

## MasterFit® Low NOx Commercial Gas Tank-Type Water Heaters

### FEATURES

**Eighty plus percentage thermal efficiency affords lower operating costs on most models.**

**INDUCED DRAFT BUILT-IN BLOWER** - The blower is built into the top cover, factory mounted and wired. Ideal for installations where negative pressure is present in the building. Blower proves draft prior to ignition. No drafthood or barometric damper required.

**METAL VENTING** - Rated Category I Appliance. Uses standard metal single wall or double wall type "B" vent. Can be commonly vented with other Category I appliances. Vent connects directly to the blower outlet. Perfect choice for retrofit and upgrade installations.

**WATER CONNECTIONS** - For ease of installation, all BTNs feature water connections on the top, front, and rear.

**GLASSLINED TANK** - Permaglas® Ultracoat is the proprietary ceramic coating developed by A. O. Smith's ceramic engineers specifically for the heater. It is applied after the complete tank has been assembled to give a seamless barrier against hot water corrosion. The maximum working pressure is 160 psi.

**INSTALLED COST SAVINGS** - When multiple BTN units are exclusively used in a vent manifold, use the National Fuel Gas Code Table 13 Fan Sizing Charts to determine vent diameter and specifications. The BTN with its internal induced draft blower enables safe use of smaller vent diameters. This feature can save hundreds of dollars in installation costs.

**FULLY AUTOMATIC DIGITAL CONTROLS WITH SAFETY SHUTOFF** - Accurate, dependable control system. Manual reset gas shutoff device for added safety. Maximum inlet gas pressure is 14" W.C. Minimum gas pressure is 5.2" W.C. Natural Gas.

**FOAM INSULATION** - Saves fuel, helps reduce standby heat loss.

**JACKET** - Heavy gauge steel finished with a baked enamel finish over a bonderized undercoat.

**EASY CLEANING** - Handhole cleanout allows access for easy cleaning.

**FULLY TESTED FOR SAFETY AND PERFORMANCE** - Design certified by the Underwriters Laboratory for 180°F hot water service. Meets rigid requirements of the National Sanitation Foundation when equipped with optional leg kit. Certified for use on combustible flooring.

**INTERMITTENT IGNITION DEVICE** - Eliminates standing pilot. Provides flame failure response in less than one second. Power ON/OFF switch.

**EASY-TO-INSTALL** - Completely factory-assembled. Only gas, water, vent and electric connections need be made. Provided with drain valve.

**ANODES** - CoreGard™ long-life, stainless steel core anode rods.

**PLUG KITS** - Pipe nipples and caps are included to plug unused water connections.

**APPROVAL RATINGS AND CERTIFICATION** - All models meet ANSI Z21.10.3 - CSA 4.3 standards and the thermal efficiency and standby loss requirements of the U.S. Department of Energy and current edition of ASHRAE/IESNA 90.1. Models also comply with California Energy Commission (CEC) and Texas low NOx and Air Quality Management Districts with requirements of less than 40 ng/j.

## MODELS BTN 120-400(A)



GAS-FIRED



Approved to NSF Standard 5 with option leg kit.



## OTHER FEATURES


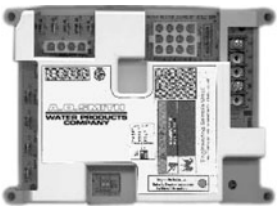


- Equipped with gas pressure regulator and pilot filter • Integral automatic gas shutoff system prevents excessive water temperature • CSA Certified and ASME Rated T&P Relief valve are factory-installed • Maximum working pressure is 160 psi standard • Cathodic protection • Adjustable thermostat with a 120-180°F range.
- **THREE YEAR LIMITED TANK WARRANTY** – For complete warranty information, consult written warranty or contact A. O. Smith.

## OPTIONS

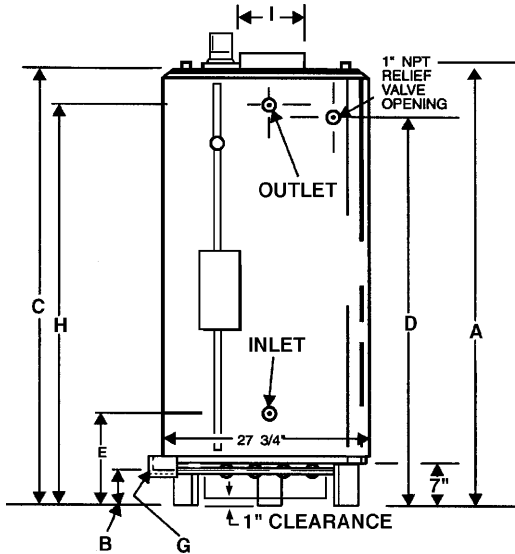
- Manifold kits for multiple heater installations.
- Meets NSF Standard 5 with optional leg kit.

## BTN DIA-SCAN™ CONTROLS

The A.O. Smith BTN models feature true self diagnostic controls in a digital solid state design. These advanced control aid in both the installation and maintenance of the BTN water heater. The White Rogers Silicon Nitride Hot Surface Ignitor ensures rugged reliability and years of trouble free operation.

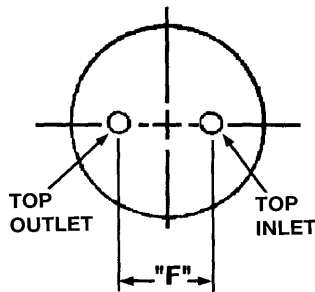
 <p><b>Digital Temperature Control</b></p>	<p><b>Digital Temperature Control</b></p> <ul style="list-style-type: none"> <li>• Accuracy to within <math>\pm 2^\circ\text{F}</math></li> <li>• Power On/Standby Indicator</li> <li>• ECO Open Indicator</li> <li>• Reset Status Indicator</li> <li>• Heating-Mode Indicator</li> </ul>
 <p><b>Solid State Ignition Control</b></p>	<p><b>Solid State Ignition Control</b></p> <ul style="list-style-type: none"> <li>• Power On/Standby Indicator</li> <li>• Gas Valve Circuit Monitor</li> <li>• Reverse Polarity Indicator</li> <li>• Improper Grounding Error Indicator</li> <li>• Lock Out Condition Indicator with Auto Retry</li> <li>• Low Gas Pressure &amp; Blower Prover Indicator</li> <li>• Weak Flame Sense Indicator</li> <li>• Combustion Operation Indicator</li> <li>• Call for Heat Indicator</li> </ul>
 <p><b>Solid State Temperature Probe</b></p>	<p><b>Solid State Temperature Probe</b></p> <ul style="list-style-type: none"> <li>• Solid State Thermistor Technology</li> <li>• Plus or minus <math>2^\circ\text{Fahrenheit}</math></li> <li>• Direct immersion package</li> </ul>
 <p><b>Silicon Nitride Hot Surface Ignitor</b></p>	<p><b>Silicon Nitride Hot Surface Ignitor</b></p> <ul style="list-style-type: none"> <li>• Rugged</li> <li>• Dependable</li> <li>• Separate Flame Prover Rod</li> <li>• Quick connect terminals</li> <li>• Adaptive learning technology extends ignitor life</li> </ul>

**ROUGH-IN DIMENSIONS  
SIDE VIEW OF BTN  
Models 120-400**



Model	Clearance to Combustibles		Clearance to Non-Combustibles	
	Sides & Rear	Top Cover	Sides & Rear	Top Cover
BTN120	1"	12"	0"	12"
BTN154	1"	12"	0"	12"
BTN180	1"	12"	0"	12"
BTN199C	2"	12"	2"	12"
BTN199	1"	12"	0"	12"
BTN200(A)	1"	12"	0"	12"
BTN250(A)	2"	12"	0"	12"
BTN275(A)	2"	12"	0"	12"
BTN310(A)	2"	12"	0"	12"
BTN366(A)	3"	12"	0"	12"
BTN400(A)	3"	12"	0"	12"

**TOP VIEW OF BTN**



Models	Water Connections in Inches					
	Inlet			Outlet		
	Top	Front	Back	Top	Front	Back
BTN120	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
BTN154	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
BTN180	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
BTN199C	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
BTN199	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
BTN200(A)	1 1/2	1 1/2	2	1 1/2	1 1/2	2
BTN250(A)	1 1/2	1 1/2	2	1 1/2	1 1/2	2
BTN275(A)	1 1/2	1 1/2	2	1 1/2	1 1/2	2
BTN310(A)	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
BTN366(A)	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
BTN400(A)	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2

Gas Pressure Requirements	
	Natural Gas
Max. Supply Pressure	14" w.c.
Min. Supply Pressure	5.2" w.c.
Manifold Pressure	3.5" w.c.

Electrical Specifications		
	Volts	Amps
BTN	120VAC	5.0



# Commercial Gas Water Heaters

Dimension Tables for BTN Models 120-400

Model	Approx. Tank Cap. (Gals.)	Type of Gas	Input Rating Btu/Hr.	A	B	C	D	E	F	G	H	I	J	Approx. Ship. Weight	
														Std.	ASME
BTN120*	71	nat	120,000	63	4 1/4	59 1/2	50 7/8	19 5/8	19	3/4	51 7/8	6	27 3/4	520	--
BTN154	81	nat	154,000	68	4 1/2	62	53 5/8	20 1/2	21	3/4	54 5/8	6	27 3/4	550	--
BTN180	100	nat	180,000	72	4 1/2	70-7/8	61 5/8	20 1/2	21	3/4	61	6	27 3/4	550	--
BTN199	100	nat	199,000	72	4 1/2	70-7/8	61 5/8	20 1/2	21	3/4	61	6	27 3/4	550	--
BTN199C*	93	nat	199,000	72	4 1/2	70	61 5/8	20 1/2	21	3/4	61	6	27 3/4	620	--
BTN200(A)	100	nat	199,000	72	4 1/2	70-7/8	61 5/8	20 1/2	21	3/4	61	6	27 3/4	660	710
BTN250(A)	100	nat	250,000	72	4 1/2	70-7/8	61 5/8	20 1/2	21	3/4	61	6	27 3/4	660	710
BTN275(A)	100	nat	275,000	72	4 1/2	70-7/8	61 5/8	20 1/2	21	3/4	61	6	27 3/4	660	710
BTN310(A)*	85	nat	310,000	73	4 1/2	72	62 1/2	20 1/2	21	3/4	63	6	27 3/4	720	770
BTN366(A)	85	nat	366,000	73	4 1/2	72	62 1/2	22 1/2	21	1	63	6	27 3/4	830	880
BTN400(A)	85	nat	390,000	73	4 1/2	72	62 1/2	22 1/2	21	1	63	6	27 3/4	830	880

\*Models rated at 82% thermal efficiency  
 BTN199C Models are available for sale in California only.  
 All dimensions are in inches.  
 +BTN120 is approved for 5" vent using a 6x5 reducer.

Recovery Capacities for BTN

Model	Input Rating Btu/Hr.	Gal.	Recovery Capacities for BTN										
			40°F	50°F	60°F	70°F	80°F	90°F	100°F	110°F	120°F	130°F	140°F
BTN120	120,000	71	288	239	193	164	144	128	115	105	96	89	82
BTN154	154,000	81	369	295	247	211	185	184	148	134	123	114	106
BTN180	180,000	100	432	345	289	247	218	192	173	157	144	133	123
BTN199	199,000	100	477	382	319	273	239	212	191	174	159	147	136
BTN199C	199,000	93	477	382	319	273	239	212	191	174	159	147	136
BTN200(A)	199,000	100	477	382	319	273	239	212	191	174	159	147	136
BTN250(A)	250,000	100	600	480	401	343	300	266	240	218	200	184	171
BTN275(A)	275,000	100	659	528	441	377	332	293	264	240	220	203	188
BTN310(A)	310,000	85	743	595	497	425	372	330	297	270	248	229	212
BTN366(A)	366,000	85	878	702	587	502	439	390	351	319	293	270	251
BTN400(A)	390,000	85	935	748	626	534	468	416	374	340	312	288	267

### SUGGESTED SPECIFICATION

Water Heater(s) shall be Model \_\_\_\_\_ as manufactured by A. O. SMITH, or equal. Water heater(s) shall be of glass-lined design, and gasfired, equipped to burn natural gas and design certified by the Underwriter Laboratory under Volume III tests for commercial heaters for delivery of 180°F water, and meet the thermal efficiency and standby loss requirements of the U.S. Department of Energy and Current Edition of ASHRAE/IESNA 90.1. Heaters shall have an input rating of \_\_\_\_\_ and a recovery rating of \_\_\_\_\_ GPH at a temperature rise of 100°F with a storage capacity of \_\_\_\_\_ gallons. Heaters shall be equipped with 1 1/2" water inlet and outlet openings (BTN 200, 250, 275, 310 rear openings are 2"), a 2 3/4" x 3 3/4" boiler-type handhole cleanout and shall have a maximum working pressure of 160 psi. Water heater(s) shall be equipped with an integrated control system consisting of a 180°F adjustable thermostat with upper and lower sensing bulbs, which average the water temperatures at the top and bottom of the tank for maximum water temperature control. Heater(s) shall be provided with a manual reset gas shutoff device, a gas pressure regulator set for the type of gas supplied, coated steel burners, an approved draft diverter, anodes for cathodic protection, flue damper and IID system. CSA Certified and ASME Rated T&P Relief Valve shall be furnished and installed by the factory. The heater shall be insulated with foam insulation or equal. The outer jacket shall have a baked enamel finish over a bonderized undercoating. All internal surfaces of the heater(s) exposed to water shall be glasslined with an alkaline borosilicate composition that has been fused-to-steel by firing at a temperature range of 1400° to 1600°F. Heater tank shall have a 3 year limited warranty against corrosion or sediment buildup as outlined in the written warranty. Fully illustrated instruction manual to be included.