1.0	2.0	2.6	3.2	3.8	4.6	6.0	7.0	11.1
Approximate Weight	lbs.		37	44	49	55	66	75	88	101	146
	Kg		17	20	22	25	30	34	40	46	66

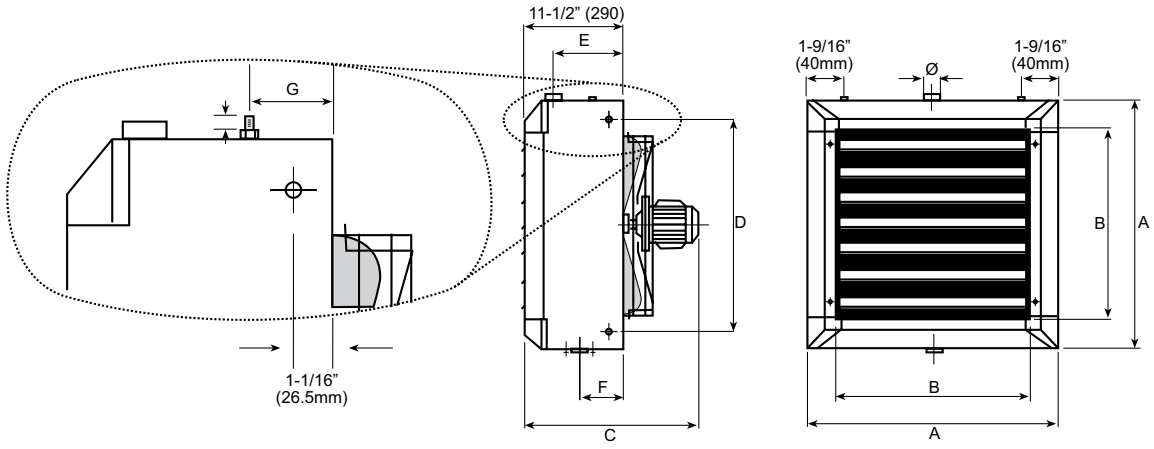
[A] Maximum heating capacity based on steam pressure at 2 psi with entering air temperature of 60°F (16°C) See tables on page 4 for more information.

[B] Based on an entering air temperature of 60°F (16°C).

DIMENSIONS

ACCURATE WITHIN ±1/8" (±3mm)

Size	A	B	C	D	E	F	G	Fan Diameter	Ø
18/24	16-7/16 (418)	11-1/8 (282)	18-5/16 (465)	12-5/8 (321)	8-11/16 (220)	5-1/8 (130)	3-15/16 (100)	11-13/16 (300)	3/4
23/33	16-7/16 (418)	11-1/8 (282)	18-5/16 (465)	12-5/8 (321)	8-11/16 (220)	5-1/8 (130)	3-15/16 (100)	11-13/16 (300)	3/4
44/62	18-9/16 (472)	13-1/4 (336)	18-5/16 (465)	14-3/4 (375)	8-11/16 (220)	5-1/8 (130)	3-15/16 (100)	13-3/4 (350)	1 1/4
60/85	20-11/16 (526)	15-3/8 (390)	18-5/16 (465)	16-7/8 (429)	8-11/16 (220)	5-1/8 (130)	3-15/16 (100)	15-3/4 (400)	1 1/4
78/110	22-13/16 (580)	17-1/2 (444)	18-5/16 (465)	19 (483)	8-11/16 (220)	5-1/8 (130)	4-3/4 (120)	17-11/16 (450)	1 1/4
96/120	24-15/16 (634)	19-5/8 (498)	19-3/16 (488)	21-1/8 (537)	8-11/16 (220)	5-1/8 (130)	4-3/4 (120)	17/11/16 (450)	1 1/4
140/175	27-1/16 (688)	21-3/4 (552)	19-3/16 (488)	23-1/4 (591)	8-11/16 (220)	5-1/8 (130)	4-3/4 (120)	19-11/16 (500)	1 1/4
190/238	29-3/16 (742)	23-7/8 (606)	20-3/16 (513)	25-3/8 (645)	8-11/16 (220)	5-1/8 (130)	5-1/8 (130)	21-5/8 (550)	1 1/4
300/350	35-7/16 (900)	30-1/16 (764)	22-5/8 (575)	31-5/8 (803)	8-1/4 (210)	5-1/2 (140)	5-1/8 (130)	25-9/16 (650)	1 1/2



REZNOR®

ENGINEERING DATA

HOT WATER CAPACITIES, CALCULATIONS AND CORRECTION FACTORS

Use the following two tables to determine

1. Heating Capacity (MBH)
2. Leaving Air Temperature (LAT)
3. Water Flow in Gallons per Minute (GPM)
4. Water Pressure Drop (WPD) in feet of water

The performances reflected in these tables are based on the following:

- Entering Water Temperature (EWT): 200°F (93°C)
- Water Temperature Drop (WTD): 20° (11°C)
- Entering Air Temperature (EAT): 60° (16°C)

TABLE A - Low Speed Fan Setting

Size	Approx. Fan rpm	MBH Output	Leaving Air Temp. (LAT) °F	Leaving Air Temp. (LAT) °C	Water Flow Gal. per Minute	Water Flow Liters per Minute	WPD feet of water	Air Volume cfm	Air Volume (m^3/hr)
18/24	1,100	13	104°	40°	1.31	4.96	0.06	270	459
23/33	1,100	17	107°	42°	1.72	6.49	0.01	330	561
44/62	1,100	32	113°	45°	3.23	12.22	0.08	560	952
60/85	1,100	45	112°	44°	4.54	17.18	0.23	800	1,359
78/110	1,100	58	109°	43°	5.85	22.15	0.48	1,100	1,869
96/120	850	72	115°	46°	7.26	27.49	0.95	1,200	2,039
140/175	850	105	115°	46°	10.59	40.09	1.90	1,750	2,973
190/238	850	141	119°	48°	14.22	53.84	4.50	2,200	3,738
300/350	850	230	116°	47°	23.20	87.82	3.30	3,800	6,457

TABLE B - High Speed Fan Setting

Size	Approx. Fan rpm	MBH Output	Leaving Air Temp. (LAT) °F	Leaving Air Temp. (LAT) °C	Water Flow Gal. per Minute	Water Flow Liters per Minute	WPD feet of water	Air Volume cfm	Air Volume (m^3/hr)
18/24	1,550	19	104°	40°	1.92	7.27	0.11	400	680
23/33	1,600	24	104°	40°	2.42	9.16	0.04	500	850
44/62	1,600	45	108°	42°	4.54	17.18	0.15	860	1,461
60/85	1,600	64	107°	42°	6.46	24.45	0.45	1,250	2,124
78/110	1,600	82	106°	41°	8.27	31.30	0.95	1,650	2,804
96/120	1,080	89	113°	45°	8.98	33.99	1.30	1,550	2,634
140/175	1,080	131	112°	45°	13.22	50.04	2.80	2,300	3,908
190/238	1,080	177	117°	47°	17.86	67.60	7.00	2,850	4,842
300/350	1,080	276	114°	45°	27.84	105.37	4.80	4,750	8,071

TABLE C - Hot Water Correction Factors for EAT and EWT different from cataloged information

Entering Air Temperature (EAT)		Entering Water temperature with 20° Temperature Drop										
		100	**120**	**140**	**160**	**180**	**200**	**220**	**240**	**260**	**280**	**300**
30°F	**-1°C**	0.462	0.615	0.769	0.923	1.077	1.231	1.385	1.538	1.692	1.846	2.000
40°F	**4°C**	0.385	0.538	0.692	0.846	1.000	1.154	1.308	1.462	1.615	1.769	1.923
50°F	**10°C**	0.308	0.462	0.615	0.769	0.923	1.077	1.231	1.385	1.538	1.692	1.846
60°F	**16°C**	0.231	0.385	0.538	0.692	0.846	1.000	1.154	1.308	1.462	1.615	1.769
70°F	**21°C**	0.154	0.308	0.462	0.615	0.769	0.923	1.077	1.231	1.385	1.538	1.692
80°F	**27°C**	0.077	0.231	0.385	0.538	0.692	0.846	1.000	1.154	1.308	1.462	1.615
90°F	**32°C**	0.000	0.154	0.308	0.462	0.615	0.769	0.923	1.077	1.231	1.385	1.538
100°F	**38°C**	0.000	0.077	0.231	0.385	0.538	0.692	0.846	1.000	1.154	1.308	1.462

TABLE D - Hot Water Correction Factors for WTD different from cataloged information

Water Temp. Drop	5°F	10°F	15°F	20°F	25°F	30°F	35°F	40°F	45°F	50°F	55°F	60°F
MBH Correction Factor	1.25	1.15	1.08	1.00	0.95	0.89	0.87	0.84	0.80	0.78	0.74	0.73
GPM Correction Factor	5.00	2.30	1.44	1.00	0.74	0.59	0.49	0.40	0.35	0.30	0.27	0.24

TABLE E - Hot Water Conversion Factors for Water Flow different from cataloged information

% Water Flow*	25%	50%	75%	100%	125%	150%	175%
MBH Correction Factor	0.80	0.89	0.96	1.00	1.04	1.07	1.10

Calculate % of Water Flow by dividing actual water flow in GPM by the "cataloged" water flow.

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ENGINEERING DATA (cont'd)

HOT WATER CAPACITIES, CALCULATIONS AND CORRECTION FACTORS

The heating output of any particular installation is a function of many different factors. It is very seldom that any installation will exactly match the conditions described in the tables on the previous page. For those installations, correction factors must be used to determine heating output and other values.

Below is an example of conditions different from those given in TABLE A and B on the previous page. Following are procedures for determining heating output and other values at conditions other than "cataloged" conditions.

Example:	Unit	Reznor Model 23/33
	Entering Water Temperature (EWT)	160°F
	Entering Air Temperature (EAT)	40°F
	Water Temperature Drop (WTD)	10°F

I.	In TABLE B find the Heating Capacity for "catalog" conditions with High Speed Fan Setting	24,000 BTUH
II.	Determine Heating Capacity for EWT at 160°F and EAT of 40°F	24,000 BUTH x 0.846 = 20,304 BTUH
	Find the correction factor in TABLE C that satisfies the conditions listed. In this instance, it is 0.846. Multiply original BTUH output by the correction factor.	
III.	Determine Heating Capacity for WTD of 10°F	20,304 BTUH x 1.15 = 23,350 BTUH
	Find the correction factor in TABLE D that satisfies the conditions listed. In this instance it is 1.15. Multiply BTUH output by the correction factor.	
IV.	Determine Gallons per Minute (GPM) at 200°F EWT, 60°EAT, but with WTD of 10°F	2.42 GPM
	Find the GPM from TABLE B for "catalog" conditions with High speed Fan Setting	
	In TABLE D find the GPM Correction Factor for WTD of 10°F. In this case it is 2.30. Multiply original GPM by the correction factor.	2.42 GPM x 2.30 = 5.57 GPM
	Note: This formula applies only to units with 200°F EWT and 60°F EAT. For all other applications, use the formula shown (right):	GPM = BTUH ÷ (500 x WTD)
	Determine GPM for installation described in step III above at 10°F	23350 ÷ (500 x 10°F WTD) = 4.67 GPM
V.	Determine Water Pressure Drop (WPD) in Feet of Water at 10°F WTD	4.67 GPM
	Find the GPM from step IV above	
	On the Heat Exchanger Resistance Chart on page 6, find the WPD at 4.67 GPM on the left side axis. Follow it until it meets the line for Model WS23/33. From that point, follow the line down to the bottom axis to determine the WPD at 176°F mean water temperature.	0.14 FT H_2O (as marked)
	Determine the Correction Factor (K). The above example started with an EWT of 160°F and WTD of 10°F. That would result in water temperature at 150°F as it leaves the heater. Find the mean (average water temperature).	(160°F + 150°F) ÷ 2 = 155°F
	Find the Correction Factor (K) for the value nearest 155°F. At 158°F the Correction Factor (K) is 1.05. Multiply 1.05 by the WPD found on the chart 0.14 FT H_2O.	0.14 FT H_2O x 1.05 = 0.147 FT H_2O
VI.	Determine Heating Capacity for water flow rate of 3.03 GPM	24,000 BUTH
	Determine the Heating Capacity from TABLE B for "catalog" conditions with High Speed Fan Setting	
	Divide actual flow rate in GPM by cataloged flow rate found in TABLE B.	3.03 GPM ÷ 2.42 GPM = 125%
	In TABLE E find the MBH Correction Factor for a flow rate of 125%. In this case it is 1.04. Multiply original MBH by the correction factor.	24,000 BTUH x 1.04 = 24,960 BTUH
VII.	Determine Leaving Air Temperature (LAT) using the formula shown (right):	LAT = EAT+ BTUH ÷ (CFM x 1.085)
	In TABLE B find the Air Volume (cfm) for "cataloged" model and apply it conditions described in Step III above.	40°F + (23,350 BTUH ÷ (500 cfm x 1.085)) = 83°F

To obtain Pressure Loss Feet of water for other GPM see the graphic data on page 6.

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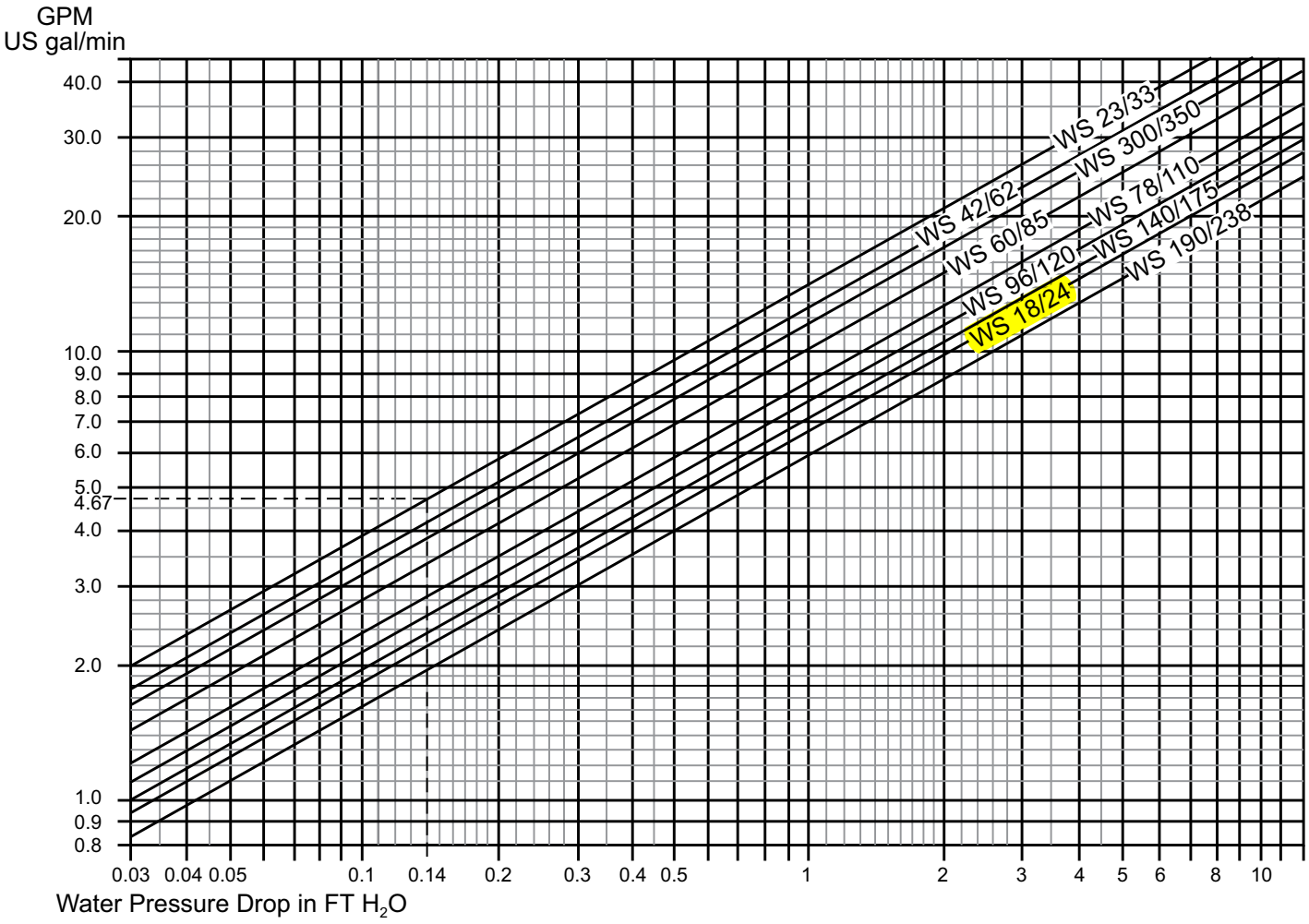
ENGINEERING DATA (cont'd)

HEAT EXCHANGER RESISTANCE CHART

The following table indicates the Water Pressure Drop (WPD) in FT H_2O for each model for a mean water temperature of 176°F (80°C)

- Mean water temperature - °F, °C
- Correction Factor - K

°C	°F	K
50	122	1.15
60	140	1.10
70	158	1.05
80	176	1.00
90	194	0.95
100	212	0.89
110	230	0.83
120	248	0.78
130	266	0.72
140	284	0.67
150	302	0.61



ENGINEERING DATA (cont'd)

TERMS, ABBREVIATIONS AND FORMULAS

Following is a list of terms, abbreviations and formulas to assist in specifying the correct size hydronic heating equipment for a specific application. All terms and abbreviations apply to both steam and hot water heating unless otherwise noted.

ATR Air Temperature Rise - The difference between the Entering Air Temperature (EAT) and the Leaving Air Temperature (LAT) due to the amount of heat added.

BTUH British Thermal Units per Hour - The common measure of heating output or capacity.

CFM Cubic Feet per Minute - The volume of air moved through the heater.

COND Condensate - The amount of water that results from removing heat from steam, measured in Pounds per Hour (lb/hr) - steam heat only.

EAT Entering Air Temperature - The temperature of the air just before it passes through the heat exchanger.

EDR Equivalent Direct Radiation - A measure of heat output measured in square feet - steam heat only.

EWT Entering Water Temperature - The temperature of the water as it enters the heat exchanger - hot water heat only.

FPM Feet Per Minute - The measure of the velocity of air as it leaves the heater.

GPM Gallons Per Minute - The measure of the flow of water that passes through the heat exchanger - hot water heat only.

L Latent heat of steam - steam heat only.

LAT Leaving Air Temperature - The temperature of the heated air just after it passes through the heat exchanger.

LWT Leaving Water Temperature - The temperature of the water as it leaves the heat exchanger - hot water heat only.

MBH One thousand BTUH

PSI Pounds per Square Inch - The measure of the pressure of steam in pipes - steam heat only.

RPM Rotations Per Minute - The number of rotations the fan will make in one minute.

WPD Water Pressure Drop - The resistance to the flow of water through a system created by friction between the water and piping - hot water heat only.

WTD Water Temperature Drop - The difference between the Entering Water Temperature (EWT) and the Leaving Water Temperature (LWT) due to the amount of heat removed - hot water heat only.

ATR = BTUH ÷ (CFM x 1.08)

LAT = EAT + BTUH ÷ (CFM x 1.08)

GPM = BTUH ÷ (WTD x 500)

WTD = BTUH ÷ (GPM x 500)

COND = BTUH ÷ L

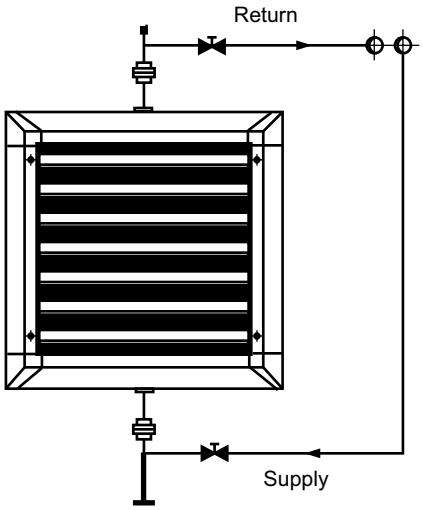
COND = EDR ÷ 4

EDR = BTUH ÷ 240 (at 2 psi only)

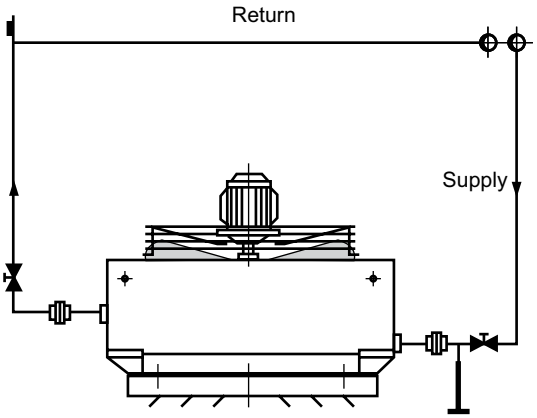
RECOMMENDED INSTALLATION

DETAILS FOR PIPING CONNECTIONS

Hot Water Connections

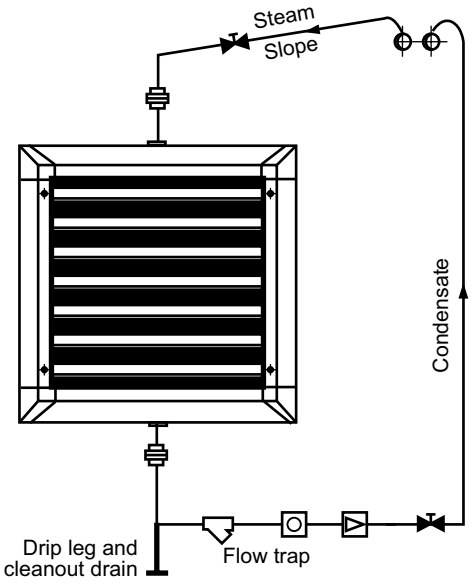


Horizontal Discharge Units

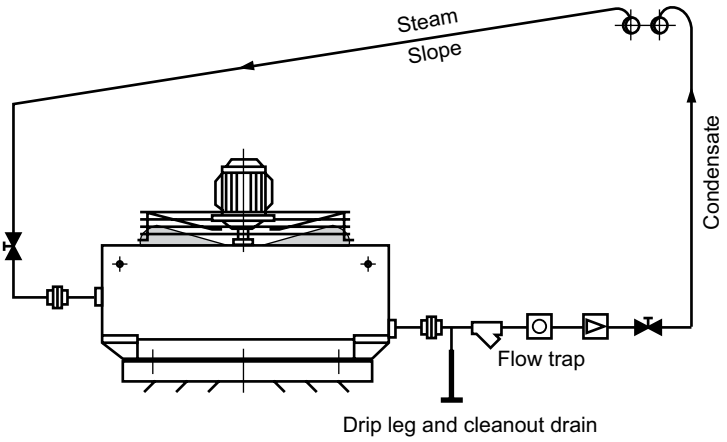


Vertical Discharge Units

Steam Connections



Horizontal Discharge Units



Vertical Discharge Units

LIMITED PRODUCT WARRANTY

Reznor, LLC warrants to the original owner-user that this Reznor product will be free from defects in material or workmanship. This warranty is limited to twelve (12) months from the date of original installation, whether or not actual use begins on that date, or eighteen (18) months from date of shipment by Reznor, LLC, whichever occurs first.

EXTENDED WARRANTY

(Limited to the following Models, Components, and Applications.)

Model WS — Extended one (1) year non-prorated warranty on the heat exchanger assembly. If leaks or other failure occur within the warranty period, Reznor, LLC will pay up to $50 for qualified contractor to make necessary repairs. If the heat exchanger cannot be repaired, Reznor, LLC will exchange the damaged unit for a new hydronic heater.

LIMITATIONS AND EXCLUSIONS

Reznor, LLC obligations under this warranty and the sole remedy for its breach are limited to repair, at its manufacturing facility, of any part or parts of its Reznor products which prove to be defective; or, in its sole discretion, replacement of such products. All returns of defective parts or products must include the product model number and serial number, and must be made through an authorized Reznor distributor or arranged through Reznor Customer Service. Authorized returns must be shipped prepaid. Repaired or replacement parts will be shipped by Reznor, LLC F.O.B. shipping point.

1. The warranty provided herein does not cover charges for labor or other costs incurred in the troubleshooting, repair, removal, installation, service or handling of parts or complete products.
2. All claims under the warranty provided herein must be made within ninety (90) days from the date of discovery of the defect. Failure to notify Reznor, LLC of a warranted defect within ninety (90) days of its discovery voids Reznor, LLC obligations hereunder.
3. The warranty provided herein shall be void and of no effect in the event that (a) the product has been operated outside its designed output capacity (heating, cooling, airflow); (b) the product has been subjected to misuse, neglect, accident, improper or inadequate maintenance, corrosive environments, environments containing airborne contaminants (silicone, aluminum oxide, etc.), or excessive thermal shock; (c) unauthorized modifications are made to the product; (d) the product is not installed or operated in compliance with the manufacturer's printed instructions; (e) the product is not installed and operated in compliance with applicable building, mechanical, plumbing and electrical codes; or (f) the serial number of the product has been altered, defaced or removed.
4. The warranty provided herein is for repair or replacement only. Reznor, LLC shall not be liable for any loss, cost, damage, or expense of any kind arising out of a breach of the warranty. Further, Reznor, LLC shall not be liable for any incidental, consequential, exemplary, special, or punitive damages, nor for any loss of revenue, profit or use, arising out of a breach of this warranty or in connection with the sale, maintenance, use, operation or repair of any Reznor product. In no event will Reznor, LLC be liable for any amount greater than the purchase price of a defective product. The disclaimers of liability included in this paragraph 4 shall remain in effect and shall continue to be enforceable in the event that any remedy herein shall fail of its essential purpose.
5. THIS WARRANTY IS THE SOLE AND EXCLUSIVE WARRANTY FOR REZNOR PRODUCTS, AND IS IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES. REZNOR, LLC SPECIFICALLY DISCLAIMS ALL OTHER EXPRESS AND IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. No person or entity is authorized to bind Reznor, LLC to any other warranty, obligation or liability for any Reznor product. Installation, operation or use of the Reznor product for which this warranty is issued shall constitute acceptance of the terms hereof.

REZNOR®

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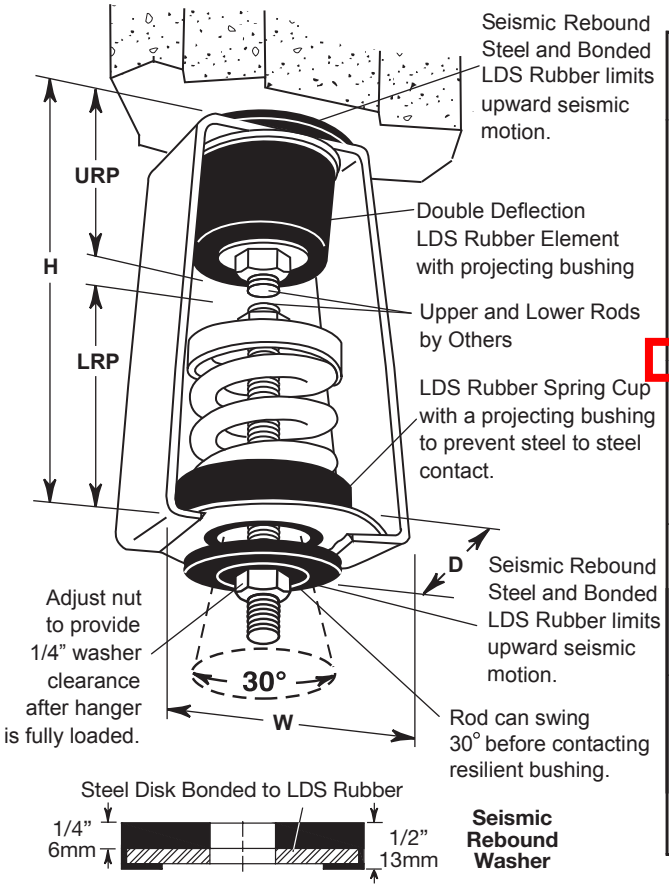
JOB NAME Marcus Daly Surgery Remodel Specification Hydronic Unit Heaters
CUSTOMER 4G's Plumbing & Heating
CUSTOMER P.O.
MASON M.I.
DWG. NO.

RW30N

1" (25mm)Defl. X, A, B, C, D & F Series Seismic Hangers



TYPE RW30N RATINGS

Size	Rated Capacity (lbs)	(kg)	Rated Defl.† (in)	(mm)	Spring Constant†† (lbs/in)	(kg/mm)	Avg. Defl. LDS (in)	(mm)	Spring Color/ Stripe
RW30N-X-12	12	**5**	1.45	**37**	10	**0.18**			Orange
RW30N-X-23	23	**10**	1.50	**38**	18	**0.30**			Brown
RW30N-X-33	33	**15**	1.30	**33**	30	**0.54**			Copper
RW30N-X-54	54	**24**	1.40	**36**	45	**0.80**			White
RW30N-X-76	76	**34**	1.22	**31**	73	**1.36**	0.20	**5.1**	Black
RW30N-X-113	113	**51**	1.20	**30**	113	**2.04**			Brass
RW30N-X-130	130	**59**	1.20	**30**	130	**2.36**			Purple
RW30N-X-175	175	**79**	1.20	**30**	175	**3.16**			Silver
RW30N-X-210	210	**95**	1.20	**30**	210	**3.80**			Blue
RW30N-A-12	12	**6**	1.10	**28**	12	**0.20**			Brass
RW30N-A-18	18	**8**	1.18	**30**	18	**0.32**			Gray
RW30N-A-25	25	**11**	1.15	**29**	25	**0.44**			Orange
RW30N-A-41	41	**19**	1.53	**39**	35	**0.63**	0.35	**8.9**	Pink
RW30N-A-56	56	**25**	1.49	**38**	49	**0.83**			Black
RW30N-A-73	73	**33**	1.41	**36**	69	**1.22**			Tan
RW30N-A-95	95	**43**	1.36	**35**	94	**1.65**			Green
RW30N-B-138	138	**63**	1.67	**42**	105	**1.85**			White
RW30N-B-222	222	**101**	1.51	**38**	191	**3.48**			Blue
RW30N-B-278	278	**126**	1.44	**37**	255	**4.50**	0.35	**8.9**	Purple
RW30N-B-336	336	**152**	1.35	**34**	336	**6.08**			Silver
RW30N-B-410	410	**186**	1.42	**36**	385	**6.89**			Black
RW30N-B-540	540	**245**	1.35	**34**	540	**9.80**			Yellow
RW30N-C-630	630	**286**	1.13	**29**	558	**9.86**			Gray
RW30N-C-800	800	**363**	1.00	**25**	800	**14.52**	0.40	**10**	Orange
RW30N-C-1010	1010	**458**	1.10	**28**	920	**16.36**			Green
RW30N-C-1265	1265	**574**	1.00	**25**	1265	**22.96**			Red
RW30N-D-1575	1575	**714**	1.23	**31**	1280	**23.03**	0.40	**10**	Pink
RW30N-D-2150	2150	**975**	1.03	**26**	2095	**37.50**			Purple
RW30N-F-2760	2760	**1252**	1.00	**25**	2760	**50.08**	0.40	**10**	Silver

† includes double deflection LDS element.
†† applies to spring only.

TYPE RW30N DIMENSIONS

Size Range	D (in)	(mm)	H (in)	(mm)	W (in)	(mm)	LRP (in)	(mm)	URP (in)	(mm)	MRD (in)	(mm)
RW30N-X-12-210	2 1/2	**64**	5 1/2	**140**	2 7/8	**73**	3 1/4	**83**	1 3/4	**44**	3/8	**10**
RW30N-A-12-25	2 3/4	**70**	6 3/4	**171**	3 1/4	**83**	3 1/4	**83**	2 1/4	**57**	5/8	**16**
RW30N-A-41-95	2 3/4	**70**	6 3/4	**171**	3 1/4	**83**	3 5/8	**92**	2 1/4	**57**	5/8	**16**
RW30N-B-138-540	4	**102**	6 3/4	**171**	4 3/4	**121**	3 3/4	**95**	2 3/4	**70**	5/8	**16**
RW30N-C-630-1265	4 3/4	**121**	9	**229**	5 1/4	**133**	5	**127**	3	**76**	3/4	**19**
RW30N-D-1575-2150	4 3/4	**121**	12 1/2	**318**	5 3/4	**146**	7	**178**	4 1/4	**108**	7/8	**22**
RW30N-F-2760	6	**152**	14 1/2	**368**	6 1/4	**159**	7	**178**	5	**127**	7/8	**22**

LDS stands for **L**ow **D**ynamic **S**tiffness
Bridge Bearing Natural Rubber to minimize noise and vibration transmission.

LRP - Lower Rod Penetration
URP - Upper Rod Penetration
MRD - Maximum Rod Diameter

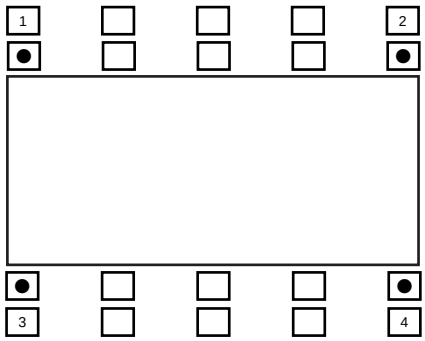
All springs have additional travel to solid equal to 50% of Rated Deflection.
Hanger elements have straight line deflection curves

PLAN VIEW OF HANGER LOCATIONS

TAG: **UH-AHU9, UH-AHU10, UH-159, UH-185, UH-157**

UNIT: **WS-18/24**

Click with mouse for each location >



1" **SPECIFIED DEFLECTION**

1:	**RW30N-A-12**	6:	
2:	**RW30N-A-12**	7:	
3:	**RW30N-A-12**	8:	
4:	**RW30N-A-12**	9:	
5:		10:	
Sets Required:	**5**		

Certification Form S-664 04/2009	DWN	CHKD	DATE	DWG No.