

# Series EHU-800 Humidifier

## Installation and Operation Manual



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# Series EHU-800 Humidifiers

The Armstrong Series EHU-800 humidifier is a non-pressurized, steam-generating humidifier that is controlled electronically. The vapor produced by the EHU-800 is discharged into the duct of an air-handling system or through a fan package. The Armstrong Series EHU-800 consists of three models: EHU-801, 803 and 804. The maximum capacity of the series is 242 lbs/h (110 kg/h).

To allow the Series EHU-800 humidifier to function to its full capability, be certain to install it in accordance with the following Armstrong recommendations. For further assistance, please contact your local Armstrong representative. The EHU-800 installation, operation and maintenance manual contains all details necessary for the planning and installation of the EHU-800 humidifier. Commissioning and maintenance details are also included within this document.

The EHU-800 installation, operation and maintenance bulletin manual is intended to be used by engineers and properly trained technical personnel. Maintenance, servicing or repair work must only be performed by skilled and qualified personnel. The customer will be responsible for ensuring their suitability any risks or hazards, especially when working from ladders or towers should be identified by a skilled and Health and Safety representative and effective control measure put in place.

No liability will attach to the Distributor if any damage, injury or accident is attributable to inattentive, inappropriate, negligent or incorrect operation of the machinery whether or not caused deliberately. Always isolate all electrical and water supplies before commencing any maintenance.

Every effort has been made to ensure details contained in this manual are correct, however in view of the wide range of conditions experienced in air handling systems; the information provided should only be used as a guide. Please contact the Armstrong factory if any doubt.

**Please read and save these instructions.**

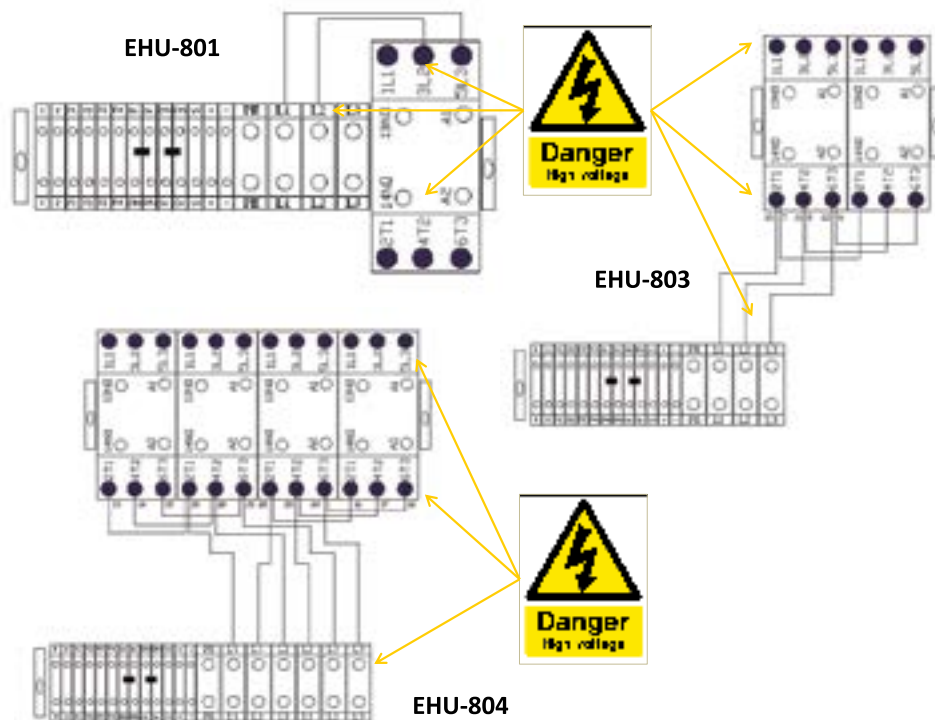
**Please complete the prestart-up checklist  
located at the back of this document.  
Retain checklist for future reference.**

# About the Series EHU-800

To protect yourself and others from accidental shocks:

- 1** Keep the humidifier locked during normal operation and store the key in a safe location away from the humidifier.
- 2** The electric cabinet can be opened by qualified personnel only.
- 3** **ALWAYS DISCONNECT THE POWER SUPPLY AT THE CIRCUIT BREAKER OR SAFETY SWITCH BEFORE OPENING ANY COVERS!**
- 4** Before servicing the humidifier, learn where the high voltage parts are.
- 5** **KEEP HANDS AND METAL TOOLS AWAY FROM THESE AREAS!**

**Warning:** High voltages are present inside the humidifier. All work concerned with the electrical installation must be carried out by skilled and qualified personnel. All wiring and installation must be completed by qualified personnel only and per the relevant local or national codes on electrical wiring. Negligence of this warning might result in the loss of property or personal damage.



# About the Series EHU-800



**Warning:** High Temperature (About 212°F (100°C)! Human bodies or other articles that are not resistant to high temperature should keep away from contacting or getting near this place. Negligence of this warning might result in the loss of property or personal damage.

**Warning:** Do not operate the supplied humidifier in combustible or explosive surroundings.

**Warning:** Do not operate the supplied humidifier when there's damage to the cabinet or to any part or component.



Transportation and storage conditions: Electrical equipment shall be designed to withstand, or suitable precautions shall be taken to protect against, the effects of transportation and storage temperatures within a range of -13°F (-25°C) to +70°F (+55°C) and for short periods not exceeding 24h at up to +158°F (+70°C). Suitable means shall be provided to prevent damage from humidity, vibration, and shock.

Requirements: Isolate the electrical equipment from the supply and have one OFF (isolated) and one ON position only, clearly marked with “O” and “I” (symbols 60417-2-IEC-5008 and 60417-2-IEC-5007, see 10.2.2), with the actuating directions in accordance with IEC60447. Circuit-breaker that, in addition, has a reset (tripped) position between “O” and “I” are also deemed to satisfy this requirement;

# About the Series EHU-800

- Have a visible gap or a position indicator that cannot indicate OFF (isolated) until all contacts are actually open and there is an adequate isolating distance between all the contacts in accordance with IEC 60947-3;
- Have an external operating means (e.g. handle), (**exception:** power-operated switchgear need not be operable from outside the enclosure where there are other means to open it). The handle should be BLACK or GREY
- Be provided with a means permitting it to be locked in the OFF (isolated) position (e.g. by padlocks). When locked, remote as well as local closing shall be prevented;
- The handle of the supply-disconnecting switch shall be located between 0.6m and 1.7m above the servicing level.
- The disconnecting switch must have overcurrent and overload protecting functions to initialize them as low as possible under normal running.
- This disconnecting switch should have leakage current protecting function. The max leakage current should be less than 30mA.
- The disconnecting switch should have a breaking capacity sufficient to interrupt the largest normal running current of loads. The breaking capacity required should be selected according to the table given below:

# Description of Nameplate

ARMSTRONG STEAM HUMIDIFIER

CE Markings: C, E, TÜV Rheinland, US

MODEL: [ ] SERIAL NUMBER: [ ] DATE MFD.: [ ]

VOLTS: [ ] PHASE: [ ] 50/60 HZ AMPS: [ ] LB/HR: [ ]

USE [ ] AMP BREAKER OR FUSE

Armstrong®

ARMSTRONG INTERNATIONAL, INC.  
THREE RIVERS, MI 49093, USA

1. Description of the Product: STEAM HUMIDIFIER
2. Certificate mark
3. Product Model: including EHU 801, EHU 803 and EHU 804
4. Product Serial Number: composed by Year & Month (6-digit) and the ex-works number (3-digit)
5. Date of Manufacturing: date when this humidifier is manufactured
6. Rated Voltage: rated voltage of the humidifier in Voltage (V)
7. Phase: number of phases of the alternating voltage power supply
8. Rated Current: rated current of the humidifier in Amperage (A)
9. Steam Output: steam output of the humidifier in lbs/h (kg/h)
10. Rated Power: rated power of the humidifier in kW
11. Product Weight: weight of the humidifier in lbs (kg) before water filling
12. Trademark: Armstrong's registered trademark

**Accreditation (UL, CCC, CE)**  
**Material Accreditation**  
**Delivery contents**  
**Check Shipment and Local Codes.**

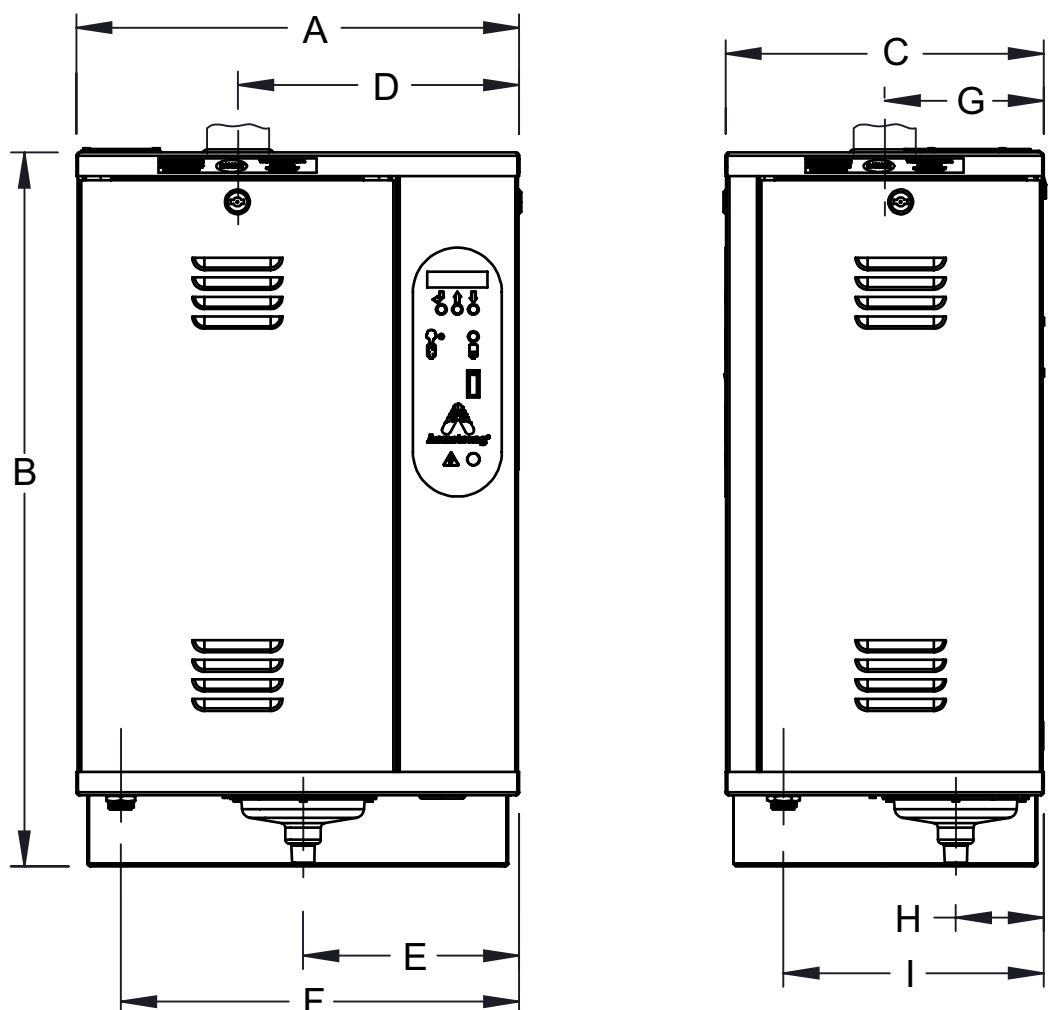
A claim should be filed with the transportation company, (and reported to Armstrong), if any items are missing or damaged.

The installation of EHU should be in accordance with all applicable building, plumbing, and electrical codes.



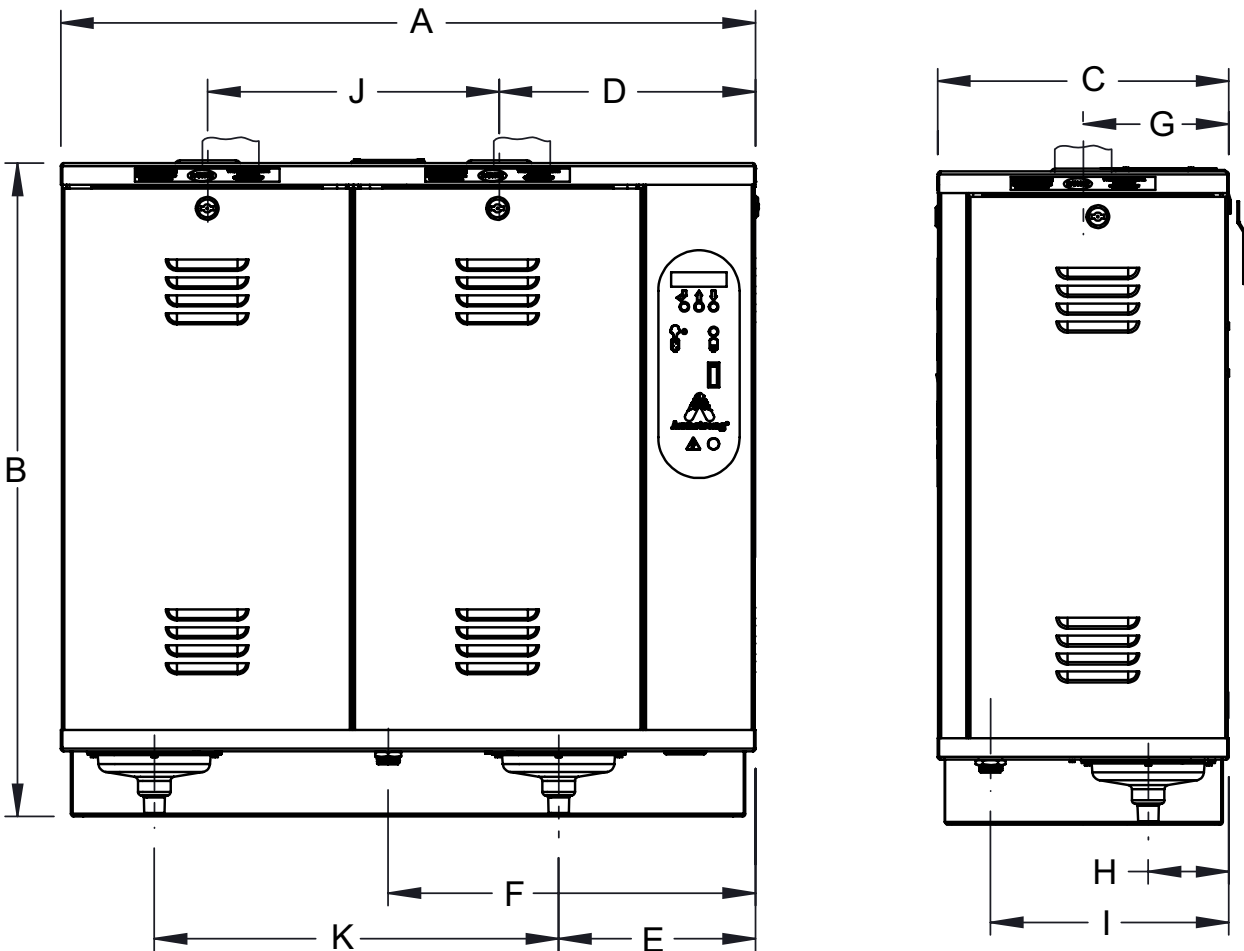
# Dimensions and Weight

	Dimensions in (mm)											Weight kg (lb)	
	Humidifier			Steam Outlet (X)	Drain Outlet (X)	Water Inlet (X)	Steam Outlet (X)	Drain Outlet (X)	Water Inlet (X)	Steam Outlet Spacing	Drain Outlet Spacing	Emptying	Operating
Model	A	B	C	D	E	F	G	H	I	J	K		
EHU-801	16.3 (413)	25.5 (647)	9.96 (253)	10.8 (274)	9.56 (243)	3.66 (93)	4.96 (126)	3.78 (96)	7.40 (188)			42 (19)	55 (25)
EHU-803	19.6 (498)	31.8 (807)	14.1 (358)	12.4 (316)	9.29 (236)	17.5 (451)	7.05 (179)	3.9 (99)	11.5 (293)			70 (32)	126 (57)
EHU-804	33.6 (854)	31.8 (807)	14.1 (358)	12.4 (316)	9.29 (236)	17.5 (451)	7.05 (179)	3.9 (99)	11.5 (293)	14.1 (358)	20.4 (518)	110 (50)	220 (100)



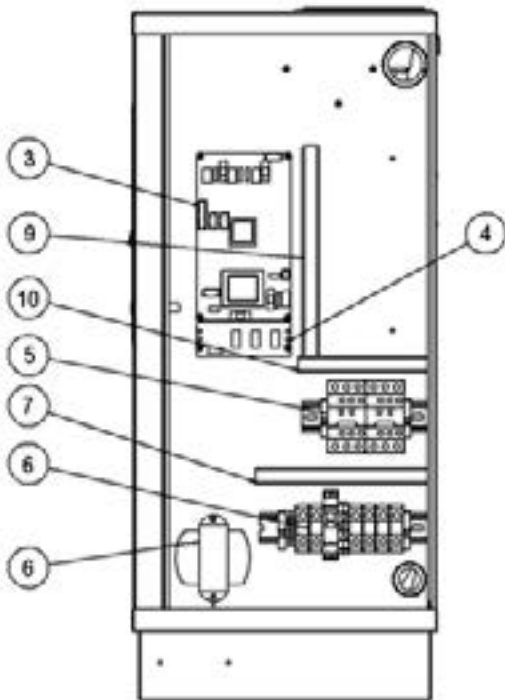
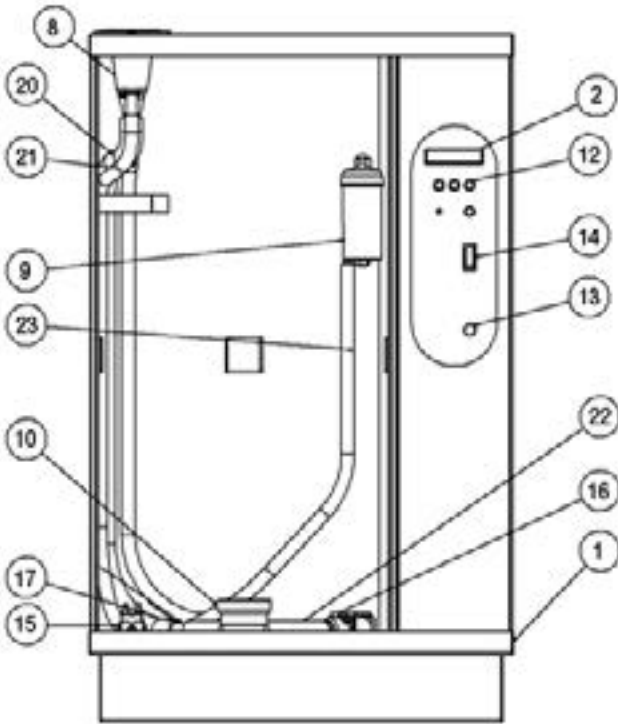
Designs, materials, weights and performance ratings are approximate and subject to change without notice. Visit [armstronginternational.com](http://armstronginternational.com) for up-to-date information.

# Dimensions and Weight



Designs, materials, weights and performance ratings are approximate and subject to change without notice. Visit [armstronginternational.com](http://armstronginternational.com) for up-to-date information.

# Humidifier Components Part Overview



No.	Part Description	Part Number		
		801	803	804
1	EHU-800 Cabinet	D51313	D51314	D51315
2	PCB Display	D50927	D50927	D50927
3	PCB Main Board	D121389	D121389	D121388
4	PCB 2TI (804 Only)	*	*	D50930
5	Contactor	D50932	D50932	D50932
6	Transformer	*	*	*
7	Wire Way	D11103	D11103	D11103
8	Fill Cup	D43662	D43662	D43662
9	High Water Float Switch	B2582A-1	B2582A-1	B2582A-2
10	Tank Adapter	C2042	C2078	C2078
11	Drain Cup	D51316	D51316	D51316
12	Front Label	D54297	D54297	D54297
13	LED Power	D50926	D50926	D50926
14	Switch on-off	D50925	D50925	D50925
15	Fill Valve	D64032	D64032	D64032
16	Drain Valve	B2004C	B2004C	B2004C
17	Tee 5/8 x 5/8 x 3/8	A9472	A9472	A9472
18	Drain Cup Gasket	D51317	D51317	D51317
19	Cabinet Bracket	D59775	D59776	D59777
20	Braided hose 7/8"	D54300	D54300	D54300
21	Braided hose hose 5/8"	D54301	D54301	D54301
22	Tube, adapter to drain 5/8"	A8567-10	A8567-10	A8567-10
23	Tube, tee to float switch 3/8"	A9016A-8	A9016A-2	A9016A-2

Transformer Table			
No.	Part No.	Description/Voltage	Model Used On
6	C1833	Power Transformer (120V)	801, 803, 804
6	C1833F	Power Transformer (208V)	801, 803, 804
6	C1833G	Power Transformer (240V)	801, 803, 804
6	C1833C	Power Transformer (277V)	801, 803, 804
6	C1833H-1	Power Transformer (346V)	801, 803, 804
6	C1833D	Power Transformer (380V)	801, 803, 804
6	C1833H-2	Power Transformer (415V)	801, 803, 804
6	C1833B	Power Transformer (480V)	801, 803, 804
6	C1833A	Power Transformer (600V)	801, 803, 804

Designs, materials, weights and performance ratings are approximate and subject to change without notice. Visit [armstronginternational.com](http://armstronginternational.com) for up-to-date information.

# Preparation and Installation

## Site selection

The humidifier should be installed in an easily accessible location. Do not install the unit where malfunction of the humidifier might cause damage to non-repairable, irreplaceable or priceless property. Refer to Installation section for other details regarding site selection.

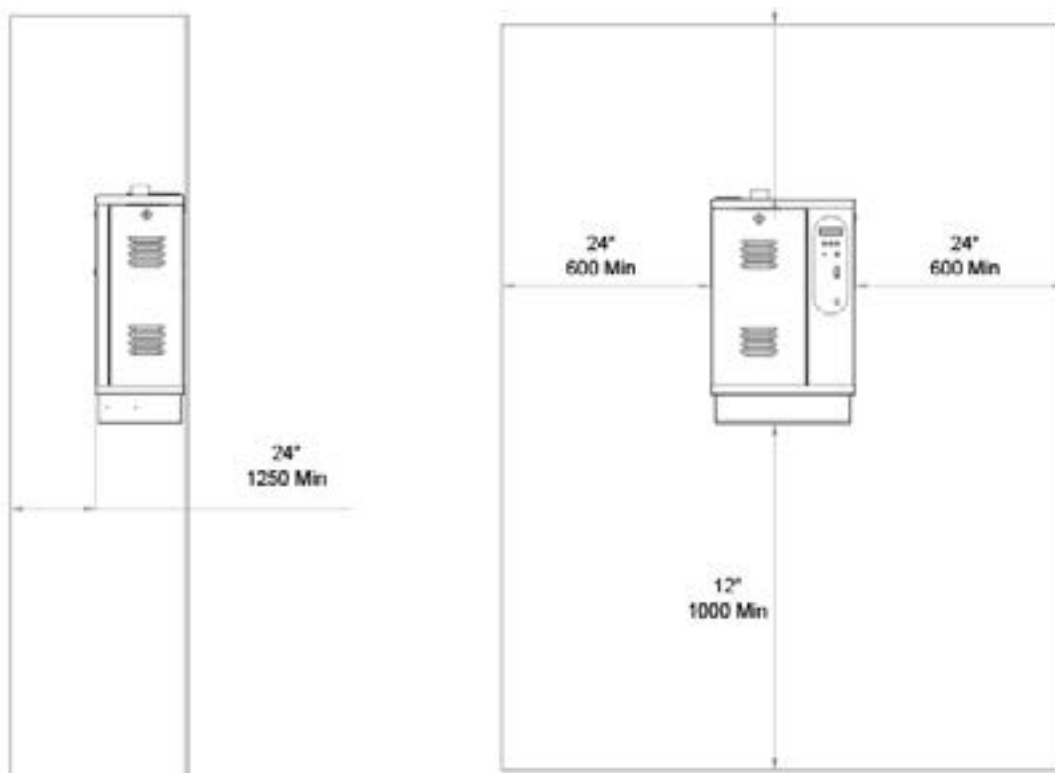
**Do not place electronic steam humidifiers in locations where unusual instances of malfunction of the humidifier or the system might cause damage to non-repairable or un-replaceable, or priceless property.**

The mounting surface should be a wall capable of supporting the maximum humidifier weight. Please refer to page 9 for maximum operating weight. The location chosen should be inside with a minimum ambient temperature of 40°F (+4°C) and a maximum of 100°F (+38°C). The humidifier should not be mounted on hot surfaces.

The location should be close enough to the air duct so that the length of steam pipe is as short as possible. A length of 10ft (3m), or less is ideal; the maximum recommended length for running distribution piping is 40ft (12m) of equivalent run. The number of piping elbows in the installation should be minimized.

The unit should have ready access to electrical service, a supply of ordinary tap water, and a sewer so the drain line can discharge hot waste water.

The Armstrong's humidifiers have been developed to be hung on a wall. Before installation, make sure that the surface material is strong enough to hold the humidifier. The humidifier performs best when the steam discharge is made at short distance from the humidifier. Consider free space around the humidifier to allow easy access for maintenance purposes, see the next drawing for the dimensions.



**NOTE:** Please contact factory for duct applications offering high static pressure (>4" WC).

# Water Quality and Treatment

Series EHU 800 electronic humidifiers use ordinary tap water for operation. The quality of water affects both the operation and the maintenance of the humidifier.

## HOW THE EHU WORKS?

The EHU is an electrode boiler. When no water is present, the electrodes are separated by air, an insulator, and so no current flows. When tap water contacts the electrodes it conducts current between the electrodes thus heating the water.

The amount of current passes between the electrodes depends on the conductivity of the water, which is measured in micromhos/cm ( $\mu\text{Mhos/cm}$ ). EHUs can operate effectively with water conductivity in the range of 100 (low) to 400 (high)  $\mu\text{Mhos}$ .

The optimum incoming water conductivity level is 200-400  $\mu\text{Mhos/cm}$ . The greater the conductivity of the water, the lower its level will be in the tank in order to draw a given current. In general, the EHU-800 Series will adjust its drain cycle to maintain the water level around 1/3-1/2 full in the tank.

## WHAT AFFECTS CONDUCTIVITY?

The minerals (mainly calcium) dissolved in the water affects conductivity. Pure water is **NOT** conductive and can't be used in an EHU. This includes distilled, de-ionized and reverse osmosis diffusion treated water. Most tap water is conductive so it will work in an EHU.

## HOW DOES THIS AFFECT MAINTENANCE?

Generally, the more conductive the water is, the more dissolved minerals there are or suspended in it. As the water is boiled away, minerals remain as a deposit on the electrodes, tank, and fittings. Deposit build up can block valves, diminish the internal volume of the tank, and form an insulating barrier on the electrodes.

## THE EHU AUTOMATIC DRAIN CYCLE:

All Series EHU humidifiers have a built in blow down circuit to intermittently purge excess mineral accumulations from the water. The drain cycle should automatically adjust for variations in water quality. Eventually, however, minerals will accumulate in the steam generator, and will ultimately have to be removed (see tank cleaning in the maintenance section of this manual).

## WATER TREATMENT GUIDELINES FOR THE EHU:

Generally, the EHU will work with any potable water source. If you are experiencing problems with your installation, however the following suggestions may be helpful in identifying and rectifying your difficulty.

## WHEN WATER CONDUCTIVITY IS TOO LOW:

Indicators:

- Unable to reach humidity set point in space
- High water level in tank
- Low current draw even though the stat demand remains at 100%
- Consistent drain cycles of two seconds or less

Results:

- Excessive time needed to reach set point during start up
- Poor humidity control

Remedy:

- Add 1/2 teaspoon of Epsom salt to the fill cup. After start-up the automatic drain program should maintain the unit at full capacity
- If problem persists, contact the factory

## WHEN WATER CONDUCTIVITY IS TOO HIGH:

### Indicators:

- Water level just touching tip of electrodes.
- Arcing and foaming in the tank.
- Frequent drain cycles (every time the fill valve opens) that last up to 10 seconds.

### Results:

- Tank frequently needs cleaning.
- Poor control because of excessively low water level.
- Electrode destruction.

## Remedies

Softened water is not recommended for use with the Series EHU-800 Humidifiers.

Water softeners replace the calcium ions in the water with sodium ions. As softened water boils, the sodium ions stay in solution causing the conductivity of the water in the tank to increase rapidly.

**CAUTION:** Soft water may increase the tank's water conductivity and does not allow a protective coating to form on the electrodes. Also, as salts stay in the solution more drainage will be needed to maintain correct water conductivity in the tank.

**Discontinue service if continuous arcing or foaming occurs in the tank.**

Range Results in PPM			
	Excellent	Satisfactory	Problem
Alkalinity	Depends upon the amount of CO2 dissolved, acts as a buffer against pH changes		
Calcium Hardness	25 - 100	100 - 200	0-25 & Over 200
Chloride	0 - 20	20 - 400	Over 400
Chlorine			
Conductivity	100 - 300	300 - 400	0-100 & Over 400 (micromhos)
Total Hardness			
Hydrogen Sulfide	0 - 20	20 - 400	Over 400
Iron	0 - 0.2	0.2 - 0.5	Over 0.5
Nitrate/Nitrite			
pH	7	5.5 - 8.5	< 5.5 & > 8.5
Silica	<150	150	>150
TDS	50 - 150	150 - 200	0 - 50 & Over 200

# Installation

## Step 1 - Placing and wall attachment

MODEL EHU-801: Making sure the unit is level, hold it against the mounting surface and mark the whole pattern. Attach the units to studs or other sturdy structure with the two 3/8"× 1½" lag screws provided.

MODELS EHU-803 & 804: Making sure the mounting bracket is level; attach it to studs or other sturdy structure with the two 3/8"× 1½" lag screws provided. Hang the humidifier on the mounting bracket.

## Step 2 - Water connection

FILLING: Connect the unit to the building water supply (25 to 125 psig pressure). Install a shut-off valve near the humidifier. Connect the water supply to the 3/8" tube compression fitting on the fill valve adaptor.

**NOTE:** ORDINARY (POTABLE) TAP WATER IS RECOMMENDED. IF POTABLE WATER IS NOT AVAILABLE, CONSULT THE FACTORY

DRAINAGE: Connect to a suitable waste draining system. Use the clear drain hose provided and a 1" copper pipe, pitched 1" per foot. The drain water may be as hot as 160°F (70°C). Drain it where it will not present a hazard to personnel. An air gap to prevent backflow is required. If drain water is required to be less than 140°F (60°C), use of Temp-R-Drain will be required.

### WARNING!

**When unit is draining, burn hazard exists at the drain outlet.**

Human bodies or other articles that are not resistant to high temperature should keep away from contacting or getting near this place. Negligence of this warning might result in the loss of property or personal damage.

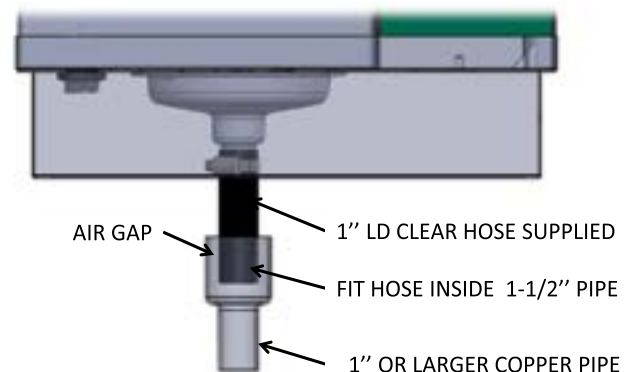
## Step 3 - Steam pipe positioning

Verify that the proper length and type of steam dispersion tube has been selected for proper dispersion tube lengths. The low capacity dispersion tube is sloped toward the generator to allow for gravity drainage. On applications where the humidifier output capacity is greater than 40 lbs/hr (18kg/hr), a high capacity tube with a ½" O.D. drain tube must be used. Drain tube must have minimum 6" water seal.

Select a location on the duct that provides adequate length for vapor mixing, the shortest connection length for vapor mixing, and the shortest connection length to the humidifier. Preferably the location should be 6" downstream and/or 10 feet upstream from any dampers, vanes, bends in the duct, or controllers (i.e. high limit stat). Do not install the dispersion tube into ducts in which airflow exceeds 2,000 fpm (10 m/s). Do not restrict airflow in ducts with a depth of 8 inches or less. Avoid placing manifold in downward, high velocity air flow as dynamic air pressure will restrict steam flow. Use the template provided to cut installation holes in the duct for the dispersion tube as in. Refer to Figure 17-2 and 17-3.

Insert the dispersion tube into the duct so the holes face upward. Fasten the mounting plate to the outside of the duct with sheet metal screws. If the dispersion tube is 36" long or more, support the far end with threaded rod or similar means.

Figure 16-1



EHU Dispersion Tube and  
EHU Dispersion Tube with Drain Tube.

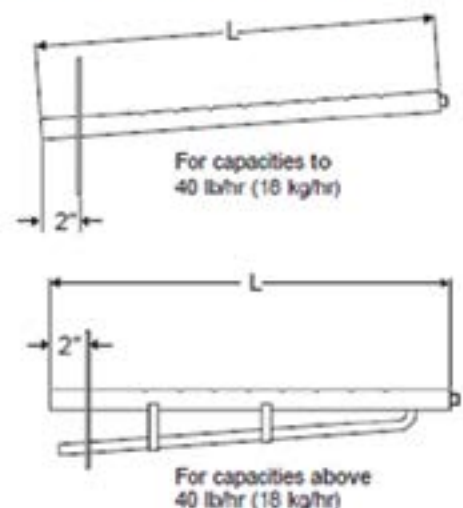


Figure 16-2

Figure 17-1

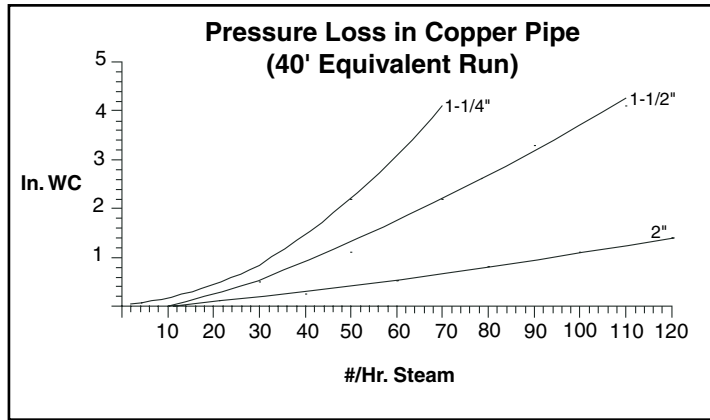


Table 17-1

Feet of Equivalent Copper Pipe for Copper Pipe Fittings			
Fitting	1-1/4	1-1/2	2
45° Elbow	1.0	2.2	2.8
90° Elbow	2.5	4.3	5.5
90° Long Elbow	1.5	2.7	3.5
Tee	5.0	9	12

Connect the dispersion tube to the steam generator using 1 1/2" (EHU-801) or 2" (EHU-803,804) nom. size hard copper tube (customer supplied) and the two short hoses supplied with the humidifier. See Figure 17-1 and chart 17-1. If piping plus duct back pressure exceeds 4" WC, please consult factory. In addition, a short length of nominal 1 1/2" threaded black iron pipe and a copper tube to female pipe thread adaptor must be supplied by the customer for attaching the piping to 803 or 804 tanks. A 1 1/2" to 1 1/4" reducer will be required to connect the dispersion tube to the steam pipe of Models EHU-803/804. See Figure 17-2.

Figure 17-2

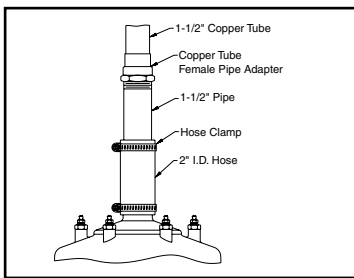
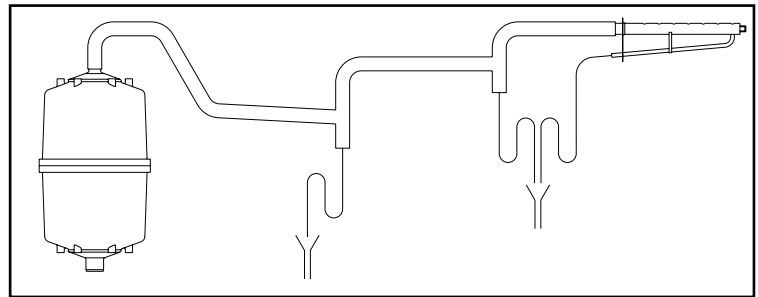


Figure 17-3



**The steam pipe must be free of kinks and sags to allow for gravity drainage of condensate. (Provide pitch of 1" per foot towards the unit.) Pipe supports may be required to accomplish this. Insulate the copper tube to minimize condensation.**

The preferred installation of the dispersion tube is above the humidifier with a maximum piping run of 20 feet (6m) or less.

Figure 17-3 shows the correct installation when:

Figure 17-4

- You cannot achieve a 1 inch (25.4mm) per foot reverse slope of the piping.
- Piping runs range from 20 (6m) to the maximum of 40 feet (12m) of equivalent run.
- Elbows or vertical risers must be placed in the piping.
- When steam dispersion tube is below the humidifier.



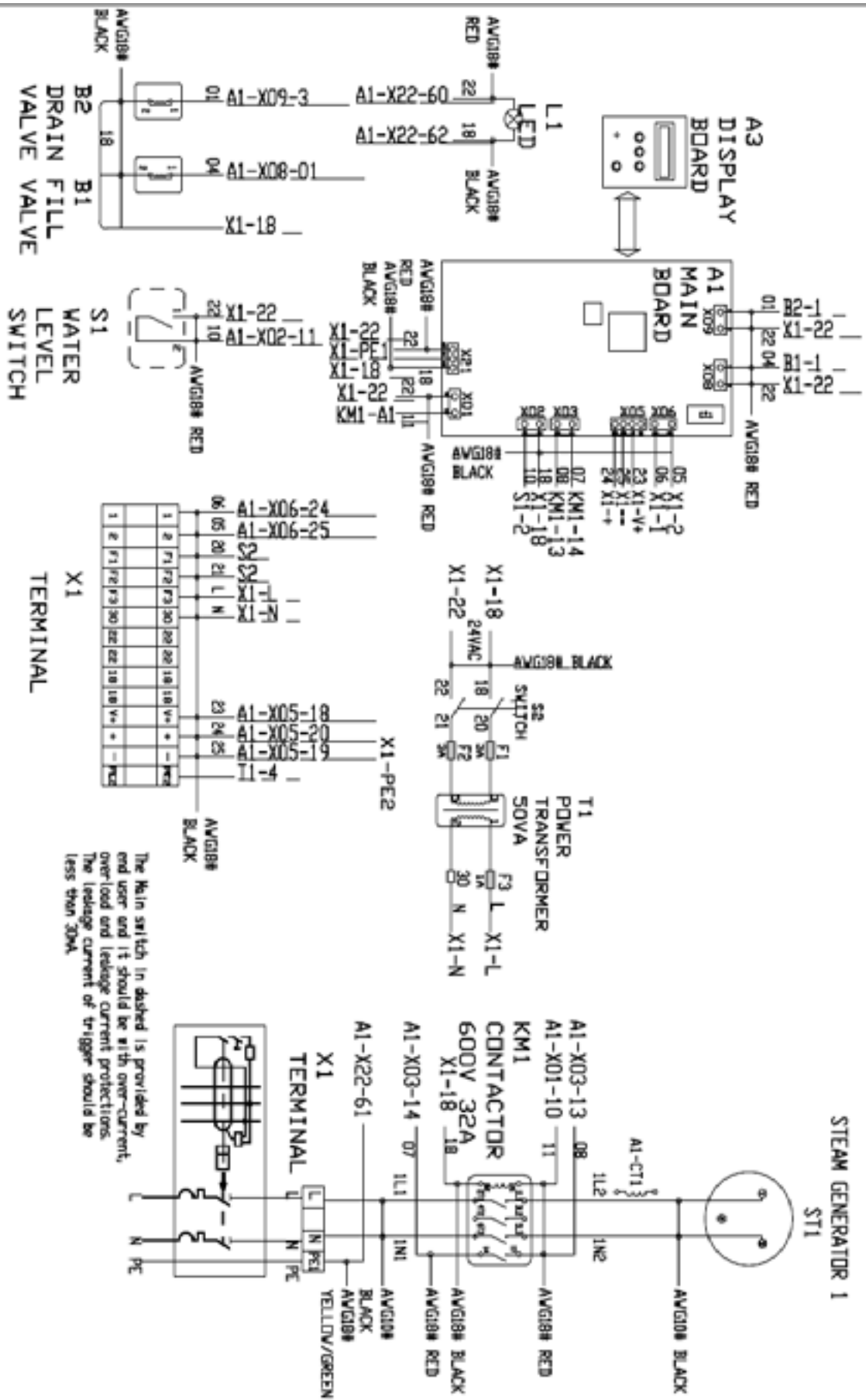


Connect dispersion tube(s) to EHU tank using 2" (5 cm) nominal insulated copper pipe and hose cuffs provided. We do not suggest steam distribution piping of field supplied rubber based compounds to be used for any EHU application. Pitch pipe back to unit 1" (2.5 cm) per foot. The steam pipe must be free of kinks and sags to allow for gravity drainage of condensate. **Maximum pipe run distance from tank to dispersion tube is 40 feet (12m) equivalent piping length.** Avoid excessive use of elbows or 45° changes in direction. A "P" trap drain should be installed every 20 feet (6m) of piping run or at the bottom of vertical runs that cannot drain back to the tank. If duct static pressure plus piping back pressure is greater than 6" (152.4mm) WC, please consult the factory.

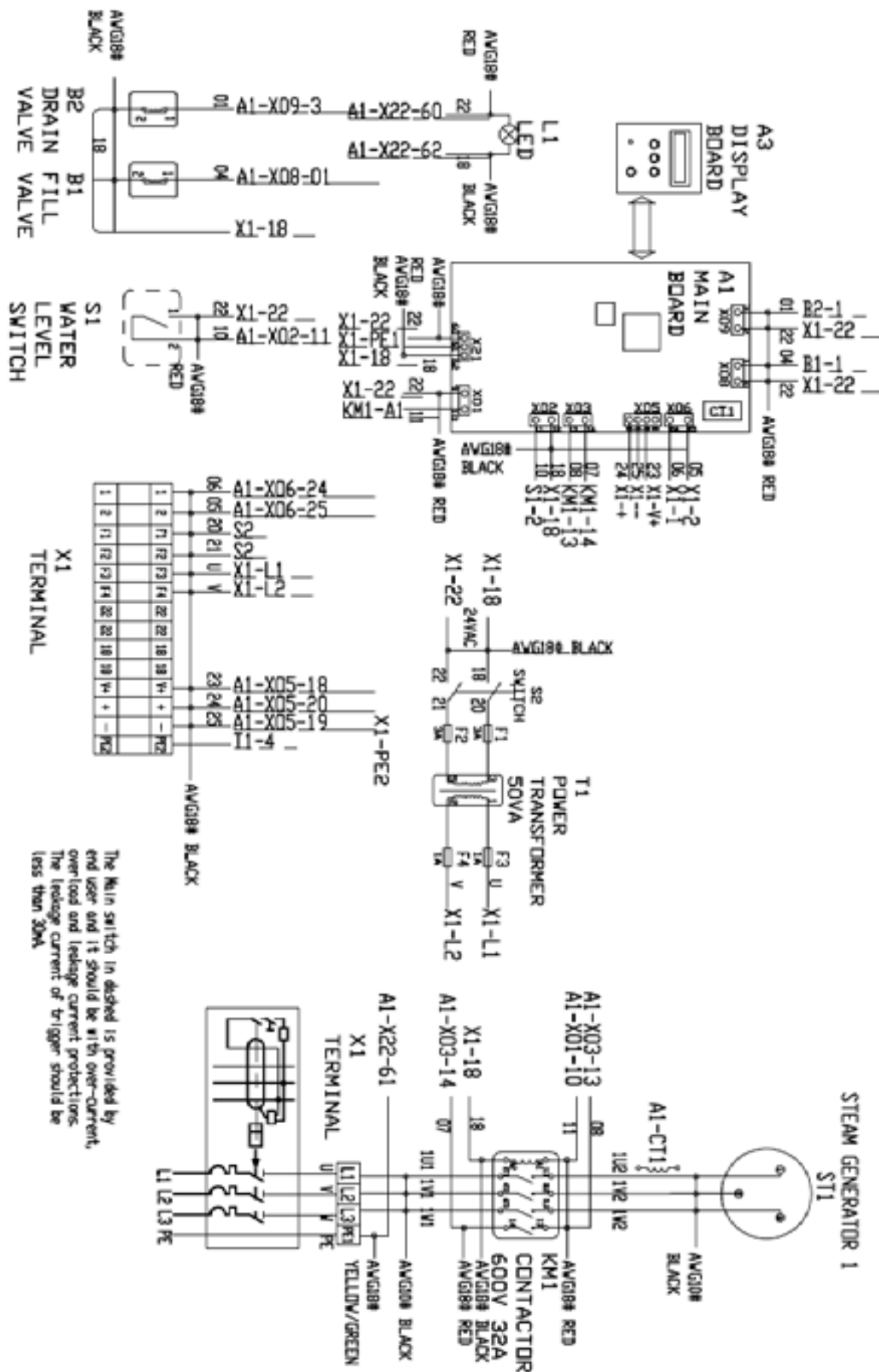
## **Step 4 - Electrical connections**

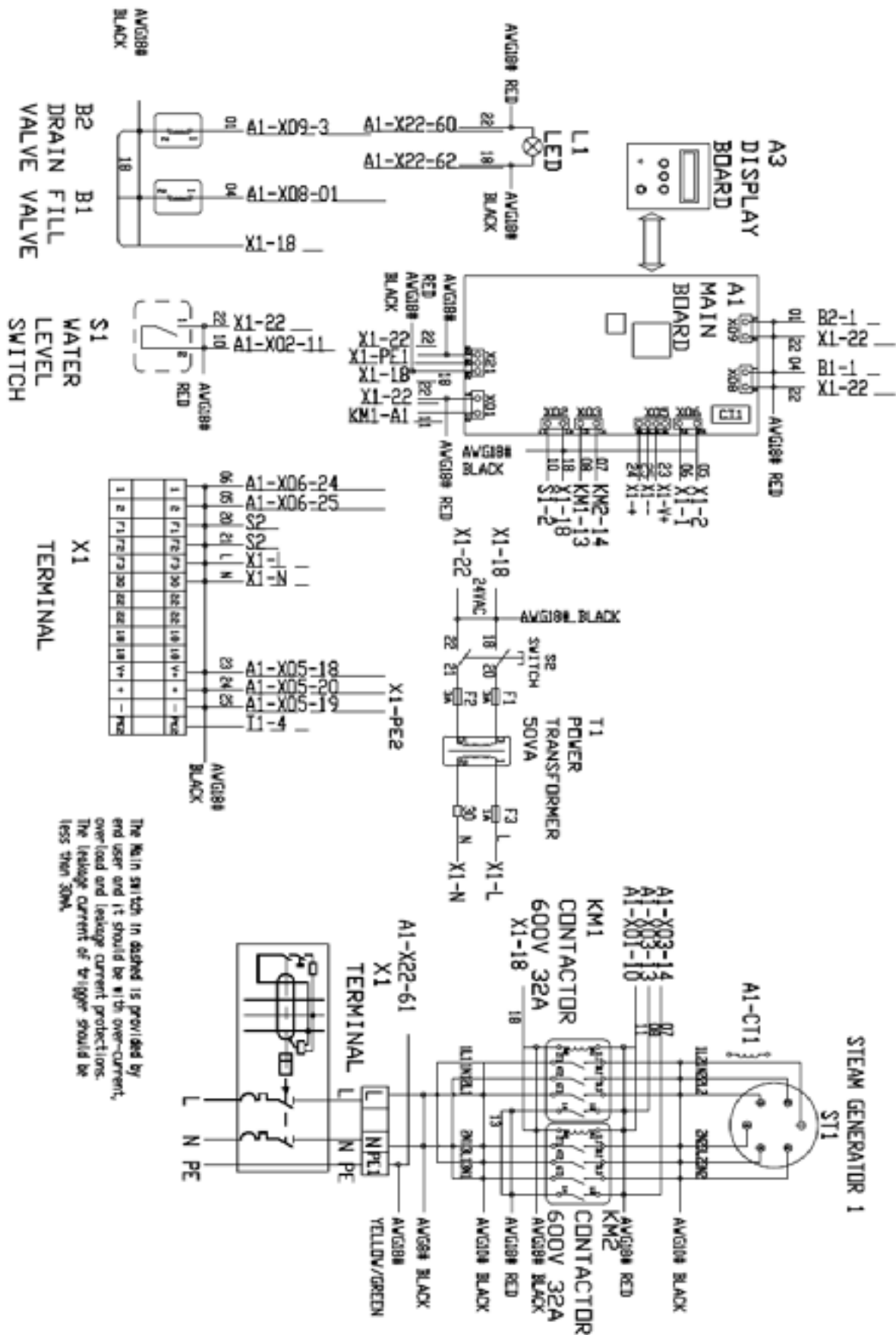
### **ELECTRICAL SERVICE WIRING**

Refer to the nameplate on the unit for recommended fuse size. It relates the fuse size to the appropriate branch size. A complete wiring diagram example is located inside the door of the humidifier.



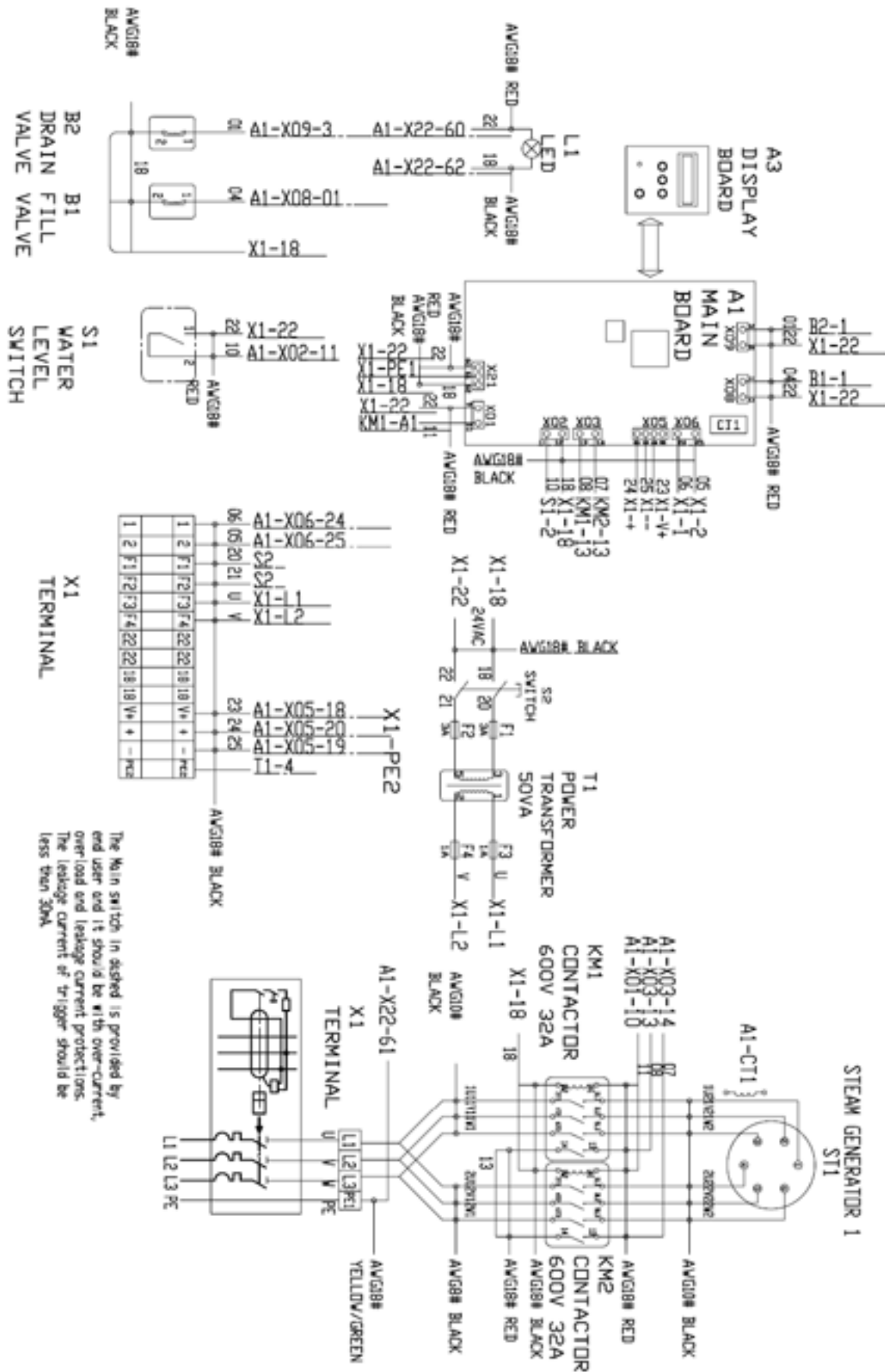
The Main switch in dashed is provided by end user and it should be with over-current, over-load and leakage current protections. The leakage current of trigger should be less than 30mA.

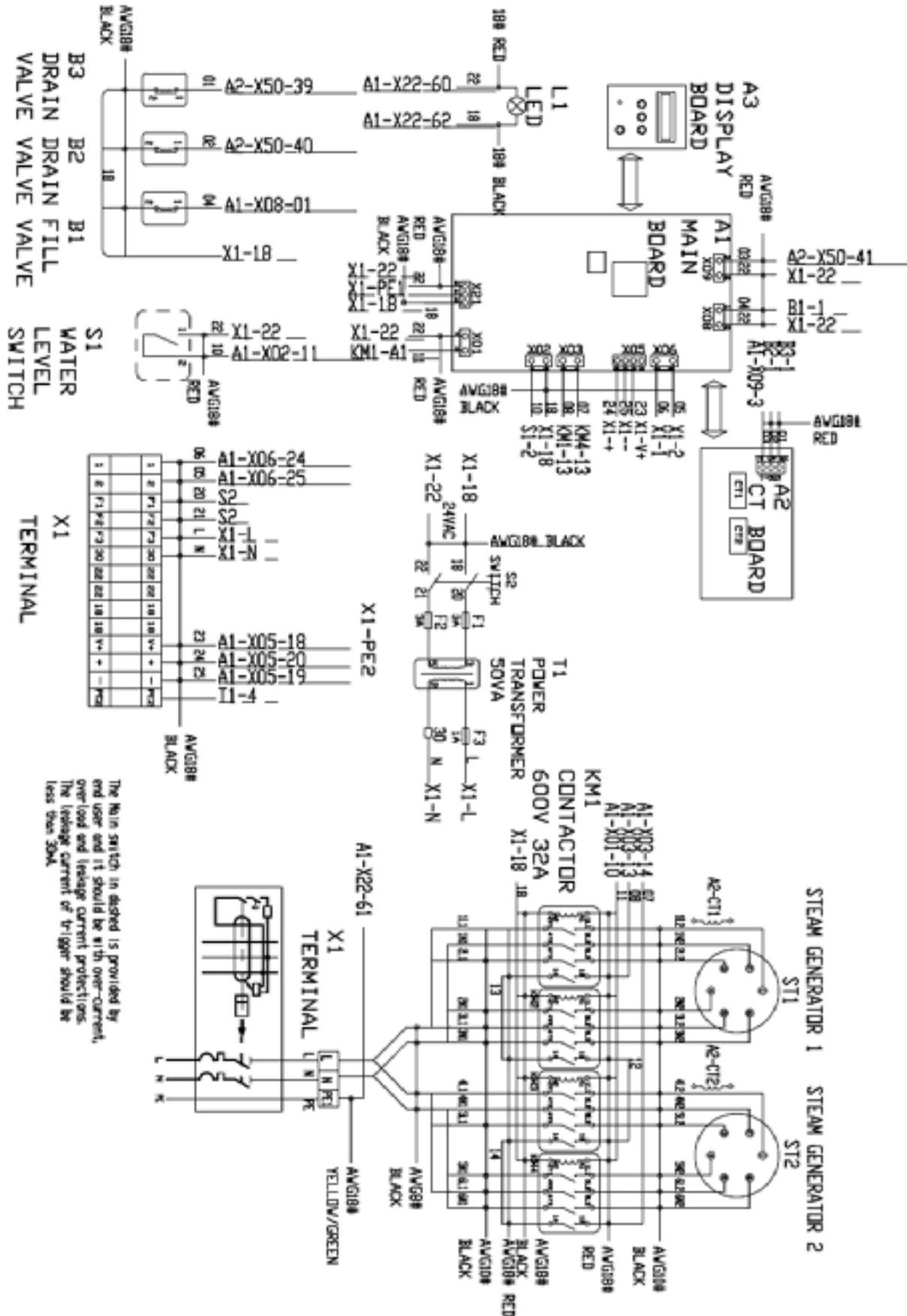




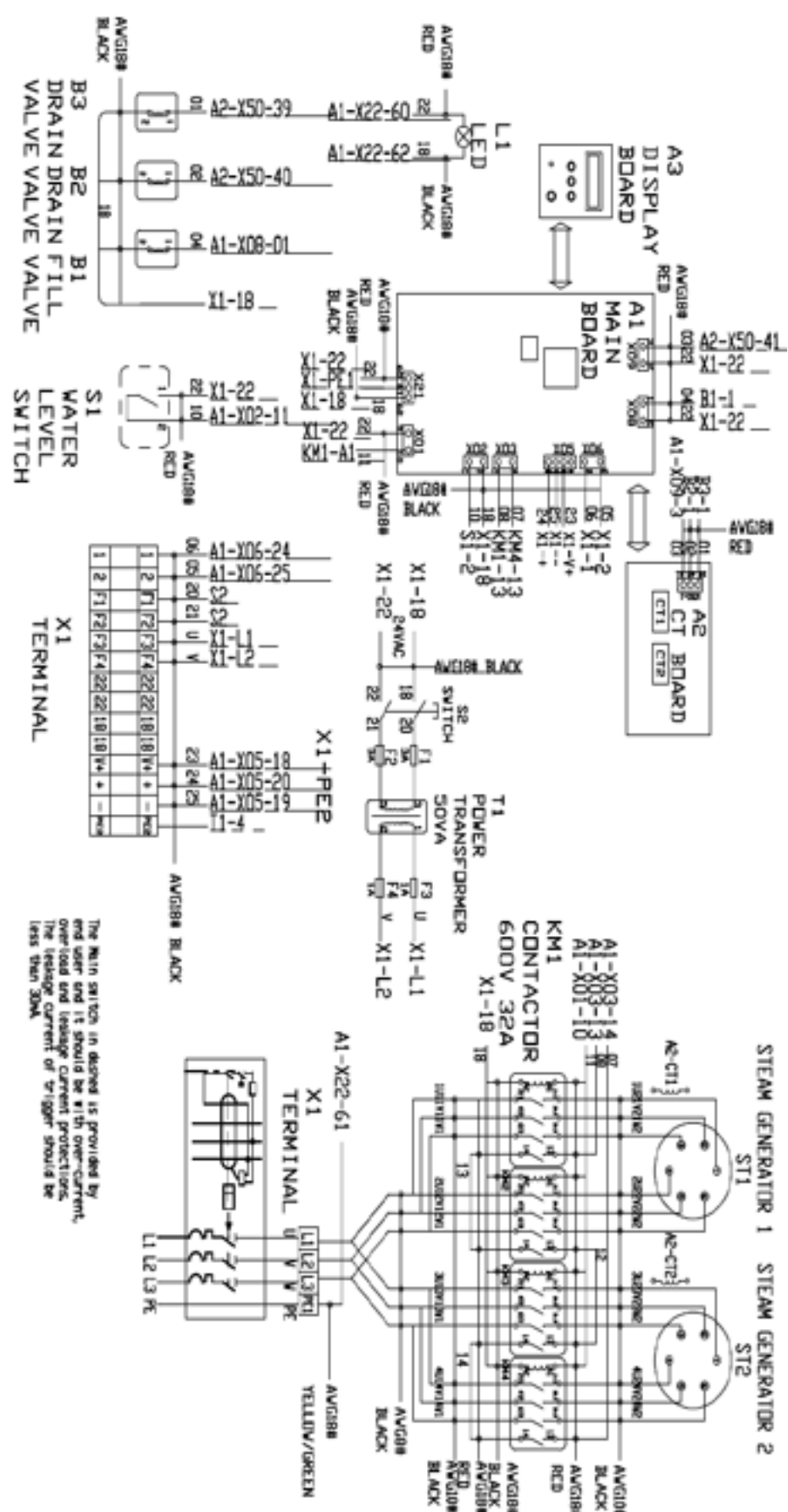
The Main switch in dashed is provided by end user and it should be with over-current, overload and leakage current protections. The leakage current of trigger should be less than 30mA.

# EHU-803 3PH Schematic





The main switch in dashed is provided by end user and it should be with over-current, over load and leakage current protections. The leakage current of trigger should be less than 30mA.



**IMPORTANT: Please observe the following:**

- Make certain there is a manually operated interlocking circuit breaker or safety switch (not furnished) in the electric service ACCESSIBLE TO AND WITHIN SIGHT OF THE HUMIDIFIER.
- USE ONLY WIRE WITH COPPER CONDUCTORS RATED 190°F (90°C) OR HIGHER FOR HIGH VOLTAGE AND GROUNDING.
- Ground the humidifier cabinet; a ground lug is provided in the wiring compartment.

## Control Wiring

Before connecting any control signal to the EHU-800, verify the control signal being used. Change dipswitch S2 setting located below the fill and drain fuses on the main board to correspond with the signal used. Failure to change the dipswitches could result in permanent damage to the main board!

0 - 10 VDC

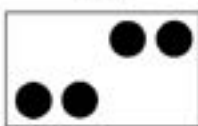
S2



1 2 3 4

4 - 20 mA

S2



1 2 3 4

0 - 5 VDC

S2



1 2 3 4



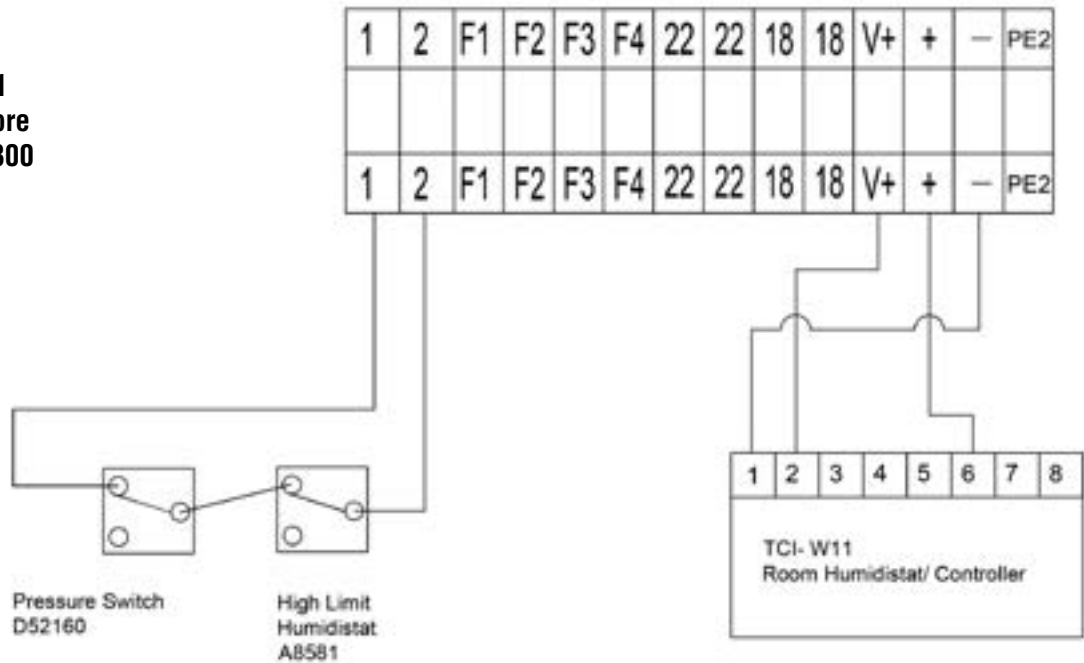
# Control Wiring - continued

**NOTE:** Wiring to the low-voltage controls should not run in the same conduits as the power supply wiring because faulty signals could result. The use of either a metal conduit or shielded wire is required for all the control and / or safety wiring. When using metal conduit, the conduit must extend the entire length of the wire, and the conduit must be grounded at the humidifier cabinet. If the conduit does not extend the entire length of the control wire, the wiring must be shielded and the following guidelines must be used:

- The wire shields and all unused conductors must be grounded externally to the humidifier cabinet.
- Ensure a good connection between the shields / conductors and the metal bar of the humidifier cabinet.

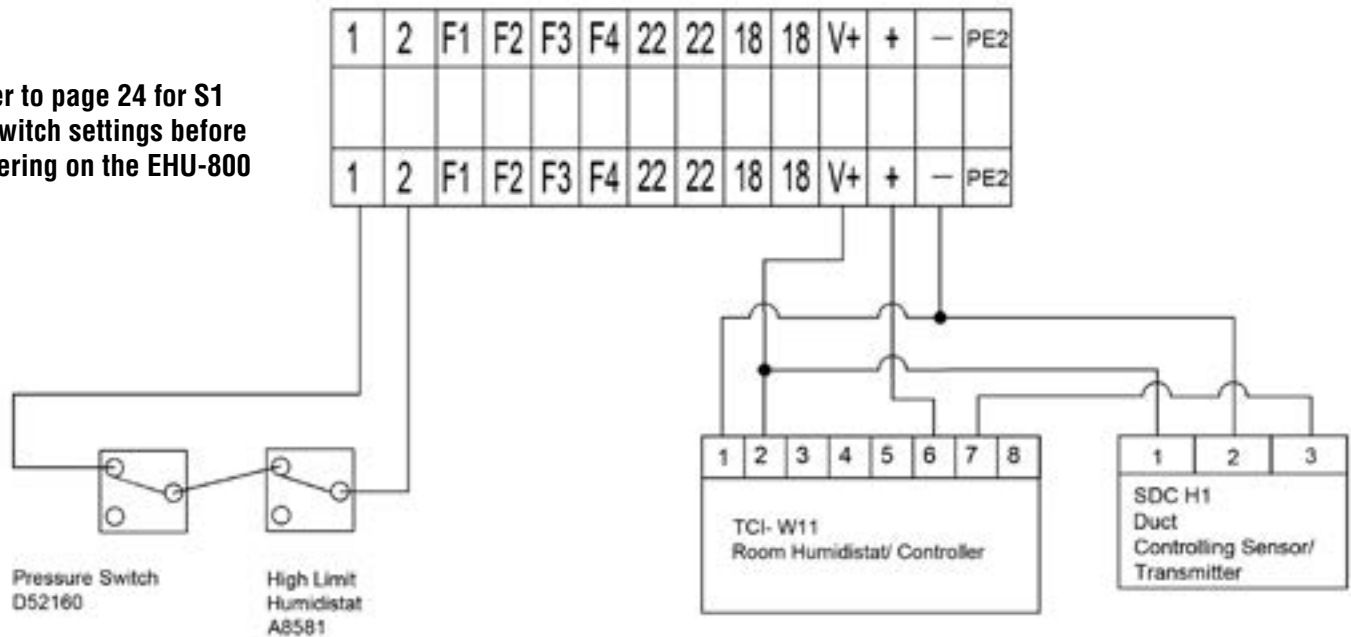
## Controller / Humidistat with Safety Switches

**\*Refer to page 24 for S1 dipswitch settings before powering on the EHU-800**



## Controller / Humidistat

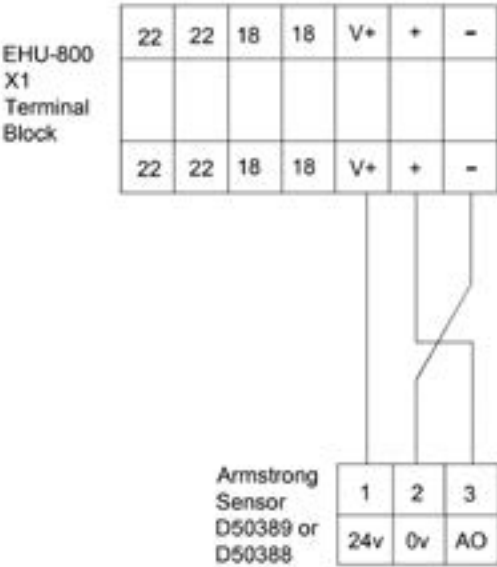
**\*Refer to page 24 for S1 dipswitch settings before powering on the EHU-800**



# Control Wiring - continued

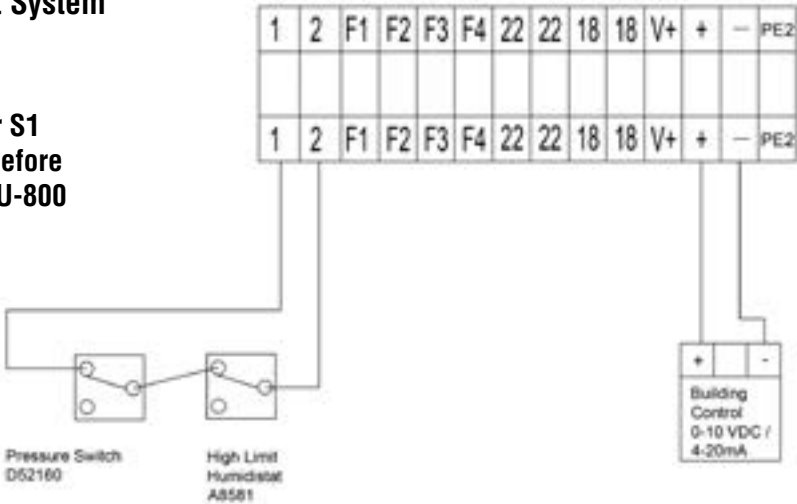
## Sensor

\*Refer to page 24 for S1 dipswitch settings before powering on the EHU-800



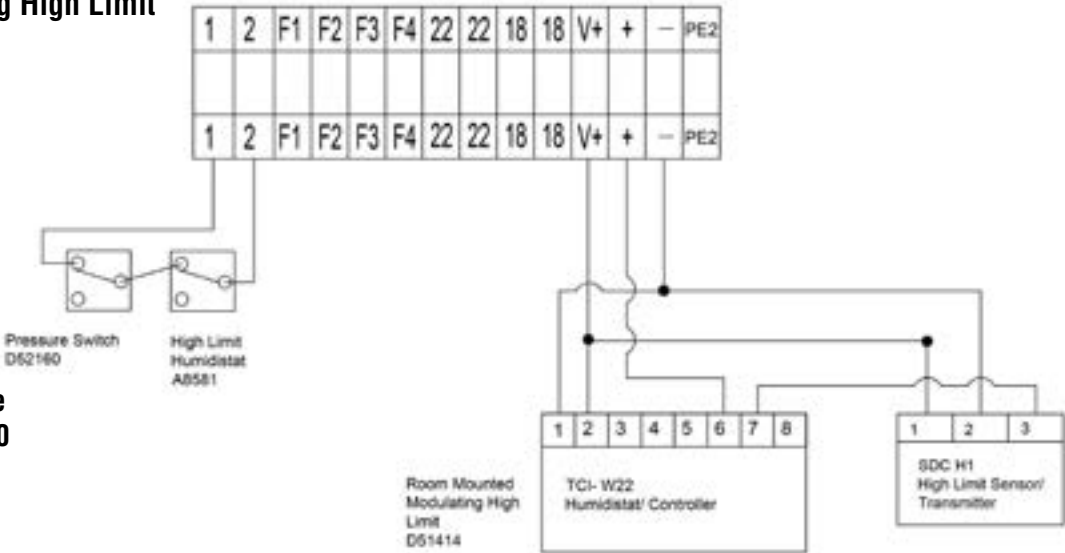
## Building Management System

\*Refer to page 24 for S1 dipswitch settings before powering on the EHU-800



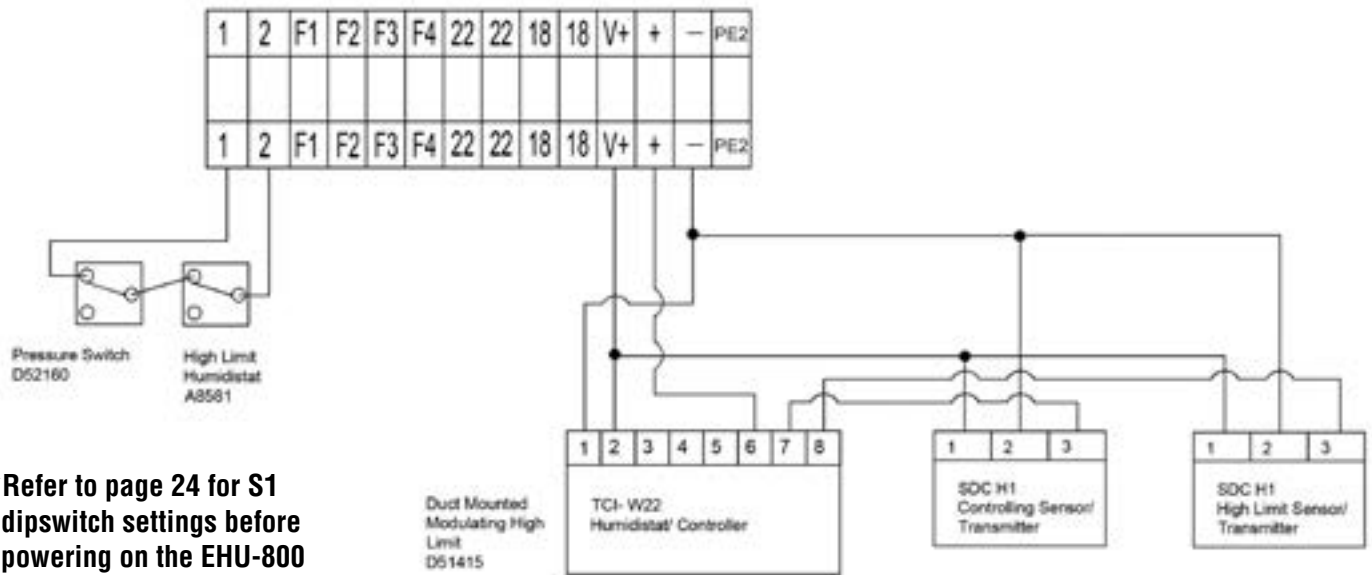
## Room Mounted Modulating High Limit

\*Refer to page 24 for S1 dipswitch settings before powering on the EHU-800



## Control Wiring - continued

### Duct Modulating High Limit



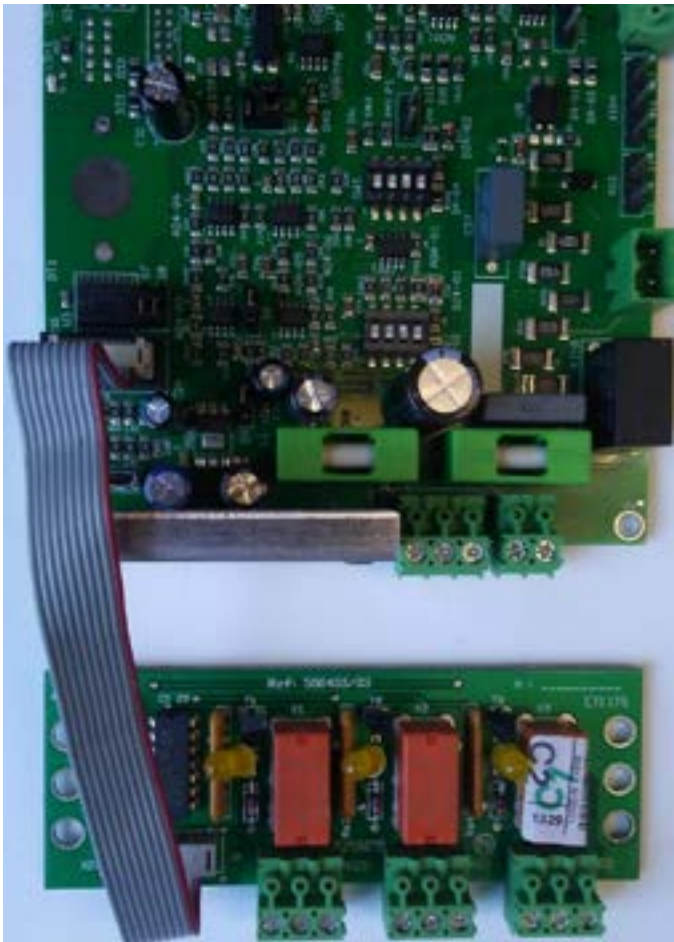
## Different Range

Output		Single Phase							
lbs/hr	kg/hr	120		208		240		277	
		Amp	kW	Amp	kW	Amp	kW	Amp	kW
EHU 801 (One small generator)									
4.4	2	12.5	1.5	7.2	1.5	6.3	1.5	5.4	1.5
6.6	3	18.8	2.3	10.8	2.3	9.4	2.3	8.1	2.3
11.0	5			18.1	3.8	15.7	3.8	13.6	3.8
17.6	8							21.7	6.0
EHU 803 (one large steam generator)									
11.0	5	31.3	3.8						
17.6	8			28.9	6.0	25.1	6.0		
22.0	10			36.1	7.5	31.3	7.5	27.1	7.5
33.1	15			54.2	11.3	47.0	11.3	40.7	11.3
44.1	20					62.7	15.0	54.3	15.0
55.1	25							67.9	18.8
EHU 804 (two large steam generators)									
44.1	20			72.3	15.0				
55.1	25			90.4	18.8	78.3	18.8		
60.1	30			108.4	22.6	94.0	22.6	81.4	22.6
77.2	35					109.6	26.3	95.0	26.3

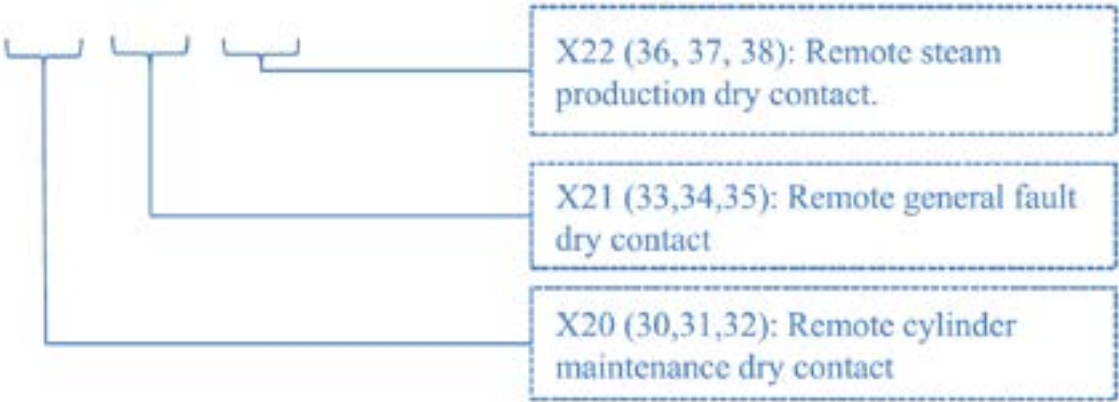
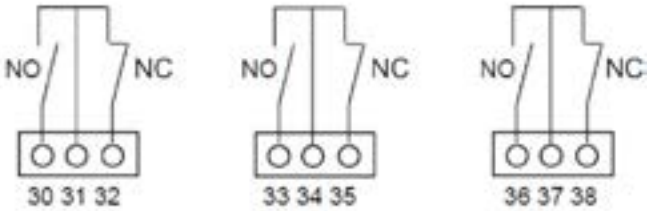
Output		Three Phase									
lbs/hr	kg/hr	208		240		380		480		600	
		Amp	kW	Amp	kW	Amp	kW	Amp	kW	Amp	kW
EHU 801 (One small generator)											
6	3	6.3	2.3	5.4	2.3						
11	5	10.4	3.8	9.0	3.8	5.7	3.8	4.5	3.8	3.6	3.8
17	8	16.7	6.0	14.5	6.0	9.1	6.0	7.2	6.0	5.8	6.0
22	10	20.9	7.5	18.1	7.5	11.4	7.5	9.0	7.5	7.2	7.5
33	15					17.1	11.3	13.6	11.3	10.9	11.3
44	20					22.8	15.0	18.1	15.0	14.5	15.0
EHU 803 (one large steam generator)											
33	15	31.3	11.3	27.1	11.3						
44	20	41.7	15.0	36.2	15.0						
55	25			45.2	18.8	28.6	18.8	22.6	18.8	18.1	18.8
66	30					34.3	22.6	27.1	22.6	21.7	22.6
77	35					40.0	26.3	31.7	26.3	25.3	26.3
88	40					45.7	30.1	36.2	30.1	28.9	30.1
99	45							40.7	33.8	32.6	33.8
110	50							45.2	37.6	36.2	37.6
EHU 804 (two large steam generators)											
55	25	52.2	18.8								
66	30	62.6	22.6	54.3	22.6						
77	35	73.0	26.3	63.3	26.3						
88	40	83.5	30.1	72.3	30.1						
99	45	93.9	33.8	81.4	33.8	51.4	33.8				
110	50			90.4	37.6	57.1	37.6				
121	55					62.8	41.4	49.7	41.4	39.8	41.4
132	60					68.5	45.1	54.3	45.1	43.4	45.1
143	65					74.3	48.9	58.8	48.9	47.0	48.9
154	70					80.0	52.6	63.3	52.6	50.6	52.6
165	75					85.7	56.4	67.8	56.4	54.3	56.4
176	80					91.4	60.2	72.3	60.2	57.9	60.2
187	85							76.9	63.9	61.5	63.9
198	90							81.4	67.7	65.1	67.7
209	95							85.9	71.4	68.7	71.4
220	100							90.4	75.2	72.3	75.2
231	105							95.0	78.9	76	78.9
242	110									79.6	82.7

Recommended Branch Circuits												
Rating Amp		1-12	13-15	16-20	21-24	25-32	33-40	41-48	49-64	68-80	81-100	101-120
Wire	(AWG)	14	12	10	10	8	8	6	4	3	1	0
	(mm2)	3	4	6	6	10	10	16	25	35	50	50
Circuit Breaker		15	20	25	30	40	50	60	80	100	125	150

Remote Information Board (optional)



Contact can be modified in NO or NF by wiring as per the following schemes (ex: wiring on 30 & 31 = NO Contact



## Control Humidistat

The Series EHU-800 is capable of accepting controls signals from a humidistat, with the following characteristics:

To adapt the EHU-800 to these different types of control humidistats on the printed circuit board must be manually changed and the humidistat must be wired to the appropriate connections of terminals 1, 2 with a 0,75mm<sup>2</sup> maximum flexible cable for the connection.

### Wall Mounted Control Humidistat:

Wall-mounted humidistats are usually installed 4 ft. to 5 ft. above floor level. Often, the best location is beside a thermostat that controls temperature in the same space that is to be humidified, if that location meets the following criteria:

The control humidistat should be located where it will be exposed to the average air condition of the space to be humidified.

Avoid areas of restricted air circulation, or locations where the sensor will be subjected to air drafts, localized heat, or moisture sources.

Locations near coffee machines, computer blower outlets, doors to other rooms, or windows that can be opened are not suitable.

### Duct Mounted Control Humidistat:

A duct mounted high limit humidistat is recommended to prevent over-saturation of the duct air. Use an on-off controller that opens on fault (high humidity). Humidistat should be set for a maximum of 90% RH. Alternately, a modulation high limit humidistat may be used on applications such as variable air volume (VAV). Locate the high limit humidistat approximately 10' (3m) downstream of the dispersion manifold. If 10' (3m) is not available, consult the factory.

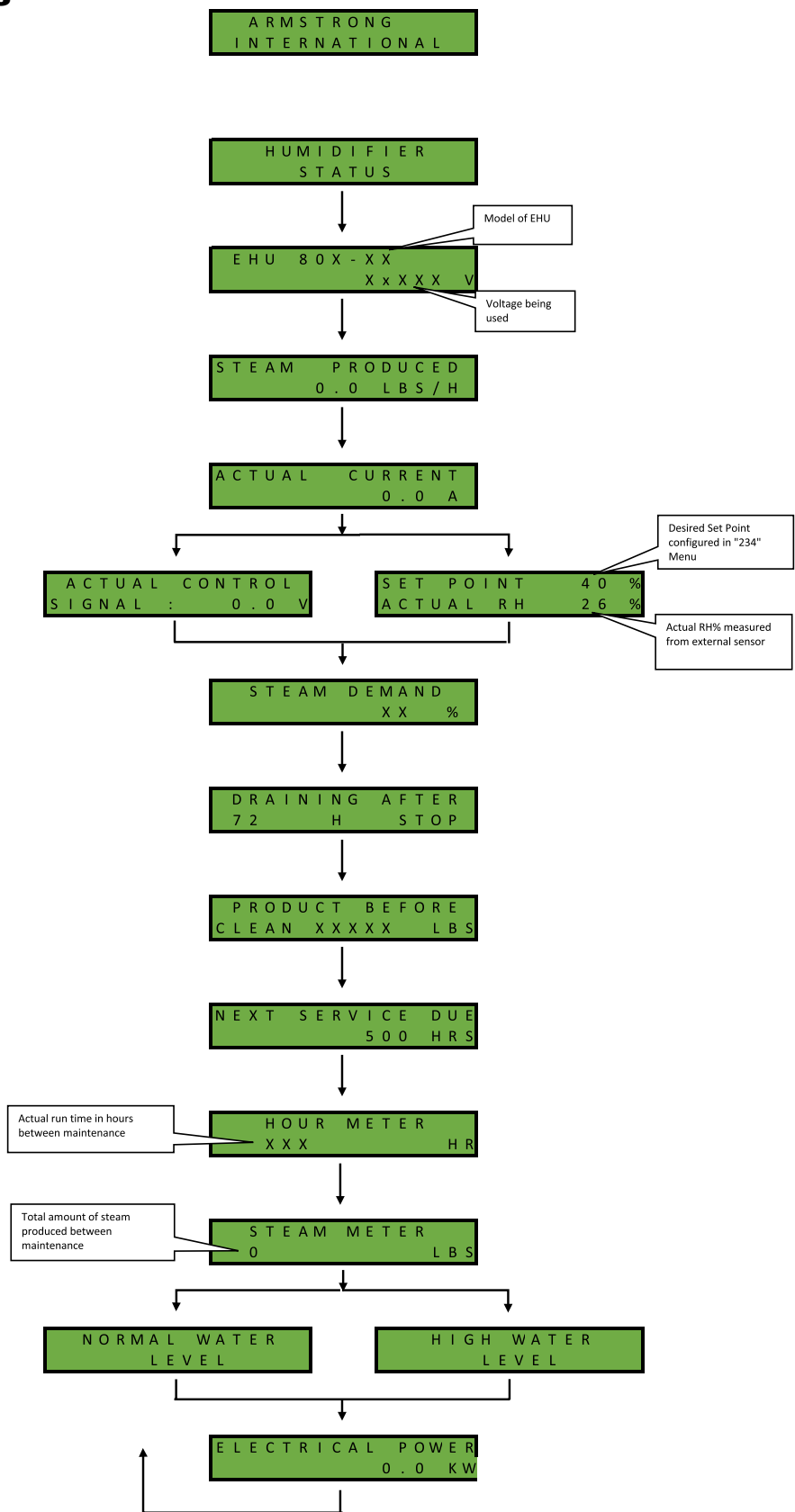
### Airflow Switch

An airflow switch is recommended to deactivate the humidifier when there is insufficient air flow in a duct system. A duct pressure switch is preferred as an airflow sensor. The pressure switch should open on insufficient airflow (opens on fault). Airflow switch should be mounted in supply air duct upstream of humidifier dispersion. Complete installation and wiring instructions are contained in the duct pressure switch package. The Airflow switch has to be connected in series with the humidistat between the terminal block 1&2.

**NOTE: LIMIT SWITCHES (HIGH LIMIT AND AIRFLOW SWITCHES) OPEN ON FAULT.**

# System Management

## Menu Screens



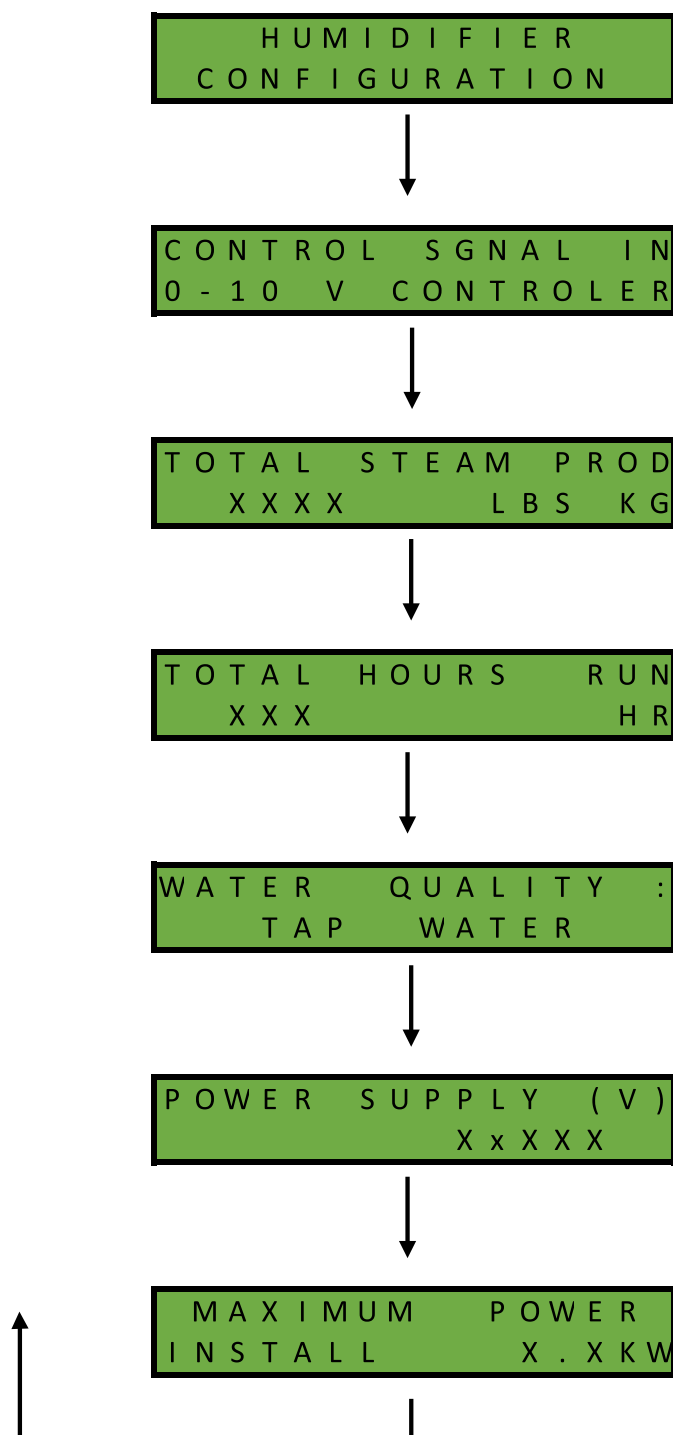
## Menu Screens (continued)

### Selecting and Changing EHU Configuration Options

The steps below are valid for any humidifier configuration change. The only difference will be which access code is used. The example uses access code 234. \*

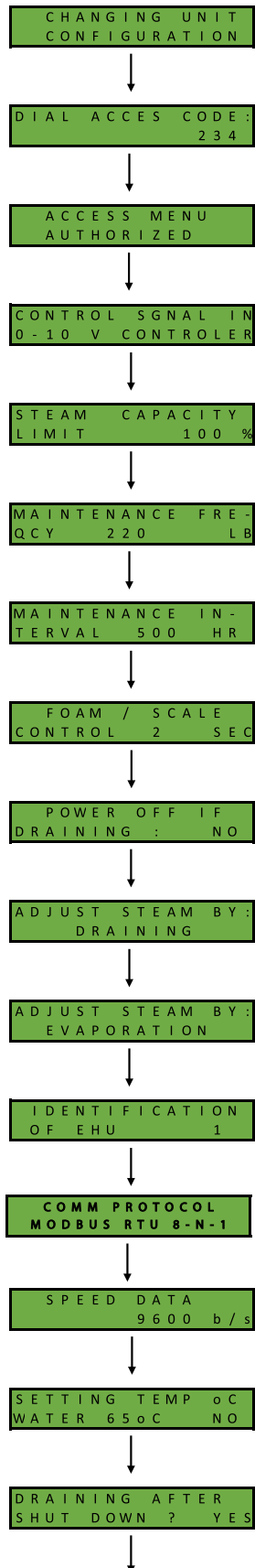
1. Use the arrow up key until "Humidifier Status" is displayed.
2. Press the "Enter" key until "Changing Unit Configuration" is displayed.
3. Press the down arrow key. "Dial Access Code: XXX" will appear.
4. Press the "Enter" and the left most X will flash. Arrow up until "2" is displayed and press the "Enter" key.
5. The cursor will shift one place to the right. Repeat the previous steps but enter a "3" and press "Enter".
6. The cursor will shift one place to the right. Use the arrow key to select "4" and press "Enter". "Access Menu Authorized" will be displayed.
7. Arrow down until the desired value to be changed is displayed. Pressing "Enter" will allow you to make a change.
8. Use the up or down arrow to change the desired option for that selection. With the desired option being displayed, press the "Enter" key. After the "Data Recorded EHU-Armstrong" disappears, use the arrow up button until "Changing Unit Configuration" is displayed.
9. Press the "Enter" key until "Humidifier Status" is displayed. Use the arrow down key to view humidifier status screens.

\* The humidifier may time out if keypad selection is not made quickly enough. If the humidifier times out and locks up, cycling power will reset the humidifier.





## Menu Screens (continued)



## Maintenance Messages

INSPECTION DUE  
50 H - SEE MANUAL

- This screen is displayed after the initial 50 hours of run time.
- This is a good time to check hoses for leaks and retighten any hose clamps on the plumbing and steam side
- The EHU will continue running even when this is displayed.
- To reset this maintenance message press and hold the down button for 5 seconds.

SERVICE DUE  
SEE MANUAL

- This screen is displayed when the EHU reaches its default maintenance run time of 300 hours.
- The EHU will continue to run for 100 hours after this screen is displayed.
- Refer to the maintenance section of this IOM page 44 for proper maintenance of the steam generator tank and valves.
- To reset this message the EHU will need to complete a manual drain cycle (about 20 minutes) by pressing the manual drain button. The EHU will display “Draining Cycle Over”.
- This timer has a factory default setting of 300 hours and can be adjusted in the “234” menu.
- After “Draining Cycle Complete” is displayed, cycle power to restart humidifier.

SERVICE OVERDUE  
SYSTEM OFF

- This message is displayed when the “Service Due” message has not been reset after 100 hours of initial alert.
- When this message is displayed the EHU’s steam production is stopped. Maintenance on the steam generator tank and valves must be done. Refer to the maintenance section of this IOM on page 44
- To reset this message the EHU will need to complete a manual drain cycle (20 minutes) by pressing the manual drain button. The EHU will display “Draining Cycle Complete”.
- After “Draining Cycle Complete” is displayed, cycle power to restart humidifier.

REPLACE CONTACTOR  
10000 HR RUN

- This message is displayed after the EHU has reached 10,000 hours of run time.
- Replacement of the contactor(s) is highly recommended
- The EHU will continue to run even after this message is displayed.
- To reset this message press and hold the down arrow for 5 seconds or longer

## Error Messages

### Contactor Coil Failure P1

CONTACTOR COIL  
FAILURE P1

When this error is displayed the EHU stops steam production and sits idle displaying the error.

This error is displayed when the contactor does not engage when there is a demand to the EHU.

- Check F1 fuse (2 Amp)
- Confirm wires 13 and 14 are secure at contactor and X4 connector.
- Confirm X4 connector to main board is secure.
- Check contactor coil for proper resistance (5-6 ohms  $\Omega$ )

To clear this error after correcting the problem, cycle power to the EHU. If the error is not corrected it will reappear 4 minutes after detection.

If the remote information board is being used, the general fault contact is on and the maintenance contact is off.

### Contactor Blocked P2

CONTACTOR  
BLOCKED P2

This error is displayed when the contactor is engaged with no demand for steam (0% demand).

Shut off power at the breaker before servicing!

- Check contactor for proper operation. If contactor functions properly replace main board.

To clear this error after correcting the problem, cycle the power to the EHU. If the error is not corrected it will be displayed again after 2 minutes of re-detection.

Remote Information Board:

- General fault contact is on
- Maintenance contact is off

### Inlet Water Valve P3

INLET WATER  
VALVE P3

This error is displayed when the fill valve is leaking water by into the steam generator tank?

- Check fill valve for debris
- Check drain valve is clear of any debris and is functioning properly

To reset this error after correcting the problem, cycle power to the EHU. If the error is not corrected it will be displayed again after 20 minutes from detection.

Remote Information Board:

- General fault contact is on
- Maintenance contact is off

## Error Messages

### No Inlet Water P4

NO INLET WATER  
P 4

This error is displayed when the EHU does not detect water in the steam generator tank.

- Check F2 fill valve fuse
- Check fill valve and confirm there is no debris clogging the valve
- Confirm proper water pressure
- Confirm the drain valve is clear of any debris and not leaking water by
- Backpressure in cylinder not allowing water level to rise

After correcting the problem this error can be reset by cycling power to the EHU. If the problem was not corrected this error will be displayed 8 minutes after detection.

Remote Information Board:

- General fault contact is on
- Maintenance contact is off

### Drain Circuit P5

DRAIN CIRCUIT  
P 5

This error is displayed when the EHU detects a problem with the draining system.

- Check drain valve fuse F3. If fuse is bad replace fuse and drain valve.
- Check drain valve to ensure it is clear of all debris
- Check drain hoses and drain cup for any debris
- Clean steam generator tank

To reset this error cycle power to the EHU. If the problem is not fixed it will be redetected and the error message will reappear.

Remote Information Board:

- General fault contact is on
- Maintenance contact is off

### Clean Cylinder + Drain Valve P8

CLEAN CYLINDER +  
DRAIN VALVE P 8

When tank electrode current gets too high the drain valves opens to lower tank water level and reduce tank current. If the current continues to rise and exceeds the unit's high current set point, a P8 error will occur. The high current set point is dependent on steam capacity of the humidifier.

- Check the drain valve for proper operation.
- Check the drain valve, drain cup and hoses to ensure they are clear of debris.
- Clean steam generator tank

# Communications

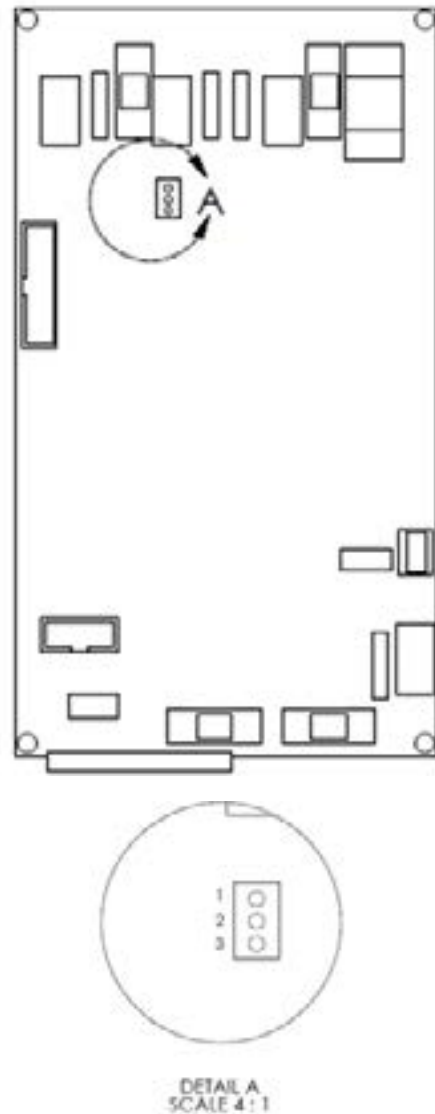
Wire to the RS-485 pin header seen below:

- Pin 1 – RS -
- Pin 2 – RS +
- Pin 3 – GND

Make sure all other connections are made properly.  
Refer to the Control Wiring Section of this IOM.

1. Power on the unit by the front panel On/Off switch.
2. Enter Menu 234.
3. Scroll down to “Control Signal In”. If you want to control the unit through Modbus change this to “Digital Ctrl”. If you want to only monitor the EHU-800 using a local humidistat / controller or sensor, select the appropriate setting for you.
4. Scroll down to “Identification of EHU”. Default is set at “1”. This sets the address of the EHU-800 between 1 and 80.
5. Scroll to “Speed Data”. The default baud rate is 9600. Adjust this to match your system.

Changes to the unit can now be done through the Building Management System or through the keypad at the EHU-800.  
Refer to the Modbus Variants List to set up the required points.



# Modbus Variants List

Register Address	Description	Value	Function Number	Data Class	Address Data (Dec)
10001	Steam Production (Contactor)	1 = Production: ON / 0 = Production: OFF	Code 02, read only	b_har_CdeContacteur	0
10002	High water level sensor	0 = Low water level / 1 = High water level		b_har_VoyantNH	1
10003	High limit (terminal block 1 and 2)	0 = opened / 1 = closed		b_rs2_Hygrostat	2
10004	Fill (Inlet Valve)	1 = Filling / 0 = no filling		b_har_CdeVE	3
10005	Drain ( Drain Valve)	1 = draining / 0 = no draining		b_har_CdeVS	4
10006	Ventilation Pack (Blower)	1 = Blower: ON -- 0 = Blower: OFF		b_har_CdeCaissonV	5
10007	Maintenance	1 is ON -- 0 is OFF		b_har_RenvoiEntretien	6
10008	General fault	1 is ON -- 0 is OFF		b_har_RenvoiDefault	7
1	Stop the humidifier via the BMS	1 = ON : Start requested 0 = Off: Stop Unit	function 1 read only function 5 write	b_reg_OnOffBMS	0
30001	Demand	(%)	Code 04, read only	uc_reg_ProductionVap	0
30002	Steam Output	(Kg/hr)		uc_ihm_Reglage (par calcul)	1
30003	Current	(A)		ui_har_ValeurCourant	2
30004	Run status	0: Idle 1: Steam Gen 2: End of season 3: Failure 4: Manual drain 5: Maintenance		uc_reg_RunStatus	3
30005	Bed Life	(Hours) x 100		uc_ihm_TempsEntretien	4
30006	Run Time	(Hours)		ui_ihm_CptHeure	5
30007	Idle Time before drain	(Hours)		uc_ihm_CptArretProlonge	6
30008	Proportional Signal (analog input)	V, mA		ui_har_AffSignalHr	7
30009	Temperature tank (Maintening hot water (option))	(°)		uc_har_Temperature	8
30010	Failure	0: Normal operating 1: P1 Error 2: P2 Error 3: P3 Error 4: P4 Error 5: P5 Error 6: P6 Error 7: P7 Error 8: P8 Error 9: P9 Error 10: First inspect. 11: Service overdue		uc_ihm_Alarm	9
30011	Water used	1: Tap water 2: Softened water 3: Slightly demineralized water 4: demineralized water		uc_har_ConfigEau	10
30012	Regulation used	20:On/Off 21: Digital controller 22: Digital sensor 24 :0-10V 25 :0-20V 26:0-20mA 27 :1-5V 28 :2-10V 29 :4-20V 30 :4-20mA 31 :devatec Sensor 32: 0-10V Sensor		uc_reg_ConfigRegul	11
40001	"Maintenance interval"	(Hoursx100) min = 1 and max = 200	function 3 read only : function 6 write	uc_ihm_FrequenceEntretien	0
40002	"Adjust steam by"	draining = 1 or evaporation = 2		uc_reg_VidangeRegul	1
40003	Drain duration (Foam scale control)	min = 0 sec and max= 15 sec		uc_ihm_AntiMousse	2
40004	Idle Time (End of Season Time)	(Hour) min = 6 and max = 168		uc_reg_TimeStopDrain	3
40005	Steam capacity limit	(%) min = 20% and max = 100%		uc_ihm_DigitalProduct	4
40006	Rh sensor or Steam Demand	(%) min = 0% and max = 100%		uc_ihm_DigitalProduct	5
40007	Rh set point.	(%) min = 20% and max = 99%		uc_ihm_DigitalProduct	6

# Operational Guidelines

This section describes the conditions and indications you should expect to find in a normally operating humidifier.

**Monitoring Stat Demand:** Indicate the demand for humidity in relation with the range control of the humidistat. 0% indicates that the humidity requirement has been exceeded. 100% indicates that the humidistat is calling for full humidifier output. In general, a reading of around 50% indicates that the set point has been met.

**Monitoring Current:** While the unit is filling, the current should increase. As the current approaches the maximum rating of the unit, it increases more slowly, especially in higher capacity units. With the tank on, and the fill and drain circuits idle, the current should fall slowly. When the unit is draining, the current should decrease at a moderate rate.

**Automatic Drain Operation:** The microcontroller will energize the drain valve at the beginning of the fill cycle to reduce the conductivity and mineral build-up in the tank. It will vary in drain duration to adjust for changes in water quality, demand history, and steam output.

**Manual Drain Mode:** If the manual drain button is pushed while the tank circuit is energized, the fill valve will also open to temper the drain water. If the tank is off, only the drain valve will open.

# Maintenance

## Recommended maintenance and precaution

### Routine Service

- After the humidifier has run for about one hour time, check for any water leakage at the cylinder gasket and at the drain valve.
- The cylinder should be inspected after about 50 hours of run. Make sure there is no arcing between the electrodes when the unit is in operation. As well, when switched off, all the contactor screws and the steam drain and internal hose clamps should be retightened.
- A complete inspection of all the humidifier hoses should be made after one year of operation.
- Any faulty or damaged hose must be replaced to prevent leakage.

### Warnings

When the humidifier is used for a long time or operates with very conductive water, solid deposits built-up on the electrode plates which can make the water even more conductive.

If electrical arcs can be seen inside the steam cylinder, the humidifier doesn't operate properly.

### Switch off the humidifier immediately. This arcing involves:

- Excessively heat on the plastic shells that can eventually make the material melt and make a hole from where scalding water can escape.
- Circuit breaking caused by excessive intensity.
- Faster corrosion of the electrode plates.
- Burning of the electrode power cables.

### Points to check in case of arcing

- Ensure that the drain valve works properly and clean it up.
- Ensure that the F3 drain valve fuse is still in order.

### Caution

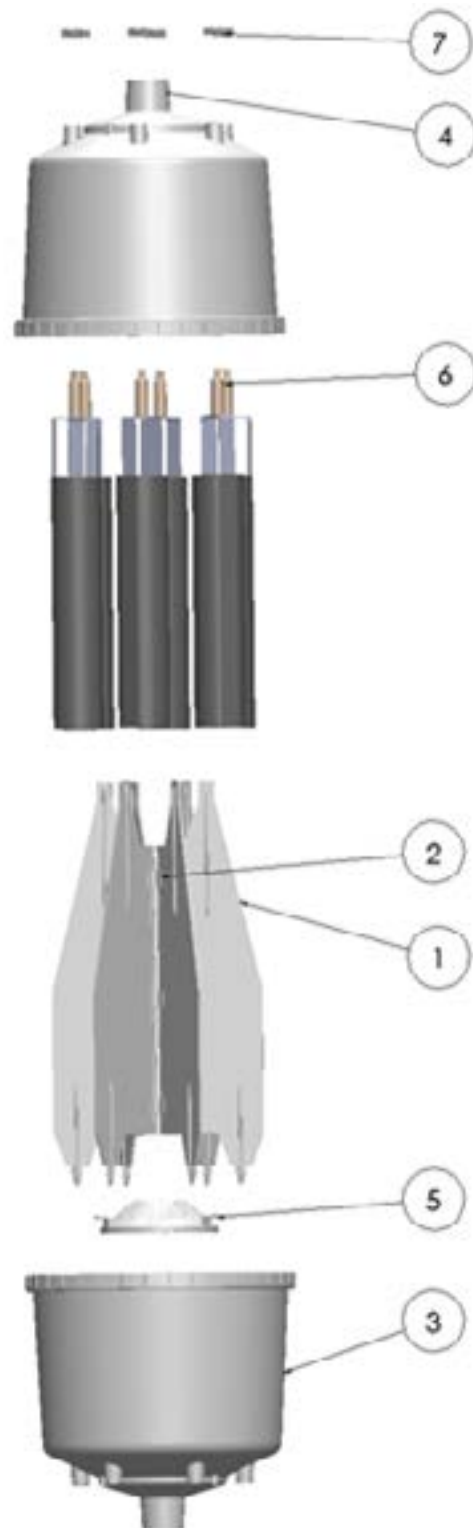
Always isolate all electrical and water supplies to the humidifier before commencing any maintenance and refer to the instructions given in this manual. The EHU humidifier includes live electrical components and the steam cylinder contains boiling water. All maintenance must only be carried out by skilled and qualified personnel.



# Steam Generator Maintenance

The steam generator is basically the only part of the EHU that requires regular maintenance. This maintenance may include cleaning or replacing the tank itself or the electrodes. We recommend substituting spare generator in order to minimize downtime and labor requirements. The replaced generator may then be serviced when it is convenient.

No.	Part Description
1	Barrier Tank
2	Ret Barrier Tank
3-4	Steam Generator Half
5	SCR Drain EHU
6	Tank Electrodes EHU
7	Nut Hex Jam 1/2-20 Brass



# Tank Cleaning

As the water in the steam generator boils away, the minerals in that water come out of suspension and are deposited on the walls of the tank and on the electrodes. This process leaves the tank walls coated with a white or light brown colored mineral buildup. This buildup may be anywhere from soft and chalky to rock hard. The automatic drain cycle will minimize mineral buildup but, eventually, the tank will need cleaning.

Tank cleaning is indicated when:

- a. The unit has been in service for a period of time, a solids buildup is visible through the tank walls, and the “normal” water level in the tank is rising, or;
- b. The display indicates a maintenance message

## Steam cylinder cleaning

This procedure is intended as a guide only for the chemical cleaning of the generator in all EHU models. Read and follow label directions on any cleaning product. Check local codes before disposing of chemicals.

**Caution: Read and follow carefully the safety procedures on the package.**

1. Obtain Armstrong Rite-Qwik or similar non-hydrochloric/muriatic acid cleaning solution.
2. Remove the tank, following the “Tank Removal” directions in this manual.
3. Let the steam generator tank cool after removal from the EHU unit.
4. Split the tank and examine the inside of the tank and the electrodes.
  - a. If the tank is black or dark brown, the electrodes may have disintegrated and chemical cleaning may not be effective. The tank can be cleaned with the following process, but the electrodes, may need to be replaced.
  - b. If tank and electrodes have a white/tan/grey mineral accumulations and/or the tank is partially filled with loose lime accumulations, proceed with chemical cleaning.
5. Empty any loose deposits from the bottom tank half. Both tank halves and the barrier assembly, if present, can be cleaned using a scraper, a stiff bristle brush, and water spray as required.
6. Remove the electrodes from the upper tank half, following the directions on page 50 of this manual. Loose and/or soft deposits should be scraped from the exterior of the electrodes before chemical cleaning.
7. Prepare the chemical cleaning solution as per manufacturer’s recommendations and fill a plastic bucket to a sufficient level to soak the electrodes. Be certain not to submerge the electrodes beyond the level of the screen.
8. Let the cleaning action take place for 15 minutes. Remove the electrodes from the bucket and rinse them thoroughly with a clean water spray.
9. Observe the electrodes to determine if another treatment is necessary.
10. It is not necessary for the electrodes to be cleaned down to bare metal. Removal of major accumulations is the only requirement.
11. Helpful Hints:
  - Check the drain valve for proper operation & good flow when the tank is drained prior to removal.
  - \* With the tank removed, inspect the drain adaptor and hose from adaptor to drain valve to ensure that it is free from deposits which may interfere with proper drainage.
12. Reassemble tank. Make sure o-rings are still on electrode terminals. Also check condition of steam generator o-ring. After a couple cleanings, it will need to be replaced. Make sure o-ring is sealed in its groove and not pinched when halves are put together. Do not over-tighten nuts that hold electrodes in place. This is an o-ring seal so nuts should be “snug”.
13. Re-install the steam generator tank. Check out for proper operation.

# Tank Removal and Replacement

## Tank Replacement:

Tank replacement is indicated if the tank body becomes deformed in any way, as this could cause leakage around the O-ring.

## Electrode Replacement:

Electrode disintegration generally starts due to high conductivity water being present in the steam generator. Electrode disintegration sometimes occurs as a result of a combination of the following factors:

1. High voltage (especially 480 and 600 volts);
2. Hard water (in excess of 20 grains/gal.);
3. Any unit with a malfunctioning drain system;
4. Softened water.

If the electrodes begin to disintegrate, the tank may turn black or red, and arcing or flashing may be visible inside the tank while it is operating. **IF YOU NOTICE EXCESSIVE ARCING, SHUT THE UNIT OFF AND CALL THE FACTORY BEFORE RE-STARTING UNIT.**

## RECOMMENDED PROCEDURE FOR STEAM GENERATOR TANK AND ELECTRODE REMOVAL, CLEANING, REPAIR AND REPLACEMENT TANK REMOVAL AND REPLACEMENT - ALL MODELS

1. Drain the tank by pressing the drain button. It may take five minutes for a full tank to completely drain.
2. Once the tank is completely empty, turn off the power at the main disconnect or breaker.
3. Disconnect the steam hose from the top of the steam generator tank by loosening the hose clamp with a screwdriver or 5/16" nut driver. BE CAREFUL! The tank may still be hot to the touch, and some steam may still be condensing in the tank.
4. Disconnect the power leads at the steam generator with a 7/16" wrench. See wiring diagram for more details.
5. Remove the tank from the cabinet by lifting it out of the drain adaptor. BE CAREFUL! The tank may still contain hot steam or condensate.
6. It is preferable that you replace the tank with a new or rebuilt unit and take the current tank to the shop for servicing.
7. Install the tank into the EHU by lowering it into the drain adaptor. A small amount of high temperature grease or silicone lubricant may be used on the drain adaptor o-ring to help it seal properly. After a couple of tank replacements the o-ring should be replaced as well.
8. Connect power leads, using a 7/16" wrench (three leads for 3-phase units, two for single phase). Refer to the wiring diagram in your unit for specific information.
9. Connect the steam hose to the top of the steam generator with the hose clamp.
10. Check all wiring connections at the main power, contactor, and control voltage terminal blocks, as well as on the generator itself. Energize the circuit breaker or main disconnect.

**Refer to Start-up Section if you encounter any problems when restarting the unit.**

## Tank Disassembly

### MODELS EHU-803 AND 804, SINGLE AND THREE PHASE:

1. Using a 7/16" wrench, disconnect the wires from the steam generator.
2. Remove 24 metal clips by pushing gently on top of each clip with a screwdriver while cupping the clip with the other hand.
3. Lift the top half of the tank free of the bottom half and rest it on the electrodes. Use a ¾" wrench to loosen and remove the nuts from the six electrode studs.
4. Lift the top tank half from the electrodes. Remove the o-ring from the lower tank half o-ring channel and put it aside for re-use. On high voltage units, lift the barrier assembly out of the bottom tank half.
5. Clean the tank halves and the barrier assembly, if applicable, using a scraper, stiff bristle brush, and/or water sprays. Rinse the unit with clear water. If necessary, the drain screen may be removed for cleaning by removing three screws and pushing up through the bottom tank connection with a screwdriver handle or other blunt object. The drain screen snaps back into place and is SECURED BY THE 3 SCREWS after cleaning. BOTH THE BARRIER ASSEMBLY AND THE DRAIN SCREEN SHOULD BE REPLACED WITH NEW PARTS IF THEY ARE UNSERVICEABLE.
6. Install one electrode in the top tank half. Make sure the small o-ring is located at the bottom of the electrode stud. Push the electrode through one of the holes in the upper tank half. Slowly turn the electrode until it locks in place. Thread a nut, finger tight, onto the electrode stud. Repeat this process with the other five electrodes.
7. Turn the tank top half upright and rest it on the electrodes. Tighten the nuts on all the electrode studs with a ¾" wrench, so they are just snug.
8. Install the o-ring in the bottom tank half o-ring channel. A third hand or weight may be needed to hold one end of the o-ring in place while the other end is being installed.
9. Install the barrier assembly in the bottom tank half.
10. Lower the top tank half onto the bottom tank half. Line up the marks on the rim of the top and bottom tank halves to properly center the electrodes.
11. Look through the top connection to make sure the o-ring is still in place.
12. Snap a metal clip over the flanges of the tank halves, midway between two alignment marks. Position another clip on the opposite side of the tank. Install all 24 clips in this manner.

### MODEL EHU-801, SINGLE AND THREE PHASES:

1. Remove 24 metal clips by pushing gently on top of each clip with a screwdriver while cupping the clip with the other hand.
2. Clean the inside of the steam generator thoroughly using a scraper, stiff bristle brush and/or water spray and rinse with clear water.
3. High voltage units are supplied with a barrier/drain screen assembly in the lower tank half to increase tank life. Inspect the barrier/drain screen assembly and replace if necessary.
4. Place a flat washer and O-ring on each ¼" electrode stud and push the studs through the holes in the upper tank half.
5. The mounting hole on each electrode is attached to the tank top with a slotted self-tapping screw.
6. From the outside, install a flat washer and ¼" hex nut on each electrode stud. Tighten these with a 7/16" wrench so they are just snug.

# Valves Maintenance

## Fill and Drain system repair

### GENERAL:

In the event of a “Drain Circuit P5” or a “No Inlet Water P4” indication on the display, perform the following steps to identify and correct the fault. **DRAIN SYSTEM FAILURE:**

Check for drain valve operation. With the unit on; press the manual drain button. You should hear the drain valve operate with a sharp click. Repeatedly activate the manual drain button to determine if the valve is operating.

1. If the drain valve does not operate but the display reads manual drain, check for 24 VAC between the two leads on the drain valve. After checking, **TURN THE POWER OFF**.
  - a. If 24 VAC was NOT found, check wiring continuity to the circuit board. Repair broken wires as necessary. If wires are intact, call the factory for assistance.
  - b. If 24 VAC was found, measure the coil resistance of the drain valve with the leads disconnected. The coil resistance should be 10 ohms; if it is not, replace the drain valve.
2. If the drain valves can be heard to operate but no water drains out, **TURN THE POWER OFF**, then:
  - a. Check for a plugged drain valve and/or plugged drain adaptor. It is often possible to see an accumulation of solids in the inlet to the drain valve or in the neck of the steam generator. If this is the case, remove the generator and clean out the drain valve and tank drain adaptor.
  - b. While the tank is out, look into the lower end of the tank. Make sure the drain screen is in place. Also check for accumulations of lime at the bottom of the tank. Refer to “Steam Generator Disassembly” and “Cleaning Procedure” sections to rectify these problems.
3. If the tank drains well when the water level is high but poorly or not at all when it is low, check the duct pressure where the dispersion tube is mounted. A negative duct pressure can cause drainage problems. While this is relatively rare, it has been known to happen.
4. If the water backs up into the drain pan inside the unit, check for a blocked drain cup under the pan. If the drain cup is OK, check the drain piping for an accumulation of solids. Clean as required and increase the pitch of the drain piping if necessary. If long runs of horizontal drain pipe cannot be avoided, it may be necessary to develop some kind of drain flushing system. An air gap in between drain piping and drain hose from the EHU will allow “burping” of air from drain piping.

### Fill System Failure:

Make sure the drain valve is not leaking. A leaking drain valve may appear to the humidifier as a fill system failure. Check to see that the fill valve is operating. While the fill light is on, disconnect one of the fill valve leads then momentarily touch the lug to the coil terminal. You should be able to hear the valve operate.

1. If the valve is not operating, check for 24 VAC between the valve lead wires. After checking, **TURN OFF THE POWER**.
  - a. If 24 VAC WAS NOT found, check the continuity of the wires back to the circuit board. Repair broken wires as necessary. If wires are intact, call the factory for assistance.
  - b. If 24 VAC WAS found, disconnect the fill valve leads and check the coil resistance. It should be 58-60 ohms. Replace the coil if necessary.
2. If the fill valve is operating but the unit fills too slowly, check for either low water pressure (less than 25 psi) or a partially plugged screen inside the inlet fitting. If the screen tends to plug too easily, it may well be removed and replaced by a larger filter in the water line external to the unit.
3. If the valve makes humming or buzzing noises but fails to open:
  - a. Check for high water pressure (over 125 psi).
  - b. If a backflow preventer is used, crack open a fitting between the backflow preventer and the fill valve. If this causes the fill valve to open, remove the backflow preventer from the system. Backflow preventers are not needed as the Series EHU-800 incorporates a 1 inch air gap as an anti-syphon feature. For additional information on Armstrong Series EHU-800 Humidifiers, contact your Armstrong Representative and request Bulletin No. 596.

# Start Up Checklist

## Armstrong EHU-800 Series Pre Start Up Checklist

Humidifier Model: \_\_\_\_\_ Serial #: \_\_\_\_\_

Voltage: \_\_\_\_\_ ph: \_\_\_\_\_ KW: \_\_\_\_\_

Steam Capacity: \_\_\_\_\_ lbs/hr

Job Name: \_\_\_\_\_

Unit Tag: \_\_\_\_\_

Inspected by: \_\_\_\_\_ Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

### Water Type:

☐ Tap Water      Connectivity: \_\_\_\_\_  $\mu$ Mhos/cm

☐ Blended      Conductivity: \_\_\_\_\_  $\mu$ Mhos/cm

### Humidifier Mounting:

Clearance needed:

- ☐ Left side (4") Obstruction: \_\_\_\_\_
- ☐ Right side (24") Obstruction: \_\_\_\_\_
- ☐ Front (24") Obstruction: \_\_\_\_\_
- ☐ Bottom (12") Obstruction: \_\_\_\_\_

### Steam Dispersion Piping:

☐ Copper      ☐ Stainless Steel      ☐ Hose

Size: \_\_\_\_\_ ☐ Insulated

Length: \_\_\_\_\_

Number of elbows:

- ☐ 45° Elbows: \_\_\_\_\_
- ☐ 90° Elbows: \_\_\_\_\_

☐ Slope up 1" per 12"      ☐ Sloped back to drain

☐ Slope down 1" per 12"

☐ P-trap at bottom of every vertical down run      P-trap Height: \_\_\_\_\_"

☐ P-trap every 20 equivalent feet of dispersion piping      P-trap Height: \_\_\_\_\_"

**Steam Dispersion Type:**

- ☐ HumidiPack      ☐ ExpressPack      ☐ Fan package (EHF)
- ☐ Dispersion Tube      ☐ Dispersion Tube with Drain
- ☐ Other: \_\_\_\_\_

Serial number of dispersion type used: \_\_\_\_\_

**Plumbing:****Inlet Water:**

- ☐ Inlet water pressure between 25-120 psig

**Drain Lines:**

Size: \_\_\_\_\_

- ☐ Air gap located within 3' of humidifier
- ☐ Line pitched 1" per 12" away from humidifier
- ☐ Temp-R-Drain (condensate cooler)
- ☐ Other condensate cooler: \_\_\_\_\_

**Wiring:**

- ☐ All wires connected securely connected
- ☐ No loose wires around PC board
- ☐ Proper breaker and wire size per table on page 29

**Control Wiring:****Installed**

- ☐ High Limit Humidistat
- ☐ Mounted 10 feet downstream of dispersion
- ☐ Air proving/pressure switch
- ☐ Mounted upstream of dispersion
- ☐ Modulating Humidistat/Controller

Signal Type:

- ☐ 0-10 VDC      ☐ 4-20 mA
- ☐ Communications
- ☐ Modbus      ☐ BACnet      ☐ LonWorks

# Start Up Procedure

## Armstrong EHU-800 Series Pre Start Up Checklist

Humidifier Model: \_\_\_\_\_ Serial #: \_\_\_\_\_

Voltage: \_\_\_\_\_ ph: \_\_\_\_\_ KW: \_\_\_\_\_

Steam Capacity: \_\_\_\_\_ lbs/hr

Job Name: \_\_\_\_\_

Unit Tag: \_\_\_\_\_

- ☐ Completed Start Up Checklist  
If checklist was not completed, complete before proceeding with start up.
- ☐ Check and recheck proper incoming high voltage and high voltage terminals.  
ex. Contactors, terminal block, steam generator tank leads and grounding lug.
- ☐ Turn on water supply and check for leaks.
- ☐ Secure all access doors and panels.
- ☐ Turn on main power to unit.
- ☐ Switch on power at front of unit.
  - a. The display and the power light will illuminate.
  - b. The display will default to "Steam Produced" in the Unit Status menu.
  - c. When the EHU-800 receives a demand from the controller or sensor the contactor(s) will pull in turning on the electrodes in the steam generation tank and the steam production LED on the front panel.
- ☐ 90 seconds after the EHU-800 receives a demand signal the fill valve will open to fill the steam generation tank.
- ☐ Verify operation of High Limit and Air Proving switches.
- ☐ Refer to Principle of Operation in the EU-800 IOM for normal operation.
- ☐ Control wiring and dipswitches.

Start up by: \_\_\_\_\_ Company: \_\_\_\_\_

Signed: \_\_\_\_\_ Date: \_\_\_\_/\_\_\_\_/\_\_\_\_



# Legacy EHU PCB Index

## IMPORTANT: Please observe the following:

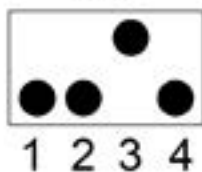
- Make certain there is a manually operated interlocking circuit breaker or safety switch (not furnished) in the electric service ACCESSIBLE TO AND WITHIN SIGHT OF THE HUMIDIFIER.
- USE ONLY WIRE WITH COPPER CONDUCTORS RATED 190°F (90°C) OR HIGHER FOR HIGH VOLTAGE AND GROUNDING.
- Ground the humidifier cabinet; a ground lug is provided in the wiring compartment.

## Control Wiring

Before connecting any control signal to the EHU-800, verify the control signal being used. Change dipswitch S2 setting located below the fill and drain fuses on the main board to correspond with the signal used. Failure to change the dipswitches could result in permanent damage to the main board!

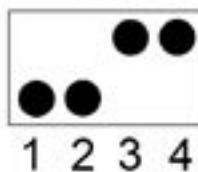
0 - 10 VDC

S1



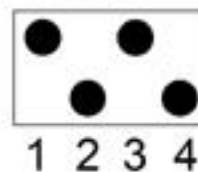
4 - 20 mA

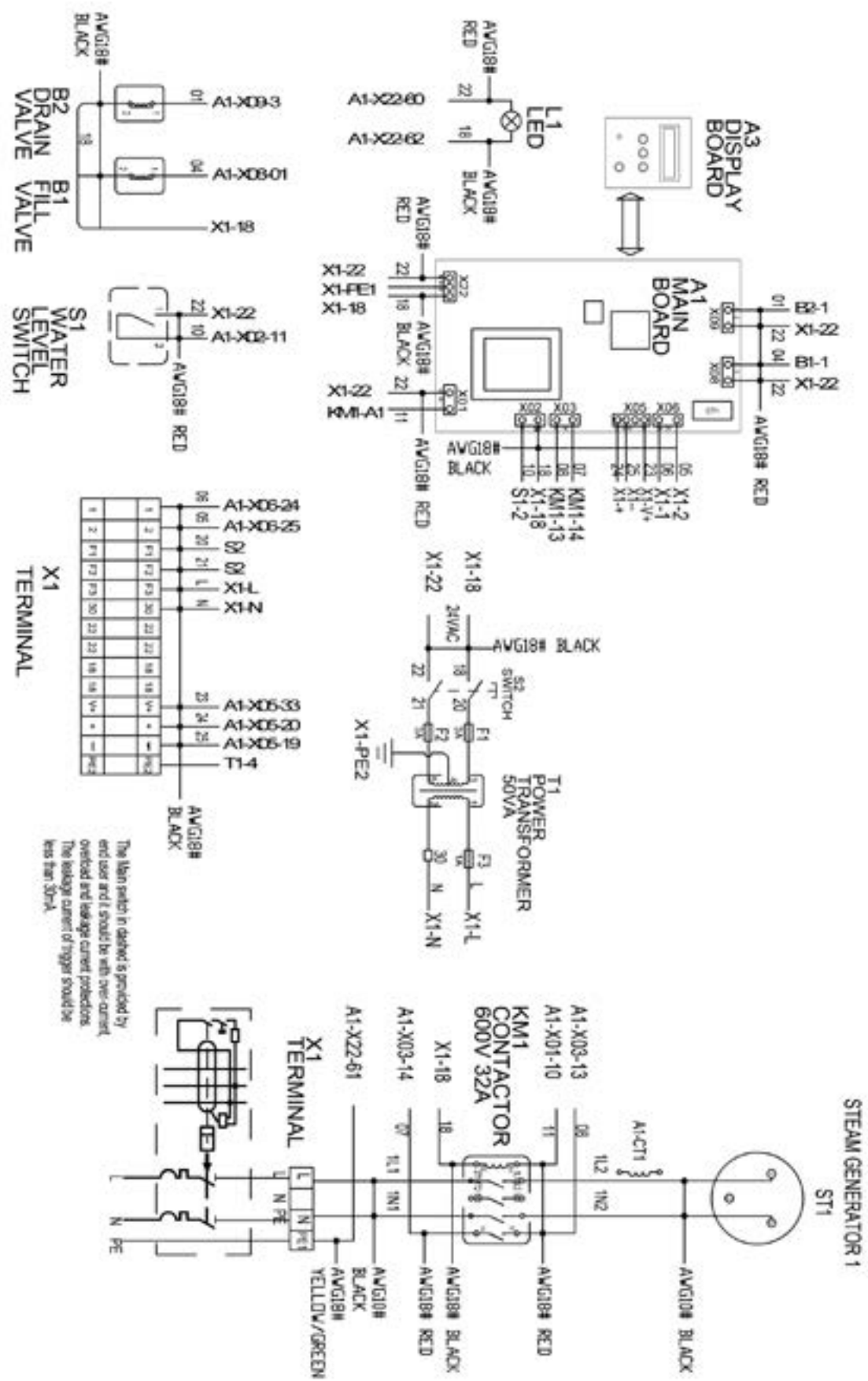
S1

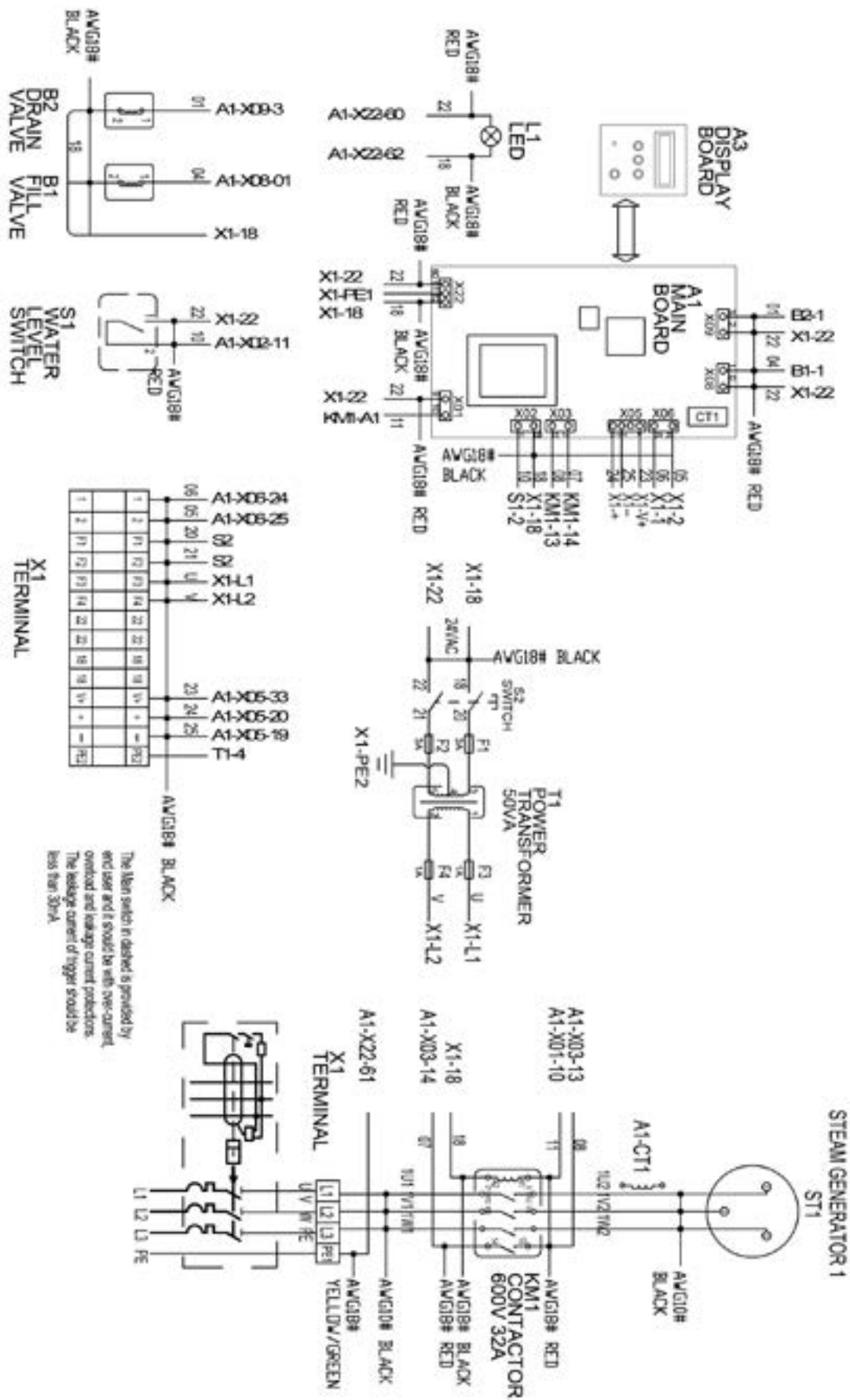


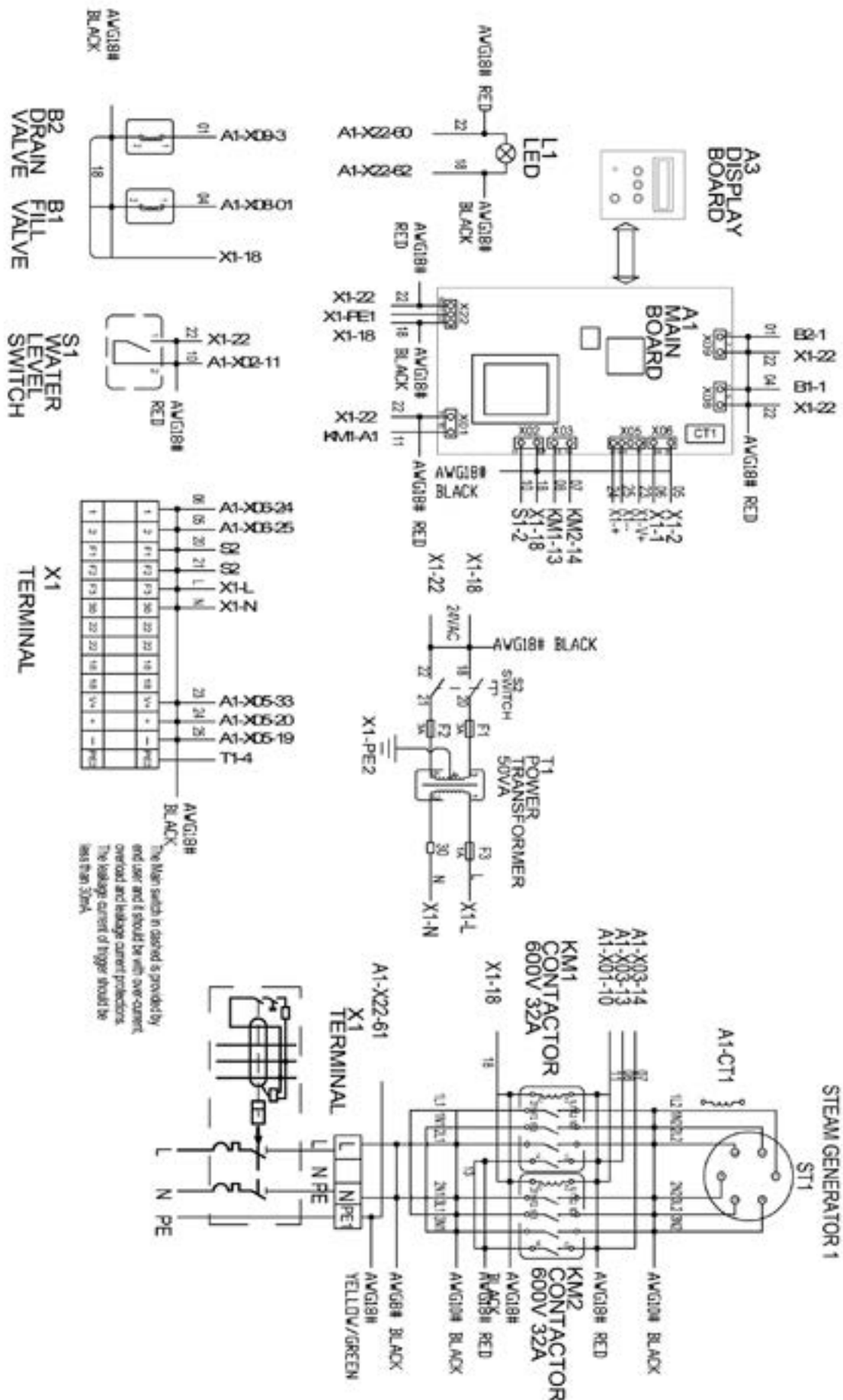
0 - 5 VDC

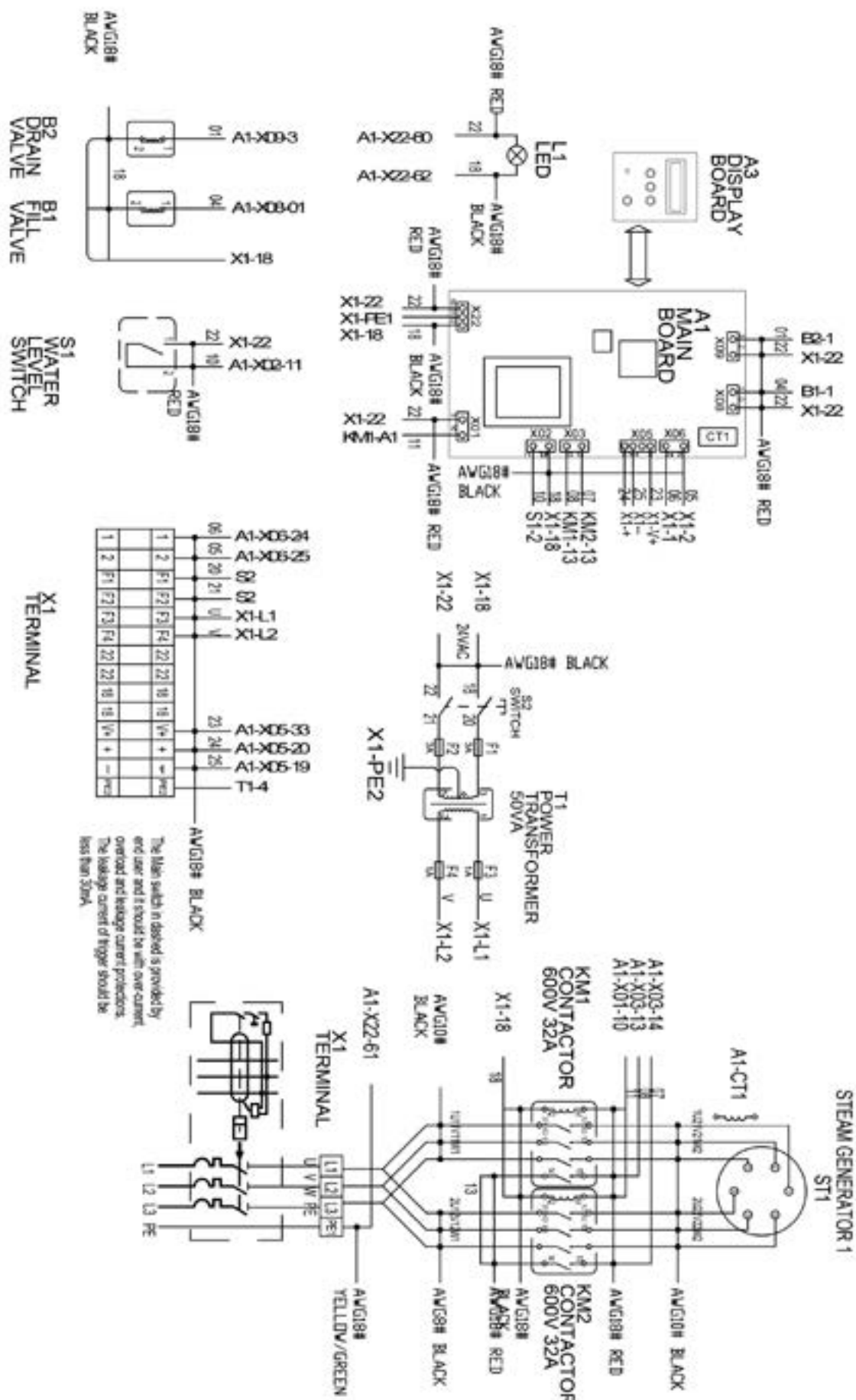
S1

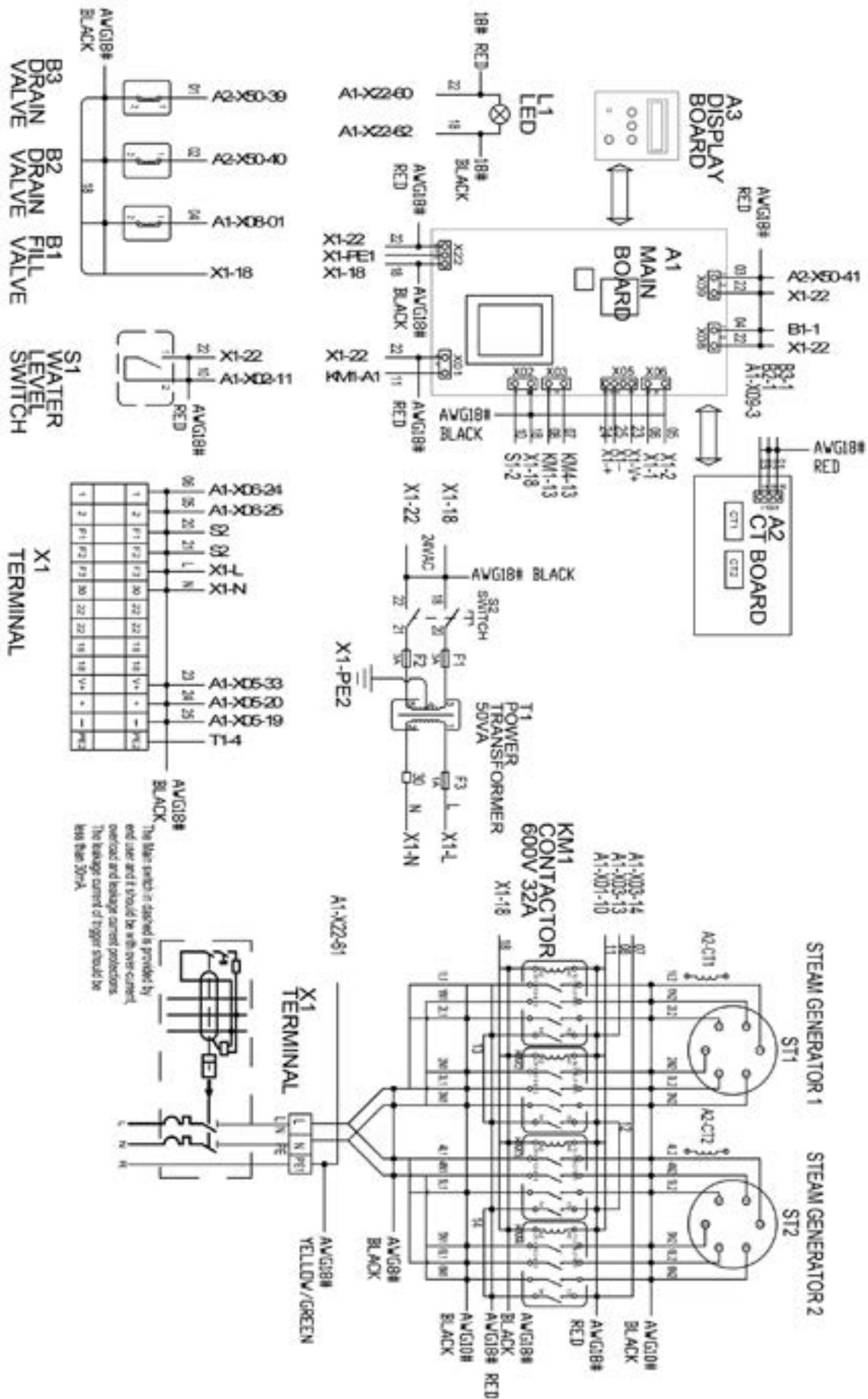


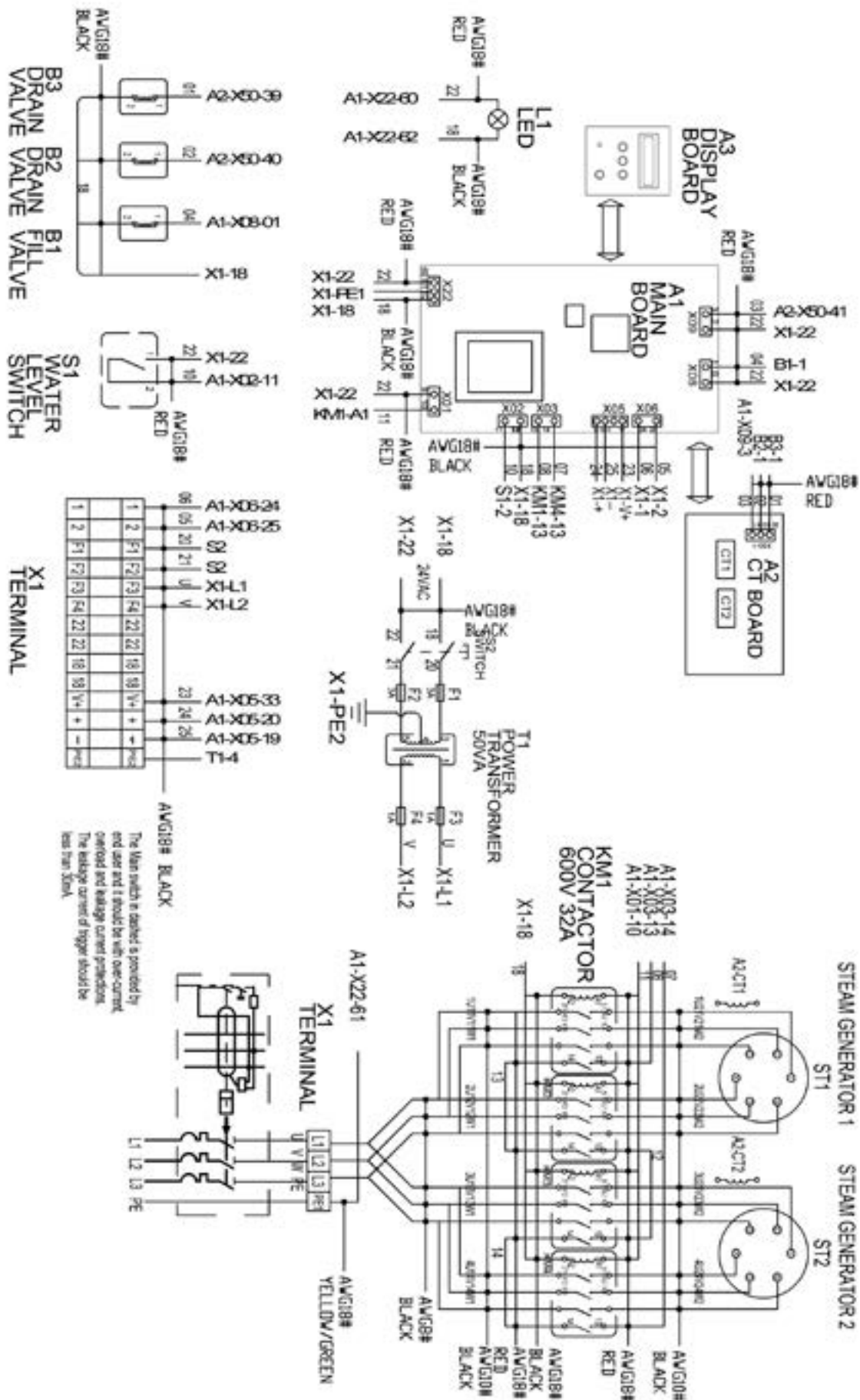










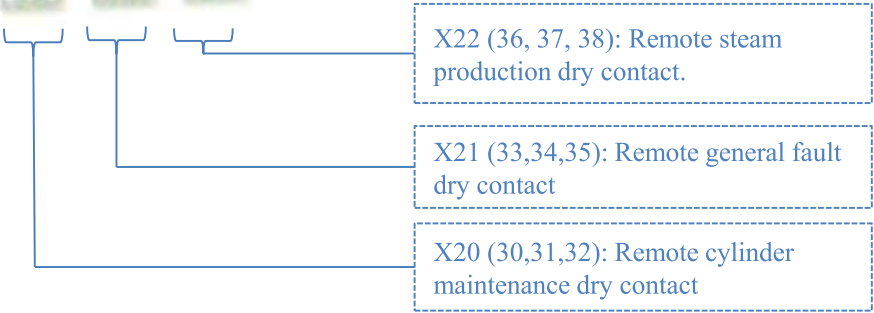
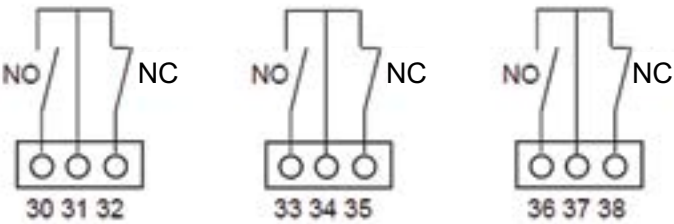


# Remote Information Board (Option)

The wiring of the optional equipment described under must be made 0.75mm² flexible cables.



Contact can be modified in NO or NF by wiring as per the following schemes (ex: wiring on 30 & 31 = NO Contact



X22 (36, 37, 38): Remote steam production dry contact.

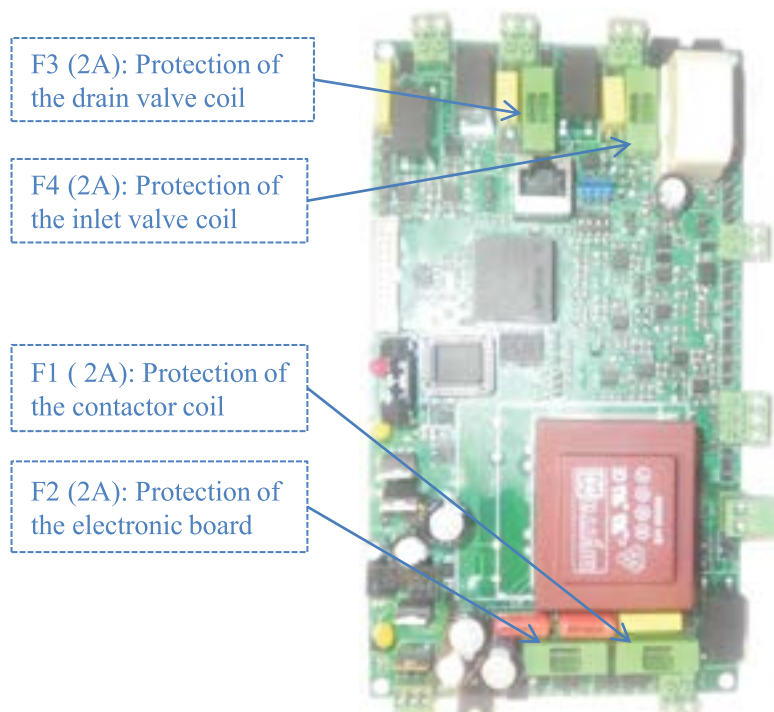
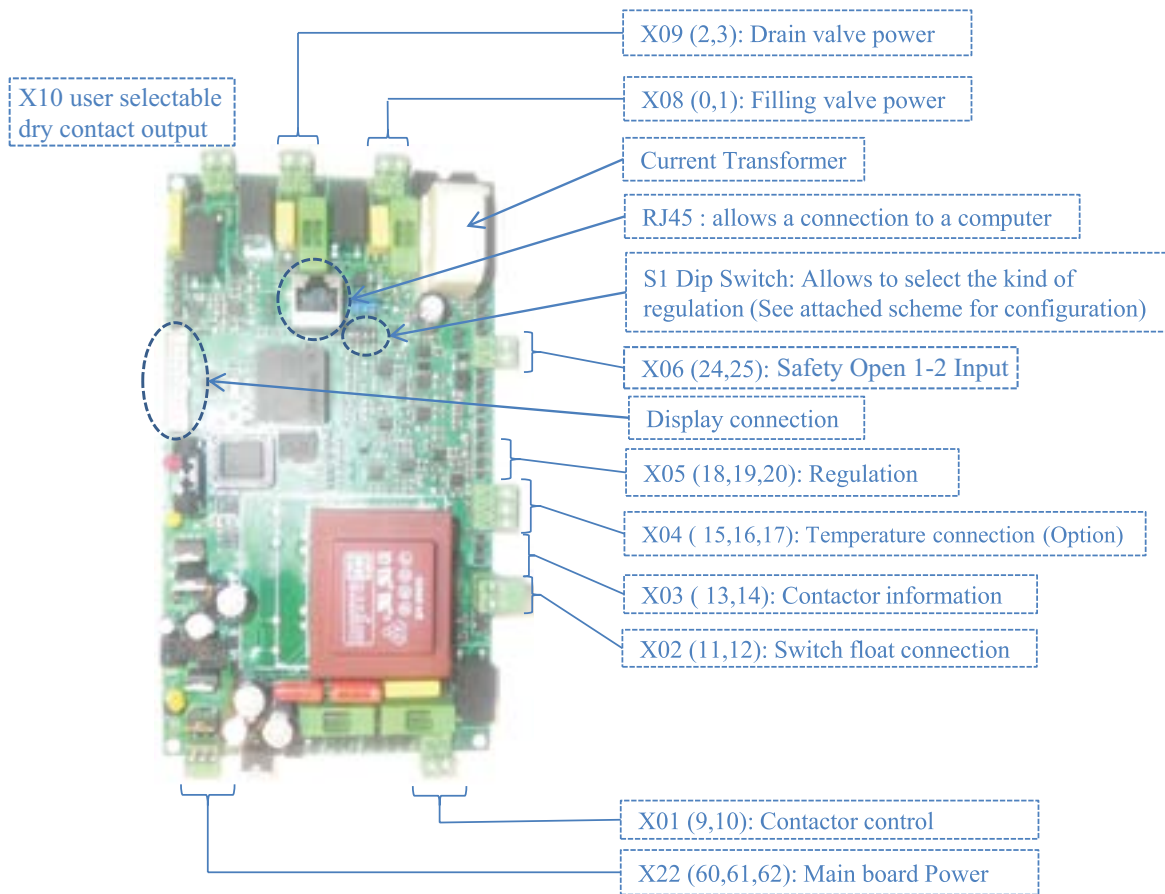
X21 (33,34,35): Remote general fault dry contact

X20 (30,31,32): Remote cylinder maintenance dry contact



## Step 6 - Control Connection

### Main Board Connection and Fuses Location



Designs, materials, weights and performance ratings are approximate and subject to change without notice. Visit [armstronginternational.com](http://armstronginternational.com) for up-to-date information.

# Communications

The EHU-800 can connect to, BacNet mstp, BacNet IP, Lonworks and Modbus. Modbus is native to the board. The three pin header connection can be seen below.

## Modbus

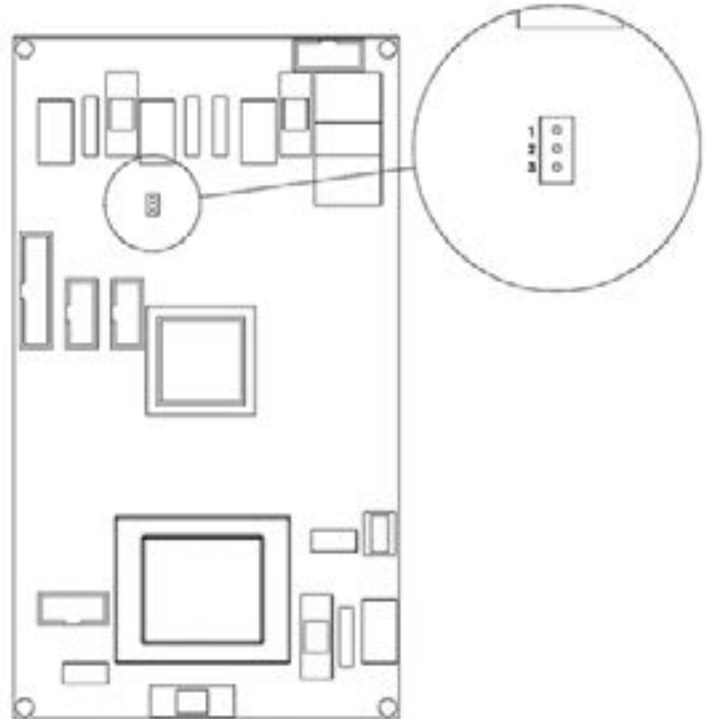
Wire to the RS-485 pin header seen below:

- Pin 1 – RS -
- Pin 2 – RS +
- Pin 3 – GND

Make sure all other connections are made properly. Refer to the Control Wiring Section of this IOM.

1. Power on the unit by the front panel On/Off switch.
2. Enter Menu 234.
3. Scroll down to “Control Signal In”. If you want to control the unit through Modbus change this to “ Digital Ctrl “. If you want to only monitor the EHU-800 using a local humidistat / controller or sensor, select the appropriate setting for you.
4. Scroll down to “Identification of EHU”. Default is set at “1”. This sets the address of the EHU-800 between 1 and 80.
5. Scroll to “Speed Data”. The default baud rate is 9600. Adjust this to match your system.

Changes to the unit can now be done through the Building Management System or through the keypad at the EHU-800. Refer to the Modbus Variants List on page 40 to set up the required points.



# Limited Warranty and Remedy

Armstrong International, Inc. ("Armstrong") warrants to the original user of those products supplied by it and used in the service and in the manner for which they are intended, that such products shall be free from defects in material and workmanship for a period of one (1) year from the date of installation, but not longer than 15 months from the date of shipment from the factory, [unless a Special Warranty Period applies, as listed below]. This warranty does not extend to any product that has been subject to misuse, neglect or alteration after shipment from the Armstrong factory. Except as may be expressly provided in a written agreement between Armstrong and the user, which is signed by both parties, Armstrong **DOES NOT MAKE ANY OTHER REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.**

The sole and exclusive remedy with respect to the above limited warranty or with respect to any other claim relating to the products or to defects or any condition or use of the products supplied by Armstrong, however caused, and whether such claim is based upon warranty, contract, negligence, strict liability, or any other basis or theory, is limited to Armstrong's repair or replacement of the part or product, excluding any labor or any other cost to remove or install said part or product, or at Armstrong's option, to repayment of the purchase price. As a condition of enforcing any rights or remedies relating to Armstrong products, notice of any warranty or other claim relating to the products must be given in writing to Armstrong: (i) within 30 days of last day of the applicable warranty period, or (ii) within 30 days of the date of the manifestation of the condition or occurrence giving rise to the claim, whichever is earlier. **IN NO EVENT SHALL ARMSTRONG BE LIABLE FOR SPECIAL, DIRECT, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO, LOSS OF USE OR PROFITS OR INTERRUPTION OF BUSINESS.** The Limited Warranty and Remedy terms herein apply notwithstanding any contrary terms in any purchase order or form submitted or issued by any user, purchaser, or third party and all such contrary terms shall be deemed rejected by Armstrong.

## Special Warranty

Periods are as follows: Series EHU-800 Electric Steam Humidifier, Series HC-6000 HumidiClean Humidifier and GFH Gas Fired Humidifier with Ionic Beds: Two (2) years after installation, but not longer than 27 months after shipment from Armstrong's factory.

## Principle of operation

**CAUTION:** Disconnect the electric power supply at the circuit breaker or switch whenever the unit is to be inspected or serviced. **DO NOT USE THE TANK ON/OFF SWITCH ON THE HUMIDIFIER BECAUSE THIS SWITCH DISCONNECTS THE STEAM GENERATOR TANK ONLY. PRINCIPLE OF OPERATION - AN OVERVIEW**

The Armstrong Series EHU-800 electronic steam humidifier converts ordinary tap water to steam and distributes it within the air being humidified to bring the relative humidity up to the desired level.

The humidity demand is sensed by the humidistat. A microcontroller converts this demand signal into an amperage requirement. If humidistat demand is above 20%, the internal power contactor closes, applying voltage to the electrodes, and the fill valve opens to begin filling the tank. Water enters the bottom of the steam generator tank and rises until it reaches the electrodes. Upon contact, electrical current flows through the water, causing it to boil and produce steam. As the water level rises increased electrical current flows through the water, producing more steam. This increase will continue until the desired current level (i.e. required steam output) is reached. At this point, the fill valves will cycle off and on to maintain the desired amperage  $\pm 5\%$ . The desired current level is a function of the nominal current rating, humidistat demand, and the automatic capacity adjustment feature.

When the humidistat senses the added moisture in the air, the demand for humidity begins to drop. As the demand drops, the output of the unit is modulated down by boiling away water and not filling. This allows the amperage to decrease, thereby reducing the steam flow. The fill valve can then cycle at the lower steam output (current) requirement. When the humidistat demand signal drops below a minimum 25% demand, the contactor is de-energized, and steam output stops. Steam output may also be stopped by a duct high-limit humidistat or a fan interlock switch. These devices prevent excess moisture and condensation in the duct by opening the tank contactor if there is too much humidity or insufficient airflow within the duct.

A high-water float switch prevents water carry-over into the duct due to an excessive water level in the tank. When the high water limit is reached the display will read "high Water Level" in the humidifier status menu and the fill valve is blocked until some water is boiled away and the water level drops. This is common during startup. If the display reads "High Water Level" and the water level is in the lower half of the steam generator, contact the factory for assistance. This is due to high static pressure. Installation of a fill cup extension kit could be required. If an overcurrent situation is detected, the overcurrent protection circuit will drain water from the tank to reduce current flow. If the overcurrent persists, the contactor will be de-energized to stop all current flow.

The Series EHU-800 patented automatic capacity adjustment feature eliminates manual adjustment and improves humidity control. This feature automatically adjusts maximum output up or down depending on the humidity demand history. When the unit is first turned on the maximum output is 40%. If the demand stays high, the unit automatically steps up the maximum output and will reach 100% maximum output after one hour. An automatic drain cycle blows down mineral-laden water to increase steam generator life and reduce maintenance requirements. The frequency and duration of the drain cycle will vary with supply water conductivity, steam output, and humidistat demand history. When it is initiated automatically, the drain valve cycle occurs at the beginning of a fill cycle. The incoming cold water tempers the drain water to less than 70°C (160°F) after 72 hours of no demand; the unit will initiate an "End-of-Season" drain to remove stagnant water.

Designs, materials, weights and performance ratings are approximate and subject to change without notice.  
Visit [armstronginternational.com](http://armstronginternational.com) for up-to-date information.



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