

Cyclone® LV (Large Volume)

ADAPTIVE GAS TECHNOLOGY AND LARGE VOLUME TANK PROVIDE A HIGH EFFICIENCY, INTEGRATED SOLUTION

The A. O. Smith Cyclone LV family of condensing water heaters are designed to deliver years of dependable service while providing optimal efficiency. The newest enhancements represent the latest in water heating and gas combustion technology. Models are available from 150,000 to 500,000 Btu/h and all deliver thermal efficiencies of 95% or greater. The time proven and unique helical coil heat exchanger makes Cyclone the clear choice for demanding commercial applications.

Cyclone is the industry leader in high efficiency commercial gas water heating. Since its initial launch in 1996, A. O. Smith has continued the tradition of innovative enhancements and new model offerings. The current LV design is no exception, and offers commercial customers the very best in water heating performance and overall cost of ownership.

AIQ™ ADAPTIVE GAS CONTROL

- Smart combustion system includes gas valve with servo motor and electronic controller
- Improves combustion and light off
- Adjusts to fuel qualities or abnormalities
- Can run on natural gas or liquid propane, gas type selected via touch screen upon installation

INTELLIGENT CONTROL SYSTEM WITH TOUCH SCREEN DISPLAY AND ICOMM CONNECTIVITY

- Exclusive A. O. Smith designed color touch display control system
- Display provides detailed water heater status information
- Precise temperature control adjustable from 90 to 180 degrees
- Built in diagnostics and run history
- Capable of receiving over-the-air software updates
- Cyclone LV comes standard with iCOMM Wi-Fi connectivity onboard. Remotely monitor and adjust the water heater via the A. O. Smith app. No charge connectivity using Wi-Fi or Ethernet connection.
- Intelligent Demand Response (IDR) feature senses large water draws and automatically adjusts the differential setpoint. This feature increases the hot water available when it is needed the most.

SUBMERGED COMBUSTION CHAMBER, WITH HELICAL HEAT EXCHANGER COIL

- Positioned in center of tank, surrounded by water to virtually eliminate radiant heat loss from chamber
- Direct spark ignition
- Spiral heat exchanger keeps hot burner gases

swirling, uses centrifugal force to maximize efficiency of heat transfer to water in tank

- Spiral heat exchanger reduces lime scale from forming on water-side surfaces, which maintains energy efficiency over time
- ASME Construction

LEAK DETECTION AND WARNING

- Ships with leak detection module that allows installing contractor to install where needed
- Provides audible alarm and alert notification via iCOMM connectivity

POWERED ANODES STANDARD ON ALL MODELS

- Provides long-lasting tank protection in varying water conditions
- Powered anodes are non-sacrificial
- Automatically adjusts output needed to properly protect the tank

PERMAGLAS® ULTRA COAT™ GLASS LINING

- Glass coating is applied using a liquid slush coating technique to ensure uniform coating
- Heat exchanger coil is glassed both externally and internally for optimum protection

HIGH EFFICIENCY MODULATING PRE-MIX POWERED BURNER

- Down-fired pre-mix burner provides optimum efficiency and quiet operation
- Top-mounted burner position prevents condensation from affecting burner operation

5-YEAR LIMITED TANK / 1-YEAR LIMITED PARTS WARRANTY

- For complete warranty information, consult written warranty or go to hotwater.com.



**BTHL-150A THROUGH BTHL-500A
MODEL SHOWN:
BTHL-500A SERIES 400**



ASME



Commercial Gas Water Heaters

OTHER FEATURES:

SPACE-SAVING DESIGN FOR INSTALLATION FLEXIBILITY

- Large volume, integrated solution eliminates need for multiple 100-gallon water heaters or separate storage tank
- Easy-to-remove top cover for convenient access to serviceable parts
- 0" installation clearances on sides and rear, 1-1/2" installation clearance on top
- Handhole cleanout allows easy access to tank interior for cleaning
- 0" clearance to combustibles, approved for installation on combustible floors

MECHANICAL VENTING VERSATILITY

- Conventional power venting or direct venting
- Vents vertically or through a sidewall
- Front located exhaust and condensate connections allow for easy install and access
- Vents with low cost PVC Schedule 40 intake and exhaust pipe. Approved for optional CPVC Schedule 40, Polypropylene and AL29-4C stainless steel vent materials
- Direct-vent intake and exhaust pipe can terminate separately outside building or through single opening, using concentric vent assembly
- Canadian installations require ULC S636 PVC/CPVC, ULC S636 Polypropylene and AL29-4C stainless steel pipe for intake and exhaust

CODES AND STANDARDS

- CSA certified and ASME rated T&P relief valve
- Maximum hydrostatic working pressure: 160 psi
- All models are design certified by Underwriters Laboratories (UL), Inc., to ANSI Z21.10.3 - CSA 4.3 Standards
- Meets the thermal efficiency and standby loss requirements of the U.S. Department of Energy and current edition ASHRAE/IES 90.1
- Design Certified by Underwriters Laboratories to NSF standard 5 for 180°F (82°C) water
- Complies with SCAQMD Rule 1146.2 and other Air Quality Management Districts with similar requirements for ultra low-NOx emissions
- ASME tank construction standard on all model sizes

VENT REQUIREMENTS BTHL 150 - 250

PVC/CPVC Equivalent Length and Maximum Number of Elbows - 100 Gallon Models						
Model	Maximum Equivalent Length, Feet (Meters)			Maximum Number of Elbows		
	2" Pipe	3" Pipe	4" Pipe	2"	3"	4"
BTHL-150A	50 (15.2)	150 (45.72)	200 (60.96)	4	4	6
BTHL-199A	40 (12.2)	150 (45.72)	200 (60.96)	4	4	6
BTHL-250A	20 (6.10)	150 (45.72)	200 (60.96)	2	4	6

VENT REQUIREMENTS BTHL 300 - 500

PVC/CPVC Equivalent Length and Maximum Number of Elbows - 119 Gallon Models				
Model	Maximum Equivalent Length, Feet (Meters)		Maximum Number of Elbows	
	4" Pipe	6" Pipe	4" Pipe	6" Pipe
BTHL-300A	100 (30.48)	150 (45.72)	6	6
BTHL-400A	100 (30.48)	150 (45.72)	6	6
BTHL-500A	100 (30.48)	150 (45.72)	6	6

GAS PRESSURE REQUIREMENTS

Model Number	Manifold Pressure		Minimum Supply Pressure		Maximum Supply Pressure	
	Natural Gas	Propane Gas	Natural Gas	Propane Gas	Natural Gas	Propane Gas
BTHL-150A	0" W.C. (0 kPa)	0" W.C. (0 kPa)	3.5" W.C. (1.10 kPa)	8" W.C. (2.12 kPa)	14" W.C. (3.49 kPa)	14" W.C. (3.49 kPa)
BTHL-199A	0" W.C. (0 kPa)	0" W.C. (0 kPa)	3.5" W.C. (1.10 kPa)	8" W.C. (2.12 kPa)	14" W.C. (3.49 kPa)	14" W.C. (3.49 kPa)
BTHL-250A	0" W.C. (0 kPa)	0" W.C. (0 kPa)	3.5" W.C. (1.10 kPa)	8" W.C. (2.12 kPa)	14" W.C. (3.49 kPa)	14" W.C. (3.49 kPa)
BTHL-300A	0" W.C. (0 kPa)	0" W.C. (0 kPa)	3.5" W.C. (1.19 kPa)	8" W.C. (2.12 kPa)	14" W.C. (3.49 kPa)	14" W.C. (3.49 kPa)
BTHL-400A	0" W.C. (0 kPa)	0" W.C. (0 kPa)	3.5" W.C. (1.19 kPa)	8" W.C. (2.12 kPa)	14" W.C. (3.49 kPa)	14" W.C. (3.49 kPa)
BTHL-500A	0" W.C. (0 kPa)	0" W.C. (0 kPa)	3.5" W.C. (1.19 kPa)	8" W.C. (2.12 kPa)	14" W.C. (3.49 kPa)	14" W.C. (3.49 kPa)

Depending on the installed equivalent length, and/or the number of appliances connected, the supply gas line size may need to be increased beyond the minimum required size.

BTHL 150A-250A

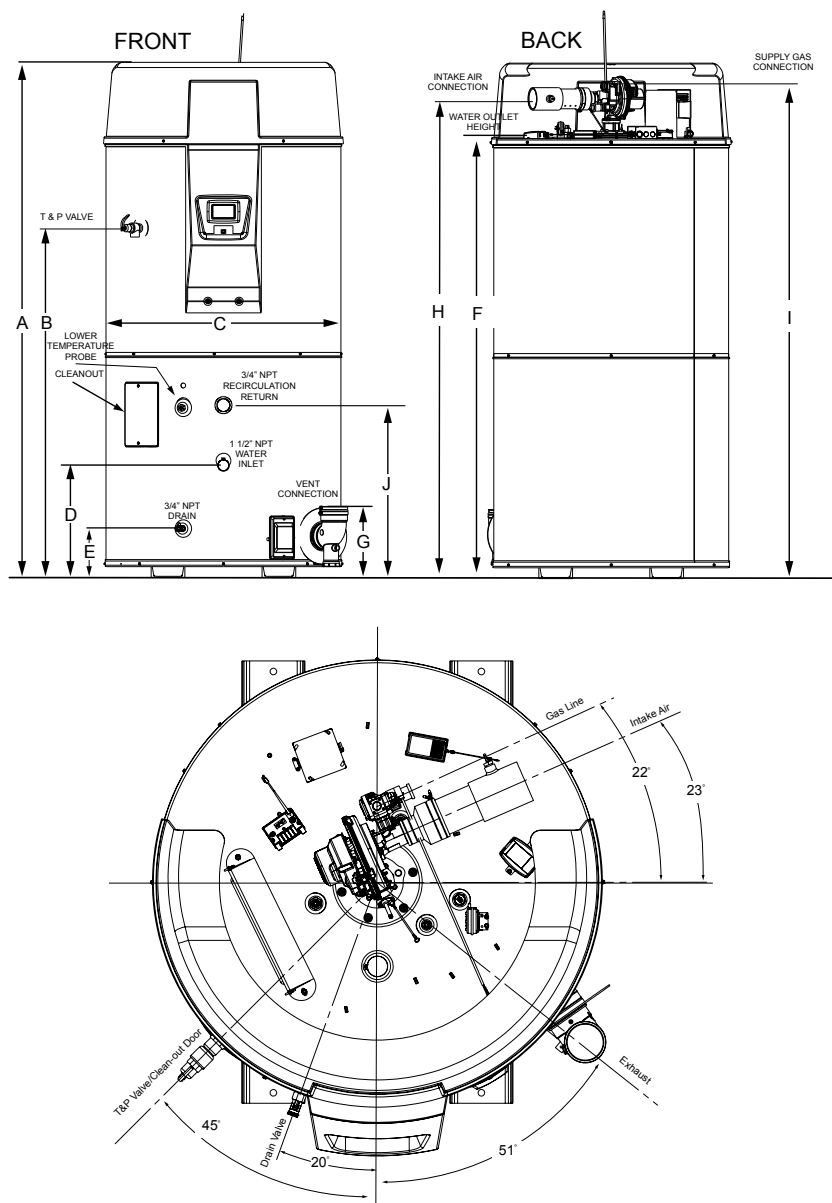


Figure 7. Rough-In Dimensions (250 Gallon Models)

Model Number	Approx. Capacity		Dimensions										lb/kg	Approx. Shipping Weight
			A	B	C	D	E	F	G	H	I	J		
BTHL-150A	Gallons	250	91-1/2	62-5/8	41-7/8	20-1/2	8-1/2	78-1/8	12	85	90-1/8	30-1/2	lb	1125
	Liters	946	232.4	159	107	52	21.6	196.4	30.4	215.9	228.9	77.4	kg	510
BTHL-199A	Gallons	250	91-1/2	62-5/8	41-7/8	20-1/2	8-1/2	78-1/8	12	85	90-1/8	30-1/2	lb	1125
	Liters	946	232.4	159	107	52	21.6	196.4	30.4	215.9	228.9	77.4	kg	510
BTHL-250A	Gallons	250	91-1/2	62-5/8	41-7/8	20-1/2	8-1/2	78-1/8	12	85	90-1/8	30-1/2	lb	1125
	Liters	946	232.4	159	107	52	21.6	196.4	30.4	215.9	228.9	77.4	kg	510

Electrical characteristics-120V-60Hz A.C., 5.0 A

"A" in model represents ASME construction

Dimensions and specifications subject to change without notice in accordance with our policy of continuous product improvement.

BTHL 300A-500A

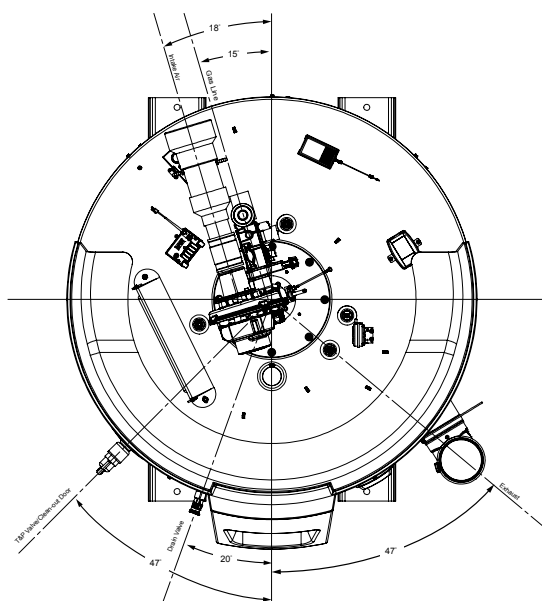
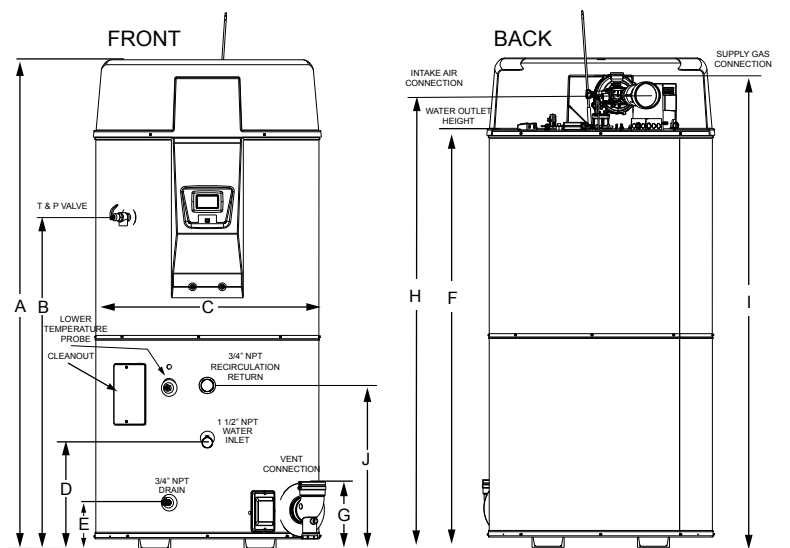


Figure 8. Rough-In (220 Gallon Models)

Model Number	Approx. Capacity		Dimensions										lb/kg	Approx. Shipping Weight
			A	B	C	D	E	F	G	H	I	J		
BTHL-300A	Gallons	220	91-1/2	62-5/8	41-7/8	20-3/4	8-1/2	78-1/8	12	84	89-3/4	30-1/2	lb	1420
	Liters	833	232.4	159	107	52.7	21.6	196.4	30.4	213.3	227.9	77.4	kg	644
BTHL-400A	Gallons	220	91-1/2	62-5/8	41-7/8	20-3/4	8-1/2	78-1/8	12	84	89-3/4	30-1/2	lb	1420
	Liters	833	232.4	159	107	52.7	21.6	196.4	30.4	213.3	227.9	77.4	kg	644
BTHL-500A	Gallons	220	91-1/2	62-5/8	41-7/8	20-3/4	8-1/2	78-1/8	12	84	89-3/4	30-1/2	lb	1420
	Liters	833	232.4	159	107	52.7	21.6	196.4	30.4	213.3	227.9	77.4	kg	644

Electrical characteristics-120V-60Hz A.C., 5.0 A

"A" in model represents ASME construction

Dimensions and specifications subject to change without notice in accordance with our policy of continuous product improvement.



Commercial Gas Water Heaters

RECOVERY CAPACITY

Model Number	Type of Gas	Input		Thermal Efficiency
		BTU/HR	kW	
BTHL-150A	Natural/Propane	150,000	44	97%
BTHL-199A	Natural/Propane	199,900	58	95%
BTHL-250A	Natural/Propane	250,000	73	95%
BTHL-300A	Natural/Propane	300,000	88	96%
BTHL-400A	Natural/Propane	399,900	117	95%
BTHL-500A	Natural/Propane	499,900	146	95%

Model Number	U.S. GALLONS AND LITRES/HR AT TEMPERATURE RISE INDICATED													
	Approx. Capacity	°F	30° F	40° F	50° F	60° F	70° F	80° F	90° F	100° F	110° F	120° F	130° F	140° F
		°C	17° C	22° C	28° C	33° C	39° C	44° C	50° C	56° C	61° C	67° C	72° C	78° C
BTHL-150A	250 U.S. Gals.	GPH	582	436	349	291	249	218	194	175	159	145	134	125
	946 Litres	LPH	2202	1652	1321	1101	944	826	734	661	601	551	508	472
BTHL-199A	250 U.S. Gals.	GPH	767	575	460	384	329	288	256	230	209	192	177	164
	946 Litres	LPH	2904	2178	1743	1452	1245	1089	968	871	792	726	670	622
BTHL-250A	250 U.S. Gals.	GPH	949	712	570	475	407	356	316	285	259	237	219	203
	946 Litres	LPH	3594	2695	2156	1797	1540	1348	1198	1078	980	898	829	770
BTHL-300A	220 U.S. Gals.	GPH	1139	855	684	570	488	427	380	342	311	285	263	244
	832 Litres	LPH	4313	3234	2588	2156	1848	1617	1438	1294	1176	1078	995	924
BTHL-400A	220 U.S. Gals.	GPH	1503	1127	902	751	644	563	501	451	410	376	347	322
	832 Litres	LPH	5688	4266	3413	2844	2438	2133	1896	1706	1551	1422	1313	1219
BTHL-500A	220 U.S. Gals.	GPH	1858	1394	1115	929	796	697	619	557	507	465	429	398
	832 Litres	LPH	7033	5275	4220	3517	3014	2638	2344	2110	1918	1758	1623	1507

Recovery capacities are based on 95% thermal efficiency.

STORAGE CAPACITY

Model Number	U.S. Gallons	Liters
BTHL-150A	250	946
BTHL-199A	250	946
BTHL-250A	250	946
BTHL-300A	220	833
BTHL-400A	220	833
BTHL-500A	220	833

GAS LINE CONNECTION SIZE

Model Number	Series	Natural Gas	Propane Gas
BTHL-150A	400	3/4" NPT	3/4" NPT
BTHL-199A	400	3/4" NPT	3/4" NPT
BTHL-250A	400	3/4" NPT	3/4" NPT
BTHL-300A	400	1-1/4" NPT	1-1/4" NPT
BTHL-400A	400	1-1/4" NPT	1-1/4" NPT
BTHL-500A	400	1-1/2" NPT	1-1/4" NPT



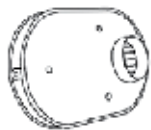
Commercial Gas Water Heaters

OPTIONAL KITS



OPTIONAL CONCENTRIC VENT KITS

- BTHL 150-250 vent kit p/n 100111100
- BTHL 300-500 vent kit p/n 100113124



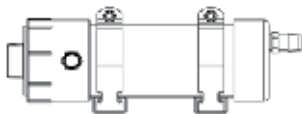
OPTIONAL LOW PROFILE TERMINATION VENT KITS

- 2" Flush Mount Vent Kit p/n 100187903
- 3" Flush Mount Vent Kit p/n 100187887
- 4" Flush Mount Vent Kit p/n 100187888
- 6" Flush Mount Vent Kit p/n 100187889

COMMON VENTING KITS FOR UP TO 3 WATER HEATERS (ONE KIT PER WATER HEATER REQUIRED)

Kit	Description
100227396	PVC Common Vent Kit, 100-250 Models
100223775	PVC Common Vent Kit, 251 - 500 Models
100227395	Polypropylene Common Vent Kit, 100-250 Models
100223774	Polypropylene Common Vent Kit, 251 - 500 Models

Installations must comply with all national, state and local codes.
See kit instructions and corresponding water heater manual for detailed installation instructions and additional information.
50 Feet maximum equivalent length of straight pipe common vent and elbows
NOTE: 1 kit per water heater required
See the Common Vent Kit manual or spec sheet for detailed information.



OPTIONAL CONDENSATE NEUTRALIZATION KITS

- BTHL 150-300 kit p/n 100289339
- BTHL 400-500 kit p/n 100374577



OPTIONAL BMS GATEWAY DEVICE

- BTH-100(A) - BTH-500(A) kit p/n 100378810

SPECIFICATION

(Natural or Propane) gas water heater(s) shall be A. O. Smith Cyclone LV model # _____ or equal, minimum 95% thermal efficiency, a storage capacity of _____ gallons, an input rating of _____ BTUs per hour, a recovery rating of _____ gallons per hour (gph) at 100°F rise and a maximum hydrostatic working pressure of 160 psi. Water heater(s) shall: 1. Adaptive gas controlled modulating gas burner that automatically adjusts the input based on demand. 2. Powered anodes that are non sacrificial and maintenance free. 3. Have seamless glass-lined steel tank construction, with glass lining applied to all water-side surfaces after the tank has been assembled and welded; 4. Meets the thermal efficiency and/or standby loss requirements of the U. S. Department of Energy and current edition of ASHRAE/IES 90.1; 5. Have foam insulation and a CSA Certified and ASME rated T&P relief valve; 6. Have a down-fired power burner designed for precise mixing of air and gas for optimum efficiency, requiring no special calibration on start-up; 7. Be approved for 0" clearance to combustibles. 8. Come standard with leak detection module that provides audible and display notification if leak is detected.

The control shall be an integrated solid-state temperature and ignition control device with integral diagnostics, graphic user interface, fault history display, and shall have digital temperature readout. No charge connectivity shall be provided allowing for remote viewing and fault notification via app. 1. All models are design certified by Underwriters Laboratories (UL), Inc., according to ANSI Z21.10.3 - CSA 4.3 standards governing storage type water heaters; 2. Meet the thermal efficiency and standby loss requirements of the U. S. Department of Energy and current edition ASHRAE/IES 90.1. Complies with SCAQMD Rule 1146.2 and other air quality management districts with similar requirements for low NOx emissions.

150K-250K BTU Input: For Standard Power Venting: Water heater(s) shall be suitable for power venting using a (2", 3" or 4") _____ diameter PVC pipe for a maximum total distance of (50 ft, 150 ft or 150 ft.) _____ equivalent feet of vent piping. For Power Direct Venting: Water heater(s) shall be suitable for power direct venting using a (2", 3" or 4") _____ diameter PVC pipe for a maximum total distance of (50 ft, 150 ft or 200 ft.) _____ equivalent feet of vent piping and (50 ft, 150 ft. or 200 ft.) _____ equivalent feet of intake air piping.

300K - 500K BTU Input: For Standard Power Venting: Water heater(s) shall be suitable for standard power venting using a (4" or 6") _____ diameter PVC pipe for a maximum total distance of (100 ft. or 150 ft.) _____ equivalent feet of vent piping. For Power Direct Venting: Water heater(s) shall be suitable for power direct venting using a (4" or 6") _____ diameter PVC pipe for a maximum total distance of (100 ft. or 150 ft.) _____ equivalent feet of vent piping and (100 ft. or 150 ft.) _____ equivalent feet of intake air piping. Operation of the water heater(s) in a closed system where thermal expansion has not been compensated for (with a properly sized thermal expansion tank) will void the warranty.

For Technical Information, call 800-527-1953. A. O. Smith Corporation reserves the right to make product changes or improvements without prior notice.