

NBT Series Installation Operation & Maintenance

Models: NBT-23 & NBT-24-P

Acidic Condensate pH Treatment Tanks
Gravity Flow NBT-23 Neutralizer
Combination Condensate Pump & Neutralizer



NBT-23



NBT-24-P

ALL JJM NEUTRALIZING PRODUCTS

WARNING

JJM neutralizers are sized by BTU input to establish a flow rating.
Job site conditions will determine neutralizer design. See GPH chart below.

How much fireside condensate will my equipment develop? Hot water heaters / Boilers / Furnaces / Economizers

Equipment Efficiency	GPH Condensate
90%	.725 / Per 100,000 BTU Input
91%	.733 / Per 100,000 BTU Input
92%	.741 / Per 100,000 BTU Input
93%	.750 / Per 100,000 BTU Input
94%	.758 / Per 100,000 BTU Input
95%	.766 / Per 100,000 BTU Input
96%	.774 / Per 100,000 BTU Input
97%	.782 / Per 100,000 BTU Input
98%	.790 / Per 100,000 BTU Input
99%	.798 / Per 100,000 BTU Input

Multiple Boiler Common Flue drains: 33.3% of total BTU input of connected equipment.
Example: (3) Boilers @ 100,000 BTU Input would need a pH treatment kit rated @ 100,000 BTU for the stack drain and a flow rate of .725 to .798 depending on efficiency.
Consider the following when choosing a neutralizer for less maintenance during operation of your heating equipment.

- 1. Your location in relation to weather (Very Cold, Cold, Moderately Cold)**
- 2. System Design (Process, Radiate, Snow Melt, Heating, etc.)**
- 3. Yearly Operating Hours**
- 4. pH level out of heating equipment (3.2 to 4.0 is normal)**
- 5. If pH out of the heating equipment is below 3.2 pH contact the factory for sizing.**
- 6. Abnormally low pH out of the equipment condensate drain can be caused by the following:**
 - A. Improper Combustion**
 - B. Contaminated Combustion Air**
 - C. High Sulfur Content in Gas Supply**
 - D. pH below 2.0 is considered hazardous waste by EPA. Contact JJM Technical Service at 413-427-3373 or 413-527-1893**

JJM highly recommends operating your heating equipment for 24-48 hours prior to connecting a neutralizer so as to flush out dirt, grease, and oils from connected piping and the heater. This is also the best time to check the heater condensate pH level for sizing your neutralizer.



Overview

Read before proceeding



Always use eye protection and plastic or rubber gloves when installing, recharging, adding water, or cleaning the NBT-23 or NBT-24-P tank.

Failure to comply with these guidelines could result in severe personal injury, death or substantial property damage.

Keep pH Power Pellets® and power pellet bags out of the reach of children and animals. pH Power Pellets® (magnesium Hydroxide) are NO food grade and should not be consumed by humans or animals.

Always return the clear cover on the NBT-23 and lockdown with the four push pins and return the blue cover on the NBT-24-P after charging with the media pellets.

DO NOT exhaust flue gases through the NBT-23 and NBT-24-P tanks, they are not rated for heater flue gases. OPERATING NBT-23 AND NBT-24-P TANKS AS EXHAUSTS WILL CAUSE INJURY OR DEATH FROM CARBON MONOXIDE.

Gas traps must be installed between the boiler, vent drains, and furnace condensate outlet and the inlet of all NBT-23 tank.

Neutralizer and lines must be wet

- **Before operating the boiler, hot water heater or furnace, fill the NBT-23 tank, NBT-24-P and traps with tap water. NEVER operate with tubes or P-traps dry.**

Application

- Condensing boilers, hot water heaters or furnaces, and flue pipe condensate drains.
- NBT-23 and NBT-24-P tanks must be installed below system P-traps, boiler, furnace, and breeching condensate drains.
- The use of Ferris and Copper piping on the neutralizer inlet or out is not permitted. The use of CPVC, PVC, PP Tubing, and Stainless Steel piping is the only material that shall be used.

Combined piping options

Flue pipe condensate drains / NBT-23 / NBT-24-P tanks

- Condensate drain piping options / Flue Drain, Boiler Drain, Furnace Drain, Hot Water Heater Drains: See Figures 1,2,3,4,5,6, and 7.
- If using a separate NBT-23, NBT-24-P tanks for a common flue pipe drain the tank should be rated at 33.3% of the total gross BTU of all units attached to the common vent.

Replacement of the NBT-23 and NBT-24-P pH Power Pellet® Media Bag

- The media bag should be replaced when pH level at the NBT-23 outlet level falls below 5.0.
- The NBT-24-P pellets can be removed with a wet-dry vacuum or by disconnecting the power source and removing the piping, cover and pump. Replace the pellets when the pH at the outlet port falls below 5.0 or at a minimum once a year.
- At a minimum the media bag must be changed once a year.
- Use only JJM pH Power Pellet® media bags. DO NOTE USE LIMESTONE OR MARBLE CHIPS.

What is pH?

The pH measurement of a fluid is an indicator of the acidity or alkalinity. Neutral fluids have pH of 7.0. Acid fluids have pH below 7. And alkaline fluids have pH above 7 (up to 14). The pH can be easily measured using a digital pocket pH probe.

Condensate pH from condensing boilers and furnaces is typically around 3.2 - 4.0. The condensate pH needs to be increased (made more neutral) to prevent possible damage to cast iron soil pipe, ABS pipe, septic tanks, plants, wastewater treatment plants and other materials handling wastewater.

NBT tanks increase pH (reduce acidity).

NBT-23 residential/commercial flue-side condensate neutralizing tubes & tanks are designed to raise the pH level of the condensate discharged by high-efficiency boilers and warm air furnaces and hot water heaters.

Applying NBT-23 series neutralizing tank

Condensate can be collected from flueways and boiler/furnace condensate trap outlets. See WARNING section at left for guidelines on application.

Match neutralizing tank to boiler, hot water heater and furnace gross BTU input ratings.

Do not install a condensate pump unit before the NBT-23 series inlet; a condensate pump can only be installed at the outlet of a NBT-23 series.

Locate the NBT-23 neutralizing tank outlet port below the heater condensate drain port for gravity flow. Never use a condensate pump before an NBT-23 inlet port. Consider using JJM model NBT-24-P with built in condensate pump.

Follow the guidelines in this manual, the boiler/furnace manual and all applicable local codes when installing, using and maintaining NBT series condensate neutralizing tank.



Keep pH Power Pellets® and power pellet bags out of the reach of children and animals. pH power pellets (magnesium Hydroxide) are NOT food grade and should not be consumed by humans or animals.

Always return the clear cover lockdown bolts and nuts in place and tighten for child safety.

Applying the NBT-24-P (Pump)

The NBT-24-P combination neutralizer and condensate pump is applied where the house drain is located in a remote location and the treated condensate needs to be pumped to that location. The NBT-24-P has a lower inlet port for FLOOR mounted heater condensate drains. The floor mounted heaters condensate drain MUST be located 2.5" minimum above the NBT-24-P's lower Inlet port.

The NBT-24-P model also has top side inlet ports for acidic condensate which can be used for WALL mounted heaters.

When installing a warm air furnace, the NBT-24-P has inlet ports for both acidic condensate and clean non-acidic air conditioning condensate. The ports are clearly labeled for the proper connections.



Installation

NBT-23

1. Remove clear cover.
2. Remove shipping bubble wrap and safely discard.
3. Remove “Date of installation label” and the “red warranty tag”.
4. Remove the wall mounting “J” hook brackets.
5. Remove the pH Power Pellet® bag.
6. Remove porous pellet bag from plastic shipping bag before placing in the NBT-23 tank.
7. Spread the porous pellet bag across the NBT-23 baffle as evenly as possible.

Wall hung NBT-23

1. Secure the “J” brackets through the holes provided 10” apart to the wall using the proper screws or bolts to handle eight pounds of weight. If mounting to the jacket of boiler, hot water heater, or furnace caution should be taken not to damage wiring or any components of these units with your mounting anchors. Place the NBT-23 tank into the “J” hooks; it is now ready to be piped. We highly recommend using ¾” schedule40 PVC pipe and fittings.
2. The outlet port of the NBT-23 pH treatment tank shall be below the condensate drain of the boiler; hot water heater, furnace, and stack drain. The heating units condensate drains shall be piped to the tank inlet port. The outlet port of the tank can be piped to an open house waste drain or condensate pump system. Follow the piping diagram in this manual which best applies your installation.
3. Do not terminate the tank outlet piping outside where temperatures will reach freezing or below (32F or 0C).
4. Once mounting and piping are complete assure that the flow baffle is placed flatly on top of the mounting ribs at the bottom of the tank.
5. Remove the pH Power Pellets® from the plastic shipping bag and place the single pellet bag flat, evenly and on top of the flow baffle. Do not remove the pellets from the polyester mesh bag. It is important that the bag and pellets fit squarely across the baffle so as not to let acidic condensate bypass the pellets.
6. Before operating the boiler, hot water heater, furnace or stack, fill the NBT-23 tank with fresh tap water to the tank outlet port. Also fill any “P” traps with fresh tap water. NEVER OPERATE THE NBT-23 TANK DRY.
7. Replace the clear cover with the push pins. The flow arrow should always point in the direction of the outlet port (Highest Port on the tank).
8. Pipe hangers or brackets should be used to support all piping.
9. Place the “Installation Label” on the side on the NBT-23 tank so as to be visible to the end user. Indicate on which date the unit was installed. Also place the stringed “Red Warranty” tag in close proximity to the outlet port and advise the owner of the need to replace the pellet bag at least once a year at minimum or if the pH falls below 5.0 pH which ever occurs first. Also advise the owner of the need to fill out the warranty card online at www.jjmboilerworks.com or via mail.

Floor mounting the NBT-23 or NBT-24-P:

1. Place the NBT-23 NBT-24-P tank in a location where it will not be a foot traffic hazard.
2. The “J” hook brackets may be used on the NBT-23 if the tank is next to a wall or heating unit.
3. Follow steps 1-9 for wall mounting.
4. The NBT-24-P is a floor mounted unit only.

Operational Flow Model NBT-23:

Once the heating unit is fired and acidic condensate is produced the condensate will flow from the heater condensate drain down into the NBT-23 tank's inlet port. The acidic condensate enters the bottom chamber of the tank below the plastic flow baffle. The acid will now flow up through the plastic baffle ports via gravity and slight head pressure at which point it comes in contact with the Magnesium Hydroxide Pellet bag (pH Power Pellets®). A chemical reaction now takes place in which ions from the acid and pellets are exchanged raising the pH level of the acid in the range of 5.0 to 9.0 pH. In this range the condensate can be safely be put to a waste drain via the NBT-23 outlet port and piping.

Operational Flow Model NBT-24-P:

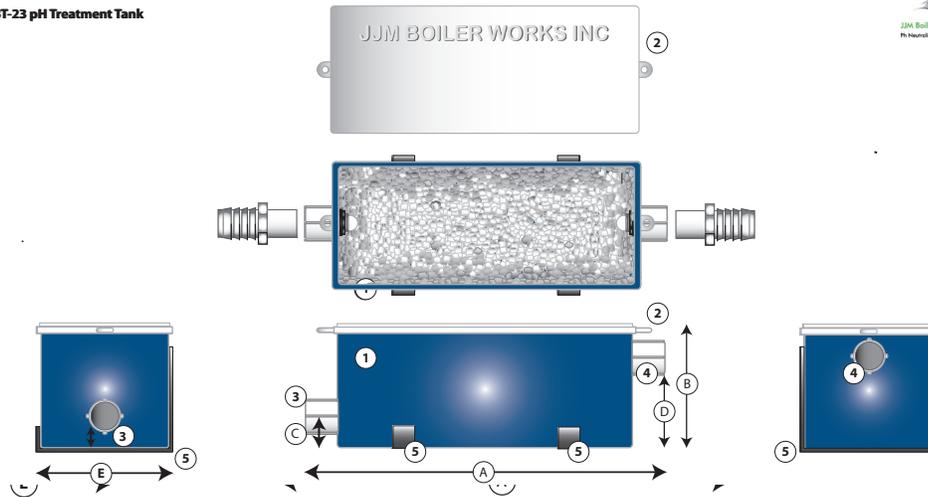
As the heater unit produces acidic condensate it enters the NBT-24-P via either the bottom or top inlet ports. The condensate flows through four pellet chambers before flowing over the walls and into the pump chamber. Once the float makes contact, the pump will be powered discharging the treated condensate out of the 3/8” barb fitting to the remote drain via tubing supplied by the contractor.

NBT-24-P

1. Remove the blue cover by slightly prying it upward in the clip slot of the clear tank.
2. Remove the pump in the same way.
3. Fill chambers 1-4 with pH power Pellets® slightly below their retaining walls. See figure 1 model NBT-24-P.
4. **DO NOT ALLOW PELLETS INTO CHAMBER #5.**
5. Fill chambers 50% with tap fresh water.
6. Return the pump and blue cover back into position making sure they snap in place.

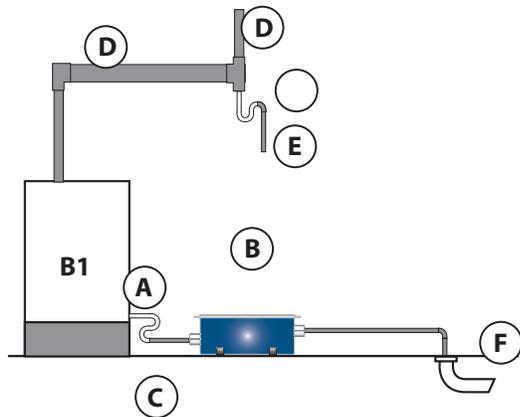
Installation **Figure 1** NBT-23 pH Treatment Tank – features and dimensions

NBT-23 pH Treatment Tank



NBT-23 pH Treatment Tank Ratings & Dimensions (in inches)							
MBH	Flow Rating	(A)	(B)	(C)	(D)	(E)	Active Ingredient/pH Power Pellets™ by JJM Boiler Works, Inc.
1 to 300	0 to 2.4	13.75"	4.75"	7/8"	3"	4.5"	(3) INLET (4) OUTLET Port Size/PVC - 3/4" Socket (EDPM Flat Gasket)
(1) Tank - Corrosion-resistant, blue polypropylene						(3C) INLET 7/8" from base to center	(4D) Outlet 3" from base to center

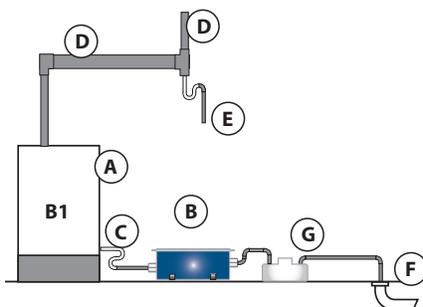
Figure 2 NBT-23 pH Treatment Tank/Single Unit



- A Boilers / Hot Water Heaters / Furnace Condensate Drains
- B NBT-23 pH Treatment Tank
- C Trap
- D Flue Pipe
- E Trap
- F Floor Drain

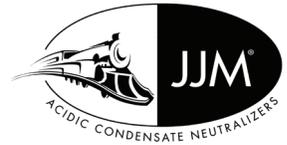
Note: Contact Factory for pH Treatment Tank and Piping Size

Figure 3 NBT-23 pH Treatment Tank Single Unit - Condensate Pump



- A Boilers / Hot Water Heaters / Furnace Condensate Drains
- B NBT-23 pH Treatment Tank
- C Trap
- D Flue Pipe
- E Trap
- F Floor Drain
- G Condensate Pump

Note: Contact Factory for pH Treatment Tank and Piping Size

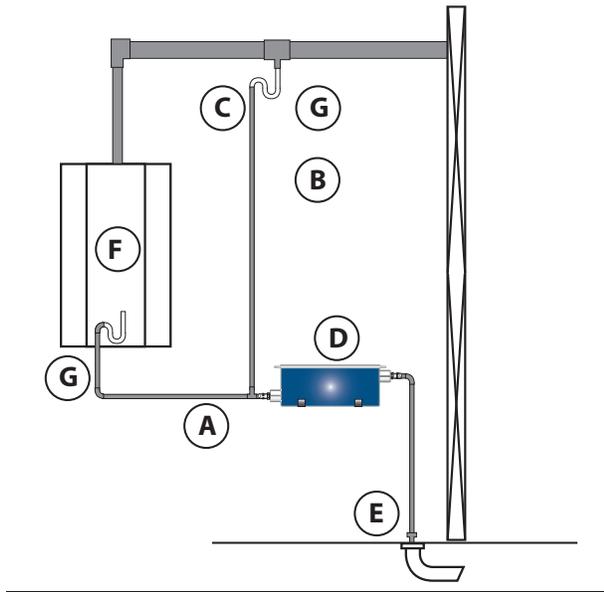


Piping Methods

⚠ WARNING

Do not install the NBT-23 or NBT-24-P in a vertical position. Only mount in a horizontal position on the floor or wall mounted horizontally using the mounting brackets provided.

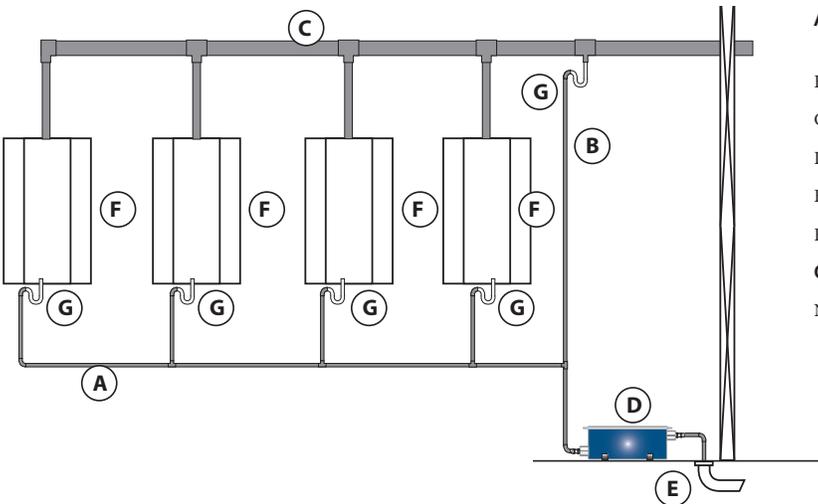
Figure 4 Piping for Single Heating Unit with Common NBT-23 pH Treatment Tank and Flue Drain Connection



- A Boilers / Hot Water Heaters / Furnace Condensate Drains
- B Flue Drain/Trapped
- C Single Flue Vent
- D NBT-23 pH Treatment Tank
- E House Drain
- F Boilers / Hot Water Heaters / Furnaces
- G Gas/Water Trap

Note: Contact Factory for pH Treatment Tank and Piping Size

Figure 5 Piping Multiple Heating Units/Single NBT-23 pH Treatment Kit / Common Vent Piping / Common Condensate Drain



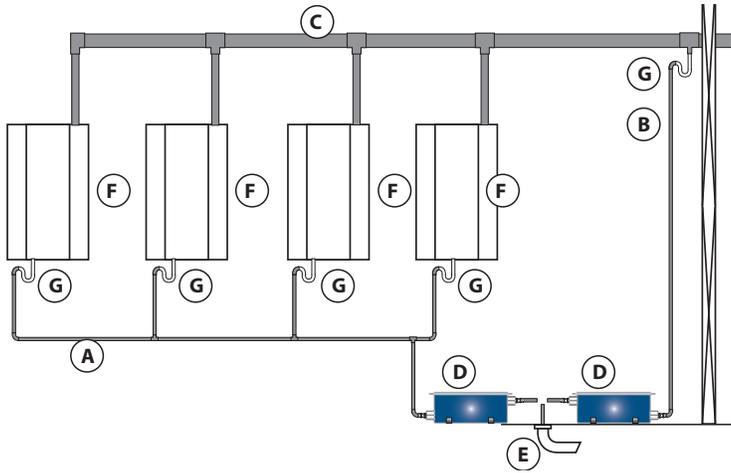
- A Boilers / Hot Water Heaters / Furnace Condensate Common Drain
- B Flue Drain
- C Common Flue Vent
- D NBT-23 pH Treatment Tank
- E House Drain
- F Boilers / Hot Water Heaters / Furnaces
- G Condensate Trap

Note: Contact Factory for pH Treatment Tank and Piping Size



Piping Methods

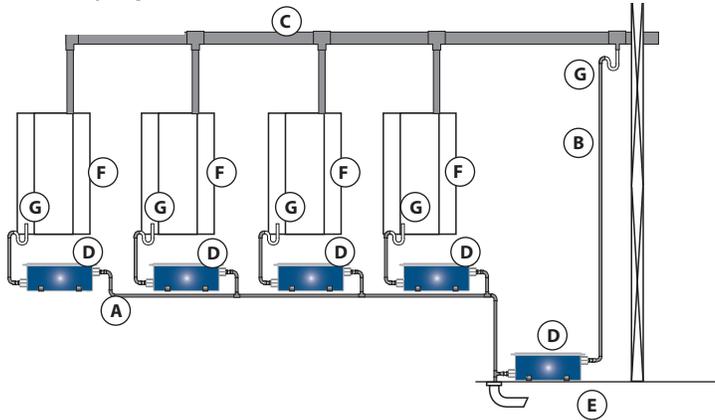
Figure 6 Piping for Multiple Heating Units with Common NBT-23 pH Treatment Tank. Common Flue Vent with Separate NBT-23 pH Treatment Tank.



- A Boilers / Hot Water Heaters / Furnace Common Drain
- B Flue Drain
- C Common Flue Vent
- D NBT-23 pH Treatment Tank
- E House Drain
- F Boilers / Hot Water Heaters / Furnaces
- G Condensate Trap

Note: Contact Factory for pH Treatment Tank Piping Size

Figure 7 Piping for Multiple Heating Units / Single pH Treatment Kit / Common Vent Piping / Common Condensate Drain



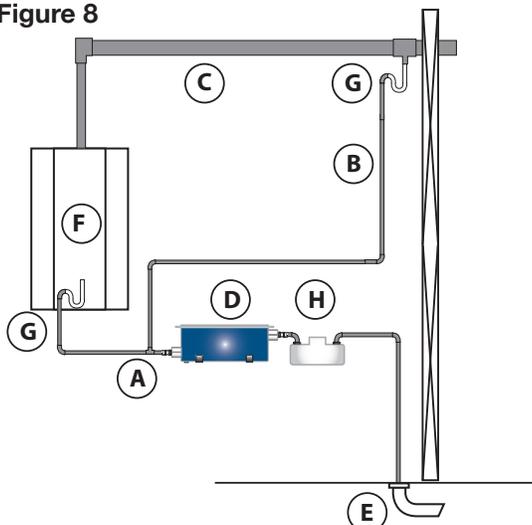
- A Boilers / Hot Water Heaters / Furnace Condensate Common Drains
- B Flue Drain
- C Common Flue Vent
- D NBT-23 pH Treatment Tank
- E House Drain
- F Boilers / Hot Water Heaters / Furnaces
- G Condensate Trap

Note: Contact Factory for pH Treatment Tank Piping Size

Wall Mounting Piping:

The NBT-23 can also be wall mounted by using the wall mounting brackets supplied with the unit. Always make sure that the method of wall mounting will support the weight of a fully operating NBT-23 unit. (8.5 U.S. pounds). Piping and pipe clamps should also be used.

Figure 8



- A Boilers / Hot Water Heaters / Furnace Condensate Drains
- B Flue Drain
- C Single Flue Vent
- D NBT-23 pH Treatment Tube Tank
- E House Drain
- F Boilers / Hot Water Heaters / Furnaces
- G Condensate Trap
- H Condensate Pump

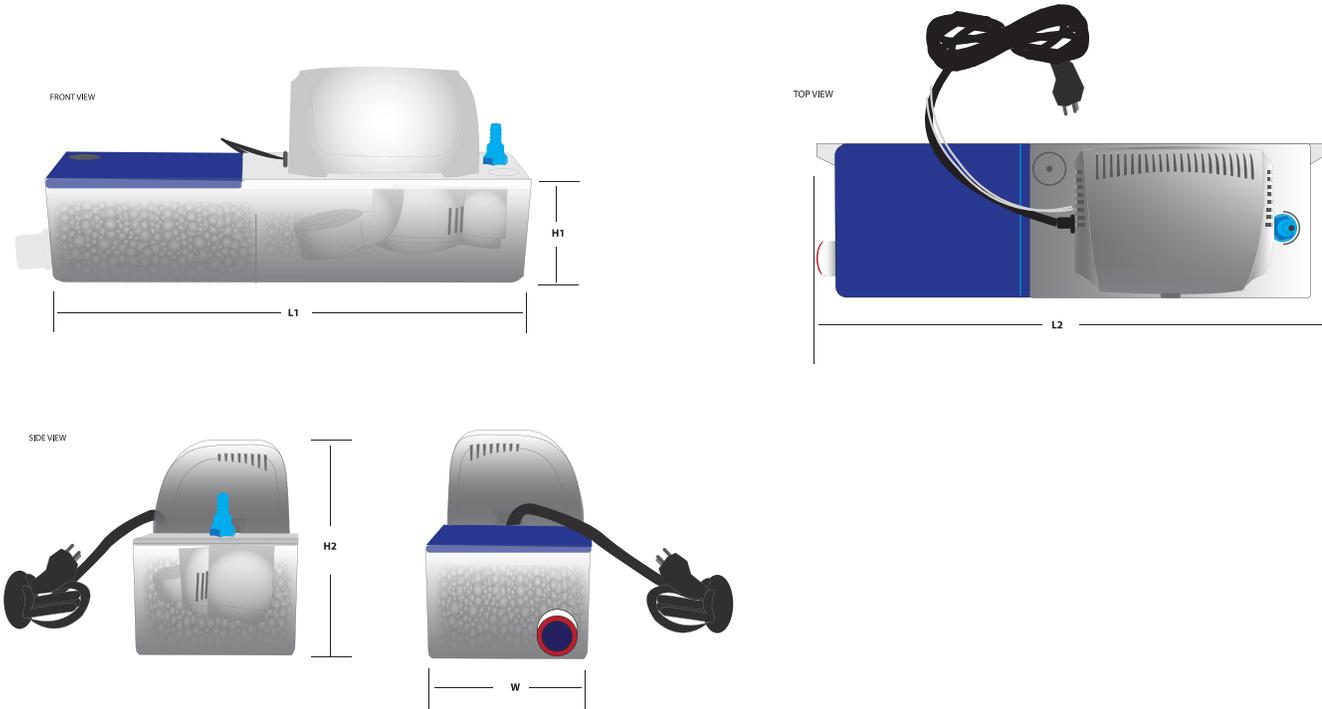
Note: Contact Factory for pH Treatment Tank and Piping Size

WARNING

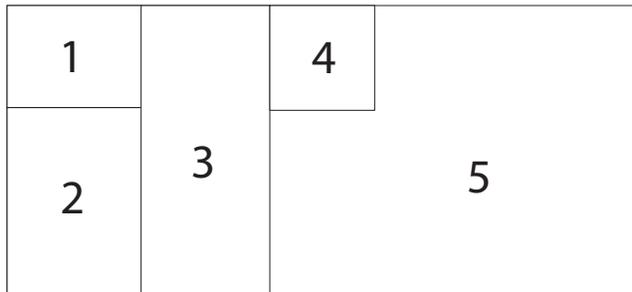
OUTDOOR INSTALLATIONS — provide and install electric heat tape and insulation of the pipes on the condensate drain lines and around the NBT-23 tank to prevent possibility of neutralizer tube damage or line blockage due to freezing. Failure to comply with the following guidelines could result in severe personal injury, death or substantial property damage.



Installation **Figure 1** NBT-24-P pH Treatment Tank – features and dimensions



Top view: Chambers



Ratings & Dimensions (in inches)							
Model	MBH	GPH	L1	L2	W	H1	H2
NBT-24-P	350	2.6	16.5	18	5	4	7.5

Pump Data

MODEL	VOLTS	AMPS	WATTS	HIGH WATER SWITCH
MD600 ETL Certified	120/1/60	0.89	87	24 Volt Max. Dry Contact

Pump Performance GPH at Feet Head

0'	6.5'	13.0'	20.0'
74.50 GPH	66.0 GPH	62.0 GPH	32.5 GPH

MICRODAM™

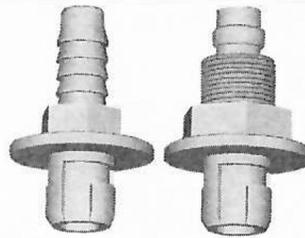
Condensate Removal Pump

INSTALLATION GUIDE

- (1) Carefully unpack the unit and check for damage. Make sure that all of the required parts are included. The units are thoroughly tested before packing to insure safe delivery and operation. If there is any sign of damage due to shipment, return it to the place of purchase for repair or replacement.
- (2) Select a mounting location near the appliance. The pump must be mounted horizontally. Run flexible tubing or pipe from evaporator drain into the inlet hole of pump. Be sure inlet piping is sloped downward to allow gravity flow.
- (3) Connect outlet piping (3/8" I.D.) with the check valve. From condensate unit, extend outlet piping straight up as high as necessary, but not higher than the maximum head of the pump. Be sure that the outlet piping is not twisted or clogged.

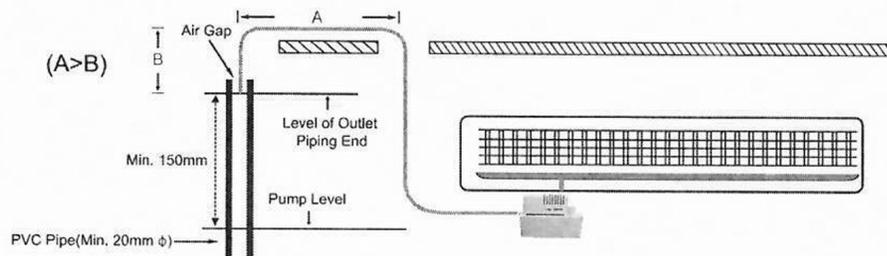
<Tip> How to Use the Check Valve

- ① For Un-installation
 - Turn an angle of 90° to the anti-clockwise direction
 - Take the check valve off from the hole
- ② For Installation
 - Put the check valve into the hole
 - Turn an angle of 90° to the clockwise direction



- (4) In order to avoid siphoning action & running the pump dry, always connect the outlet piping to a drain at a higher level than the pump itself.

<Tip> To Avoid the Siphoning Action



- (5) ⚠ Make sure that the power source voltage matches with the pump's requirement. Connect the pump's power cord to a constant source of power (not a fan or other device that runs intermittently). Do not connect or link the air conditioner's power cable directly to the pump's power cable. Use the power plugs respectively. If the pump's power cable should be extended, use a cable of same specification. All wiring should be done by qualified service technician.
- (6) When all the above tasks are done, please perform a trial operation. Pour water into the pump's reservoir and check if the pump works properly.

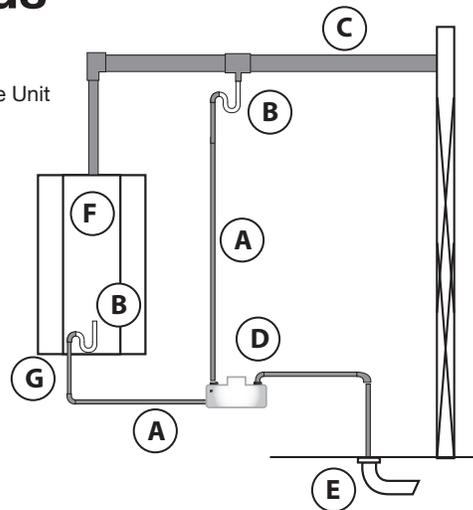
<Tip> About Safety Switch

- ⚠ The purpose of the safety switch is to prevent an overflow while the pump is not properly working due to various reasons.
- ⚠ The lead wires of safety switch originally coming from our factory are set to shut down the Heating/AC circuit. For this, the lead wires should be connected in series with the Low Voltage Thermostat Circuit.
- ⚠ All wiring should be done by qualified service technician. Please refer to local codes in your area.



Piping Methods

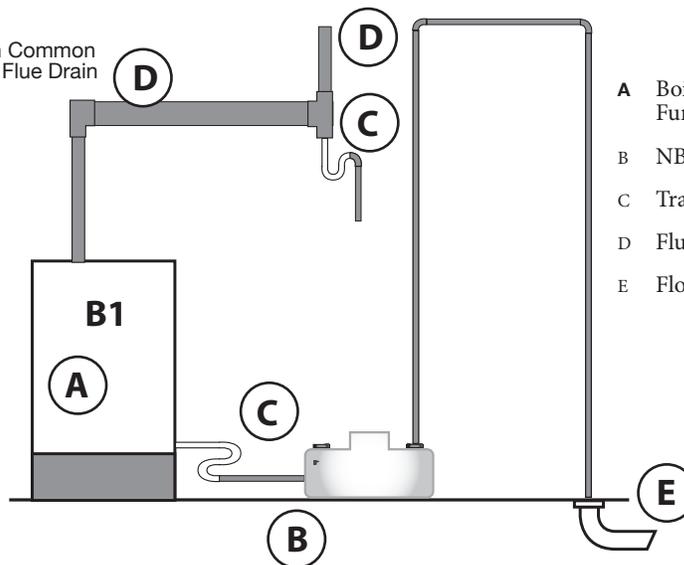
Figure 2
NBT-24-P pH Treatment Tank/Single Unit with common flue drain piping



- A Boilers / Hot Water Heaters / Furnace Condensate Drains
- B Flue Trap
- C Flue Vent
- D NBT-24-P
- E House Drain
- F Heater

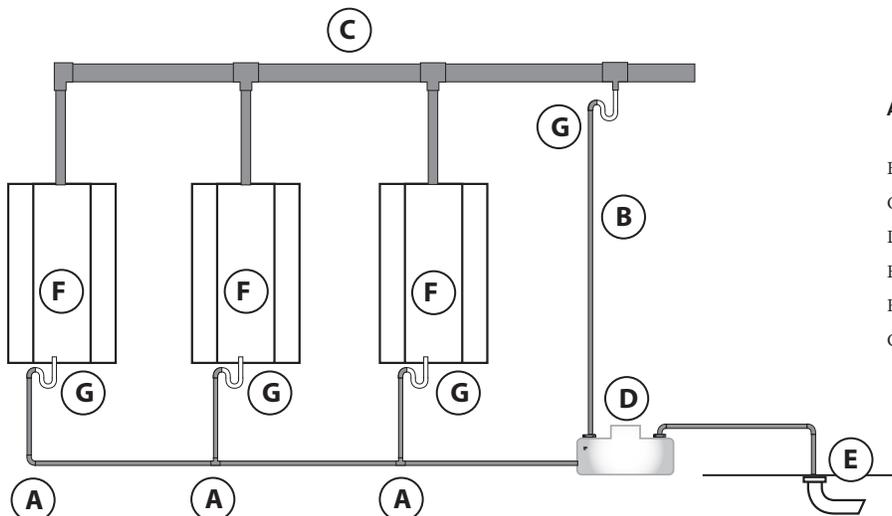
Figure 3
Piping for Single Heating Unit with Common NBT-24-P pH Treatment Tank and Flue Drain Connection

Vertical Discharge



- A Boilers / Hot Water Heaters / Furnace Condensate Drains
- B NBT-24-P Tank/Pump
- C Trap
- D Flue Pipe
- E Floor Drain

Figure 4 Piping Multiple Heating Units/Single NBT-24-P pH Treatment Kit / Common Vent Piping / Common Condensate Drain

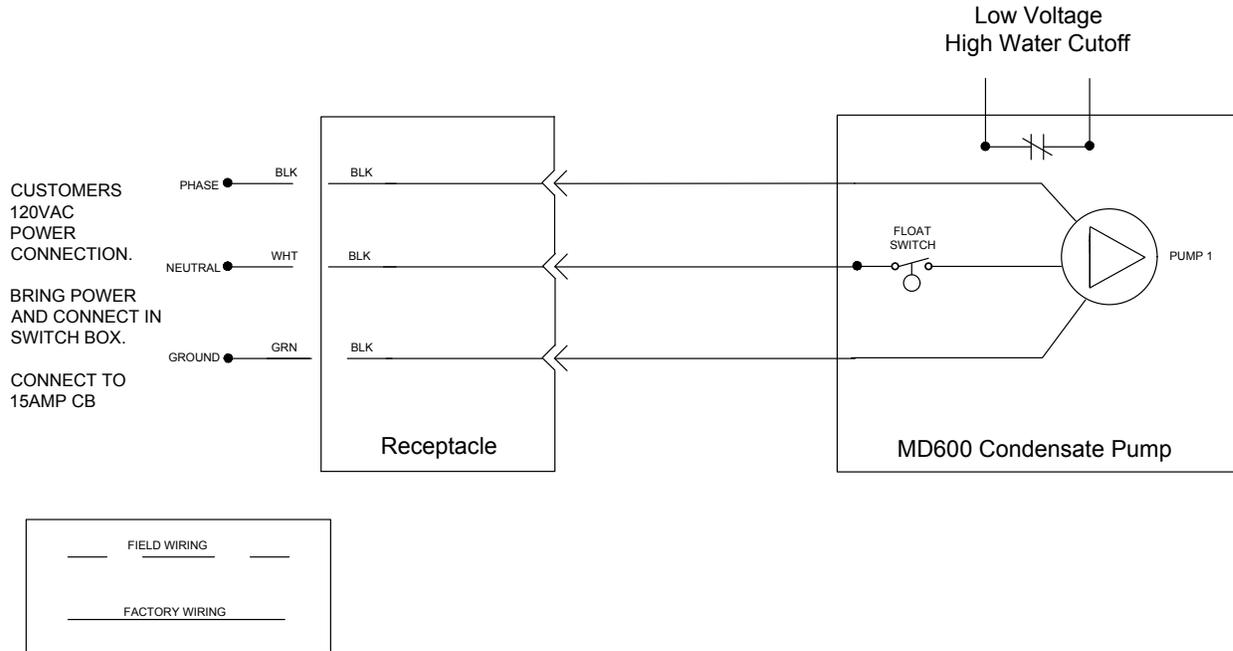


- A Boilers / Hot Water Heaters / Furnace Condensate Drains
- B Flue Drain
- C Common Flue Vent
- D NBT-24-P
- E House Drain
- F Heater Units
- G Traps



In all installations the heater condensate drains MUST be above the neutralizer outlet drain for gravity flow. The model NBT-24-P MUST have the heater condensate drain 2.5" or higher above the inlet ports of the NBT-24-P.

Figure 5 NBT-24-P Wiring Diagram



Maintenance

Inspect frequently

Installer — Instruct the building owner to frequently inspect the NBT-23 and NBT-24-P tank neutralizer and all condensate connections. The owner must notify a qualified technician if any problems are noticed.

Environmentally Friendly

The pH Power Pellets® (Magnesium Hydroxide) pellets are NON-Hazardous to the environment and can be disposed of as normal refuse. Do not allow children or animals to consume pH power pellets as they are not meant as a neutralizer for human or animal consumption.

Recharge as required

When pH tank outlet falls below 5PH. Local codes may have different requirement, check with local authority.

At least at a minimum once a year.

Cleaning

The baffle at the bottom of the NBT-23 tank should be lifted out every three years during re-charging for cleaning of the tank bottom. This should be done by a trained technician.

Contact your local wholesaler or manufacturer's representative for replacement parts.

Dealer listing at www.jjmboilerworks.com

Important

Remove porous pellet bag from plastic shipping bag before placing in the NBT-23 tank.

SDS sheet is included with the NBT-23 units or can be found on the JJM Boiler Works, Inc. website @ www.jjmboilerworks.com

If you have our model NBT-24-P

1. Pellets can be replaced by removing the blue cover and pump. Either vacuum the pellets out with a wet vacuum or hand empty into a pail.
2. Pellets can also be rinsed off with fresh tap water through a strainer and re-installed, if pH moves to a safe level (5.0 to 8.5) there is no need for new pellets. If the pH is below 5.0 after rinsing replace pellets.



Maintenance Procedures

Getting the most out of your JJM® Neutralizer

Acidic wastewater neutralizers like all filtering devices need both maintenance and replacing. The average pH level of acidic wastewater produced by today's condensing boilers, hot water heaters, furnaces, flue stack drains, and stack economizers is 3.2pH. When using a passive Inline Tube, Tank, or Canister the range of pH modification will fall in between 5.0 and 9.5 pH.

When the pH falls below 5.0 at the outlet port of any neutralizer the active ingredient must be replaced. **Media replacement schedule will depend on several factors including Operating Hours, Efficiency, System Design, and Neutralizer Piping Scheme.** The active ingredient in the case of JJM® products is Magnesium Hydroxide Pellets. The trade name is pH Power Pellets®.

Before changing the pellets when the pH level falls below 5.0 you can get the most out of your neutralizer by first agitating the pellets. In the case of an **inline tube products** try lightly tapping the outer sides of the tube with a rubber mallet several times and then check the pH level once again at the outlet port. You may find that your pH level has risen back into the 5.0 to 9.5pH range.

When your **neutralizer is a tank product with loose pellets** you can simply use a wooded dowel to stir the pellets and again use fresh tap water to flush out the tank.

If your **neutralizer pellets are incased in a porous pellet bag** there are three methods to agitating the pellets:

1. Remove the pellet bag or bags from the tank and using your hands move the pellets around inside the bags.
2. Using a five gallon bucket filled with fresh tap water, use step one with the bag under water.
3. Using a fresh water hose slowly pour fresh water over both sides of the pellet bag and also use method one.

If the pH level is has not risen back into the safe range of 5.0 to 9.5 pH the pellets must be replaced.

If you have our **Model V-250 or V-250 Combi vertical canisters** try the following method:

1. Twist off the outer canister to get access to the inner pellet cartridge and over a five gallon pail shake the Cartridge several times to agitate the pellets.
2. Again using a five gallon pail filled with fresh tap water let the cartridge soak for five minutes under water and then drain and hand shake the cartridge to agitate the pellets. Also clean out any sediment which may be held within the outer canister.

DURING ALL OF THE ABOVE PROCEDURES THE FOLLOWING SAFETY ITEMS MUST BE USED:

- 1. WEAR SAFETY GLASSES**
- 2. WEAR RUBBER OR LATEX PROTECTIVE GLOVES**
- 3. SHUT OFF ALL ELECTRICAL POWER TO THE HEATING UNIT OR UNITS BEFORE SERVICING YOUR NEUTRALIZERS.**

The pellets are **Non-Hazardous** and can be disposed of in your normal refuge.

MSDS sheets can be found online at www.jjmboilerworks.com.

Any questions can be directed to JJM Boiler Works, Inc. at

413-527-1893 or at www.jjmboilerworks.com

George Carney, President, JJM Boiler Works, Inc.