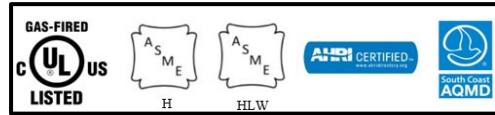


Date: \_\_\_\_\_ Engineer: \_\_\_\_\_  
 Job: \_\_\_\_\_ Contractor: \_\_\_\_\_  
 Model #: \_\_\_\_\_ End User: \_\_\_\_\_  
 Representative: \_\_\_\_\_ Prepared by: \_\_\_\_\_



The Avenger is a two-pass counter flow condensing commercial boiler for hydronic heating and hot water supply at working pressures up to 160PSI.

- ANSI Z21.13/CSA 4.9 & ANSI Z21.10.3/CSA 4.3 certified
- ASME Certified; "H" and "HLW" Stamps / National Board Listed
- Canadian Registration Number (CRN)
- CSD-1 Compliant
- California Code Compliant
- South Coast Air Quality Management District Qualified



### Standard Features

- ASME "H" and "HLW" stamped stainless steel heat exchangers
- 160PSI working pressure
- Stainless Steel rifle tubes, designed to optimize flue gas velocity on the first pass
- Stainless steel oblong tubes, designed to maximize condensation on the second pass
- Fully welded construction with stainless steel pressure vessel, tubes, tube sheets and combustion chamber
- Modulating boiler with up to 25:1 turn-down
- Operating water pressure as low as 12PSI
- Natural or propane gas operation
- Radial fired knitted fiber stainless steel burner
- Low gas pressure operation
- Downstream gas testcocks
- Fast closing shutoff gas pressure regulator
- Variable frequency drive (VFD) modulation
- Electronic low air pressure switch
- Blocked flue switch
- Water pressure switch
- Flow Switch
- Low gas pressure switch on all models w/manual reset
- High gas pressure switch on models 3000-4000 w/manual reset
- ΔT heat exchanger protection algorithm
- Staging relay to govern operation of low end or high end gas valve
- Local/Remote switch for building management, remote modulation and set-point control
- SOLA Controller featuring cascade controls lead lag up to 8 boilers
- Low NOx operation (SCAQMD Pending)
- Hot surface ignition
- Ultraviolet flame detection
- Direct ignition for models 1000-2500
- Proven pilot ignition for models 3000-4000
- Sealed combustion
- Adjustable high limit with manual reset
- Return water temperatures as low as 40°F
- Inlet, outlet, and stack sensors

- Drain valve
- ASME relief valve
- Single point input adjustment for control of air and gas
- Inherent O2 trim
- Pressure regulated electro-hydraulic proportional air/gas actuator, providing a slow opening and fast closing safety shutoff valve
- 1 to 1 air/gas ratio control for proper combustion across entire modulation range
- Window viewport for combustion chamber
- Water, gas, vent and electric connections on the back
- Low and high voltage terminal strips
- On/Off switch
- Built-in audible alarm
- Flame failure alarm contacts
- Modbus RTU standard, Protocol Translator available for other communication needs
- Factory test fired and certified
- 10-year warranty on heat exchanger (see warranty details)
- 5-year warranty on burner (see warranty details)
- 1-year warranty on parts (see warranty details)

### Optional Features

- CSD-1
- Motorized isolation valves
- Condensate neutralization kit
- BMS gateway – BACnet MSTP/IP, LonWorks or Metasys N2
- Outdoor installation kit (Consult Factory)
- Outdoor sensor for standalone boiler
- Outdoor sensor for cascade
- Outdoor vent kit (Consult Factory)
- Optional high gas pressure switch for models 1000-2500
- Optional low water cutoff w/manual reset
- Spring return air inlet damper with wire harness
- Vent adapter to PVC/CPVC
- Air inlet filter kit for room air installations

Date: \_\_\_\_\_ Engineer: \_\_\_\_\_  
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**Venting Options**

- Category II and IV venting
- Direct venting
- Room air
- Horizontal & vertical venting
- Outdoor venting (Consult Factory)

**Venting Material**

- Stainless steel or AL29-4C for all system applications
- Polypropylene for all system applications
- CPVC for domestic hot water systems and select low temperature heating systems – consult factory
- PVC for domestic hot water systems and select low temperature heating systems – consult factory

Model	Required Ø for up to 100 ft. equiv. length for Direct Venting (in)	Required Category IV, vent Ø up to 100 ft. equiv. length (in)	Required Category II vent Ø (in)
AR(N,P)-1000	6	6	7
AR(N,P)-1500	6	7	8
AR(N,P)-2000	8	8	10
AR(N,P)-2500	8	9	10
AR(N,P)-3000	10	9	10
AR(N,P)-3500	10	10	12
AR(N,P)-4000	10	10	12

Model	Blower air inlet Ø (in)	Vent connection Ø, as shipped (in)
AR(N,P)-1000	5 3/8	6
AR(N,P)-1500	5 3/8	8
AR(N,P)-2000	5 3/8	9
AR(N,P)-2500	7 5/16	9
AR(N,P)-3000	7 5/16	10
AR(N,P)-3500	7 5/16	10
AR(N,P)-4000	7 5/16	10

Voltage Requirement	
Model	Voltage
1000 – 2000	115VAC, 60Hz
1000 – 2000 <sup>Δ</sup>	208/230VAC, 60Hz, 1 Phase*
2500 – 3500	208/230VAC, 60Hz, 1 Phase*
1000 - 3500 <sup>Δ</sup>	208/230VAC, 60Hz, 3 Phase**
4000	208/230VAC, 60Hz, 3 Phase**
1000 - 4000 <sup>Δ</sup>	460VAC, 60Hz, 3 Phase

\*This is a 4-wire power supply requiring two (2) lives, a neutral and a ground  
 \*\*This is a 5-wire power supply requiring three (3) lives, a neutral and a ground  
 Δ Optional power supply

Date: \_\_\_\_\_ Engineer: \_\_\_\_\_  
 Job: \_\_\_\_\_ Contractor: \_\_\_\_\_  
 Model #: \_\_\_\_\_ End User: \_\_\_\_\_  
 Representative: \_\_\_\_\_ Prepared by: \_\_\_\_\_



Model	Input MBH		Gross Output MBH
	Max	Min	
ARN-1000	1000	47	945
ARP-1000	1000	100	945
ARN-1500	1500	60	1,416
ARP-1500	1500	150	1,416
ARN-2000	2000	80	1,886
ARP-2000	2000	200	1,886
ARN-2500	2500	100	2,355
ARP-2500	2500	250	2,355
ARN-3000	3000	120	2,841
ARP-3000	3000	300	2,841
ARN-3500	3500	140	3,325
ARP-3500	3500	350	3,325
ARN-4000	4000	160	3,748
ARP-4000	4000	400	3,748

Water Content	
Model	Volume (Gallon)
AR(N,P)-1000	55
AR(N,P)-1500	68
AR(N,P)-2000	96
AR(N,P)-2500	96
AR(N,P)-3000	107
AR(N,P)-3500	120
AR(N,P)-4000	120

Minimum Flow Rate at Maximum Fire Rate	
Model	Flow (GPM)
AR(N,P)-1000	23.6
AR(N,P)-1500	35.4
AR(N,P)-2000	47.1
AR(N,P)-2500	58.8
AR(N,P)-3000	71.0
AR(N,P)-3500	83.1
AR(N,P)-4000	93.6

Based on maximum temperature rise of 80°F

Absolute Minimum Flow Rate	
Model	Flow (GPM)
AR(N,P)-1000	7.9
AR(N,P)-1500	11.8
AR(N,P)-2000	15.7
AR(N,P)-2500	19.6
AR(N,P)-3000	23.7
AR(N,P)-3500	27.7
AR(N,P)-4000	31.2

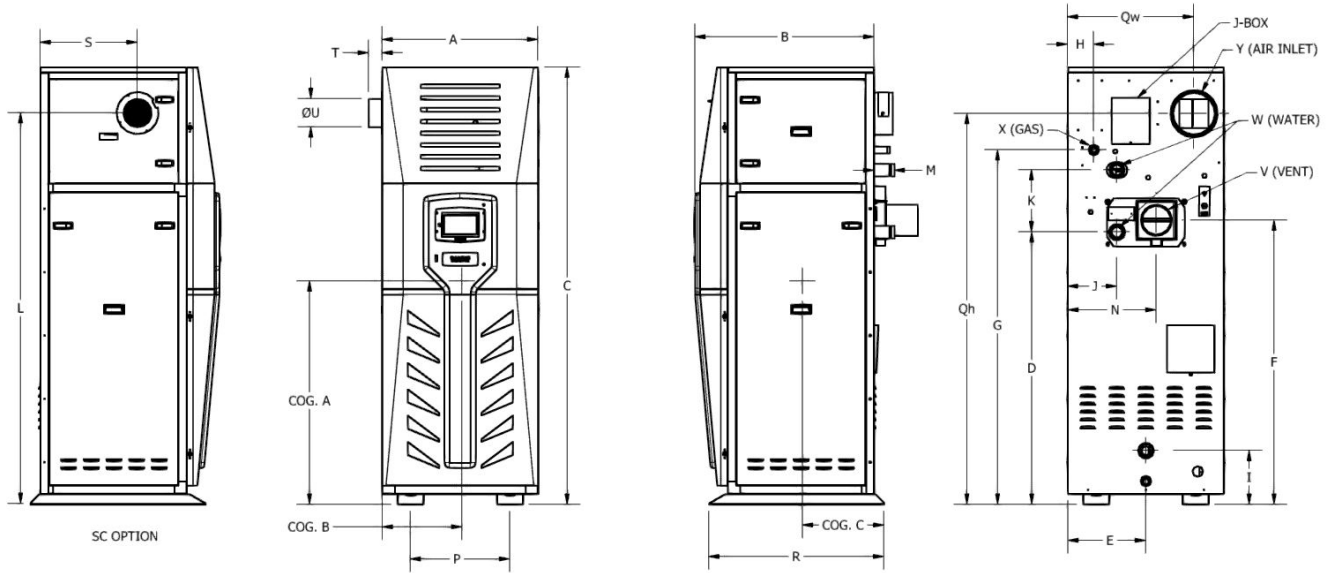
Recovery Capacity (Water Heater Only – HLW)			
Model	100°F (GPH)	80°F (GPH)	60°F (GPH)
AR(N,P)W-1000	1146	1432	1909
AR(N,P)W-1500	1717	2146	2861
AR(N,P)W-2000	2286	2858	3811
AR(N,P)W-2500	2855	3569	4758
AR(N,P)W-3000	3422	4278	5703
AR(N,P)W-3500	3988	4985	6647
AR(N,P)W-4000	4509	5637	7516

Heat Exchanger Head Loss and Flow						
Model	20°F		40°F		60°F	
	US GPM	ΔP-FT	US GPM	ΔP-FT	US GPM	ΔP-FT
AR(N,P)-1000	94.4	22	47.2	5.8	31.5	3.1
AR(N,P)-1500	141.6	11.5	70.8	3.7	47.2	2.4
AR(N,P)-2000	188.6	4.37	94.3	1.46	62.87	0.94
AR(N,P)-2500	235.5	6.63	117.75	1.93	78.5	1.18
AR(N,P)-3000	284.1	4.9	142.05	2.17	94.7	1.15
AR(N,P)-3500	332.2	6.9	166.1	1.8	110.7	1.1
AR(N,P)-4000	374.5	9.0	187.2	2.1	124.8	1.2

Date: \_\_\_\_\_ Engineer: \_\_\_\_\_  
 Job: \_\_\_\_\_ Contractor: \_\_\_\_\_  
 Model #: \_\_\_\_\_ End User: \_\_\_\_\_  
 Representative: \_\_\_\_\_ Prepared by: \_\_\_\_\_



**Dimensional Data**



Model	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F (in.)	G (in.)	H (in.)	I (in.)	J (in.)	K (in.)	*L (in)	COG (A)	COG (B)
1000	29 1/2	34	83	51 1/2	14 7/8	53 7/8	67 1/8	5	10 1/4	9 3/8	11 3/4	74 1/8	40	14.5
1500	29 1/2	38	83	52 3/8	14 7/8	54 1/2	68	3 1/2	10 7/8	8 1/8	10 1/2	74	38.5	15
2000	35	44	90	52 7/8	17 1/2	57 1/4	73 1/2	5 5/8	10	10 1/8	13 1/4	78 1/2	42	17.75
2500	35	44	90	52 7/8	17 1/2	57 1/4	73 1/2	5 5/8	10	10 1/8	13 1/4	78 1/2	42	17.75
3000	35	44	90	52 7/8	17 1/2	52 1/4	73 1/2	5 3/4	10 1/4	9	13	79 1/8	55	18.5
3500	35	44	99	53 3/8	17 1/2	60	77	5 1/2	10	8 1/2	16	83 1/2	43	18
4000	35	44	99	53 3/8	17 1/2	60	77	5 1/2	10	8 1/2	16	85 1/2	43	18

Model	COG (C)	M (in.)	N (in.)	P (in.)	Qw (in)	Qh (in)	R (in.)	*S (in.)	T (in.)	U (in.)	W (in.) Ø Water	X (in.) Ø Gas	Y (in) Ø air	Weight (lbs)
1000	13.5	3 7/8	16 7/8	18 7/8	24	74	33 1/4	18 1/2	3 1/2	5 3/8	2	1	8	1180
1500	15	4	17 7/8	19 3/8	24	74	36 1/2	20 1/2	3 1/2	5 3/8	2 1/2	1 1/4	10	1530
2000	17	4	20	24	28	81	42 1/2	23 1/4	3	5 3/8	3	1 1/4	12	2085
2500	17	4	20	24	28	81	42 1/2	23 1/4	3	7 5/16	3	1 1/2	12	TBD
3000	20	4	20	24	28	81	42 1/2	24 1/8	3 1/2	7 5/16	3	1 1/2	12	TBD
3500	17	6 1/2	20 1/2	24	27	90	42 1/2	24	4	7 5/16	4	2	12	2520
4000	17	6 1/2	20 1/2	24	27	90	42 1/2	24 1/2	4	7 5/16	4	2	12	2620

\*Direct Vent/Sealed combustion option COG-Center of Gravity

*Minimum Clearance to Combustibles				
Model	Top (in.)	Back (in.)	Sides (in.)	Front (in.)
All	12	12	12	12

\*Service clearances are different than clearances to combustibles. Refer to IOM.