CPU-0600 (Stand Alone Boiler Control)

Technical Data Sheet

Submittal: HBX CPU-0600

Project: [ ]

HBX Control Systems Inc. – Specification

Part 1: CPU-0600 Product

1. The Hydronic Control must be a full microprocessor control with at least a 16-bit, 140MHz integrated microprocessor chip.

2. The Control must use a full- colour touchscreen display. The display must be capable of showing the following information in one single screen:

a. Heat Demand
b. DHW Demand
c. WWSD (Warm Weather Shut Down)
d. Boiler Temperature (Actual vs. Target)*staging mode
e. System Temperature (Actual vs. Target) *mixing mode
f. DHW Temperature (Actual vs. Target) *Staging or Mixing mode
g. On/off status of each boiler (staging/mixing mode), pumps and valves
h. DHW priority
i. Outdoor Temperature
j. Wi-Fi connection status

3. The Control must be capable of the following Input/ Output Functions

a. 2 x Dry Contact Demand Inputs
    i. Heat Demand
    ii. DHW Demand
    iii. Flow switch input (Pump sequencer mode)
b. 3 x Modulating Output (0-10 VDC)
c. 4 x Thermistor Inputs (10K Ohm)
    i. Boiler Temperature
    ii. System temperature
    iii. DHW temperature
    iv. Outside temperature
d. 4 x Staging Output Relays 24V 1A (Dry Contact)
e. 3 x Auxiliary Relays
    i. Boiler pump , System pump, DHW Pump (Staging Mode), Injection (Mixing Mode)
    ii. Boiler pump, System pump, DHW Pump, PMIp, Modulating or Floating Valve (Mixing Mode), Heating or cooling (Dual setpoint), Setpoint (Dual Setpoint

iii. Boiler pump, System pump, DHW Pump, PMIp, Modulating or Floating Valve (Mixing Mode), Heating or cooling (Dual setpoint), Setpoint (Dual Setpoint), Flow alarm (Pump Sequencer)

3. The Control/unit must be capable of operating in multiple application modes:

i. Staging (Boiler staging with DHW)
ii. Mixing (PMIp, Modulating or Floating Valve)
iii. Differential setpoint (Solar thermal)
iv. Dual setpoint (one or two independent setpoints)
v. Pump Sequencer (Pump sequencing, pump exercising)

4. The Control must be expandable in design by linking multiple CPU-0600 together to a maximum of 4 controllers per system. The control must be capable of staging up to 16 boiler stages or modulating up to 12 Modulating Boilers, or a combination of both modulating and on/off stages. Each individual control can stage up to 4 boilers and/or 3 modulating boilers.

5. A screen must be available to display and read each of the accumulated run times for each boiler (stage).

6. In the event of Thermistor sensor problems the main display with indicate an “error” with 3 dash lines on the screen.

7. The Control must be capable of controlling DHW temperature via valve or pump, with or without priority, from a thermistor or aquastat signal.

8. The Control programming must allow for DHW Priority.

9. The Control must have the ability to program and control for Warm Weather Shut Down.

10. The Control must be capable of using PMI (Pulse Modulated Injection). The Control must use built in Arc-Suppression on PMI (Pulse Modulated Injection) Output Control Relays. *Auxiliary relay #1

11. The Control must allow for boiler rotation based of time or cycles in staging and mixing mode.

12. The Control must be capable of running a temperature Differential in Differential Setpoint mode.

13. The Control must be capable of controlling a floating action valve (power open/ power close) or an injection pump in mixing mode.

14. The Control must be capable of pump sequencing based on time, cycles and flow switch inputs. The Control must also have a dry contact alarm output, should the flow switch get tripped.

15. The control must be capable of controlling one or two independent setpoints. Each setpoint is setpoint is set up individually and each has its own thermistor input and relay outputs.

16. The control must be capable of connecting to a 2.4Ghz Wi-Fi network for remote configuration and monitoring using the HBX SensorLinx mobile app.

17. The control must allow for parameter temperatures to be viewed in Celsius (°C) or Fahrenheit (°F).

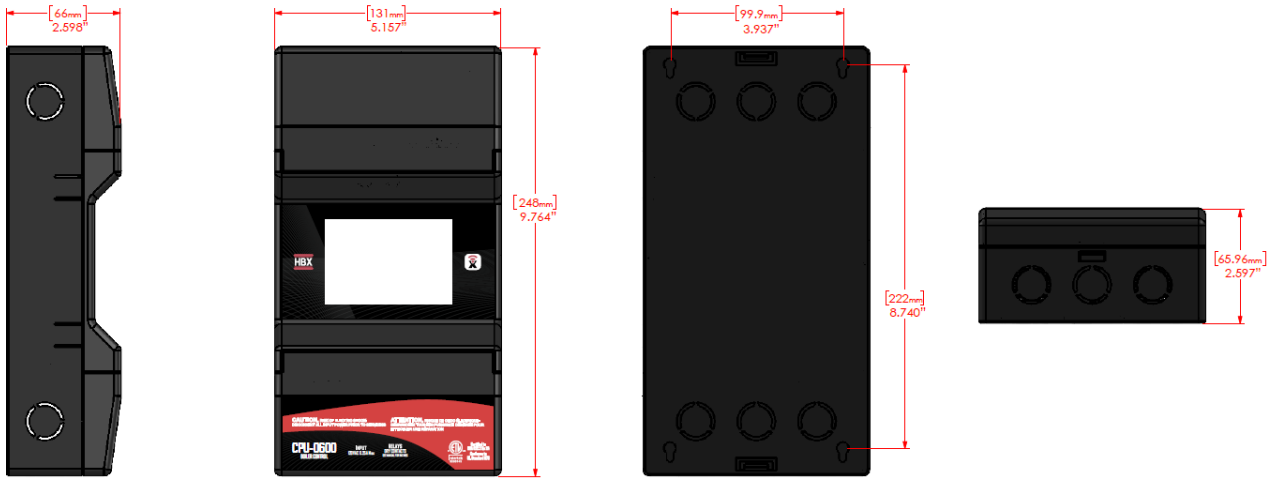
18. The control must be capable of setting pump post purge, exercising and start delay times.

19. The Control unit must be ETL approved.

Part 2: Acceptable Products

1. HBX CPU-0600 Control

Part 3: Physical Dimensions



Part 4: Technical Data, Main Parts & Labels

Inputs/Outputs:

4 x thermistor Input (10k Ohm)
3x Modulating Outputs (0-10VDC)
4 x Stage Relays 24VAC 1A Max
3 x AUX Relays

- 240VAC 5A Max
- 240VAC 5A Max
- 240VAC 5A Max

FCC ID: 2AHMR-ESP12S

Power supply:

120 VAC +/- 10% 50/60Hz 15A Max

Microprocessor:

16-bit, 140MHz

Languages:

English

Weight:

0.750 Kg

Wi-Fi:

2.4 GHz Network Only

Supplied Parts:

2 x HBX 029-0022 (Universal Brass Sensor) – 10K Ohm Thermistor, 12” lead wire
1 x HBX OUT-0100 (Outdoor/Indoor Sensor) – 10K Ohm Outdoor Sensor
2 x Cable ties
1 x terminal screwdriver (2.5mm)

Dimensions:

5.16” W x 9.83” H x 2.64 D” (131mm x 246mm x 66.71mm)

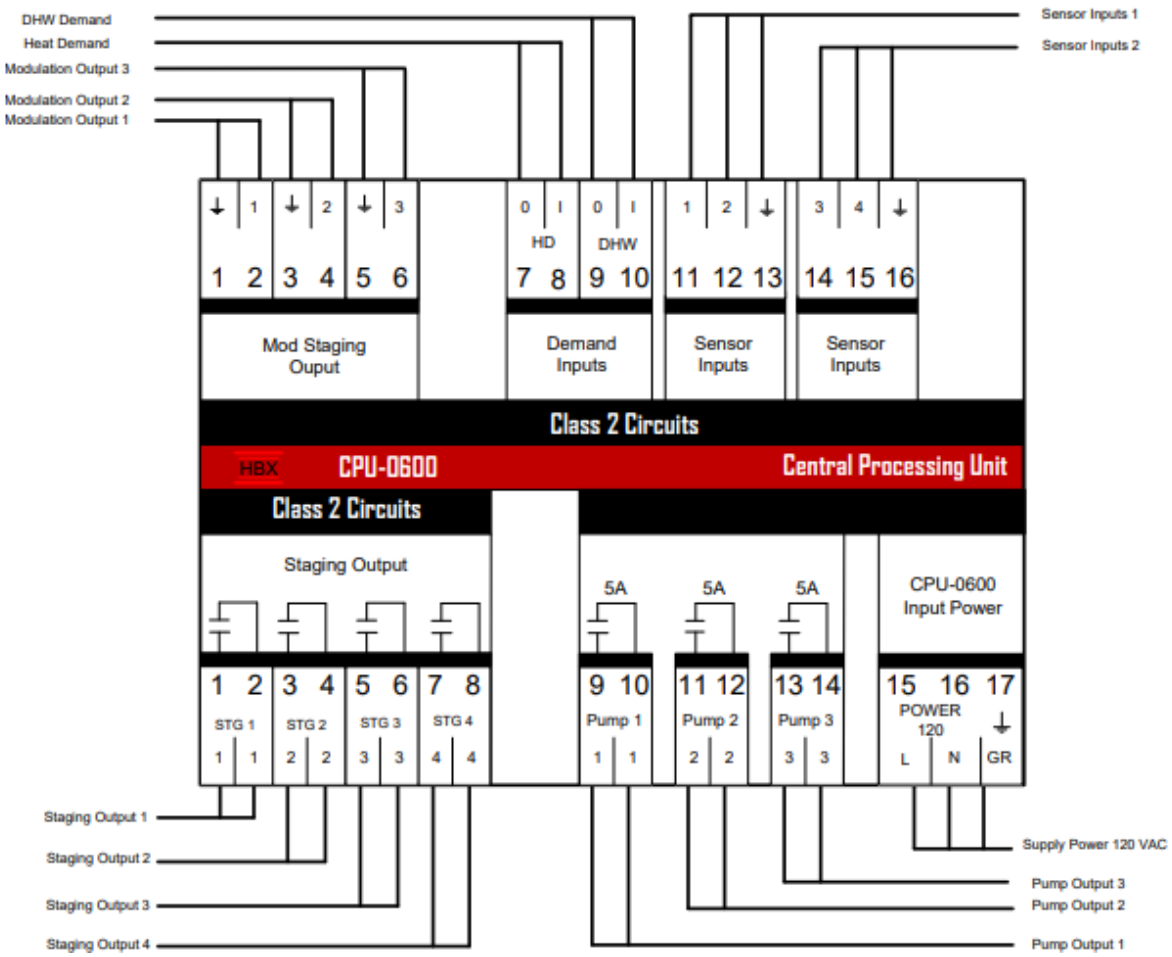
ETL Listings:

Meets CSA C22.2 No. 24
Meets UL Standard 873
ETL Control No. 3068143

Storage:

50°F to 104°F (10ºC to 40ºC)

Pin Out / Terminal Block Labels:



Wiring

All signal wiring must be with a minimum of 18AWG wire at a maximum of 500ft.

Modulating Outputs

1, 2: Modulating output 1 – (0-10 VC) Can be used for a modulating boiler or valve
3, 4: Modulating output 2 – (0-10 VDC) Can be used for a modulating boiler or valve
5, 6: Modulating output 3 – (0-10 VDC) Can be used for a modulating boiler or valve

Demand Outputs

7,8: Demand signal 1: Apply a heat demand from a dry contact or 24v
9,10: Demand signal 2: Used for DHW or setpoint demand

Sensor Inputs

11, 13: Boiler Temperature in Staging Mode. Setpoint 1 temperature in Dual Setpoint Mode.
12, 13: Boiler Return temperature in Staging. System temperature in Mixing Mode. Setpoint 2 temperature in Dual Setpoint mode.
14, 16: Outdoor temperature.
15, 16: Used for DHW tank temperature.

Staging Outputs

1, 2: Boiler Stage 1 (Primary Control) or Stage 5, 9, 13 (Secondary Control)
3, 4: Boiler Stage 2 (Primary Control) or Stage 6, 10, 14 (Secondary Control)
5, 6: Boiler Stage 3 (Primary Control) or Stage 7, 11, 15 (Secondary Control)
7, 9: Boiler Stage 4 (Primary Control) or Stage 8, 12, 16 (Secondary Control)

Auxiliary Outputs

9, 10: Aux 1 - Can be used as a system pump, Injection pump
11, 12: Aux 2 – Can be used as a system pump, DHW pump, Boiler pump, Valve up
13, 14: Aux 3 - Can be used as a system pump, DHW pump, Boiler pump, Valve down

Input Power

15, 16, 17: 120 VAC +/- 10% 50/60Hz 15A Max

Part 5: HBX Sensor Temperature Conversion / Resistance Table

Celsius	Fahrenheit	Ohms	Celsius	Fahrenheit	Ohms	Celsius	Fahrenheit	Ohms
-30	-22	177,000	15	59	15,714	60	140	2,488
-29	-20.2	166,342	16	60.8	15,000	61	141.8	2,400
-28	-18.4	156,404	17	62.6	14,323	62	143.6	2,315
-27	-16.6	147,134	18	64.4	13,681	63	145.4	2,235
-26	-14.8	138,482	19	66.2	13,071	64	147.2	2,157
-25	-13	130,402	20	68	12,493	65	149	2,083
-24	-11.2	122,807	21	69.8	11,942	66	150.8	2,011
-23	-9.4	115,710	22	71.6	11,418	67	152.6	1,943
-22	-7.6	109,075	23	73.4	10,921	68	154.4	1,876
-21	-5.8	102,868	24	75.2	10,449	69	156.2	1,813
-20	-4	97,060	**25**	**77**	**10,000**	70	158	1,752
-19	-2.2	91,588	26	78.8	9,571	71	159.8	1,693
-18	-0.4	86,463	27	80.6	9,164	72	161.6	1,637
-17	1.4	81,662	28	82.4	8,776	73	163.4	1,582
-16	3.2	77,162	29	84.2	8,407	74	165.2	1,530
-15	5	72,940	30	86	8,056	75	167	1,480
-14	6.8	68,957	31	87.8	7,720	76	168.8	1,431
-13	8.6	65,219	32	89.6	7,401	77	170.6	1,385
-12	10.4	61,711	33	91.4	7,096	78	172.4	1,340
-11	12.2	58,415	34	93.2	6,806	79	174.2	1,297
-10	14	55,319	35	95	6,530	80	176	1,255
-9	15.8	52,392	36	96.8	6,266	81	177.8	1,215
-8	17.6	49,640	37	98.6	6,014	82	179.6	1,177
-7	19.4	47,052	38	100.4	5,774	83	181.4	1,140
-6	21.2	44,617	39	102.2	5,546	84	183.2	1,104
-5	23	42,324	40	104	5,327	85	185	1,070
-4	24.8	40,153	41	105.8	5,117	86	186.8	1,037
-3	26.6	38,109	42	107.6	4,918	87	188.6	1,005
-2	28.4	36,182	43	109.4	4,727	88	190.4	974
-1	30.2	34,367	44	111.2	4,544	89	192.2	944
0	32	32,654	45	113	4,370	90	194	915
1	33.8	31,030	46	114.8	4,203	91	195.8	889
2	35.6	29,498	47	116.6	4,042	92	197.6	861
3	37.4	28,052	48	118.4	3,889	93	199.4	836
4	39.2	26,686	49	120.2	3,743	94	201.2	811
5	41	25,396	50	122	3,603	95	203	787
6	42.8	24,171	51	123.8	3,469	96	204.8	764
7	44.6	23,013	52	125.6	3,340	97	206.6	742
8	46.4	21,913	53	127.4	3,217	98	208.4	721
9	48.2	20,883	54	129.2	3,099	99	210.2	700
10	50	19,903	55	131	2,986	100	212	680
11	51.8	18,972	56	132.8	2,787	101	213.8	661
12	53.6	18,090	57	134.6	2,774	102	215.6	643
13	55.4	17,255	58	136.4	2,675	103	217.4	626
14	57.2	16,464	59	138.2	2,579	104	219.2	609