BL Series

Outdoor Mechanical Rooms with Boilers and Pumps

Engineering Catalog

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BL Series Features and Benefits

AAON has taken the lead with factory engineered and installed pumping and boiler packages that save time and expenses associated with the normal jobsite construction of the equipment room details. By effectively constructing packaged outdoor mechanical rooms, AAON eliminates the need to take up valuable indoor floor space.

The AAON BL Series is a packaged outdoor mechanical room that includes boilers and building pumps, and is designed with the features that AAON customers have come to expect: convenient installation, serviceability, efficiency and reliability.

Convenience and Serviceability
All models feature lockable, hinged doors providing access to the cabinet interior. A lighted walk-in control vestibule provides indoor access to vital control components, electrical systems, boilers and pumps. A unit specific color-coded wiring diagram is laminated and affixed within the controls cabinet. Vestibule electric heater options are available. Water connections may be specified at the front, back, or bottom of the cabinet, which may be rooftop, platform, or ground-level slab mounted. With all components internal to the cabinet, the AAON BL Series does not require mounting in a remote location or a screened, protected area to prevent contact with the building or visiting personnel.

Reliability
The cabinet's composite construction, galvanized G-90 sheet steel paneling surrounding insulating foam, provides strength, rigidity and excellent thermal characteristics. Corrosion resistant external polyurethane coating surpasses 2,500 hour salt spray testing.

Efficiency
Each BL Series contains factory installed boilers, available in capacities from 500,000 to 1,500,000 Btu/h input, with as many as four boilers available for up to 6,000,000 Btu/h input. Central to the boiler's operational efficiency is the design of its copper-tube heat exchanger. Not only does it efficiently maintain heat transfer, but the innovative gasket-less carbon steel header provides for easy inspection, cleaning and individual tube replacement. The combustion chamber is also completely enclosed in a stainless steel compartment and features collection/evaporation components to effectively handle cold start condensate. Designed to operate at 88% thermal efficiency with NOx ratings less than 9.9 ppm, the noiseless ceramic radiant burner runs at minimal excess air levels creating highly efficient and trouble-free operation. The rugged industrial cast aluminum blower and fan wheel are equipped with a replaceable combustion air filter (99% efficient to one micron) to create excellent combustion characteristics and even air distribution. The boiler can even be operated with its jacket panels removed for easy inspection or maintenance.

Unique Timesaving Controls
Instead of using a series of relays, the boiler utilizes state-of-the-art microprocessor flame safeguard controls to provide extensive diagnostic information including first-out fault annunciation using an LED diagnostic display. The proven ignition system ensures that the pilot is lit before allowing the main gas valve to open. The display unit, as shown above, provides operational information and history. Full

modulation, from 10 to 100%, is achieved using a VFD and an air-fuel ratio modulating control valve, for dependable, repeatable modulation. The control valve is actuated by an air signal from the fan - as the fan varies so does the gas valve. It is truly a linkage-less system and allows for safe fuel-air combustion. Full modulation is available on all models. Every BL Series model is furnished with a microprocessor controller that cycles the boilers to maintain the leaving water temperature within 3°F over a wide range of operating conditions. A convenient LCD interface is provided. Inputs are made via large function keys with menu driven prompts. Schedules are available with a seven day built-in time clock. Terminals are provided for remote stop-start and for remote reset of the leaving water temperature setpoint. A non-volatile memory is used for all control functions.

Factory Installed Pumping Packages

The factory installed piping package is configurable, including a building pump with factory mounted air separator, expansion tanks, and piping access to the building through the sides or bottom. Victaulic piping and fittings are furnished as a standard feature, and the insulated compartment can even be provided with heating or cooling for comfort while periodic maintenance is performed.

The Primary/Secondary pumping package for variable flow systems includes: Armstrong® pumps, butterfly valves, strainers, ball valves, pressure relief valves, water makeup pressure reduction valve, and backflow prevention. Individual redundant or dualArm pumps are also available. Each port is fitted with an isolation valve that allows the units to operate in parallel or standby, yet may also be used to isolate one pumping unit for servicing or removal, with the other pump still operating.

For added convenience, selection of pumping packages will be handled through the AAON selection software, AAONEcat. When a compression/expansion tank option is selected, the appropriate expansion tank size to be included with the package will be selected. Refer to the AAON website for further information and the downloadable AAONEcat software. A manual selection of the pumping package components is not possible due to the many combinations and applications conditions that can be selected. All the primary pumping systems are supported throughout the BL model sizes and associated flow rates. After a primary pump selection is made, the AAONECat program will generate a rating sheet, a pump performance curves and a piping diagram.

BL Series Feature String Nomenclature

Model Options : Unit Feature Options

GEN	SIZE	VLT	CONFIG	A1	A2	A3	A4	B1	B2	B3	1A	1B	1C	1D	2	3	4	5A	5B	5C	6A	6B	6C	7	8	9	10	11	12	13	14A	14B	15	16	17	18	19	20	21	22	23
B	**L**	**–**	**0**	**5**	**0**	**–**	**3**	**–**	**0**	**–**	**A**	**0**	**0**	**0**	**–**	**A**	**1**	**A**	**:**	**0**	**0**	**0**	**0**	**–**	**0**	**C**	0	–	0	0	0	–	K	C	C	–	B	0	0	0	F	B	G	–	0	A	–	C	A	A	0	0	0	0	0	X

BASE MODEL

SERIES AND GENERATION
BL

UNIT SIZE
050 = 500 MBH Boiler Capacity
075 = 750 MBH Boiler Capacity
100 = 1,000 MBH Boiler Capacity
150 = 1,500 MBH Boiler Capacity
200 = 2,000 MBH Boiler Capacity
225 = 2,250 MBH Boiler Capacity
300 = 3,000 MBH Boiler Capacity
400 = 4,000 MBH Boiler Capacity
450 = 4,500 MBH Boiler Capacity
600 = 6,000 MBH Boiler Capacity

VOLTAGE
2 = 230V/3Φ/60Hz
3 = 460V/3Φ/60Hz
4 = 575V/3Φ/60Hz
8 = 208V/3Φ/60Hz

BLANK
0 = Standard

Model Option A: STYLE

A1: STYLE
0 = Standard - Narrow Cabinet
A = Wide Cabinet

A2, A3, A4: BLANK
000 = Standard

Model Option B: HEATING

B1: HEATING TYPE
A = Natural Gas Fired Boiler
B = Propane Fired Boiler

B2: BOILER QUANTITY
1 = 1 Boiler
2 = 2 Boilers
3 = 3 Boilers
4 = 4 Boilers

B3: BOILER HEATING CAPACITY
A = 500 MBH Modulating High Flow
B = 750 MBH Modulating High Flow
C = 1,000 MBH Modulating High Flow
D = 1,500 MBH Modulating High Flow
E = 500 MBH Modulating Low Flow
F = 750 MBH Modulating Low Flow
G = 1,000 MBH Modulating Low Flow
H = 1,500 MBH Modulating Low Flow

FEATURE 1: BLANK

1A, 1B, 1C, 1D: BLANK
0000 = Standard

FEATURE 2: BLANK

0 = Standard

FEATURE 3: BOILER ACCESSORIES

0 = Standard
A = Glycol Boiler
B = Thermometers and Pressure Gauges
C = Options A + C

BL Series Feature String Nomenclature

Model Options : Unit Feature Options

GEN	SIZE	VLT	CONFIG	A1	A2	A3	A4	B1	B2	B3	1A	1B	1C	1D	2	3	**4**	**5A**	**5B**	**5C**	**6A**	**6B**	**6C**	7	8	9	10	11	12	13	14A	14B	15	16	17	18	19	20	21	22	23
BL	– 0 5 0	– 3	– 0	– A 0 0 0				– A 1			A : 0	0	0	0	– 0	C	**0**	– **0**	**0**	**0**	– **K**	**C**	**C**	– B	0	0	0	F	B	G	– 0	A	– C	A	A	0	0	0	0	0	X

FEATURE 4: BLANK
0 = Standard

FEATURE 5: BLANK
5A, 5B, 5C: BLANK
000 = Standard

FEATURE 6: BOILER PUMP
6A: BUILDING PUMP CONFIGURATION
0=Standard, No Boiler Pump
A = 1 Pump/Barrel - Std Eff, 1170 RPM
B = 2 Single Pumps/Barrel - Std Eff, 1170 RPM
C = *dualArm* Pump/Barrel - Std Eff, 1170 RPM
D = 1 Pump/Barrel - Prem Eff, 1170 RPM
E = 2 Single Pumps/Barrel - Prem Eff, 1170 RPM
F = *dualArm* Pump/Barrel - Premium Eff, 1170 RPM
G = 1 Pump/Barrel w/ VFD - 1170 RPM
H = 2 Single Pumps/Barrel w/ 2 VFDs - 1170 RPM
J = *dualArm* Pump/Barrel w/ 2 VFDs - 1170 RPM
K = 1 Pump/Barrel - Std Eff, 1760 RPM
L = 2 Single Pumps/Barrel - Std Eff, 1760 RPM
M = *dualArm* Pump/Barrel - Std Eff, 1760 RPM
N = 1 Pump/Barrel - Prem Eff, 1760 RPM
P = 2 Single Pumps/Barrel - Prem Eff, 1760 RPM
Q = *dualArm* Pump/Barrel - Prem Eff, 1760 RPM
R = 1 Pump/Barrel w/ VFD - 1760 RPM
S = 2 Single Pumps/Barrel w/ 2 VFDs - 1760 RPM
T = *dualArm* Pump/Barrel w/ 2 VFDs - 1760 RPM
Y = 1 Pump/Barrel - Prem Eff - 3520 RPM
Z = 2 Single Pumps/Barrel - Prem Eff, 3520 RPM
1 = *dualArm* Pump/Barrel - Prem Eff, 3520 RPM
2 = 1 Pump/Barrel w/ VFD - 3520 RPM
3 = 2 Single Pumps/Barrel w/ 2 VFDs - 3520 RPM
4 = dualArm Pump/Barrel w/ 2 VFDs - 3520 RPM

6B: BUILIDNG PUMP SIZE
0 = Standard, No Boiler Pump
A = Pump 4360 1.5B
B = Pump 4360 2B
C = Pump 4360 2D
D = Pump 4380 1.5x1.5x6
E = Pump 4380 2x2x6
F = Pump 4380/4382 3x3x6
G = Pump 4380/4382 4x4x6
H = Pump 4380 1.5x1.5x8
J = Pump 4380 2x2x8
K = Pump 4380/4382 3x3x8
L = Pump 4380/4382 4x4x8
M = Pump 4380 5x5x8
N = Pump 4380/4382 6x6x8
P = Pump 4380 2x2x10
Q = Pump 4380/4382 3x3x10
R = Pump 4380/4382 4x4x10
S = Pump 4380/4382 6x6x10
T = Pump 4380/4382 8x8x10
U = Pump 4380 4x4x11.5
V = Pump 4380 5x5x11.5
W = Pump 4380 6x6x11.5
Y = Pump 4380 8x8x11.5
Z = Pump 4380 4x4x13
1 = Pump 4380 6x6x13
2 = Pump 4380 8x8x13
3 = Pump 4382 6x6x6
4 = Pump 4382 8x8x8
5 = Pump 4360 3D

6C: BUILDING PUMP MOTOR
0 = Standard, No Building Pump
A = 0.50 hp
B = 0.75 hp
C = 1 hp
D = 1.5 hp
E = 2 hp
F = 3 hp
G = 5 hp
H = 7.5 hp
J = 10 hp
K = 15 hp
L = 20 hp
M = 25 hp
N = 30 hp
P = 40 hp
Q = 50 hp
R = 60 hp
S = 75 hp

BL Series Feature String Nomenclature

Model Options : Unit Feature Options

GEN	SIZE	VLT	CONFIG	A1	A2	A3	A4	B1	B2	B3	1A	1B	1C	1D	2	3	4	5A	5B	5C	6A	6B	6C	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14A**	**14B**	**15**	**16**	17	18	19	20	21	22	23
BL	– 0 5 0	– 3	– 0	– A	0	0	0	– A	1	A	: 0	0	0	0	– 0	C	0	– 0	0	0	– K	C	C	– **B**	**0**	**0**	**0**	**F**	**B**	**G**	– **0**	**A**	– **C**	**A**	A	0	0	0	0	0	X

FEATURE 7: SERVICE OPTIONS
0 = Standard
A = 115V Outlet, Factory Wired
B = 115V Outlet, Field Wired

FEATURE 8: BLANK
0 = Standard

FEATURE 9: BLANK
0 = Standard

FEATURE 10: POWER OPTIONS
0 = Standard Power Block
A = Power Switch (225 Amps)
B = Power Switch (400 Amps)
C = Power Switch (600 Amps)
D = Power Switch (800 Amps)
E = Power Switch (1200 Amps)

FEATURE 11: SAFETY OPTIONS
A = Standard, Boiler w/ UL/FM/CSD-1 Certification
B = Boiler w/ IRI Gas Train
C = Boiler w/ IRI Gas Train and Proof of Closure
D = Boiler w/ Low Water Cutoff
E = Options B + D
F = Options C + D

FEATURE 12: CONTROLS
0 = Standard
B = Phase and Brown Out Protection

FEATURE 13: SPECIAL CONTROLS
0 = MCS Controller
G = MCS Controller w/ Modem
P = w/ BACnet Connection
Q = w/ Modbus Connection
R = w/ N2 Connection
S = w/ LonTalk Connection
T = w/ Automated Logic Connection
U = w/ BACnet Connection and Modem
V = w/ Modbus Connection and Modem
W = w/ N2 Connection and Modem
Y = w/ LonTalk Connection and Modem
Z = w/ Automated Logic Connection and Modem

FEATURE 14: COMPRESSION TANK
14A: BLANK
0 = Standard

14B: BOILER COMPRESSION TANK
0 = Standard - No Compression Tank
A = AX-15V
B = AX-20V
C = AX-40V
D = AX-60V
E = AX-80V
F = AX-100V
G = AX-120V
H = AX-180V
J = AX-200V
K = AX-240V
L = AX-260V
M = AX-280V
N = 1000-L
P = 1200-L
Q = 1600-L
R = 2000-L

FEATURE 15: OPTION BOXES
0 = Standard
A = 2ft. Option Box
B = 4ft. Option Box
C = 6ft. Option Box
D = 8ft. Option Box
E = 10ft. Option Box
F = 12ft. Option Box

FEATURE 16: INTERIOR CABINET OPTIONS
0 = Standard
A = Electric Vestibule Heating

BL Series Feature String Nomenclature

Model Options : Unit Feature Options

GEN	SIZE	VLT	CONFIG	A1	A2	A3	A4	B1	B2	B3	1A	1B	1C	1D	2	3	4	5A	5B	5C	6A	6B	6C	7	8	9	10	11	12	13	14A	14B	15	16	**17**	**18**	**19**	**20**	**21**	**22**	**23**
B	L	–	0	5	0	–	3	–	0	–	A	0	0	0	–	A	1	A	:	0	0	0	0	–	0	C	0	–	0	0	0	–	K	C	C	–	B	0	0	0	F	B	G	–	0	A	–	C	A	**A**	**0**	**0**	**0**	**0**	**0**	**X**

FEATURE 17: EXTERIOR CABINET OPTIONS

0 = Standard
A = Access Door Windows

FEATURE 18: CUSTOMER CODE

0 = Standard

FEATURE 19: CODE OPTIONS

0 = Standard - ETL U.S.A. Listing
A = MEA New York
H = ETL U.S.A. + Canada Listing

FEATURE 20: BLANK

0 = Standard

FEATURE 21: BLANK

0 = Standard

FEATURE 22: BLANK

0 = Standard

FEATURE 23: TYPE

B = Standard Paint
U = Special Price Authorization and Special Paint
X = Special Price Authorization w/ Standard Paint

Model Option - Unit Size

Example: BL-**050**-3-0-A000-A1A:0000-0C0-000-KCC-B000FBG-0A-CAA00000X

Table 1 - Model Sizes

Model	Input Capacity (MBH)	Output Capacity (MBH)	Width (inch)	Height (inch)
BL-**050**	500	450	100 - standard or 142 - wide	102
BL-**075**	750	675		
BL-**100**	1,000	900		
BL-**150**	1,500	1,350		
BL-**200**	2,000	1,800		
BL-**225**	2,250	2,025		
BL-**300**	3,000	2,700		
BL-**400**	4,000	3,600		
BL-**450**	4,500	4,050		
BL-**600**	6,000	5,400		

Model Option - Voltage

Example: BL-050-**3**-0-A000-A1A:0000-0C0-000-KCC-B000FBG-0A-CAA00000X

All units have single point power blocks with grounding lugs, 120 VAC control circuits, and branch circuit fusing.

2 = 230V/3ϕ/60Hz
3 = 460V/3ϕ/60Hz
4 = 575V/3ϕ/60Hz
8 = 208V/3ϕ/60Hz

Model Option - Blank

Example: BL--050-3-**0**-A000-A1A:0000-0C0-000-KCC-B000FBG-0A-CAA00000X

0 = *Standard*

Model Option A1 - Style

Example: BL-050-3-0-**A**000-A1A:0000-0C0-000-KCC-B000FBG-0A-CAA00000X

0 = *Standard* - 100 inch narrow cabinet
A = *Wide* - 142 inch wide cabinet

Model Options A2-A4 - Blank

Example: BL-050-3-0-A**000**-A1A:0000-0C0-000-KCC-B000FBG-0A-CAA00000X

0 = *Standard*

Model Option B1 - Heating Type

Example: BL-050-3-0-A000-**A**1A:0000-0C0-000-KCC-B000FBG-0A-CAA00000X

A = *Boiler Natural Gas* - Natural gas fired boiler.
B = *Boiler Propane* - Propane fired boiler.

Model Option B2 - Boiler Quantity

Example: BL-050-3-0-A000-A**1**A:0000-0C0-000-KCC-B000FBG-0A-CAA00000X

1 = *1 Boiler*
2 = *2 Boilers*
3 = *3 Boilers*
4 = *4 Boilers*

Model Option B3 - Boiler Heating Capacity

Example: BL-050-3-0-A000-A1**A**:0000-0C0-000-KCC-B000FBG-0A-CAA00000X

A = *500 MBH Modulating High Flow* - 500 MBH boiler operating with a 20°F temperature rise through the boiler.
B = *750 MBH Modulating High Flow - 7*50 MBH boiler operating with a 20°F temperature rise through the boiler.
C = *1,000 MBH Modulating High Flow* - 1,000 MBH boiler operating with a 20°F temperature rise through the boiler
D = *1,500 MBH Modulating High Flow* - 1,500 MBH boiler operating with a 20°F temperature rise through the boiler.
E = *500 MBH Modulating Low Flow* - 500 MBH boiler operating with a 40°F temperature rise through the boiler.
F = *750 MBH Modulating Low Flow - 7*50 MBH boiler operating with a 40°F temperature rise through the boiler.
G = *1,000 MBH Modulating Low Flow* - 1,000 MBH boiler operating with a 40°F temperature rise through the boiler.
H = *1,500 MBH Modulating Low Flow* - 1,500 MBH boiler operating with a 40°F temperature rise through the boiler.

Available configurations for each BL Series Model are shown below in terms of the number of boilers of each type comprising the selection.

Table 2 - Selectable Quantity of Boilers

Model	Input Capacity (MBH)	500 MBH	750 MBH	1,000 MBH	1,500 MBH
BL-050	500	1			
BL-075	750		1		
BL-100	1,000	2		1	
BL-150	1,500	3	2		1
BL-200	2,000	4		2	
BL-225	2,250		3		
BL-300	3,000		4	3	2
BL-400	4,000			4	
BL-450	4,500				3
BL-600	6,000				4

Unit Feature Options 1A-1D - Blank

Example: BL-050-3-0-A000-A1A:**0000**-0C0-000-KCC-B000FBG-0A-CAA00000X

0 = *Standard*

Unit Feature Option 2 - Blank

Example: BL-050-3-0-A000-A1A:0000-**0**C0-000-KCC-B000FBG-0A-CAA00000X

0 = *Standard*

Unit Feature Option 3 - Boiler Accessories

Example: BL-050-3-0-A000-A1A:0000-0**C**0-000-KCC-B000FBG-0A-CAA00000X

0 = *Standard* - None
A = *Glycol System* - AAONECat will choose this option when glycol is entered in the conditions screen.
B = *Thermometers and Pressure Gauges* - Thermometers and pressure gauges are factory installed on the pump package to indicate water temperature and pressure drop of various components.
C = *Glycol + Thermometers and Pressure Gauges* - Options A + B

Unit Feature Option 4 - Blank

Example: BL-050-3-0-A000-A1A:0000-0C**0**-000-KCC-B000FBG-0A-CAA00000X

0 = *Standard*

Unit Feature Options 5A-5C - Blank

Example: BL-050-3-0-A000-A1A:0000-0C0-**000**-KCC-B000FBG-0A-CAA00000X

0 = *Standard*

Unit Feature Option 6A - Boiler Building Pump Configuration

Example: BL-050-3-0-A000-A1A:0000-0C0-000-**K**CC-B000FBG-0A-CAA000000

0 = *Standard* - No Boiler Pump
A = *1 Pump/Barrel - Standard Efficiency, 1170 RPM Motors*
B = *2 Single Pumps/Barrel - Standard Efficiency, 1170 RPM Motors*
C = *dualArm Pump/Barrel - Standard Efficiency, 1170 RPM Motors*
D = *1 Pump - Premium Efficiency, 1170 RPM Motor*
E = *2 Single Pumps - Premium Efficiency, 1170 RPM Motors*
F = *dualArm Pump - Premium Efficiency, 1170 RPM Motors*
G = *1 Pump w/ VFD - Premium Efficiency, 1170 RPM Motor*
H = *2 Single Pumps w/ 2 VFDs - Premium Efficiency, 1170 RPM Motors*
J = *dualArm Pump w/ 2 VFDs - Premium Efficiency, 1170 RPM Motors*
N = *1 Pump - Premium Efficiency, 1760 RPM Motor*
P = *2 Single Pumps - Premium Efficiency, 1760 RPM Motors*
Q = *dualArm Pump - Premium Efficiency, 1760 RPM Motors*
R = *1 Pump w/ VFD - Premium Efficiency, 1760 RPM Motor*
S = *2 Single Pumps w/ 2 VFDs - Premium Efficiency, 1760 RPM Motors*
T = *dualArm Pump w/ 2 VFDs - Premium Efficiency, 1760 RPM Motors*
Y= *1 Pump - Premium Efficiency, 3520 RPM Motor*
Z = *2 Single Pumps - Premium Efficiency, 3520 RPM Motors*
1 = *dualArm Pump - Premium Efficiency, 3520 RPM Motors*
2 = *1 Pump w/ VFD - Premium Efficiency, 3520 RPM Motor*
3 = *2 Single Pumps w/ 2 VFDs - Premium Efficiency, 3520 RPM Motors*
4 = *dualArm Pump w/ 2 VFDs - Premium Efficiency, 3520 RPM Motors*

Note: Two single pumps and dualArm pump options include a redundant, or backup, pump.

AAONECat will select the correct option for Feature 6A based on unit conditions and the input from the pump selection program. When creating a pump configuration with AAONECat you must first select a heating option in Model Option B. When all of the remaining features have been selected, you will be prompted by the "Pump Selection" window to select the unit conditions and pump configurations. In the "Pump Selection" window you will be able to select number and size of the pumps, motor efficiency, number of VFDs and view the pump curves.

Unit Feature Option 6B - Boiler Building Pump Size

Example: BL-050-3-0-A000-A1A:0000-0C0-000-K**C**C-B000FBG-0A-CAA00000X

0 = *Standard* - No Boiler Pump
A = *Pump 4360 1.5B*
B = *Pump 4360 2B*
C = *Pump 4360 2D*
D = *Pump 4380 1.5x1.5x6*
E = *Pump 4380 2x2x6*
F = *Pump 4380 3x3x6*
G = *Pump 4380/4382 4x4x6*
H = *Pump 4380 1.5x1.5x8*
J = *Pump 4380 2x2x8*
K = *Pump 4380/4382 3x3x8*
L = *Pump 4380/4382 4x4x8*
M = *Pump 4380 5x5x8*
N = *Pump 4380/4382 6x6x8*
P = *Pump 4380 2x2x10*
Q = *Pump 4380/4382 3x3x10*
R = *Pump 4380/4382 4x4x10*
S = *Pump 4380/4382 6x6x10*
T = *Pump 4380/4382 8x8x10*
U = *Pump 4380 4x4x11.5*
V = *Pump 4380 5x5x11.5*
W = *Pump 4380 6x6x11.5*
Y = *Pump 4380 8x8x11.5*
Z = *Pump 4380 4x4x13*
1 = *Pump 4380 6x6x13*
2 = *Pump 4380 8x8x13*
3 = *Pump 4380 6x6x6*
4 = *Pump 4380 8x8x8*
5 = *Pump 4360 3D*

AAONECat will select the correct option for Feature 6B based on unit conditions and the input from the pump selection program. When creating a pump configuration with AAONECat you must first select a heating option in Model Option B. When all of the remaining features have been selected, you will be prompted by the "Pump Selection" window to select the unit conditions and pump configurations. In the "Pump Selection" window you will be able to select number and size of the pumps, motor efficiency, number of VFDs and view the pump curves.

Unit Feature Option 6C - Boiler Building Pump Motor

Example: BL-050-3-0-A000-A1A:0000-0C0-000-KC**C**-B000FBG-0A-CAA00000X

0 = *Standard* - No Boiler Pump
A = *0.5 hp*
B = *0.75 hp*
C = *1 hp*
D = *1.5 hp*
E = *2 hp*
F = *3 hp*
G = *5 hp*
H = *7.5 hp*
J = *10 hp*
K = *15 hp*
L = *20 hp*
M = *25 hp*
N = *30 hp*
P = *40 hp*
Q = *50 hp*
R = *60 hp*
S = *75 hp*

AAONECat will select the correct option for Feature 6C based on unit conditions and the input from the pump selection program. When creating a pump configuration with AAONECat you must first select a heating option in Model Option B. When all of the remaining features have been selected, you will be prompted by the "Pump Selection" window to select the unit conditions and pump configurations. In the "Pump Selection" window you will be able to select number and size of the pumps, motor efficiency, number of VFDs and view the pump curves.

Unit Feature Option 7 - Service Options

Example: BL-050-3-0-A000-A1A:0000-0C0-000-KCC-**B**000FBG-0A-CAA00000X

0 = *Standard* - Compressors and controls components are accessible in a convenient service vestibule that includes a hinged access door with lockable handle, color-coded wiring diagram to match color-coded unit wiring, and unit nameplate. All components are labeled to improve serviceability.
A = *Factory Wired 115V Convenience Outlet* - Factory wired 2x4 inch electrical box with ground fault interrupter receptacle located within the controls vestibule. The circuit is rated at 12 amps maximum and is factory wired to a step-down transformer, fuse block and outlet disconnect. The circuit is wired to the line side of the unit power block or power switch permitting use of the outlet while power to the unit is shut off. **Caution: When the power to the unit is disconnected with the factory installed unit power switch, the convenience outlet will remain live.**
B = *Field Wired 115V Convenience Outlet* - Field wired 2x4 inch electrical box with ground fault interrupter receptacle, located within the controls vestibule. Receptacle is rated for 20 amps. The outlet must be field wired to a 115 VAC power supply.

Unit Feature Option 7 - Service Options Continued

Figure 1 - Factory Wired Convenience Outlet

Unit Feature Option 8 - Blank

Example: BL-050-3-0-A000-A1A:0000-0C0-000-KCC-B**0**00FBG-0A-CAA00000X

0 = *Standard*

Unit Feature Option 9 - Blank

Example: BL-050-3-0-A000-A1A:0000-0C0-000-KCC-B0**0**0FBG-0A-CAA00000X

0 = *Standard*

Unit Feature Option 10 - Power Options

Example: BL-050-3-0-A000-A1A:0000-0C0-000-KCC-B00**0**FBG-0A-CAA00000X

0 = *Standard Power Block*

A = *225 Amp Power Switch*

B = *150 Amp Power Switch*

C = *600 Amp Power Switch*

D = *800 Amp Power Switch*

E = *1,200 Amp Power Switch*

Individual components within the control cabinet are fused. Switch options include molded case, non-fused, disconnect switch externally mounted. The switch is accessible from the exterior of the unit. The switch disconnects high voltage service to the unit. To add a switch, choose any switch and after all options have been selected and the pump program is completed AAONECat will automatically calculate the minimum allowable ampacity and choose the correct size switch.

Unit Feature Option 11 - Safety Options

Example: BL-050-3-0-A000-A1A:0000-0C0-000-KCC-B000**F**BG-0A-CAA00000X

A = *Standard, Boiler with UL/FM/CSD-1 Certification* - Meets ASME regulation of controls and safety devices for automatically fired boilers and UL-795, Commercial Industrial Gas Heating Equipment.
B = *Boiler with IRI Gas Train* - Motorized automatic main and redundant gas valves with normally open vent valve in between.
C = *Boiler with IRI Gas Train and Proof of Closure* - Motorized automatic main and redundant gas valves with proof of closure contacts, normally open vent valve in between, and flame safeguard that reads the proof of closure end switches.
D = *Boiler with Low Water Cutoff* - Boiler with water flow switch which prevents boiler operation during low water flow conditions.
E = *Boiler with IRI Gas Train and Low Water Cutoff* - Option B + D
F = *Boiler with IRI Gas Train, Proof of Closure and Low Water Cutoff* - Options C + D

Unit Feature Option 12 - Controls

Example: BL-050-3-0-A000-A1A:0000-0C0-000-KCC-B000F**B**G-0A-CAA00000X

0 = *Standard*
B = *Phase and Brown Out Protection* - Voltage monitor that is used to protect motors from voltage imbalance, over/under voltage and phase loss. Reset is automatic.

Unit Feature Option 13 - Special Controls

Example: BL-050-3-0-A000-A1A:0000-0C0-000-KCC-B000FB**G**-0A-CAA00000X

0 = *MCS Controller* - Micro Control Systems (MCS) boiler controller package which maintains boiler leaving water temperature.
G = *MCS Controller with Modem* - MCS package with a 56K modem. Option allows MCS, AAON or customer to remotely communicate with the unit in order to assist service in the field. Reduces field diagnostic time and allows field updates to the unit program.
***P** = *MCS Controller and BACnet Connection*
***Q** = *MCS Controller and Modbus Connection*
***R** = *MCS Controller and N2 Connection*
***S** = *MCS Controller and LonTalk Connection*
***T** = *MCS Controller and Automated Logic Connection*
***U** = *MCS Controller, BACnet Connection with Modem*
***V** = *MCS Controller, Modbus Connection with Modem*
***W** = *MCS Controller, N2 Connection with Modem*
***Y** = *MCS Controller, LonTalk Connection with Modem*
***Z** = *MCS Controller, Automated Logic Connection with Modem*

*The communication portal provides an RS-232 PTP connection for end user interfacing on all protocol versions. BACnet and Automated Logic protocol versions provide an additional ARC 156 end user connection. A bridge or gateway must be supplied by the end user to convert to any other network connection. If BACnet is selected a PTP or MS/TP connection may be selected.

Unit Feature Option 14A - Blank

Example: BL-050-3-0-A000-A1A:0000-0C0-000-KCC-B000FBG-**0**A-CAA00000X

0 = *Standard*

Unit Feature Option 14B - Boiler Compression Tank

Example: BL-050-3-0-A000-A1A:0000-0C0-000-KCC-B000FBG-0**A**-CAA00000X

0 = *No Boiler Compression Tank*
A = *AX-15V*
B = *AX-20V*
C = *AX-40V*
D = *AX-60V*
E = *AX-80V*
F = *AX-100V*
G = *AX-120V*
H = *AX-180V*
J = *AX-200V*
K = *AX-240V*
L = *AX-260V*
M = *AX-280V*
N = *1000-L*
P = *1200-L*
Q = *1600-L*
R = *2000-L*

AAONECat will select the correct option for Feature 14B based on the input from the pump selection program. To add a boiler compression tank, choose any tank and after all options have been selected and the pump program is completed AAONECat will automatically calculate the correct size.

Unit Feature Option 15 - Option Boxes

Example: BL-050-3-0-A000-A1A:0000-0C0-000-KCC-B000FBG-0A-**C**AA00000X

0 = *Standard* - No option box
A = *2 ft Option Box*
B = *4 ft Option Box*
C = *6 ft Option Box*
D = *8 ft Option Box*
E = *10 ft Option Box*
F = *12 ft Option Box*

Note: These are additional cabinet sections for the installation of items not currently offered in the BL Series equipment. The option box is located between the control compartment and the boilers. A Special Pricing Authorization (SPA) is required if the factory is to install customer supplied equipment.

Unit Feature Option 16 - Interior Cabinet Options

Example: BL-050-3-0-A000-A1A:0000-0C0-000-KCC-B000FBG-0A-C**A**A00000X

0 = *Standard* - Cabinet is constructed of double wall rigid polyurethane foam insulated panels.
A = *Electric Vestibule Heating* - A 1kW heater mounted in the boiler mechanical room.

Unit Feature Option 17 - Exterior Cabinet Options

Example: BL-050-3-0-A000-A1A:0000-0C0-000-KCC-B000FBG-0A-CA**A**00000X

0 = *Standard* - Cabinet is constructed of double wall rigid polyurethane foam insulated panels.
A = *Access Door Windows* - 12" x 12", wire reinforced glass, double pane windows permit visual inspection of cabinet interior while the access doors are closed. If this option is selected, windows are placed in all cabinet access doors.

Unit Feature Option 18 - Customer Code

Example: BL-050-3-0-A000-A1A:0000-0C0-000-KCC-B000FBG-0A-CAA**0**0000X

0 = *Standard*

Feature is used for national account customers.

Unit Feature Option 19 - Code Options

Example: BL-050-3-0-A000-A1A:0000-0C0-000-KCC-B000FBG-0A-CAA0**0**000X

0 = *Standard ETL USA Listing* - AAON units are ETL listed and tested in accordance with the latest revision of UL 1995. If a Special Pricing Authorization (SPA) is applied there may be additional costs incurred to secure the ETL label.
A = *MEA (New York)* - Approval tag attached to the unit exterior, designating AAON specific units comply with the Material & Equipment Acceptance requirements for the City of New York.
H = *ETL USA + Canada Listing* - Canadian and USA listings for export. The nameplate, safety labels, drain and blower warnings will be in English and French.

Unit Feature Option 20 - Blank

Example: BL-050-3-0-A000-A1A:0000-0C0-000-KCC-B000FBG-0A-CAA00**0**00X

0 = *Standard*

Unit Feature Option 21 - Blank

Example: BL-050-3-0-A000-A1A:0000-0C0-000-KCC-B000FBG-0A-CAA000**0**0X

0 = *Standard*

Unit Feature Option 22 - Blank

Example: BL-050-3-0-A000-A1A:0000-0C0-000-KCC-B000FBG-0A-CAA0000**0**X

0 = *Standard*

Unit Feature Option 23 - Type

Example: BL-050-3-0-A000-A1A:0000-0C0-000-KCC-B000FBG-0A-CAA00000**X**

0 = *Standard* - Cabinet exterior is primer washed then spray coated with a two part polyurethane, heat-baked exterior paint. The paint is gray in color and is capable of withstanding at least 2,500 hours, with no visible corrosive effects, when tested in a salt spray and fog atmosphere in accordance with the ASTM B 117-95 test procedure.
U = *Special Price Authorization and Special Paint* - When a special paint color is specified, a set-up charge and price add per unit is required. Also use this designation if other special paint options are necessary. The Special Pricing Authorization worksheet with comprehensive explanation of requirements must accompany the order documents.
X = *Special Price Authorization with Standard Paint* - The Applications Department must issue a Special Pricing Authorization (SPA) to include a non-standard option.

Electrical Service Sizing Data

Use the following equations to correctly size the electrical service wiring and disconnect switch for the unit.

To calculate the correct Minimum Circuit Ampacity (MCA) and Maximum Overcurrent Protection (MOP) values for units, use the equations below.

MCA = 1.25(Load 1) + Load 2

MOP = 2.25(Load 1) + Load 2

Where:
Load 1 = Current of the largest load
Load 2 = Sum of the currents of the remaining components. Include boilers, boiler building pumps and boiler recirculating pumps.

Select a fuse rating equal to the MOP value. If the MOP does not equal a standard fuse rating select the next lower standard fuse rating. If the MOP is less than the MCA then select the fuse rating equal to or greater than the MCA.

Standard Ampere Ratings for Fuses (From NEC Handbook, 240-6)
The standard ratings for fuses shall be considered 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250, 300, 350, 400, 450, 500, 600, 700, 800 and 1000 amperes.

Select the appropriate component FLA from the tables below or AAONECat.

Table 3 - Pump Motor FLA

Building Boiler Pump Motors	Three Phase Voltage			
	230	460	575	208
Motor Size (hp)				
1	3.6	1.8	1.4	4
2	6.8	3.4	2.7	7.5
3	9.9	4.8	3.8	10.6
5	16.3	8.1	6.1	16.7
7.5	22	11	8.8	24.2
10	29	14.5	11.2	30.8
15	42	21.3	16.8	46.2
23	54	28.5	21.6	59.4
25	68	34	27.2	74.8
30	80	40	32	88
40	104	52	41.6	114
50	130	65	52	143

Table 4 - Boiler Component FLA

Boiler Recirculating Pump*		Three Phase Voltage			
		230	460	575	208
Boiler (MBH)	Flow (Rate)				
500	High Flow	1	0.5	0.4	1.2
	Low Flow	0.8	0.4	0.3	0.9
750	High Flow	2	1	0.8	2.2
	Low Flow	1	0.5	0.4	1.2
1000	High Flow	2	1	0.8	2.2
	Low Flow	1	0.5	0.4	1.2
1500	High Flow	3.6	1.8	1.4	4
	Low Flow	2	1	0.8	2.2

*__Note__: The 120V single phase boiler current for the selection of a 500 MBH boiler is 2.2 Amps, and for the selection of a 750, 1000 or 1500 MBH boilers is 13.7 Amps. The 120V single phase control circuit current is 2.9 Amps.

Unit Dimensional Information

Unit length is determined by the number of boilers selected in the configuration of the BL Series model number. The overall length for units with boilers, pumps and compression/expansion tanks is shown in the table below. If an option box is selected, the unit length will be increased by the length of the option box. If an option box is selected, add 24 inches for a 2 ft box, 48 inches for a 4 ft. box, 72 inches for a 6 ft. box, 96 inches for an 8 ft. box, 120 inches for a 10 ft. box and 144 inches for a 12 ft. box.

Table 5 - Unit Length

<table>
<tr><th rowspan="2">Model</th><th colspan="4">Number of Boilers</th></tr>
<tr><th>1</th><th>2</th><th>3</th><th>4</th></tr>
<tr><td>BL-050</td><td rowspan="4">168 in.</td><td rowspan="2">NA</td><td rowspan="3">NA</td><td rowspan="4">NA</td></tr>
<tr><td>BL-075</td></tr>
<tr><td>BL-100</td><td rowspan="3">204 in.</td></tr>
<tr><td>BL-150</td><td>240 in.</td></tr>
<tr><td>BL-200</td><td rowspan="6">NA</td><td>NA</td><td>276 in.</td></tr>
<tr><td>BL-225</td><td>NA</td><td rowspan="2">240 in.</td><td>NA</td></tr>
<tr><td>BL-300</td><td>204 in.</td><td rowspan="2">276 in.</td></tr>
<tr><td>BL-400</td><td rowspan="3">NA</td><td>NA</td></tr>
<tr><td>BL-450</td><td>240 in.</td><td>NA</td></tr>
<tr><td>BL-600</td><td>NA</td><td>276 in.</td></tr>
</table>

Unit Drawings

Unit drawings of some possible BL Series boiler configurations are included. Note the variations in unit length.

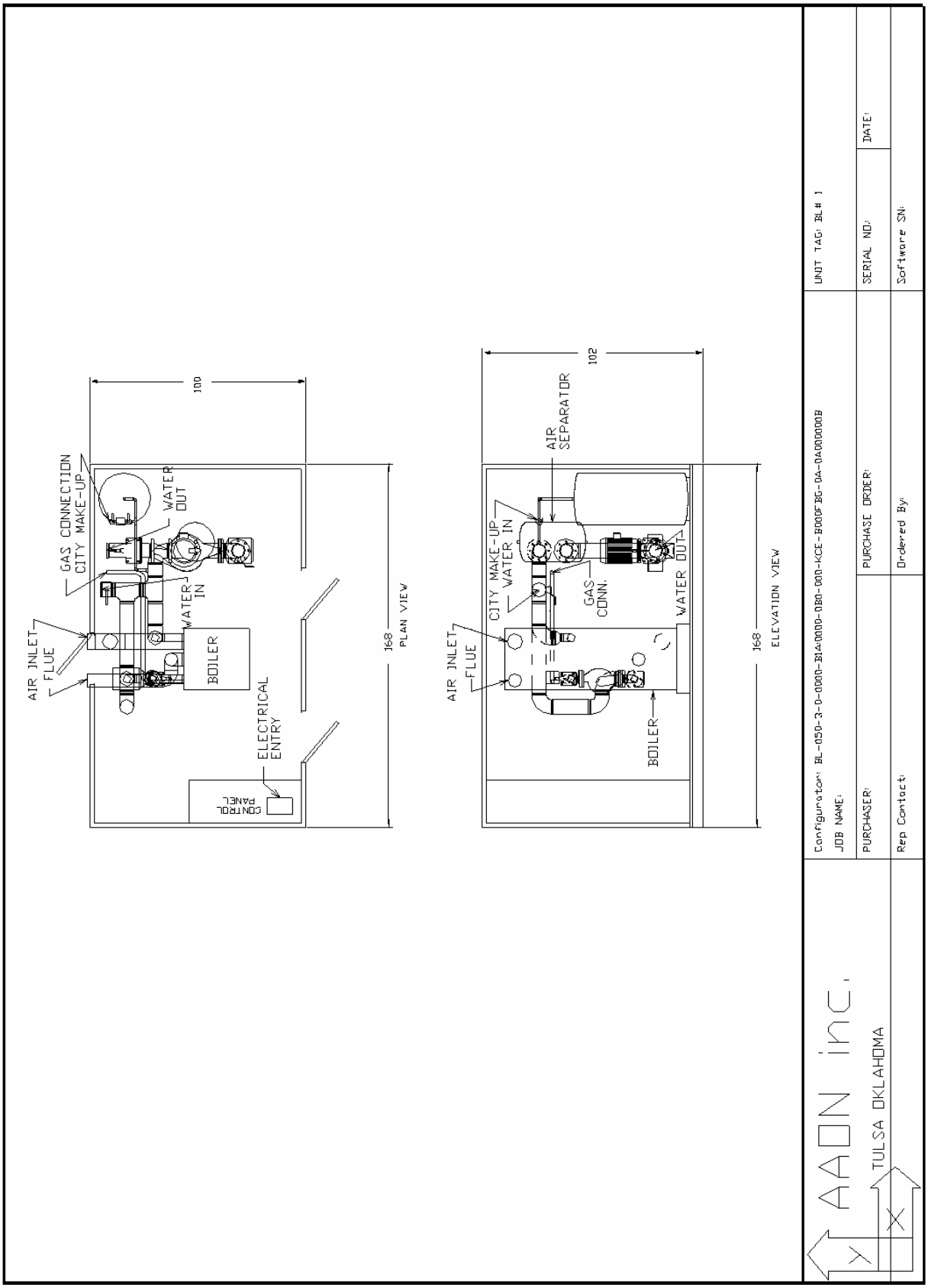

Figure 2 - BL-050 with One Boiler

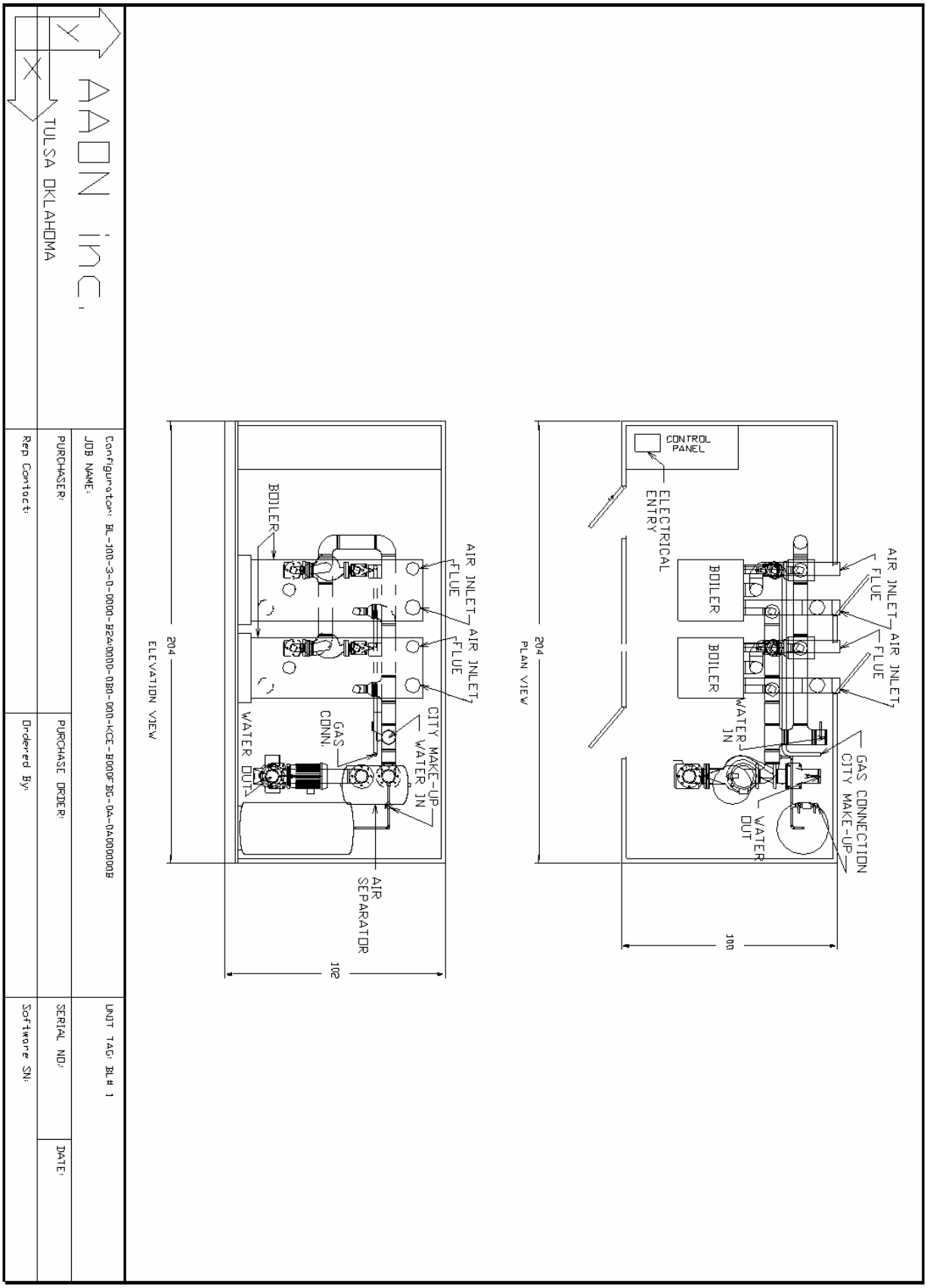

Figure 3 - BL-100 with Two Boilers

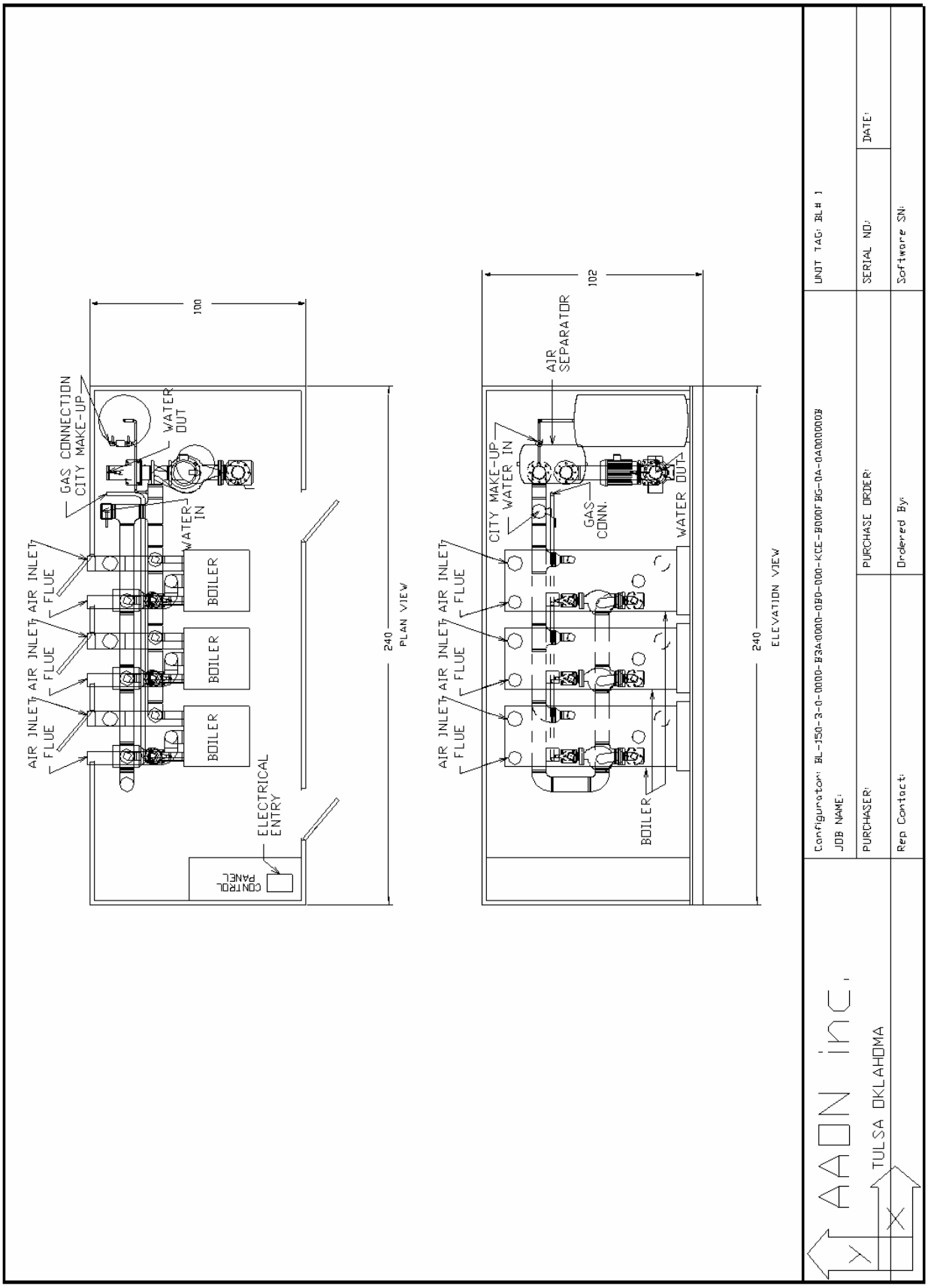

Figure 4 - BL-150 with Three Boilers

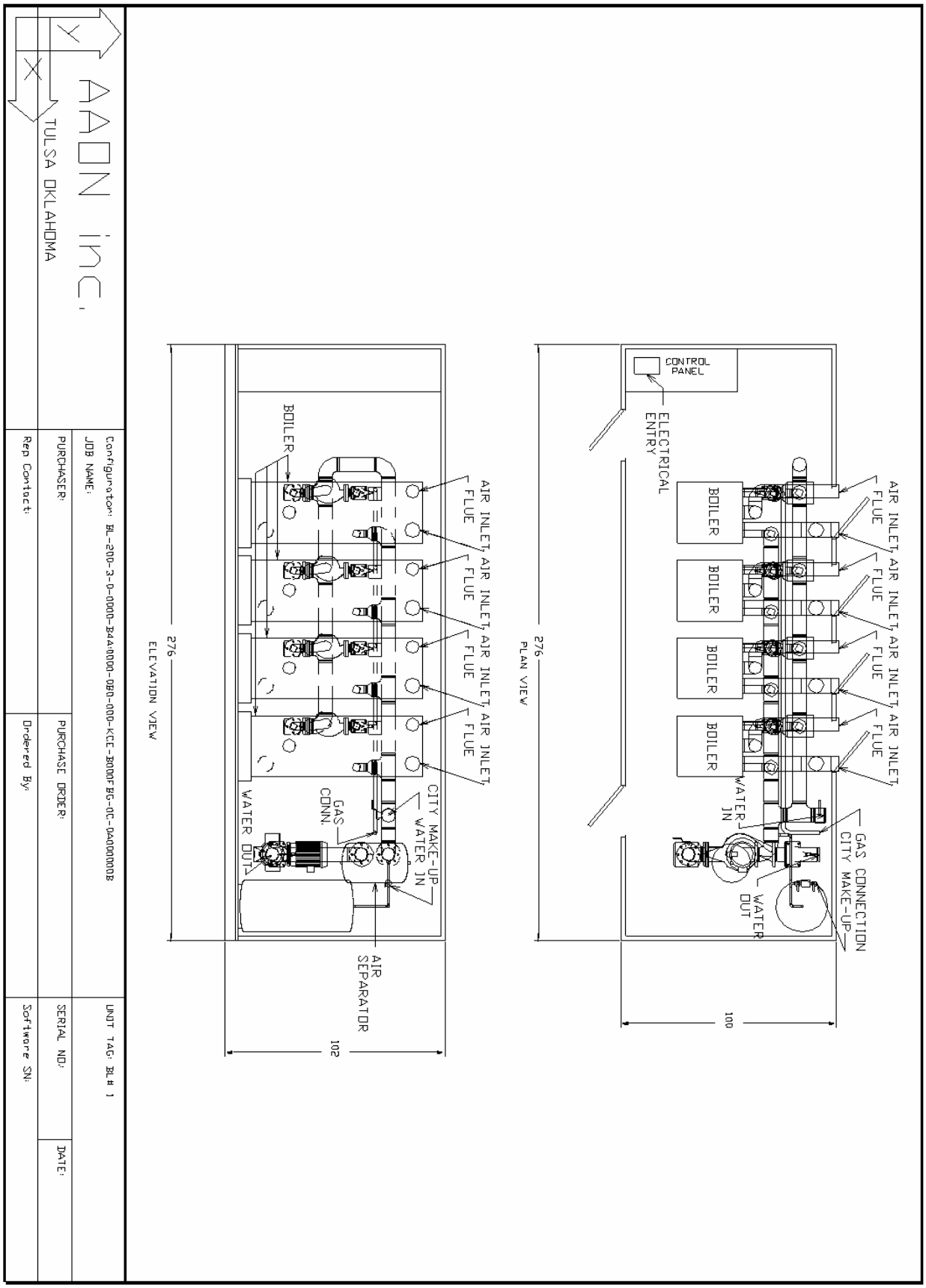

Figure 5 - BL-200 with Four Boilers

Literature Change History

March 2010
Update of catalog to match the standard Engineering Catalog format.

December 2010
Update of the catalog removing the standard efficiency pump motor options.

July 2013
Update of the Model and Unit Feature Options.

July 2015
Update of Catalog to improve some of the formatting.

November 2016
Revision of the amp rating of the factory installed convenience outlet.

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