

# FETCO®

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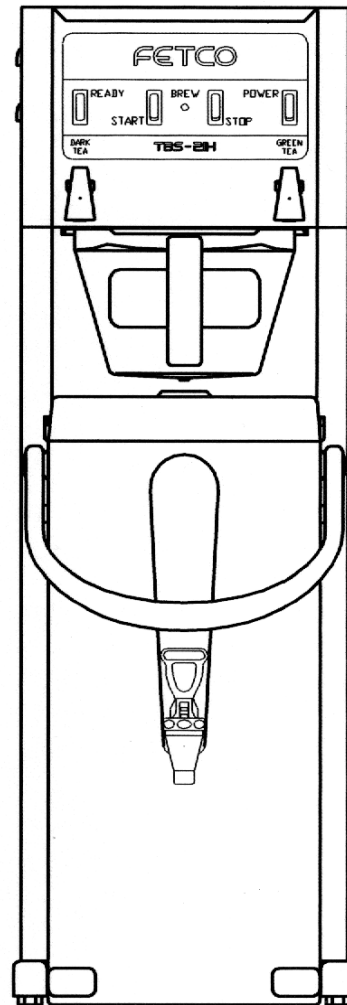
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# User's Guide

## Installation - Operation - Service

### Model: TBS-21H

# Iced Tea Brewing System



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# Introduction

## Model TBS-21H 3 Gallon Iced Tea Brewer

The TBS-21H is the most innovative Iced Tea Brewer ever introduced. The exclusive PulseBrew feature gently showers the tea leaves with hot water for several seconds, then pauses while the water drains through. This alternating spray and pause cycle repeats throughout the brew cycle. PulseBrew is adjustable, and can be set for a continuous spray (no pulse) if desired.

Conventional tea brewers steep the tea leaves, submerging them in a bath of hot water throughout the brew cycle. The TBS-21H allows most of the water to drain out of the tea leaves between pulse cycles. This allows oxygen to contact the tea leaves throughout the brewing process for the best flavor extraction available.

The cold water dilution ratio is also different than most tea brewers. After brewing 0.6 gallons (77 oz.) of concentrated hot tea, the TBS-21H automatically adds 2.4 gallons (307 oz.) of cold water. The result is a 1:4 ratio, the best for tea flavor extraction with PulseBrew's unique brewing style. Other tea brewers typically use a 1:2 ratio (one third hot / two thirds cold).

If you have any questions about your new tea brewer, please call FETCO at (800) 338-2699, or visit our web site at <http://www.fetco.com>.

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## Features

- Fully Automatic Brew and Dilution
- PulseBrew for Best Flavor Extraction
- Hot Water Faucet for Dark Tea
- Optional Hot Water Faucet for Green Tea
- Brews into Portable LUXUS Iced Tea Server
- Easily Removable Liner for Cleaning
- Liner is Dishwasher Safe
- All Stainless Steel Brewer Body Construction

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## Technical Data

### Brewing Specifications

Brew Volume: 3.0 gallons (11.3 liters)

Paper Filter Size: 13" X 5" Product # F002

Water Requirements: 20-75 psig, 2 gpm

### Factory Settings

Brew time: 12 minutes

Water Temperature:

205°F in Main Tank

Pulse: 10 seconds on, 20 seconds off

175°F Green Tea Tank (optional)

Brew Temperature Protection: Enabled

*All factory settings are adjustable. See the Settings & Adjustments section of this manual.*

### Weights and Capacities

Brewer Weight (empty)	Water Tank Capacity	Brewer Weight (filled)	Dispenser Weight (empty)	Dispenser Capacity	Dispenser Weight (filled)	Total Weight Brewer & Dispenser Filled
49 lbs.	5.0 gal.	90.5 lbs.	12.0 lbs.	3.0 gal.	37.0 lbs.	127.5 lbs.
22.2 kg	19 liters	41.1 kg	5.4 kg.	11.3 liters.	16.8 kg.	58.0 kg.

## Electrical Configurations & Brewing Capacities

Domestic Model	Heater Configuration	Voltage	Phase	Wires	KW	Maximum Amp draw	Batches per Hour**
TBS-21H (-1)	1 X 1500 watt	120	1 ph.	2 + ground	1.6	13.0	2.3
TBS-21H (-2)	1 X 2100 watt	120	1 ph.	2 + ground	2.2	18.0	2.6
TBS-21H (-3)	1 X 2700 watt	120/208	1 ph.	3 + ground	2.1*	10.2*	2.6
		120/220	1 ph.	3 + ground	2.4*	11.2*	2.7
		120/240	1 ph.	3 + ground	2.8*	11.8*	2.8
TBS-21H (-5)	1 X 3700 watt	120/208	1 ph.	3 + ground	2.9*	13.8*	2.8
		120/220	1 ph.	3 + ground	3.3*	15.1*	2.9
		120/240	1 ph.	3 + ground	3.8*	15.9*	3.0

\*Units with the optional green tea faucet: Add 0.3 KW and 2.5 amps to the figures shown.  
(Green tea faucet is not available on 120 volt or export versions.)

Export Model	Heater Configuration	Voltage	Phase	Wires	KW	Maximum Amp draw	Batches per Hour**
TBS-21H (-4)	1 X 2700 watt	220	1 ph.	2 + ground	2.4	11.2	2.7
TBS-21H (-6)	1 X 3700 watt	220	1 ph.	2 + ground	3.3	15.1	2.9

\*\*Batches per hour are based on standard factory settings: Timer – 12 min. / Pulse – 10 seconds

# Installation

(For Qualified Service Technicians Only)

## Keys To A Successful Installation

FETCO brewers are rugged and reliable machines that will provide many years of service. However, if not installed correctly by qualified personnel, the brewer will not operate properly and damage to the brewer may result. Damages resulting from improper installation are not covered by the warranty.

Here are the key points to consider before installation:

**General:** Utilize a qualified beverage equipment service technician for installation.

Place the brewer on a level surface.

Do not adjust the thermostat setting unless absolutely necessary. It is set at the factory for optimum performance- 205°F. It should only be lowered at high altitude installations.

**Plumbing:** This equipment is to be installed to comply with the applicable federal, state, or local plumbing codes.

The water line must be flushed thoroughly prior to connecting it to the brewer to prevent debris from contaminating the machine.

A taste and odor filter is highly recommended for this and all beverage equipment

Verify that the water line will provide at least 2 gallons per minute before connecting it to the brewer.

**Electrical:** 120 volt units are supplied with appropriate cords and plugs for 15 amp or 20 amp service.

Dual voltage units (120/208-240VAC) are not supplied with a cord or plug. The terminals must be wired as follows: L-1: 120 VAC                      L-2: neutral (white)                      L-3: 120 VAC                      ground (green)

Both neutral (white) and ground (green) must be provided.

The electrical drawing is located inside the rear cover of the brewer.

## Installation Check List

The installation must comply with applicable federal, state, and local codes having jurisdiction at your location. Check with your local inspectors to determine what codes will apply to the installation and operation of FETCO products.

1. Review the Dimensional Drawings and the Operating Procedures for the unit you are installing. Verify the brewer will fit in the space intended for it. Verify that the counter or table will support the weight of the brewer and dispensers when filled and that the surface is level.
2. Verify that the actual voltage at the electrical service connection is compatible with the specifications on the brewer's serial number plate. Make sure the electrical service includes **neutral**. Ensure at this time that the circuit breaker to the brewer and the power switch on the brewer are in the off position.
3. Remove the white plastic protective coating from the brewer body.
4. The thermostat, timer, and the water tank fill level are pre-set at the factory. **There is no need to turn off the heaters during the installation process. The heaters are disabled by the liquid level control circuit on the main board until water is sensed.** The heating process will start automatically when the tank has filled with water.
5. Remove the top and rear panel to inspect for leaks, loose wires, etc., and for adjustments.
6. Water connection:
  - Water inlet is a 3/8 inch male flare fitting
  - We discourage the use of softened water. Softened water will give poor brew performance in any drip tea system using a paper filter.
  - Install a water shut off valve near the brewer to facilitate service. If an in-line water filter is used, it should be installed after the water shut off valve and in a position to facilitate filter replacement.
  - Flush the water supply line and filter **before** connecting it to the brewer.
  - Verify that the water line will provide at least 2 gallons per minute, and that the water pressure is between 20 and 75 psig.
  - Use a wrench on the factory fitting when connecting the incoming water line. This will reduce stress on the internal connections and reduce the possibility of leaks developing after the install has been completed.
7. Power connection:
  - A fused disconnect switch or circuit breaker on the incoming power line must be conveniently located near the brewer, and its location and markings known to the operators.
  - All brewers require **neutral**. Damage to the brewer may result if neutral is not present.
  - The body of the brewer must be grounded to a suitable building ground. A ground lug is provided in the brewer on the floor of the chassis. Use suitable gauge copper wire for grounding.
  - Electrical connections must be secured in-place within the unit to meet national and local standards.
8. Turn on the incoming water supply line and inspect both inside and outside of the brewer for leaks in all fittings and tubes.
9. Plug in brewer and turn on the incoming power
10. Turn on the brewer with the power switch.
  - Within 6 seconds, the internal tanks will begin filling until the water is sensed by the water level probe.
  - The heaters will be disabled by the L.L.C. circuits on the main board until water is sensed by the water probe at the top of the tank.

**On initial startup, from dry tank conditions, the green "READY" will flash 3 minutes after turning unit on, indicating a fault (low water level). Turn the power switch off and back on to reset this. Repeat one additional time if necessary**

The brewer will be ready for operation as soon as the ready light comes on to signify that the water tank is up to temperature.

Depending on the cost of electricity in your area, very little savings may be had by turning the brewer off between shifts. The water tank is well insulated and may actually use less electricity to keep the tank hot, than re-heating the tank from a cold condition. Leaving the brewer in the on position will also avoid delays at the beginning of shifts for the brewer to reach operating temperature.

11. Brew one dispenser (water only) to confirm proper fill levels.

- The brewer is factory set to deliver a total of 3.0 gallons to the dispenser.
- Tea leaves retain water after brewing, therefore your brew level will be reduced proportionally to the amount of tea used.
- Review the entire operating procedures with whoever will be using the brewer. Pay particular attention to the following areas.
- Don't remove the brew basket until it has stopped dripping.
- Don't remove the spray plate until it has cooled from the brewing operation. It may still be hot, and hot brew water may be retained behind it.
- Make sure the dispenser is empty before brewing into it.
- Show the location and operation of the water shut off valve as well as the circuit breaker for the brewer.
- Never unplug the tea brewer (or any high wattage equipment) while it is operating. Push the power switch to the off position first. The resulting electrical pulse may cause a burn or shock hazard, or damage the computer operating circuits on the control board.
- Steam from the tank will form condensation in the vent tube. This condensation will drip into and then out of the brew basket. Up to 1/4 cup discharging overnight is possible. Place an appropriate container under the brew basket when not in use.

# Operating Procedures

## 1. Turn brewer power switch to the on position

- The power switch will illuminate to indicate that the brewer has power and is operational.
- When the **ready light** illuminates, the brewer is fully up to temperature. The amount of time required to gain full operating temperature will vary depending on the electrical configuration that was ordered, and the temperature of the incoming water.

## 2. Prepare the brew basket.

- Place a paper filter in the brew basket. Pour the appropriate amount of tea into the paper filter, and distribute it evenly. The amount of tea used will depend on your personal tastes and the recommendation of your supplier.
- Slide the brew basket into place.

## 3. Place the dispenser in position under the brew basket.

- Make sure the dispenser is empty. Overflowing may result if it is not completely empty when the brew cycle begins.
- Ensure that the dilution spout is inserted into the back of the dispenser
- Ensure that the dispenser is pushed all the way in, so that the dispenser body is pressing the sensing switch.

### Optional Setting: Brew Temperature Protection

The TBS-21H is factory set so that it cannot brew unless the water is at the proper temperature. If a brew cycle is started without the ready light on, no water will be dispensed and the brew light will begin flashing. Once the water heats to the proper temperature, the brew cycle will begin normally. See the Settings & Adjustments section for instructions on disabling this feature.

## 4. Start the brew cycle.

- Start a brew cycle by pressing the start switch.
- The brew light will illuminate during the brew cycle. At the end of the brew cycle, the brew light will flash for 4 minutes, indicating that hot tea is still dripping from the brew basket and that cold water is flowing into the back of the dispenser through the dilution tube. Do not move the dispenser until the brew light has stopped flashing.
- The factory settings include a time delay between the brew cycle and dilution cycle to allow for clarification (See page 8). As a result, the brew light will continue to blink for a few minutes after tea has stopped dripping, before the dilution cycle begins.
- **CAUTION!** Do not remove the brew basket until dripping from the bottom of the brew basket has stopped. Carefully remove the brew basket while inspecting the inside of the basket for hot tea that may have been trapped or has not finished draining.
- To interrupt the brew cycle at any time, press the stop switch. This will reset all functions.

### Hot Water Faucets

The red and green hot water faucets must not be used during the brew cycle. Using the faucets will reduce the amount of water for brewing, resulting in a short batch.

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## Cleaning

**Brewer:** At the end of each day, wipe the underside of the spray plate. The spray plate should be removed and cleaned periodically to remove hard water deposits. In areas with extremely hard water, it may be necessary to do this weekly. Monthly cleaning may be sufficient in areas with average water conditions.

**Dispensers:** The dispensers are dishwasher safe, and should be cleaned daily. If cleaned manually, use detergent and a soft brush or sponge. Do not use wire brushes or abrasive pads. To prevent deposits from forming, do not allow tea to sit inside the dispenser overnight.

# Settings and Adjustments

**Caution!** Always unplug or disconnect power to the brewer before changing any settings or adjustments.

All settings and adjustments, except for the optional green tea faucet, are made on the control board, which is accessible inside the back of the unit. (See the control board diagram.)

## Dispense System

The TBS-21H features a system which dispenses factory calibrated amounts of hot and cold water completely before refilling the tanks. The amount of water (0.6 gallons hot, 2.4 gallons cold) is not adjustable. The water tanks will not refill until the brew cycle is finished and the dispense valves have closed.

## Brew Time (bottom dial)

The brew time is adjustable from 2 to 12 minutes and is factory set at 12 minutes. The brew time always defaults to the nearest full minute on the dial.

The brew time must be set long enough to dispense the full volume of water. See the next section, Pulse Feature, for a full explanation.

## Pulse Feature (top dial)

The pulse feature allows the spray of water over the tea to cycle on and off throughout the brew cycle. The setting is made on the top dial on the control board, labeled "ON TIME". The total pulse cycle is 30 seconds in length.

Examples:

- 1.) The factory setting, 10 seconds, will give 10 seconds of spray over followed by a 20 second pause.
- 2.) A setting of 15 seconds will give 15 seconds of spray over followed by a 15 second pause.
- 3.) A pulse setting of 30, the maximum, will give a constant spray of water throughout the brew cycle. In other words, no pulse at all.

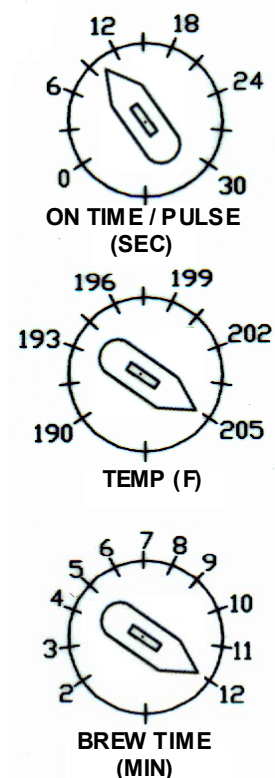
The Pulse and Brew settings must be synchronized so that the dispense valve is open long enough to dispense all of the brew water.

Use the following chart to determine the proper settings.  
(Standard factory settings shown in bold.)

On Time (Pulse) (seconds)	Brew Time (minutes)	
	Recommended Settings for Best Clarity	Minimum Settings for Highest Production
5	12	8
<b>10</b>	<b>12</b>	7
15	11	6
20	10	5
25	9	4
30 (No pulse)	7	2

**Regarding clarity...** The clarity of the final product may be improved by allowing the hot tea to sit for a few minutes before it is diluted with cold water. This is achieved by setting the brew time higher than the minimum necessary to dispense all of the water. The recommended settings listed include extra time for clarification.

If these settings do not produce enough tea to satisfy demand, you may reduce the brew time to increase production, which may result in a cloudier appearing product. Do not reduce the brew time setting below the minimum settings shown. Experimentation will be necessary to determine the best settings for your particular type of tea.



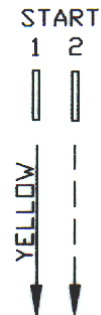
### Temperature (center dial)

The brew water temperature is adjustable from 190°F to 205°F and is factory set at 205°F. The adjustment is made on the center dial of the control board. Adjustment should only be necessary at high altitudes to prevent boiling. Check the temperature by holding a thermometer in the stream of water flowing out of the hot water faucet with the red handle.

### Brew Temperature Protection

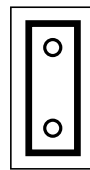
When this feature is enabled, a brew cycle cannot begin unless the water is at the proper temperature. If a brew cycle is started without the ready light on, no water will be dispensed and the brew light will begin flashing. Once the water heats to the proper temperature, the brew cycle will begin normally.

The brewer is factory set with this feature enabled. To disable it, locate the yellow wire near the lower right side of the control board. Move the wire from the terminal labeled START 1 to the terminal labeled START 2.

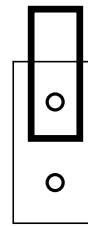


### Jumper Settings

The control board is used on a variety of different brewer models. In order to function properly in the TBS-21H, Jumper #1 must be in the closed position, as shown below:



Jumper 1 in closed position.  
Correct Configuration



Jumper 1 in open position.  
Incorrect Configuration

Jumper # 2 & 3 are not used for the TBS-21H.

### Green Tea Faucet (optional)

The green tea faucet draws water from a separate water tank, which is controlled by a separate thermostat. The temperature of this water is factory set at 175° F. Check the temperature by holding a thermometer in the stream of water flowing out of the green tea faucet.

The green tea thermostat is located in the back of the unit, next to the main control board. Turn the adjustment stem slightly clockwise to increase the temperature, and counter-clockwise to decrease the temperature.



# Replacement Parts

## Brewer Parts

Part Number	Description		List Price
51018	control board, pulse brew, 120VAC		\$266.00
53049	heater element, 1.5KW, 120VAC, bottom mount		\$32.00
53050	heater element, 2.1KW, 120VAC, bottom mount		\$32.00
53051	heater element, 2.7KW, 240VAC, bottom mount		\$32.00
53052	heater element, 3.7KW, 240VAC, bottom mount		\$32.00
54020	temperature probe, 8"		\$22.00
57006	fill valve, S-53, 1.35 GPM, 120VAC		\$26.00
58016	switch, dispenser sensing		\$38.00
57035	dilution valve. 120 VAC		\$36.00
54005	liquid level control board, 120 VAC, green tea tank		\$60.00
53012	thermostat, 120 VAC, green tea tank		\$72.00
104014	tank assy, green tea, 120 VAC, 300 W		\$268.00
58017	lamp, "brew" 120VAC		\$4.00
58019	lamp, "ready", 220VAC		\$12.00
58020	switch, brew 240VAC		\$10.00
58021	switch, stop 240VAC		\$10.00
58023	switch, power, 240VAC		\$10.00
71021	faucet, complete, hot water, red		\$44.00
71023	faucet upper assy., hot water, red		\$23.00
71075	faucet, complete, hot water, green		\$44.00
71076	faucet upper assy., hot water, green		\$23.00
71003	faucet seat cup, hot water		\$2.00
101010	brew basket assy., 13 "X 5"	With wire insert	\$116.00
2003	brew cone, 13" X 5"	Without wire insert	\$80.00
9001	brew basket wire insert, 13" X 5"		\$37.00
102013	tank cover assy.		\$10.00
24002	tank cover gasket		\$17.00
102080	spray housing assy, 120VAC, CBS-18, TBS-21H	With coil, o-ring, spray plate	\$138.00
102081	spray plate assy.		\$32.00
57047	spray housing coil service kit, DSV-11, 120 VAC		\$58.00
24032	o-ring, spray housing		\$1.60
102084	water level probe assy., hot water tank		\$30.00
102094	water level probe assy., green tea tank		\$30.00

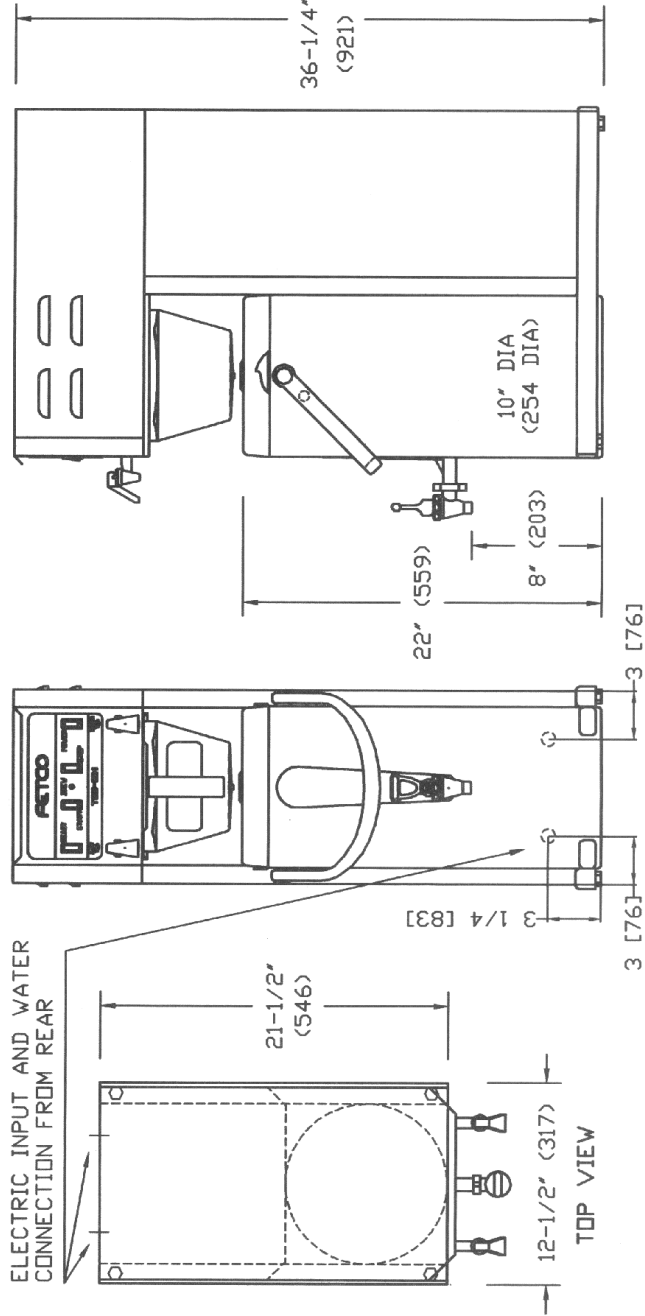
## ITD-30 Dispenser Parts

Part Number	Description		List Price
71071	faucet, complete, ITD-30		\$12.00
71037	faucet upper assy., black handle	Includes handle, spring, seat cup.	\$19.00
71028	faucet handle, black		\$8.00
71035	faucet seat cup		\$5.00
71072	faucet wing nut		\$1.20
71036	faucet C ring		\$2.00
23087	liner, ITD-30		\$42.00
23088	cover, ITD-30		\$28.00

# Drawings

ELECTRICAL INPUT (ONE OF THE FOLLOWING) : WATER INLET: TOTAL WEIGHT IN USE: X X X

CHECK ELECTRICAL SPECIFICATION LABEL FOR SPECIFIC SERVICE REQUIRED. UTILITIES CONNECTIONS THROUGH BOTTOM AND/OR BACK WALL OF UNIT.



FETCD TBS-21H	640 HEATHROW DRIVE, LINCOLNSHIRE, IL. 60069, TEL: (800) FETCD-99	SCALE: 1:10
MODEL:	DRW. NO. 201-060	
ROUGHING-IN SPECIFICATION		