

INDUSTRIAL TUMBLE DRYERS

11kg
13kg
15kg

INSTALLATION MANUAL

70390001R5
Publication date: Jan 2009

Installation must conform with local codes or, in the absence of local codes, with:

In the U.S.A., installation must conform to the latest edition of the American National Standard Z223.1/ NFPA 54 “National Fuel Gas Code” and Standard ANSI/NFPA 70 “National Electric Code.”

In Canada, installation must comply with Standards CAN/CSA-B149.1 or Natural Gas and Propane Installation Code and CSA C22.1, latest edition, Canadian Electric Code, Part I.

In Australia, installation must comply with the Australian Gas Association Installation Code for Gas Burning Appliances and Equipment.



WARNING

FOR YOUR SAFETY, the information in this manual must be followed to minimize the risk of fire or explosion or to prevent property damage, personal injury or death.

W033

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- **WHAT TO DO IF YOU SMELL GAS:**
 - Do not try to light any appliance.
 - Do not touch any electrical switch; do not use any phone in your building.
 - Clear the room, building or area of all occupants.
 - Immediately call your gas supplier from a neighbor’s phone. Follow the gas supplier’s instructions.
 - If you cannot reach your gas supplier, call the fire department.
- Installation and service must be performed by a qualified installer, service agency or the gas supplier.

W052



MISE EN GARDE

POUR VOTRE SÉCURITÉ, les informations de ce guide doivent être respectées afin de réduire les risques d’incendie, d’explosion ou d’éviter les dommages matériels, personnels ou blessures mortelles.

W033R3QU

- Ne pas entreposer ou utiliser d’essence ou toutes autres vapeurs et liquides inflammables à proximité de cette machine ou de tout autre appareil.
- **QUE FAIRE EN CAS D’ODEUR DE GAZ :**
 - Ne pas mettre d’appareil en marche.
 - Ne pas toucher aux interrupteurs électriques ; ne pas utiliser le téléphone des lieux.
 - Évacuer la pièce, le bâtiment ou la zone de tous les occupants.
 - Appeler immédiatement le fournisseur de gaz de la maison d’un voisin. Respecter les instructions communiquées par le fournisseur.
 - Si vous ne pouvez pas joindre le fournisseur de gaz, appeler le service d’incendie.
- L’installation et l’entretien doivent être effectués par un installateur, service d’entretien qualifiés ou par le fournisseur de gaz.

W052R5QU

IMPORTANT: Information must be obtained from a local gas supplier on instructions to be followed if the user smells gas. These instructions must be posted in a prominent location. Step-by-step instructions of the above safety information must be posted in a prominent location near the tumbler for customer use.



WARNING

- Installation of unit must be performed by a qualified installer.
- Install tumbler according to manufacturer's instructions and local codes.
- **DO NOT** install a tumbler with flexible plastic venting materials. If flexible metal (foil type) duct is installed, it must be of a specific type identified by the appliance manufacturer as suitable for use with tumbler. Refer to section on connecting exhaust system. Flexible venting materials are known to collapse, be easily crushed, and trap lint. These conditions will obstruct tumbler airflow and increase the risk of fire.

W752

FOR YOUR SAFETY

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

W053



MISE EN GARDE

- L'unité doit être installée par un installateur qualifié.
- Installer la sècheuse conformément aux instructions du fabricant et aux codes locaux.
- **NE PAS** installer une sècheuse avec des matériaux d'aération souples en plastique. Si un conduit d'aération souple en métal (de type feuille mince) est utilisé, il doit être d'un type spécifiquement mentionné par le fabricant de l'appareil comme convenable pour utilisation avec sècheuses. Se reporter à la section sur la façon de connecter le système d'évacuation. Les matériaux d'aération souples risquent de s'affaisser, ils s'écrasent facilement, et les fibres et les peluches s'y accumulent. Ces conditions obstruent l'écoulement de l'air et augmentent les risques d'incendie.

W752QU

POUR VOTRE SÉCURITÉ

Ne pas entreposer ou utiliser d'essence ou toutes autres vapeurs et liquides inflammables à proximité de cette unité ou de tout autre appareil.

W053R2QU

The following information applies to the state of Massachusetts, USA.

- This appliance can only be installed by a Massachusetts licensed plumber or gas fitter.
- This appliance must be installed with a 36 inch (91 cm) long flexible gas connector.
- A "T-Handle" type gas shut-off valve must be installed in the gas supply line to this appliance.
- This appliance must not be installed in a bedroom or bathroom.

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Introduction

Model Identification

Information in this manual is applicable to these models.

	Gas		Steam	Electric	
25 Pound	GA025L	LA025L	GT025S	GT025E	
	GA025N	LA025N	GU025S	GU025E	
	GT025L	LT025L	KT025S	KT025E	
	GT025N	LT025N	KU025S	KU025E	
	GU025L	LU025L	LT025S	LT025E	
	GU025N	LU025N	LU025S	LU025E	
	KA025L	PA025L	PT025S	PT025E	
	KA025N	PA025N	PU025S	PU025E	
	KT025L	PT025L			
	KT025N	PT025N			
	KU025L	PU025L			
	KU025N	PU025N			
	30 Pound	GA030L	LT030L	GT030S	GT030E
		GA030N	LT030N	GU030S	GU030E
GT030L		LU030L	KT030S	KT030E	
GT030N		LU030N	LT030S	LT030E	
GU030L		PA030L	LU030S	LU030E	
GU030N		PA030N	PT030S	PT030E	
KT030L		PT030L	PU030S	PU030E	
KT030N		PT030N			
LA030L		PU030L			
LA030N		PU030N			
35 Pound		GA035L	LA035L	GT035S	GT035E
		GA035N	LA035N	GU035S	GU035E
	GT035L	LT035L	KT035S	KT035E	
	GT035N	LT035N	KU035S	KU035E	
	GU035L	LU035L	LT035S	LT035E	
	GU035N	LU035N	LU035S	LU035E	
	KA035L	PA035L	PT035S	PT035E	
	KA035N	PA035N	PU035S	PU035E	
	KT035L	PT035L			
	KT035N	PT035N			
	KU035L	PU035L			
	KU035N	PU035N			
	55 Pound	GT055L	KT055L	Not Applicable	GT055E
		GT055N	KT055N		KT055E

Includes models with the following control suffixes:

BC – basic electronic, coin

BL – basic electronic, central pay

BX – basic electronic, prep for coin

BY – basic electronic, prep for card

NC – micro, coin

NX – micro, prep for coin

NY – micro, prep for card

OM – OPL micro

QT – dual digital timer

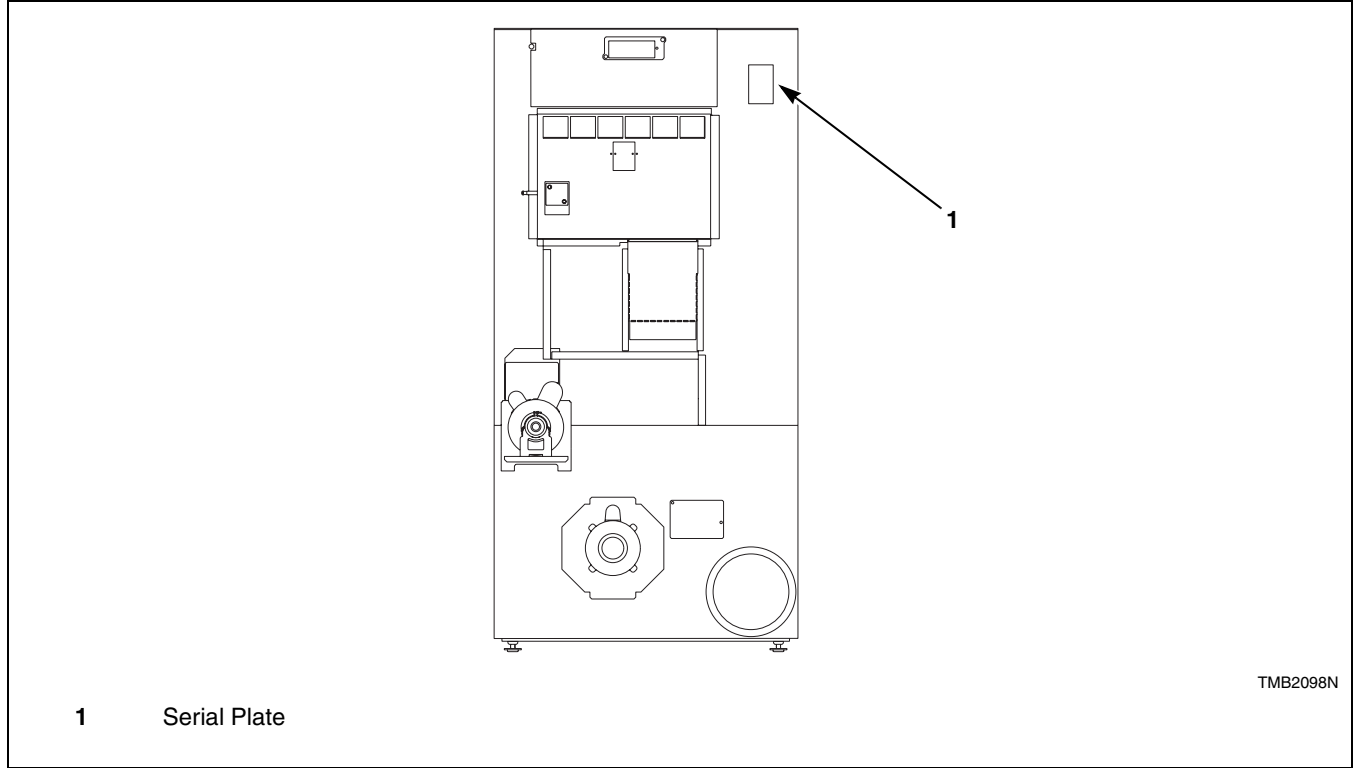
Introduction

Serial Plate Location

When calling or writing for information about your product, be sure to mention model and serial numbers. Model and serial numbers are found on serial plate on rear of machine, and inside the loading door hinge.

Wiring Diagram


The wiring diagram is located inside the junction or contactor box. The wiring diagram part number is in the lower portion of the electrical data on the serial plate.





Conversion Table						
Multiply	By	To Obtain		Multiply	By	To Obtain
Btu	0.252	kCal		Pounds/sq. inch	0.06895	Bars
Btu	1055	Joules		Pounds/sq. inch	0.070	kg/sq. cm
Inch	25.4	Millimeters		Pounds (lbs.)	0.454	Kilograms
Inches W.C.	0.036	Pounds/sq. inch		Boiler Horsepower	33,479	Btu/hr.
Inches W.C.	0.249	kPa		Boiler Horsepower	34.5	lbs. steam/hr.
lb/inch ² (psi)	6.895	kPa		CFM	0.471	liters/second
ft ³	28.32	Liters		kW	3414	Btu/hr.

Safety Information

Precautionary statements (“DANGER,” “WARNING,” and “CAUTION”) followed by specific instructions, are found in this manual and on machine decals. These precautions are intended for the personal safety of the operator, user, servicer, and those maintaining the machine.

	DANGER
Indicates an imminently hazardous situation that, if not avoided, will cause severe personal injury or death.	


	WARNING
Indicates a hazardous situation that, if not avoided, could cause severe personal injury or death.	

	CAUTION
Indicates a hazardous situation that, if not avoided, may cause minor or moderate personal injury or property damage.	

Additional precautionary statements (“IMPORTANT” and “NOTE”) are followed by specific instructions.

IMPORTANT: The word “IMPORTANT” is used to inform the reader of specific procedures where minor machine damage will occur if the procedure is not followed.

NOTE: The word “NOTE” is used to communicate installation, operation, maintenance or servicing information that is important but not hazard related.

	WARNING
Failure to install, maintain, and/or operate this machine according to manufacturer’s instructions may result in conditions which can produce serious injury, death and/or property damage.	
W051R1	

NOTE: The WARNING and IMPORTANT instructions appearing in this manual are not meant to cover all possible conditions and situations that may occur. It must be understood that common sense, caution and carefulness are factors which CANNOT be built into this tumbler. These factors MUST BE supplied by the person(s) installing, maintaining or operating the tumbler.

Always contact your dealer, distributor, service agent or the manufacturer on any problems or conditions you do not understand.

Save These Instructions

Important Safety Instructions




WARNING

Hazardous Voltage. Can cause shock, burn or cause death. Allow machine power to remain off for two minutes prior to working in and around AC inverter drive.

W359

1. Read all instructions before using the tumbler.
2. Refer to the *Grounding Instructions* for the proper grounding of the tumbler.
3. Do not dry articles that have been previously cleaned in, washed in, soaked in, or spotted with gasoline, dry cleaning solvents, or other flammable or explosive substances as they give off vapors that could ignite or explode.
4. Do not allow children on or in the tumbler. This appliance is not intended for use by young children or infirm persons without supervision. Young children should be supervised to ensure that they do not play with the appliance.
5. Before the tumbler is removed from service or discarded, remove the door to the drying compartment and the door to the lint compartment.
6. Do not reach into the tumbler if the cylinder is revolving.
7. Do not install or store the tumbler where it will be exposed to water and/or weather.
8. Do not tamper with the controls.
9. Do not repair or replace any part of the tumbler, or attempt any servicing unless specifically recommended in the user-maintenance instructions or in published user-repair instructions that you understand and have the skills to carry out.
10. Do not use fabric softeners or products to eliminate static unless recommended by the manufacturer of the fabric softener or product.
11. To reduce the risk of fire, **DO NOT DRY** plastics or articles containing foam rubber or similarly textured rubberlike materials.
12. Always clean the lint filter daily.
13. Keep area around the exhaust opening and adjacent surrounding area free from the accumulation of lint, dust, and dirt.
14. The interior of the tumbler and the exhaust duct should be cleaned periodically by qualified service personnel.
15. If not installed, operated and maintained in accordance with the manufacturer's instructions or if there is damage to or mishandling of this product's components, use of this product could expose you to substances in the fuel or from fuel combustion which can cause death or serious illness and which are known to the State of California to cause cancer, birth defects or other reproductive harm.
16. Tumbler will not operate with the loading door open. **DO NOT** bypass the door safety switch to permit the tumbler to operate with the door open. The tumbler will stop tumbling when the door is opened. Do not use the tumbler if it does not stop rotating when the door is opened or starts rotating without pressing or turning the **START** mechanism. Remove the tumbler from use and call the service person.
17. Tumbler will not operate with lint panel open. **DO NOT** bypass lint panel safety switch to permit the tumbler to operate with the lint panel open.
18. Do not put articles soiled with vegetable or cooking oil in the tumbler, as these oils may not be removed during washing. Due to the remaining oil, the fabric may catch on fire by itself.
19. To reduce the risk of fire, **DO NOT** put clothes which have traces of any flammable substances such as machine oil, flammable chemicals, thinner, etc. or anything containing wax or chemicals such as in mops and cleaning cloths, or anything dry-cleaned at home with dry-cleaning solvent in the tumbler.
20. Use the tumbler only for its intended purpose, drying water-washed fabrics.
21. **ALWAYS** disconnect the electrical power to the tumbler before servicing. Disconnect power by shutting off appropriate breaker or fuse.

22. Install this tumbler according to these ***Installation Instructions***. All connections for electrical power, grounding, and gas supply must comply with local codes and be made by licensed personnel when required.
23. Remove laundry immediately after tumbler stops.
24. Always read and follow manufacturer's instructions on packages of laundry and cleaning aids. Heed all warnings or precautions. To reduce the risk of poisoning or chemical burns, keep them out of reach of children at all times (preferably in a locked cabinet).
25. Do not tumble fiberglass curtains and draperies unless the label says it can be done. If they are dried, wipe out the cylinder with a damp cloth to remove particles of fiberglass.
26. Always follow the fabric care instructions supplied by the garment manufacturer.
27. Never operate the tumbler with any guards and/or panels removed.
28. **DO NOT** operate the tumbler if it is smoking, grinding, or has missing or broken parts.
29. **DO NOT** bypass any safety devices.
30. Solvent vapors from dry-cleaning machines create acids when drawn through the heater of the drying unit. These acids are corrosive to the tumbler as well as to the laundry load being dried. Be sure make-up air is free of solvent vapors.
31. Failure to install, maintain, and/or operate this machine according to the manufacturer's instructions may result in conditions which can produce bodily injury and/or property damage.

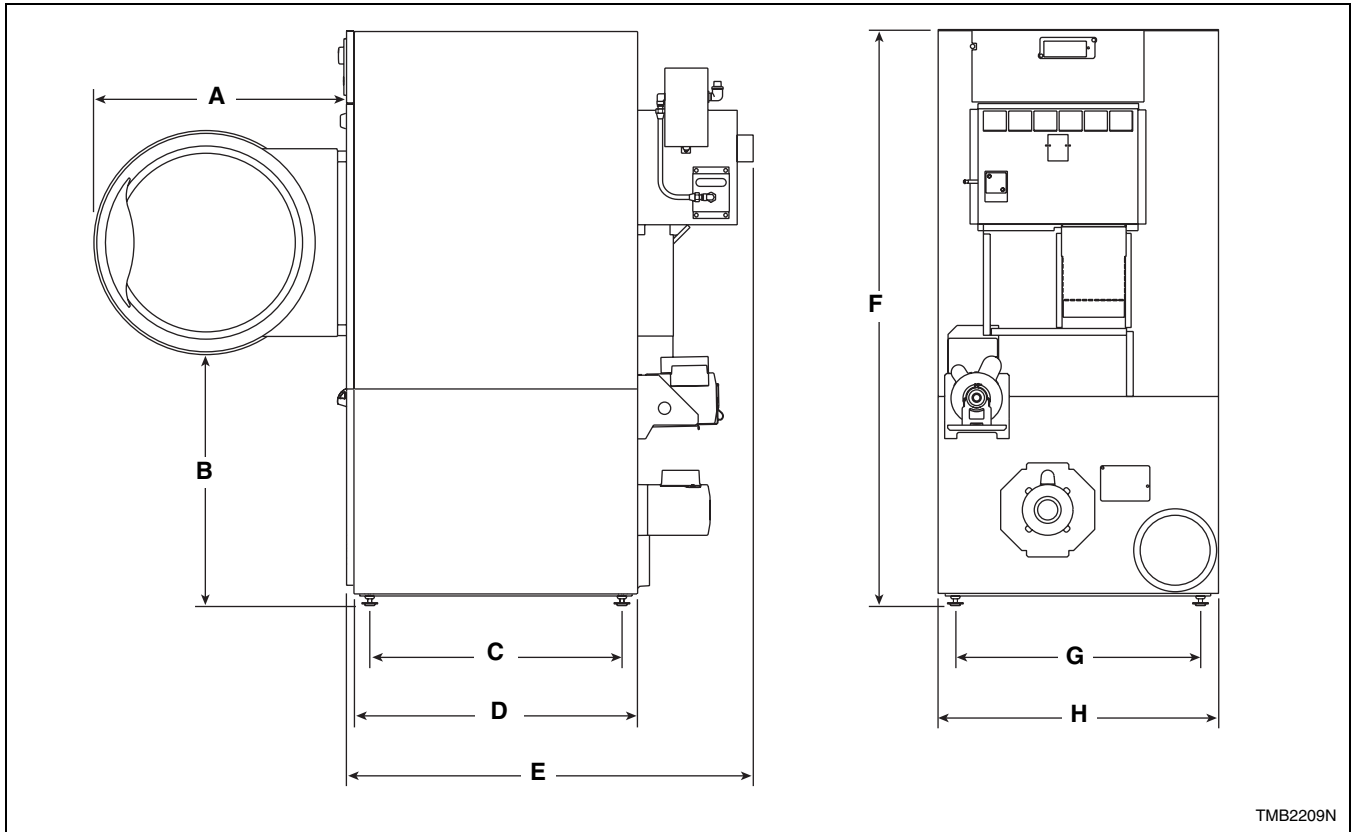
	WARNING
To reduce the risk of serious injury, install lockable door(s) to prevent public access to rear of tumblers.	
<small>W055</small>	

Specifications and Dimensions

Specifications		25 Pound	30 Pound	35 Pound	55 Pound
Noise level measured during operation at operator position of 3.3 feet (1 meter) in front of machine and 5.2 feet (1.6 meters) from floor		60 dBA	61 dBA	63 dBA	63 dBA
Net Weight (approximate): Pounds (kg)		300 (137)	330 (150)	360 (163)	435 (197)
Cylinder Size: Inches (mm)		26.5 x 24 (673 x 610)	26.5 x 30 (673 x 762)	30 x 30 (762 x 762)	33 x 35 (838 x 889)
Cylinder Capacity (dry weight): Pounds (kg)		25 (11.3)	30 (13.6)	35 (15.9)	55 (24.9)
Drive Motor Horsepower		1/4	1/4	1/4	1/2
Fan Motor Horsepower		1/4	1/4	1/4	1/2
Maximum Airflow per Pocket: C.F.M. (l/sec)	50 Hertz	430 (203)	430 (203)	550 (260)	600 (283)
	60 Hertz	500 (236)	500 (236)	650 (307)	700 (330)
Maximum Static Back Pressure: Inches W.C. (mbar)	50 Hertz	0.6 (1.5)	0.6 (1.5)	0.5 (1.3)	0.5 (1.3)
	60 Hertz	0.8 (2.0)	0.8 (2.0)	0.6 (1.5)	0.6 (1.5)
Gas Models					
Gas Connection		1/2 in. NPT	1/2 in. NPT	1/2 in. NPT	1/2 in. NPT
Gas Burner Rating: Btu/hr (kW, Mj/hr)		64,000 (18.7, 67.5)	73,000 (21.4, 77)	90,000 (26.4, 95)	112,000 (32.8, 118.2)
Electric Models					
Heating Element Rating		12 kW	21 kW	24 kW	27 kW
Steam Models					
Steam Connection		3/4 in. NPT	3/4 in. NPT	3/4 in. NPT	N/A
Steam Coil Rating at 100 psig: Boiler Horsepower (Btu/hr)		3.9 (134,700)	3.9 (134,700)	4.8 (166,000)	N/A
Steam Coil Rating at 15 psig: Boiler Horsepower (Btu/hr)		2.6 (89,940)	2.6 (89,940)	3.7 (129,000)	N/A

N/A = Not Applicable

Cabinet Dimensions

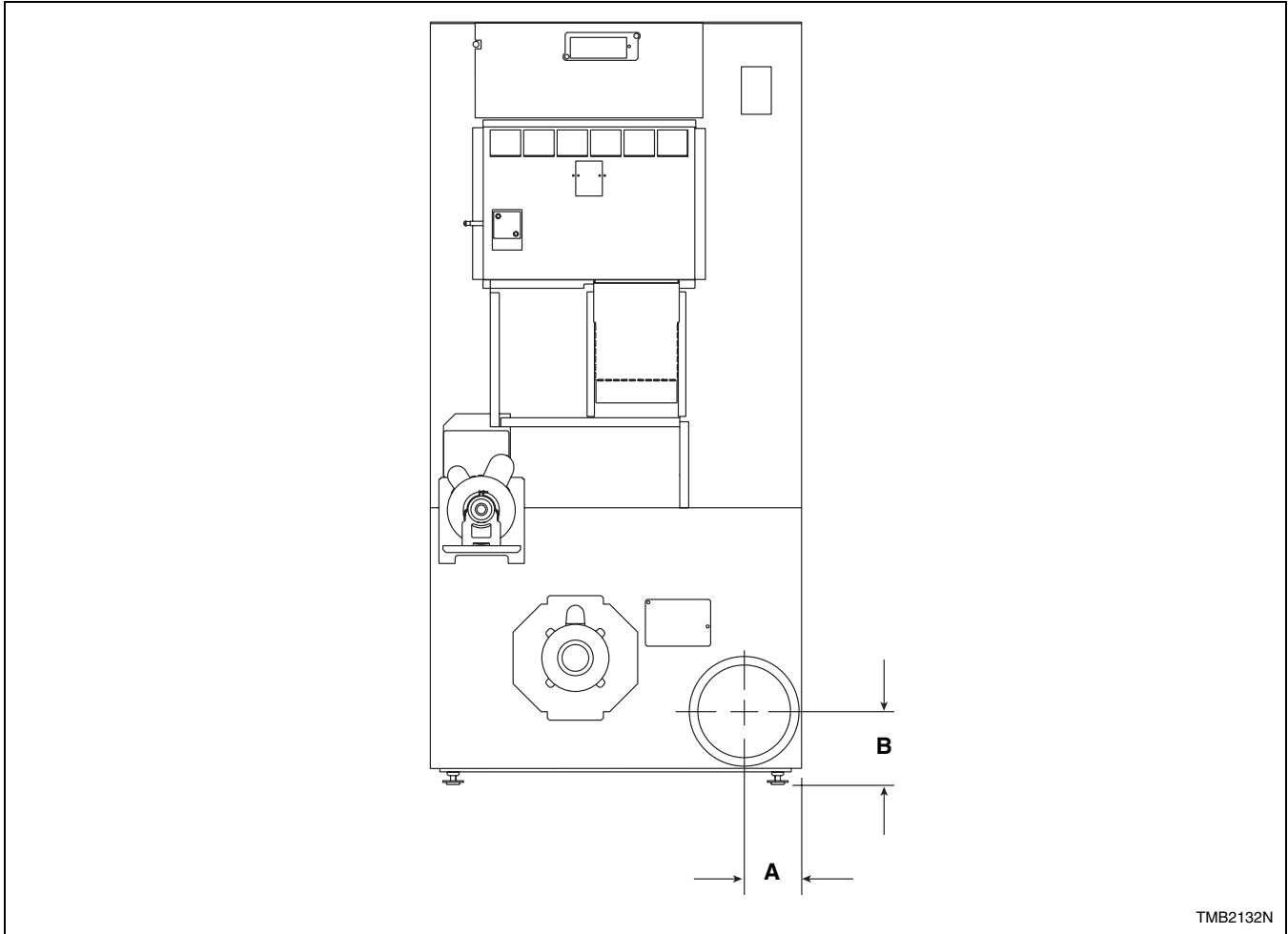


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Models	A	B	C	D	E	F	G	H
25 Pound	26.25 in. (667 mm)	27.5 in. (699 mm)	23.35 in. (593 mm)	25.75 in. (654 mm)	40.875 in. (1038 mm)	63.875 in. (1622 mm)	24.64 in. (626 mm)	28 in. (711 mm)
30 Pound	26.25 in. (667 mm)	27.5 in. (699 mm)	28.35 in. (720 mm)	31.75 in. (806 mm)	46.875 in. (1191 mm)	63.875 in. (1622 mm)	24.64 in. (626 mm)	28 in. (711 mm)
35 Pound	28 in. (711 mm)	27.5 in. (699 mm)	28.35 in. (720 mm)	31.75 in. (806 mm)	46.875 in. (1191 mm)	63.875 in. (1622 mm)	27.38 (695 mm)	31.5 in. (800 mm)
55 Pound	31.88 in. (810 mm)	26.87 in. (682.5 mm)	33.75 in. (857.25 mm)	38.25 in. (971.5 mm)	53.62 in. (1365 mm)	66.72 in. (1694.7 mm)	30.5 in. (774.7 mm)	34.5 in. (876 mm)

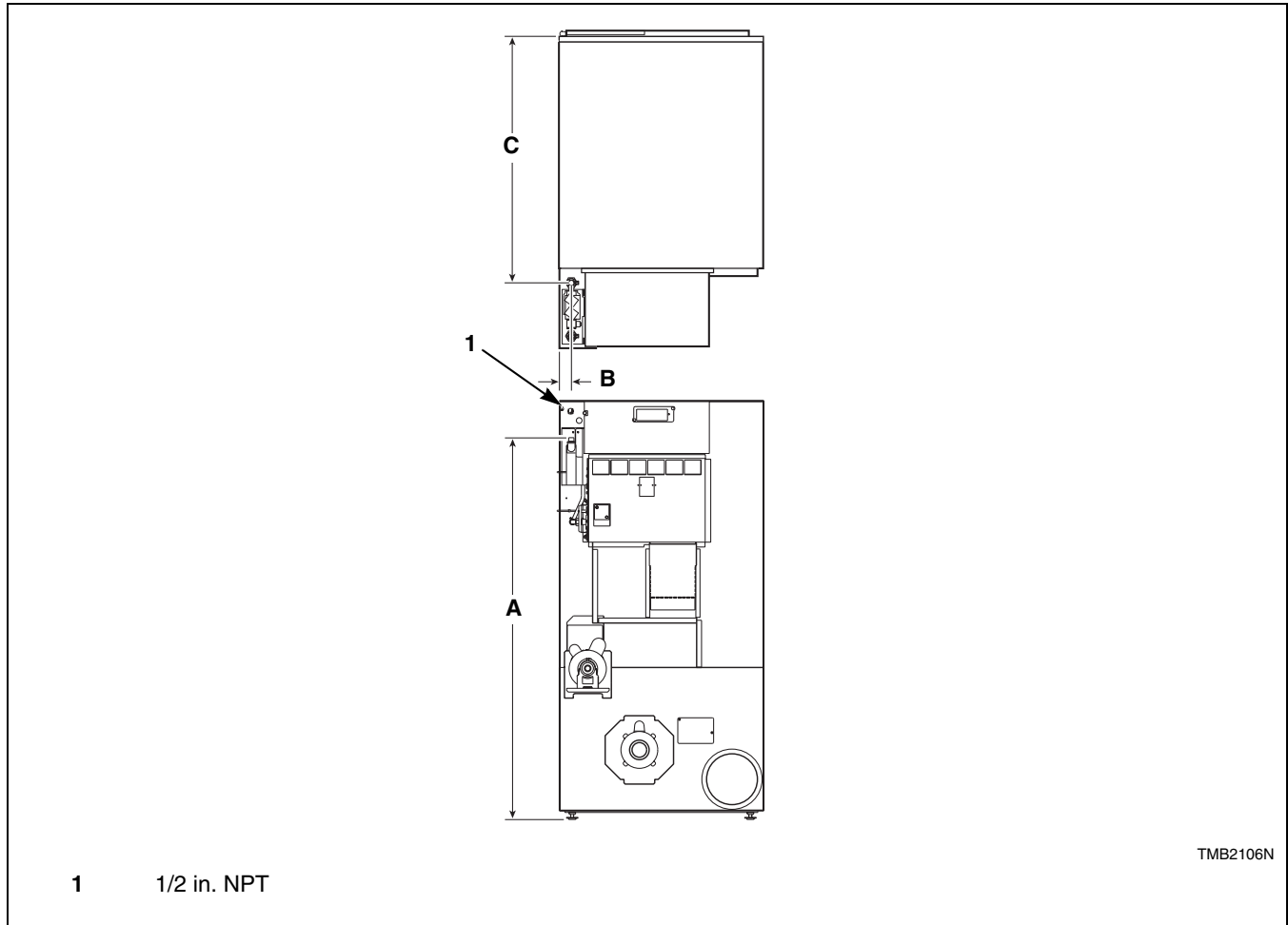
NOTE: Facia panels available to increase height of models to 72.25 inches (1835 mm) and 76.25 inches (1938 mm).

Exhaust Outlet Locations



Models	Rear Exhaust		
	Diameter	A	B
25/30 Pound	6 in. (152 mm)	3.875 in. (99 mm)	4.625 in. (117 mm)
35 Pound	8 in. (203 mm)	4.875 in. (124 mm)	5.625 in. (143 mm)
55 Pound	8 in. (203 mm)	4.808 in. (122 mm)	6.156 in. (156.3 mm)

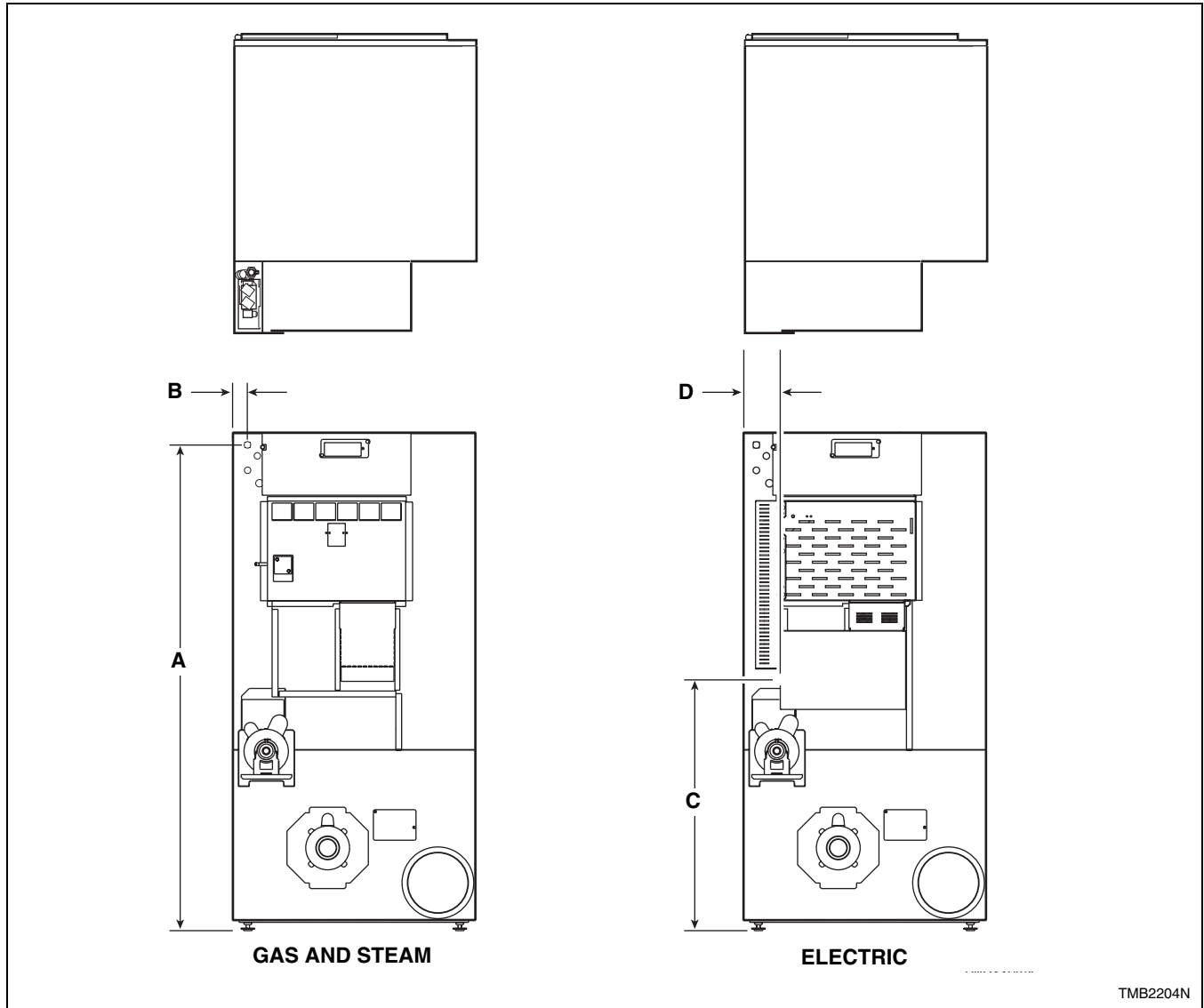
Gas Connection Locations



Models	Gas Connection – CE and Australian Units		
	A	B	C
25 Pound	59 in. (1500 mm)	1.5 in. (38.1 mm)	29 in. (737 mm)
30 Pound	59 in. (1500 mm)	1.5 in. (38.1 mm)	35 in. (889 mm)
35 Pound	59 in. (1500 mm)	2.5 in. (64 mm)	35 in. (889 mm)

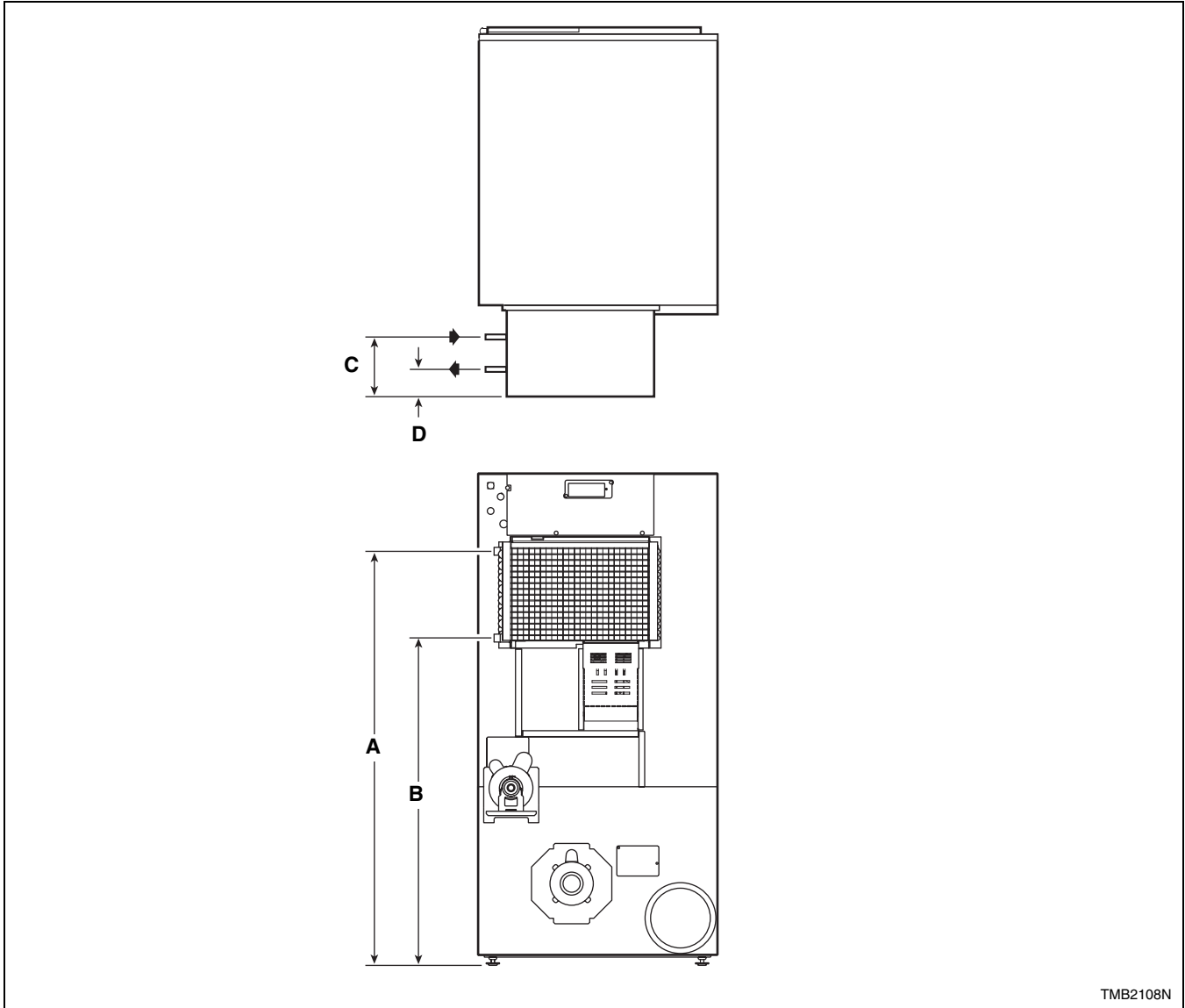
Models	Gas Connection – Non-CE and Non-Australian Units		
	A	B	C
25 Pound	57 in. (1450 mm)	2.5 in. (64 mm)	35.5 in. (927 mm)
30 Pound	57 in. (1450 mm)	2.5 in. (64 mm)	43 in. (1092 mm)
35 Pound	57 in. (1450 mm)	4 in. (101.6 mm)	43 in. (1092 mm)
55 Pound	55.285 in. (1404 mm)	1.621 in. (41.17 mm)	46.75 in. (1187.45 mm)

Electrical Connection Locations



Models	Electrical Service			
	Gas and Steam Models		Electric Models	
	A	B	C	D
25/30 Pound	62.25 in. (1581 mm)	2 in. (51 mm)	28 in. (711 mm)	3.25 in. (83 mm)
35 Pound	62.25 in. (1581 mm)	3 in. (76 mm)	28 in. (711 mm)	4.25 in. (108 mm)
55 Pound	65.187 in. (1655.75 mm)	1.765 in. (44.83 mm)	32.526 in. (826.16 mm)	6.547 in. (166.3 mm)

Steam Connection Locations



Models	Inlet		Outlet	
	A	C	B	D
25/30/35 Pound	53.75 in. (1365 mm)	6.29 in. (160 mm)	42.5 in. (1080 mm)	2.39 in. (61 mm)

NOTE: All connections use 3/4 inch NPT pipe.

Installation

Pre-Installation Inspection

Upon delivery, visually inspect the crate, carton and parts for any visible shipping damage. If the crate, carton, or cover is damaged or signs of possible damage are evident, have the carrier note the condition on the shipping papers before the shipping receipt is signed, or advise the carrier of the condition as soon as it is discovered.

Remove the crate and protective cover as soon as possible and check the items listed on the packing list. Advise the carrier of any damaged or missing articles as soon as possible. A written claim should be filed with the carrier immediately if articles are damaged or missing.

IMPORTANT: Warranty is void unless tumbler is installed according to instructions in this manual. Installation should comply with minimum specifications and requirements detailed herein, and with applicable local gas fitting regulations, municipal building codes, water supply regulations, electrical wiring regulations, and any other relevant statutory regulations. Due to varied requirements, applicable local codes should be thoroughly understood and all pre-installation work arranged for accordingly.

Material Required (Obtain Locally)	
All Models	One disconnect switch or circuit breaker.
Gas Models	One gas shut-off valve for gas service line to each tumbler.
Steam Models	<p>One steam shut-off valve for steam service line to be connected upstream of solenoid steam valve.</p> <p>Steam shut-off valve for each condensate return line.</p> <p>Flexible steam hoses with a 125 psig (pounds per square inch gauge) (8.78 kg/sq. cm) working pressure for connecting steam coils. Refer to <i>Figure 20</i> for sizing and connection configurations.</p> <p>Steam trap for steam coil outlet to condensate return line.</p> <p>Optional – Vacuum breaker for condensate return line.</p>


Location Requirements

The tumbler must be installed on a level floor capable of supporting weight of tumbler fully loaded. Floor covering materials such as carpeting or tile should be removed.

To assure compliance, consult local building code requirements. The tumbler must not be installed or stored in an area where it will be exposed to water and/or weather.

IMPORTANT: DO NOT block the airflow at the rear of the tumbler with laundry or other articles. Doing so would prevent adequate air supply to the combustion chamber of the tumbler.

A typical tumbler enclosure is shown in *Figure 1*. Note the minimum and maximum dimensions. Local codes and ordinances must be complied with.

	WARNING
<p>To reduce the risk of serious injury, install lockable door(s) to prevent public access to rear of tumblers.</p>	
W055	

IMPORTANT: Install tumblers with sufficient clearance for servicing and operation. Refer to *Figure 1*.

IMPORTANT: Keep tumbler area clear and free from combustible materials, gasoline and other flammable vapors and liquids.

Tumbler Enclosure

WARNING

To reduce the risk of severe injury, clearance of tumbler cabinet from combustible construction must conform to the minimum clearances.

W056

TMB2021N

NOTE: Shaded areas indicate adjacent structure.

- 1 0.5 in. (13 mm) recommended between machines for removal or installations.
- 2 Allow 2-4 in. (51-102 mm) opening at top of machine to aid in removal or installation. A removable trim piece may be used to conceal the opening; zero clearance allowed for trim.
- 3 4 in. (102 mm) Maximum Header Thickness
- 4 12 in. (305 mm) Minimum Clearance
- 5 24 in. (610 mm) minimum, 36 in. (914 mm) recommended for maintenance purposes.
- 6 Provision for make-up air: Minimum 1 square foot required per tumbler. Location for reference only. May be anywhere behind tumbler.
- 7 0.25 in. (6 mm) recommended for removal or installation purposes, zero clearance allowed.

Figure 1

Installation

Position and Level the Tumbler

Remove lint panel door, and unscrew the four shipping bolts (one at each corner). Remove tumbler from skid.

NOTE: Do not throw bolts away – they are the leveling legs.

Remove four nuts from the literature packet, and screw one fully onto each leveling leg.

Screw the four leveling legs (bolts) back into the level adjusting fittings from the bottom.

Slide tumbler to its permanent location. Adjust the leveling legs until the unit is level within 0.125 inch (32 mm). Refer to *Figure 2*. Tumbler must not rock. Lock leveling legs with nuts installed.

NOTE: The front of the tumbler should be slightly higher than the rear (approximately 0.125 inch, 3.18 mm). This will prevent the clothes, while tumbling, from wearing on the door glass gasket.

IMPORTANT: Keep tumbler as close to floor as possible. The unit must rest firmly on floor so weight of tumbler is evenly distributed.

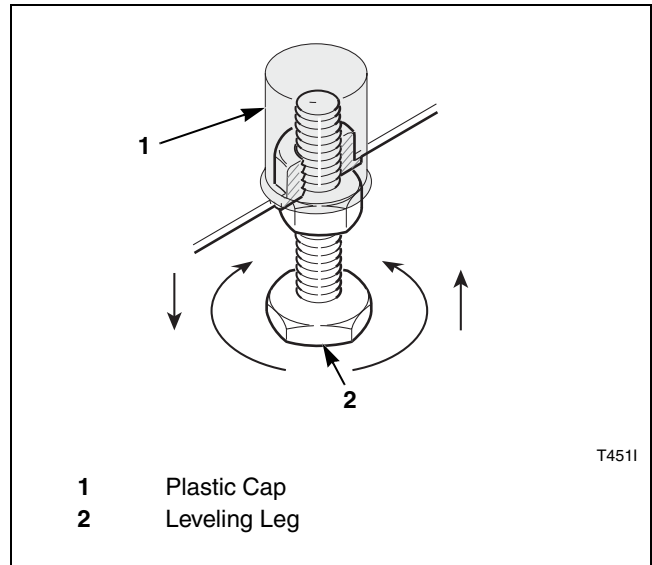


Figure 2

To Reverse the Loading Door

The tumbler is delivered with a right hinged door, but the door can be changed to a left hinged position.

	WARNING
<p>To reduce the risk of electric shock, fire, explosion, serious injury or death:</p> <ul style="list-style-type: none"> • Disconnect electric power to the tumbler before servicing. • Close gas shut-off valve to gas tumbler before servicing. • Close steam valve to steam tumbler before servicing. • Never start the tumbler with any guards/panels removed. • Whenever ground wires are removed during servicing, these ground wires must be reconnected to ensure that the tumbler is properly grounded. 	
<small>W002</small>	

1. Disconnect power supply to tumbler.
2. Unlock and remove control panel. Remove two control assembly screws from right side. Swing open control. Refer to *Figure 3*.
3. Remove lint panel.

IMPORTANT: Support door and hinge assembly securely to prevent it from dropping once side screws are removed from door hinge lug.

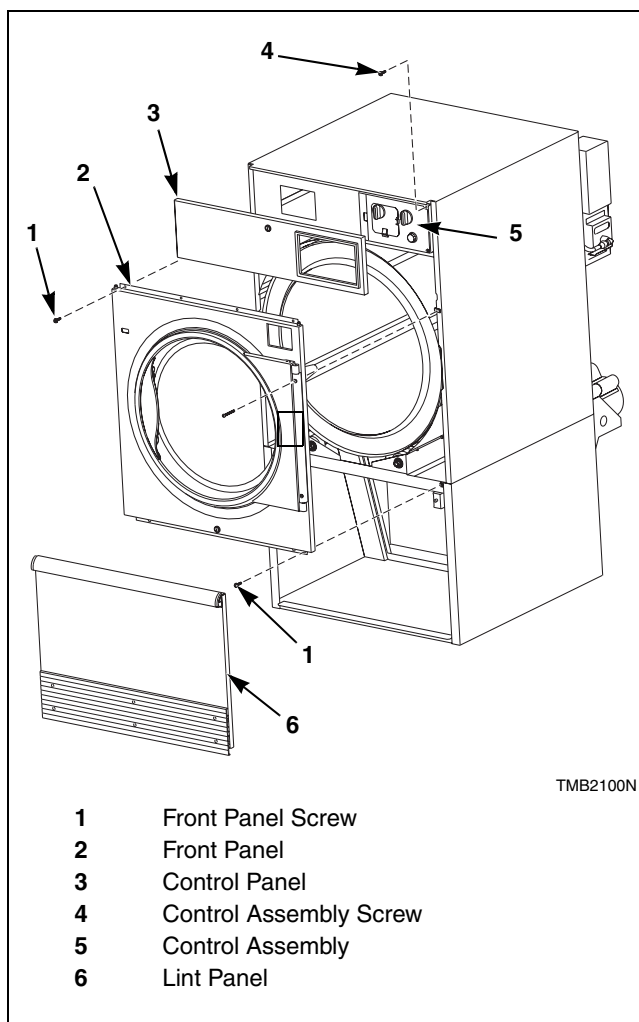


Figure 3

Installation

4. Remove four front panel screws. Refer to *Figure 3*. Keep door hinge cams in place on door hinge lug. Pull lug and door assembly off as one piece. Refer to *Figure 4*.
5. Remove remaining front panel screws, four on the top and four on the bottom. Refer to *Figure 3*. Disconnect door switch harness from switch. Take off front panel. Refer to *Figure 4*.
6. Exchange switch and plug locations. Depress tabs with an adjustable pliers to remove plug and switch from front panel. Reinstall switch, orienting button toward center of machine. Reinstall plug in switch's previous location. Refer to *Figure 4*.
7. Cut wire ties to remove door switch harness bundle. Be careful not to damage harness wires. Refer to *Figure 5*.
8. Reroute door switch harness up through the hole in the right side of the top panel. Use the panel cutout opening to then put harness down through the hole in the left side of the top panel and into the upper left corner of the cylinder enclosure.

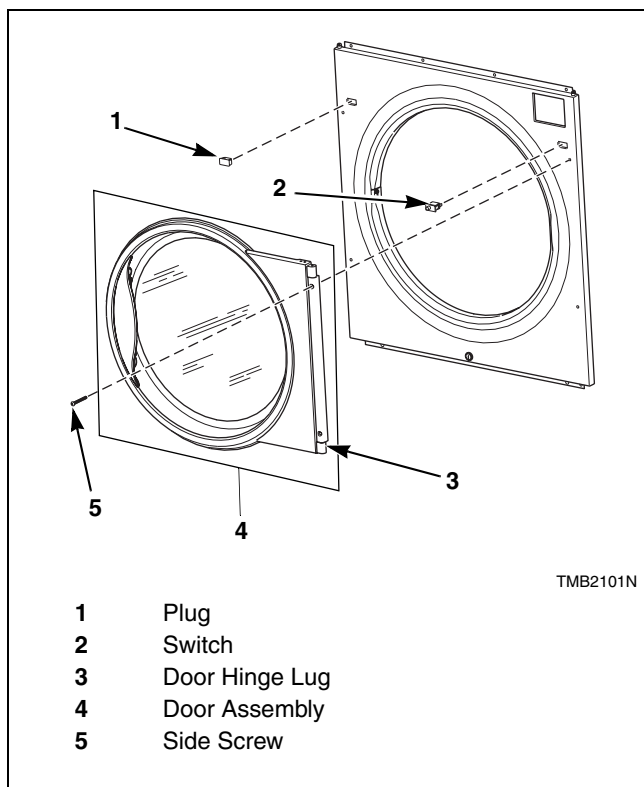


Figure 4

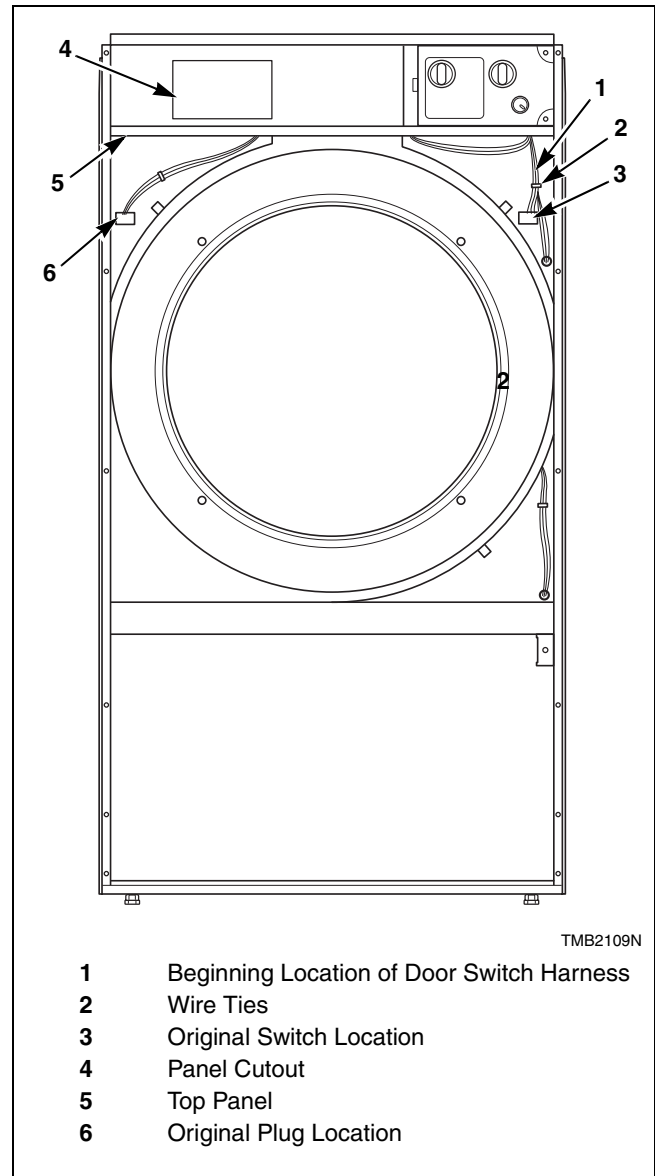


Figure 5

9. Place front panel on machine, loosely attach four bottom screws. Connect door switch harness to switch in new location.
10. Remove opposite door hinge cam. **DO NOT DISCARD CAM AND NUT.** Reattach door hinge cam to door hinge assembly securing with screw. Install door assembly and four door hinge side screws loosely. Refer to *Figure 6*.
11. Check lint panel fit, adjusting front panel up or down as required. Tighten four front panel side screws to maintain position of front panel for proper lint panel clearance.
12. Remove lint panel. Fully tighten bottom screws on front panel.
13. Reinstall top screws.
14. Adjust door catch if necessary to allow 7 – 15 pounds pull (0.48 – 1.03 bar) at center of handle.
15. Reinstall control assembly using mounting screws.
16. Reinstall control panel and lint panel.

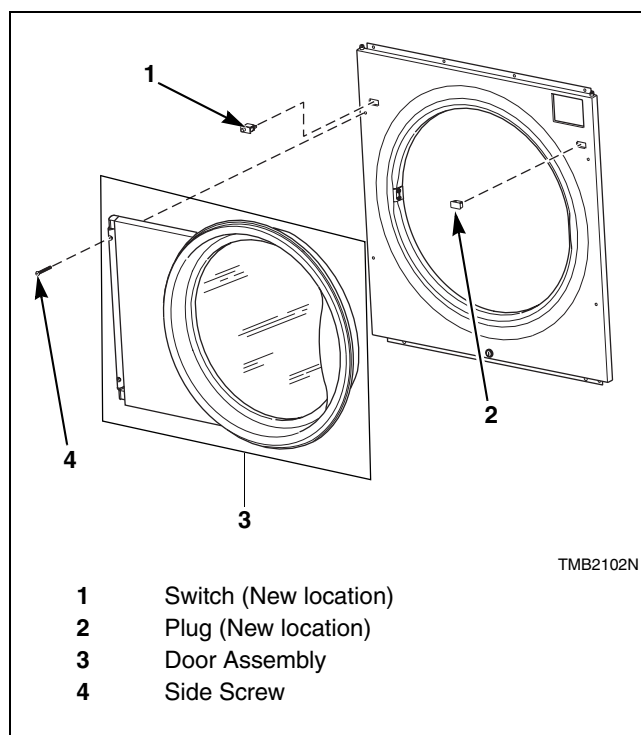


Figure 6

IMPORTANT: Restore power to tumbler and test for proper operation of loading door switch. Tumbler should not start with door open; an operating tumbler should stop when door is opened.

NOTE: If machine is converted back to right hand hinge operation, the door switch harness must be rerouted and rebundled with the lint panel switch harness. Wire ties must be used to secure harnesses.

Installation

Before Placing Tumbler into Service

1. Remove or open all panels, and check accessible bolts, nuts, screws, terminals and fittings for tightness.
2. Replace all panels and guards.
3. Remove and discard wire tie from the airflow switch so it can swing freely. Refer to *Figure 7*.

IMPORTANT: Airflow switch operation may be affected by:

- Clogged lint screen.
- Failure to remove wire tie from rear of machine. Refer to *Figure 7*.
- Lack of make-up air. Refer to *Exhaust Requirements* section.
- Obstruction in exhaust duct. Refer to *Exhaust Requirements* section.

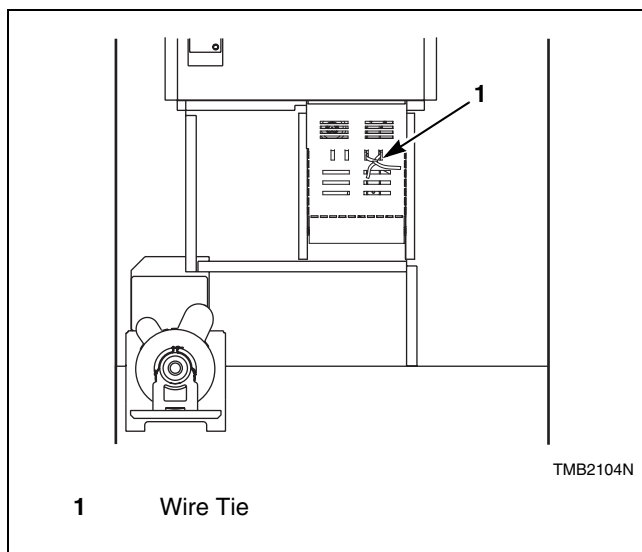


Figure 7

4. Turn on electrical supply to tumbler.
5. Open the supply valve for gas or steam heated tumblers.
6. After performing the previous checks, start the tumbler by pressing START. (Refer to the *Operating Manual* for detailed instructions.) Release the start button and open the loading door. The cylinder should stop rotating within seven seconds after the door is opened a maximum of 2 inches (51 mm). If it does not, adjust the loading door switch. Refer to *Adjustments* section.

7. **Gas Tumblers:** Start the tumbler and check the burner flame. Adjust the air inlet shutter as required. Refer to the *Adjustments* section.

IMPORTANT: The electronic ignition system will attempt to light the gas by sparking for the “trial for ignition” period. Refer to *Table 1*. If gas does not ignite within this period, the ignition control will go into a safety lockout and the valve will no longer open until the control is reset. It may be necessary to retry several times to bleed air from the gas lines. To reset, open and close the loading door and restart tumbler.

Location	Prepurge Time (seconds)	Trial for Ignition (seconds)	To Reset Lockout Condition:
CE and Australia	18	10	Press reset button on rear of machine
All others	1-3	10	Open loading door

Table 1

If lockout condition persists, check that the manual gas shut-off valve is in the “ON” position and that the gas service is properly connected. If condition still persists, remove tumbler from service.

8. Load the cylinder with a full load of clean rags and run to remove oil or dirt from cylinder.
9. Wipe out the cylinder using an all-purpose cleaner or detergent and water solution. Refer to *Figure 8*.

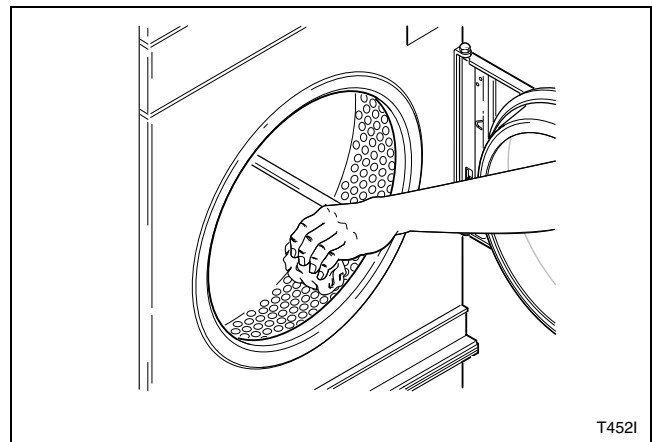


Figure 8


If the tumbler does not meet ANY of the listed requirements, remove tumbler from use. Refer to *Removing Tumbler from Service* section.

Required for CE Models Only

Once machine is installed, please be sure to complete the following items:

- Review and verify machine operation with customer.
- Leave all literature and a signed Declaration of Conformity with customer.
- Apply warning sticker on front panel of machine, in language appropriate to country of sale (included in literature packet).

Installing CE Gas Drying Tumblers

	WARNING
<p>To reduce the risk of electric shock, fire, explosion, serious injury or death:</p> <ul style="list-style-type: none"> • Disconnect electric power to the tumbler before servicing. • Close gas shut-off valve to gas tumbler before servicing. • Close steam valve to steam tumbler before servicing. • Never start the tumbler with any guards/panels removed. • Whenever ground wires are removed during servicing, these ground wires must be reconnected to ensure that the tumbler is properly grounded. 	
W002	

General Information

This information is to be used when installing gas tumblers in countries, and/or on gases, different than the machine's factory configuration. Tumblers are supplied from the factory for operation on Natural Gas 1000 Btu/cu. ft. (8914 kcal/m³), or L.P. Gas 2500 Btu/cu. ft. (22,250 kcal/m³) in the countries of GB/IE/PT/ES/IT/GR/LU/CH. To install machines in any other country, or on any other gas, requires some level of modification.

Burner orifices, stickers, block-open kits, regulator springs and other parts needed for conversions are to be ordered separately.

Models are built in two different configurations:

- **Regulated Natural Gas** – Burner orifice is sized for Natural Gas, second family, group H (E) at 20 mbar inlet pressure. Regulator/governor is operational. Gas valve CAN be field-converted to a non-regulating type.
- **Unregulated L.P. (Liquefied Petroleum) Gas** – Burner orifice is sized for L.P., third family, group 3+ at 28.37 mbar inlet pressure. Regulator/governor is blocked open. Gas valve CANNOT be field-converted to a regulating type.

Serial plates supplied from the factory are configured for the countries of GB/IE/PT/ES/IT/GR/LU/CH. These instructions pertain to the situations when the country of use or gas supply is different than that on the serial plate.

Table 2 describes the different gases that are available in different CE countries, and how the machines need to be configured to operate with those gases. In the CE, there are Natural Gas configurations that do not allow for machine regulation, and L.P. Gas configurations that must be regulated. For L.P. Gas, third family B/P at 50 mbar, order Regulated Natural Gas machines and convert according to *Table 2*.

Installation

Gases and Configurations

Country Code	Gas Type	Group	Supply Pressure, mbar	Burner Orifice Pressure, mbar	Capacity/ Model	Diameter, mm	Quantity	Burner Orifice Part No.
DK/NO/ SE/FI/CZ/ EE/LV/LT/ SI/SK	Natural Gas	H	20	7.6 8.0 8.0 8.0	25 30 35 55	3.9 4.0 4.6 5.2	1	M402980 M402992 M411511 M402993
	L.P. Gas	B/P	30	No Governor	25 30 35 55	2.1 2.2 2.5 3.0	1	M401003 M401011 M406361 M401017
DE	Natural Gas	E	20	7.6 8.0 8.0 8.0	25 30 35 55	3.9 4.0 4.6 5.2	1	M402980 M402992 M411511 M402993
	L.P. Gas	LL	30	No Governor	25 30 35 55	2.1 2.2 2.5 3.0	1	M401003 M401011 M406361 M401017
NL	Natural Gas	L	25	11.0	25 30 35 55	3.9 4.0 4.6 4.8	1	M402980 M402992 M411511 M411372
	L.P. Gas	B/P	30	No Governor	25 30 35 55	2.1 2.2 2.5 3.0	1	M401003 M401011 M406361 M401017
BE/FR*	Natural Gas	E+	20 or 25	No Governor	25 30 35 55	3.9 3.3 3.7 4.0	1	M402980 M401021 M400998 M401012
	L.P. Gas	+	28 or 37	No Governor	25 30 35 55	2.1 2.2 2.5 2.8	1	M401003 M401011 M406361 M411512

Injector information at 0-2000 feet (0-600 meters) altitude.

* For Natural Gas, Group E+ applications, convert using L.P. Gas model and replace injectors.

Table 2 (Continued)

Table 2 (Continued)

Country Code	Gas Type	Group	Supply Pressure, mbar	Burner Orifice Pressure, mbar	Capacity/ Model	Diameter, mm	Quantity	Burner Orifice Part No.
GB/IE/PT/ES/IT/GR/LU/CH	Natural Gas	H	20	7.6 8.0 8.0 8.0	25 30 35 55	3.9 4.0 4.6 5.2	1	M402980 M402992 M411511 M402993
	L.P. Gas	+	28 or 37	No Governor	25 30 35 55	2.1 2.2 2.5 2.8	1	M401003 M401011 M406361 M411512
AT	Natural Gas	H	20	7.6 8.0 8.0 8.0	25 30 35 55	3.9 4.0 4.6 5.2	1	M402980 M402992 M411511 M402993
	L.P. Gas	B/P	30	No Governor	25 30 35 55	2.1 2.2 2.5 3.0	1	M401003 M401011 M406361 M401017
CY/IS/MT	L.P. Gas	B/P	30	No Governor	25 30 35 55	2.1 2.2 2.5 3.0	1	M401003 M401011 M406361 M401017
HU	Natural Gas	H	25	7.6 8.0 8.0 8.0	25 30 35 55	3.9 4.0 4.6 5.2	1	M402980 M402992 M411511 M402993
	L.P. Gas	B/P	30	No Governor	25 30 35 55	2.1 2.2 2.5 3.0	1	M401003 M401011 M406361 M401017
PL	Natural Gas	H	20	7.6 8.0 8.0 8.0	25 30 35 55	3.9 4.0 4.6 5.2	1	M402980 M402992 M411511 M402993
	L.P. Gas	3P	37	No Governor	25 30 35 55	2.1 2.2 2.5 2.8	1	M401003 M401011 M406361 M411512

Injector information at 0-2000 feet (0-600 meters) altitude.

Table 2


Installation

Basic Configuration

1. Determine the necessary conversion operations to convert from the factory-supplied configuration to the desired configuration.
2. Perform the conversions required so the machine is properly configured for the desired country and gas (refer to *Specific Conversion Procedures* section):
 - How to Convert Gas Valve from Regulated to Unregulated

NOTE: Conversion from regulated to unregulated is only needed when regulated tumblers were ordered, but unregulated tumblers were needed or if gas supply type is changed at a later date.

- How to Change Burner Orifice Size
 - How to Adjust Gas Valve Governor/Regulator
 - How to Change Regulator Spring, DE/AT Only
3. If applicable, peel off the appropriate country sticker (included with machine) and apply it to the serial plate over the existing country information.
 4. If applicable, peel off the appropriate conversion sticker (included with machine) and apply it to the data plate over the “ADJUSTED FOR _____ GAS: _____” information.
 5. Commission tumbler for use.

	WARNING
<p>When converting the tumbler to a different gas or pressure, first verify that the supply inlet pressure is equipped with a pressure regulator (located ahead of the tumbler) that will maintain the gas supply at the inlet pressure specified.</p>	
<small>W430</small>	

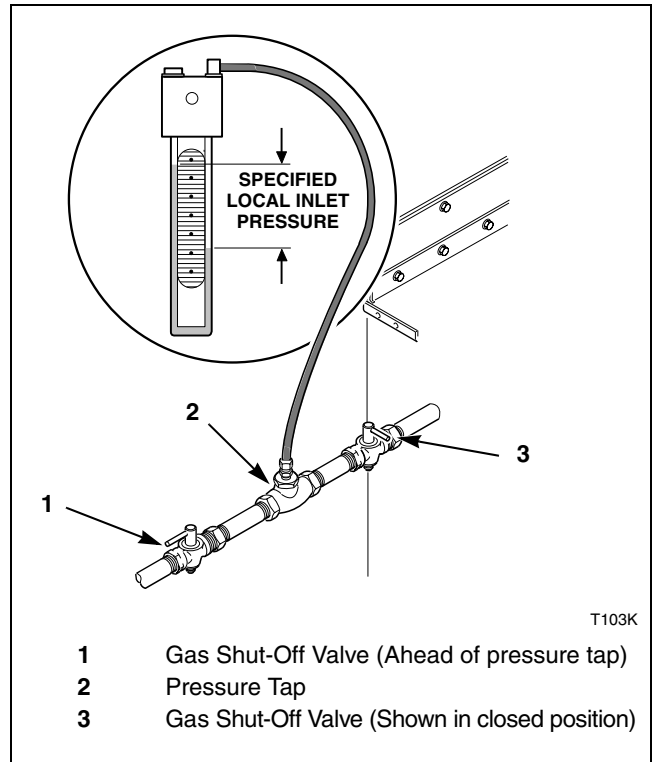


Figure 9

Specific Conversion Procedures

How to Convert Gas Valve from Regulated to Unregulated

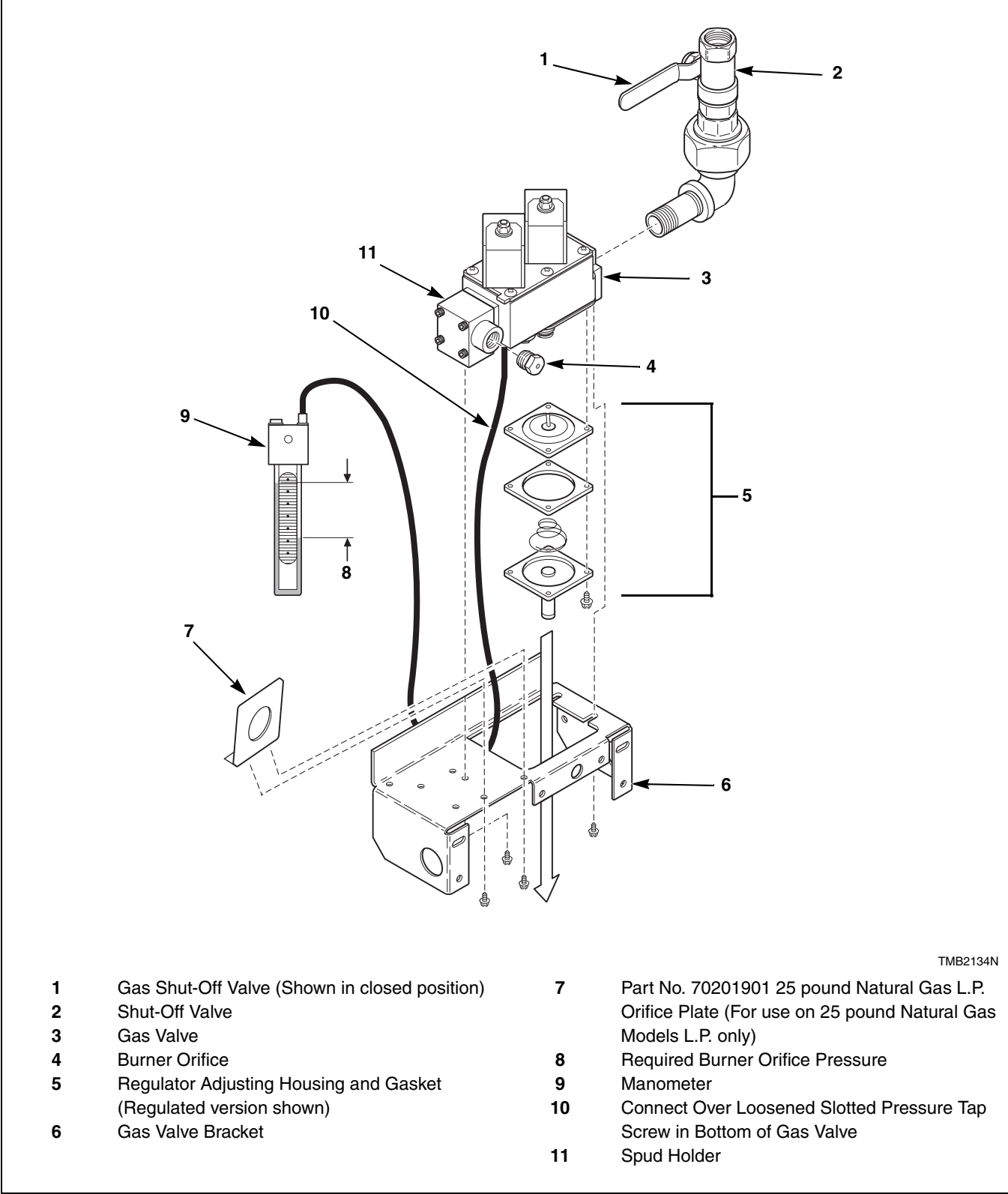
NOTE: Conversion from regulated to unregulated is only needed when regulated tumblers were ordered, but unregulated tumblers were needed.

Johnson GM7000 gas valve:

1. Disconnect electrical power from tumbler. Close gas shut-off valve to tumbler. Refer to *Figure 10*.
2. Follow instructions in Conversion Kit, Part No. 431485 (Johnson Part No. GM-70 CBP).

NOTE: This kit does not contain any burner orifices.

3. Change burner orifice size as required by the appropriate table according to *How to Change Burner Orifice Size*.
4. For 25 pound Natural Gas models, L.P. Gas only. Install 25 pound L.P. orifice plate (Part No. 70201901) onto gas valve bracket. Refer to *Figure 10*.
5. Commission tumbler for use.



TMB2134N

- 1 Gas Shut-Off Valve (Shown in closed position)
- 2 Shut-Off Valve
- 3 Gas Valve
- 4 Burner Orifice
- 5 Regulator Adjusting Housing and Gasket (Regulated version shown)
- 6 Gas Valve Bracket
- 7 Part No. 70201901 25 pound Natural Gas L.P. Orifice Plate (For use on 25 pound Natural Gas Models L.P. only)
- 8 Required Burner Orifice Pressure
- 9 Manometer
- 10 Connect Over Loosened Slotted Pressure Tap Screw in Bottom of Gas Valve
- 11 Spud Holder

Figure 10

Installation

How to Change Burner Orifice Size

1. Disconnect electrical power from tumbler. Close gas shut-off valve to tumbler. Refer to *Figure 9*.
2. For Johnson GM7000 gas valve:
Remove burner orifice(s) from the spud holder. Refer to *Figure 10*.
3. Install the new, correct burner orifices. Refer to *Figure 11*. Torque each to 9 – 10 Nm.
4. Commission tumbler for use.

NOTE: Blank burner orifices are available as Part No. M400995.

How to Adjust Gas Valve Governor/Regulator

1. Check gas burner orifice (manifold) pressure as follows. Refer to *Figure 10*.
2. Loosen screw plug inside pressure tap located on underside of valve.
3. Connect a “U”-tube manometer (or similar pressure gauge) to the tap.
4. Start tumbler and note pressure once flame is burning. Remove regulator cap and adjust regulator screw until the burner orifice pressure per applicable table is achieved. Replace regulator cap and close needle valve (pressure tap).
5. Commission tumbler for use.

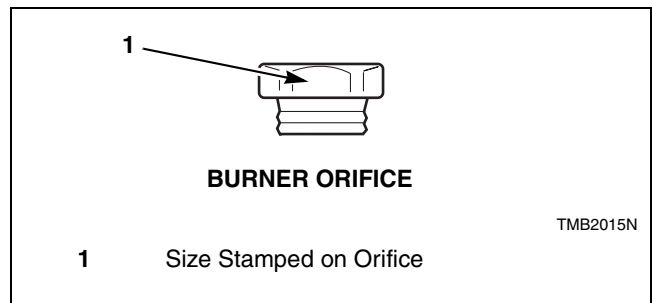



Figure 11

Exhaust Requirements

	WARNING
A drying tumbler produces combustible lint. To reduce the risk of fire, the tumbler must be exhausted to the outdoors.	
<small>W057</small>	
To reduce the risk of fire and accumulation of combustible gases, DO NOT exhaust tumbler air into a window well, gas vent, chimney or enclosed, unventilated area such as an attic wall, ceiling, crawl space under a building, or concealed space of a building.	
<small>W059</small>	

Layout

Whenever possible, install tumblers along an outside wall where duct length can be kept to a minimum, and make-up air can be easily accessed. Elbows and long vents tend to increase drying time. Construction must not block the airflow at the rear of the tumbler. Doing so would prevent adequate air supply to the tumbler's combustion chamber.

Make-Up Air

A tumbler is forced air exhausted and requires provisions for make-up air to replace the air exhausted by the tumbler.

IMPORTANT: Do not obstruct the flow of combustion and ventilation air.

Make-up air openings should be as close to the tumbler(s) as possible.

The required make-up air opening to the outside for each tumbler is:


110 square inches (709 sq. cm)
for 25 and 30 pound models

144 square inches (928 sq. cm)
for 35 and 55 pound models

Make-up air openings with louvers will restrict airflow. The opening must be increased to compensate for area taken up by louvers.

Make-up air openings for a room containing tumbler(s) and/or gas fired hot water heater or other gravity vented appliances must be increased sufficiently to prevent downdrafts in any of the vents when all tumblers are in operation. Do not locate gravity vented appliances between tumbler(s) and make-up air openings. If it is necessary to duct make-up air to the tumbler(s), increase the area of the ductwork by 25% to compensate for any restriction in air movement.

Venting

	WARNING
To reduce the risk of fire due to increased static pressure, we do not recommend installation of in-line secondary lint filters or lint collectors. If secondary systems are mandated, frequently clean the system to assure safe operation.	
<small>W749</small>	


IMPORTANT: Installing in-line filters or lint collectors will cause increased static pressure. Failure to maintain the secondary lint system will decrease tumbler efficiency and may void machine warranty.

For maximum efficiency and minimum lint accumulation, tumbler air must be exhausted to the outdoors by the shortest possible route.

Proper sized exhaust ducts are essential for proper operation. All elbows should be sweep type. Exhaust ducts must be assembled so the interior surfaces are smooth, so the joints do not permit the accumulation of lint. DO NOT use plastic or thin foil ducts - rigid metal ducts are recommended. Use exhaust ducts made of sheet metal or other noncombustible material. DO NOT use sheet metal screws or fasteners on exhaust pipe joints which extend into the duct and catch lint. Use duct tape or pop-rivets on all seams and joints.

Verify that old ducts are thoroughly cleaned out before installing new tumbler(s).

Exhaust Requirements

	WARNING
<p>Improperly sized or assembled ductwork causes excess back pressure which results in slow drying, lint collecting in the duct, lint blowing back into the room, and increased fire hazard.</p>	
W355	

NOTE: Exhaust ducts must be constructed of sheet metal or other noncombustible material. Such ducts must be equivalent in strength and corrosion resistance to ducts made of galvanized sheet steel not less than 0.0195 inches (0.495 mm) thick. Local codes may require additional thickness.

Where the exhaust duct pierces a combustible wall or ceiling the opening must be sized per local codes. The space around the duct may be sealed with noncombustible material. Refer to *Figure 12*.

IMPORTANT: For best performance provide an individual exhaust duct for each tumbler. Do not install a hot water heater in a room containing tumblers. It is better to have the water heater in a separate room with a separate air inlet.

Individual Venting

For maximum efficiency and performance, it is preferred to exhaust tumbler(s) individually to the outdoors.

IMPORTANT: At no point may the cross sectional area of installed venting be less than the cross sectional area of the exhaust outlet of the tumbler.

The exhaust duct must be designed so the static back pressure measured 12 inches (305 mm) from the exhaust outlet does not exceed the maximum allowable pressure specified on the installation sticker on the rear of the tumbler.

NOTE: Static back pressure must be measured with the tumbler running.

The maximum allowable length venting of the same diameter as the exhaust thimble is 14 feet (4.3 m) and two 90° elbows or equivalent. If the equivalent length of a duct required for an installation exceeds the maximum allowable equivalent length, the diameter of a round duct must be increased by 10% for each additional 20 feet (6.1 m). Cross section area of a rectangular duct must be increased by 20% for each additional 20 feet (6.1 m). Refer to *Table 3* to determine equivalent venting.

NOTE: The maximum length of a flexible metal duct must not exceed 2.4 m (7.87 ft.) as required to meet UL2158, clause 7.3.2A.

Duct Diameter	Equivalent Length of Rigid Straight Duct
6 in. (152 mm)	One 90° elbow = 7 ft. (2.1 m)
8 in. (203 mm)	One 90° elbow = 9.3 ft. (2.83 m)
10 in. (254 mm)	One 90° elbow = 11.6 ft. (3.5 m)
12 in. (305 mm)	One 90° elbow = 14 ft. (4.3 m)
14 in. (356 mm)	One 90° elbow = 16 ft. (4.9 m)
16 in. (406 mm)	One 90° elbow = 18.7 ft. (5.7 m)
18 in. (457 mm)	One 90° elbow = 21 ft. (6.4 m)
Equivalent Length (feet) = 1.17 x Duct Diameter (inches)	

Table 3

Example: A 12 inch (305 mm) diameter duct's equivalent length of 14 feet (4.3 m) of duct and two 90° elbows is:

$$\begin{aligned} \text{Equivalent Length} &= 14 \text{ feet} + (2) \text{ 90}^\circ \text{ elbows} \\ &= 14 \text{ feet} + 14 \text{ feet} + 14 \text{ feet} \\ &= 42 \text{ feet (12.8 meters)} \end{aligned}$$

With the tumbler in operation, airflow at any point in the duct should be at least 1200 feet per minute (366 meters per minute) to ensure that lint remains airborne. If 1200 feet per minute cannot be maintained, schedule monthly inspections and cleaning of the ductwork.

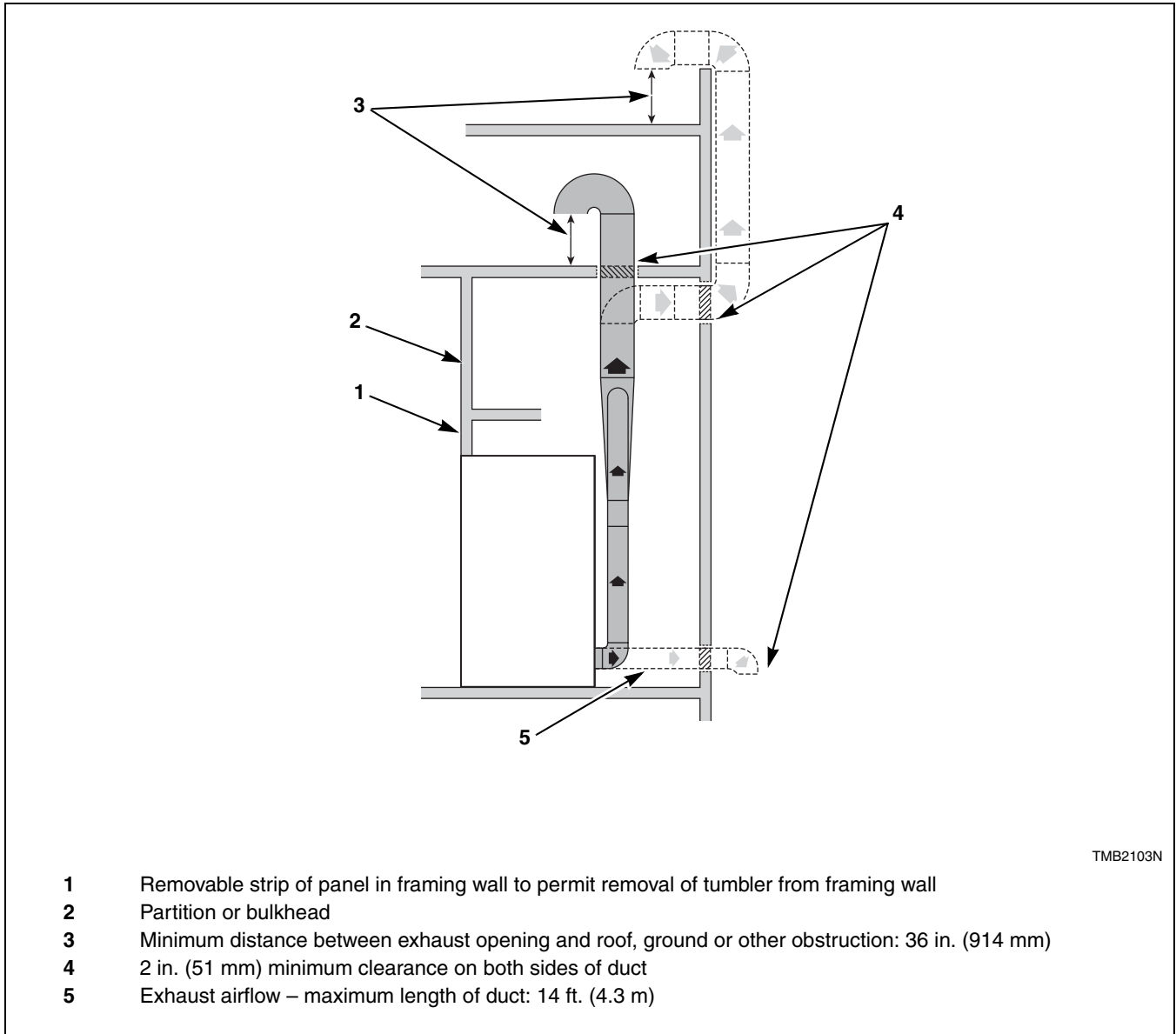


Figure 12

NOTE: Do not install wire mesh or screen in exhaust duct opening to avoid lint build-up or impacting proper discharge of air from tumblers.

NOTE: Where exhaust duct pierces a combustible wall or ceiling, the opening must be sized per local codes.

NOTE: Inside of duct must be smooth. Do not use sheet metal screws to join sections.

Consult your local building code for regulations which may also apply.

Exhaust Requirements

Manifold Venting

While it is preferable to exhaust tumblers individually to the outdoors, a main collector duct may be used if it is sized according to *Figure 14* and *Figure 15*. This illustration indicates minimum diameters, which should be increased if the collector length exceeds 14 feet (4.3 meters) and two 90° elbows. The diameter of a round duct must be increased by 10% for each additional 20 feet (6.1 meters). Cross sectional area of a rectangular or square duct must be increased 20% for each additional 20 feet (6.1 meters). Refer to *Table 4* and *Table 5* to determine equivalent ducting sizing. The collector duct may be rectangular or square in cross section, as long as the area is not reduced. Provisions **MUST** be made for lint removal and cleaning of the collector duct.

The vent collector system must be designed so the static back pressure measured 12 inches (305 mm) from the exhaust outlet does not exceed the maximum allowable pressure specified on the installation sticker on the rear of tumbler. Static back pressure must be measured with all tumblers vented into the collector operating.

NOTE: Never connect a tumbler duct at a 90° angle to the collector duct. Refer to *Figure 13*. Doing so will cause excessive back pressure, resulting in poor performance. Never connect two tumbler exhaust ducts directly across from each other at the point of entry to the collector duct.

With the tumbler in operation, airflow at any point in the duct should be at least 1200 feet per minute (366 meters per minute) to ensure that lint remains airborne. If 1200 feet per minute cannot be maintained, schedule monthly inspections and cleaning of the ductwork.

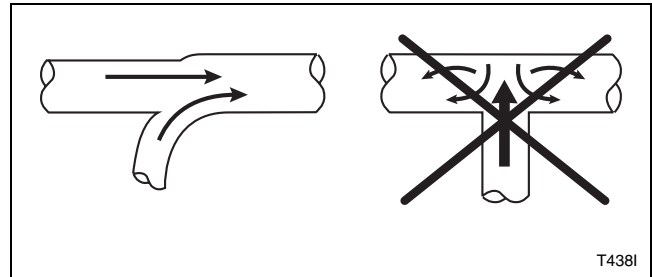


Figure 13

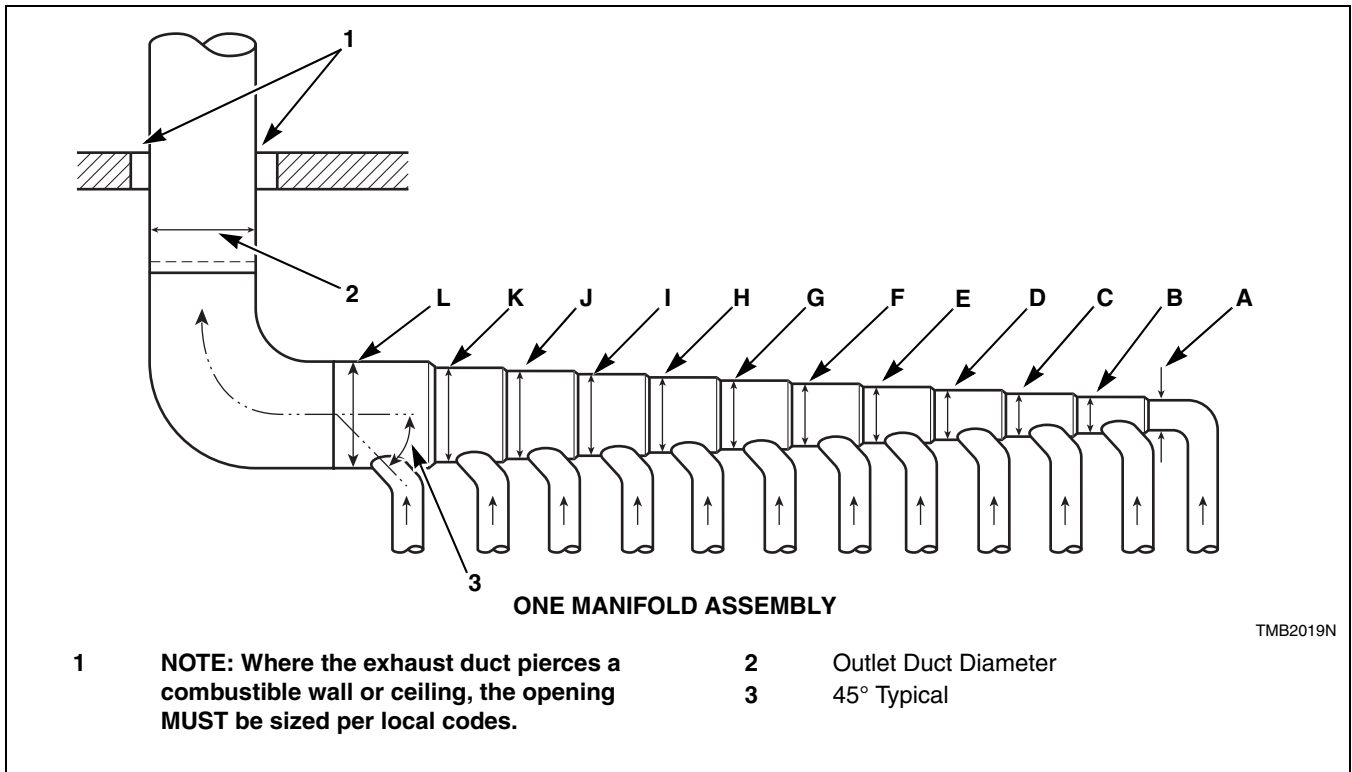


Figure 14

Duct Station	25 and 30 Pound	35 and 55 Pound
	6 in. (152 mm) Duct	8 in. (203 mm) Duct
A	6 in. (152 mm)	8 in. (203 mm)
B	10 in. (254 mm)	12 in. (305 mm)
C	12 in. (305 mm)	15 in. (381 mm)
D	14 in. (356 mm)	17 in. (432 mm)
E	16 in. (406 mm)	19 in. (483 mm)
F	18 in. (457 mm)	21 in. (533 mm)
G	19 in. (483 mm)	23 in. (584 mm)
H	20 in. (508 mm)	24 in. (610 mm)
I	22 in. (559 mm)	26 in. (660 mm)
J	23 in. (584 mm)	27 in. (686 mm)
K	24 in. (610 mm)	28 in. (711 mm)
L	25 in. (635 mm)	30 in. (762 mm)

Table 4

Exhaust Requirements

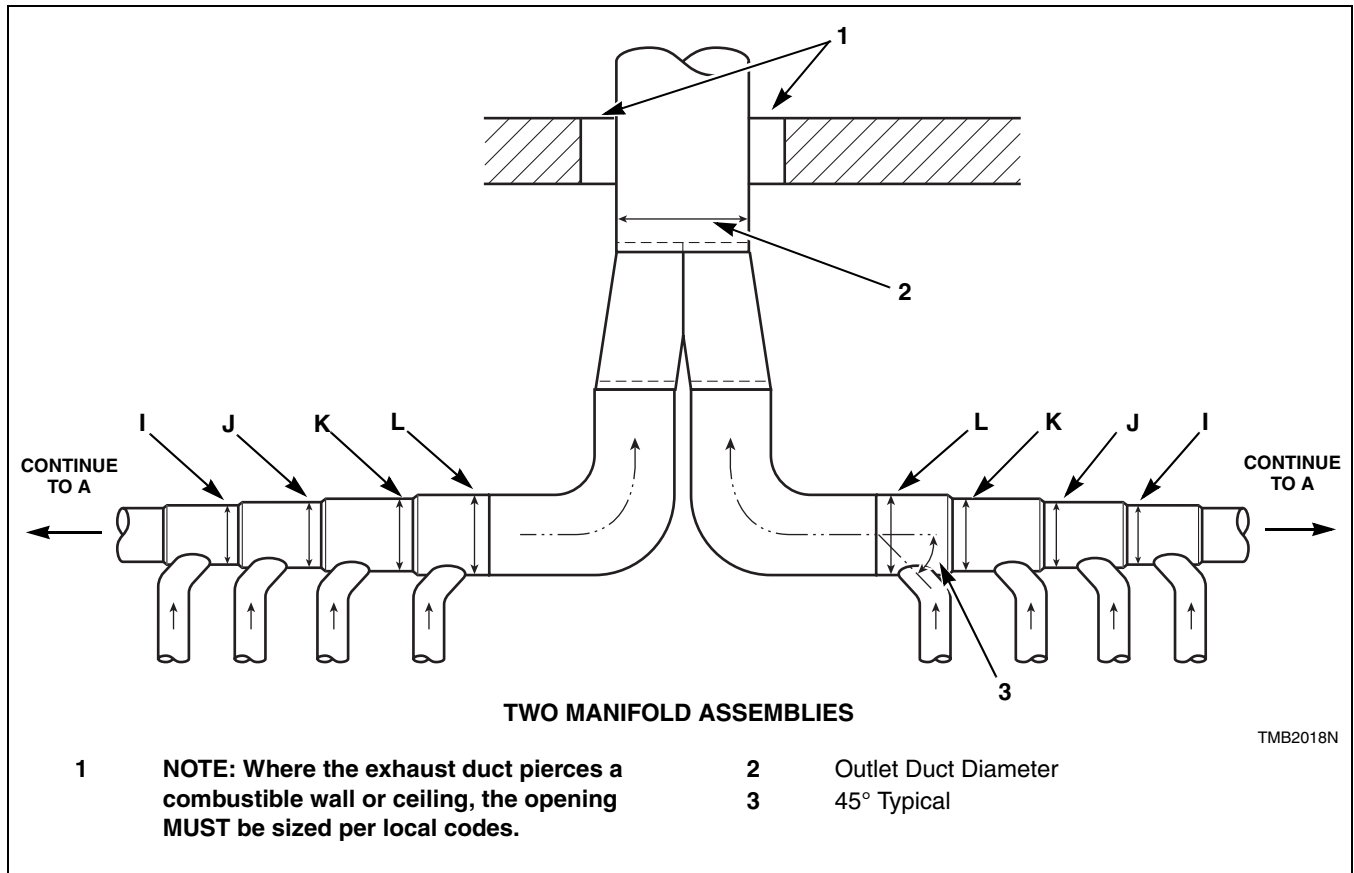



Figure 15

Duct Station	25 and 30 Pound	35 and 55 Pound
	6 in. (152 mm) Duct	8 in. (203 mm) Duct
A	10 in. (254 mm)	12 in. (305 mm)
B	15 in. (381 mm)	17 in. (432 mm)
C	18 in. (457 mm)	22 in. (559 mm)
D	20 in. (508 mm)	25 in. (635 mm)
E	23 in. (584 mm)	27 in. (686 mm)
F	26 in. (660 mm)	30 in. (762 mm)
G	27 in. (686 mm)	33 in. (838 mm)
H	29 in. (737 mm)	34 in. (864 mm)
I	32 in. (813 mm)	37 in. (940 mm)
J	33 in. (838 mm)	39 in. (991 mm)
K	34 in. (864 mm)	40 in. (1016 mm)
L	36 in. (914 mm)	43 in. (1092 mm)

Table 5

Gas Requirements

	WARNING
<p>To reduce the risk of fire or explosion, DO NOT CONNECT THE GAS LINE TO THE TUMBLER IF THE GAS SERVICE IS NOT THE SAME AS THAT SPECIFIED ON THE TUMBLER SERIAL PLATE! It will first be necessary to convert the gas burner orifice and gas valve. Appropriate conversion kits are available.</p>	
<small>W060</small>	

IMPORTANT: Any product revisions or conversions must be made by the manufacturer's authorized dealers, distributors, or local service personnel.

IMPORTANT: The tumbler must be isolated from the gas supply piping system by closing its individual manual shut-off valve during any pressure testing of the gas supply piping system at test pressure equal to or less than 0.5 psig (3.45 kPa, 34.5 mbar).

IMPORTANT: The tumbler and its manually operated appliance gas valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 0.5 psi (3.45 kPa, 34.5 mbar).

IMPORTANT: The installation must comply with local codes or, in the absence of local codes:


- with the latest edition of the "National Fuel Gas Code," ANSI Z223.1/NFPA 54 in the U.S.A.,
- with CAN/CSA-B149.1 or Natural Gas and Propane Installation Code in Canada,
- and Australian Gas Association/Australian L.P. Gas Association requirements in Australia.

Obtain specific gas service pipe size from the gas supplier. Refer to *Table 6* for general pipe size.

The following must be furnished and installed by the customer for the gas service line to each tumbler. Refer to *Figure 16*.

- Sediment traps
- Shut-off valves
- Supply pressure taps

It is important that equal pressure be maintained at all tumbler gas connections. This can best be done by installing a one inch (25 mm) pipe gas loop. Refer to *Figure 17*.

	WARNING
<p>To reduce the risk of fire or explosion, if the tumbler is to be connected to Liquefied Petroleum (L.P.) gas, a vent to the outdoors must be provided in the room where the tumbler is installed.</p>	
<small>W062</small>	

NATURAL GAS line pressure must be maintained at 6.5 water column inches (1.62 kPa), with no less than 5 water column inches (1.24 kPa) and no more than 10.5 water column inches (2.61 kPa), with all gas appliances running (tumblers, water heaters, space heaters, furnace, etc.). An in-line pressure regulator may be required if the line pressure exceeds 8 water column inches (2.0 kPa) with all gas appliances running.

LIQUID PETROLEUM GAS (L.P.) line pressure must be maintained at 11 water column inches (2.74 kPa), with no less than 10 water column inches (2.49 kPa) and no more than 13 water column inches (3.23 kPa), with all gas appliances running (tumblers, water heaters, space heaters, furnace, etc.).

For converting Non-CE models from Natural Gas to L.P. Gas:

- 25 Pound – M4699P3
- 30 Pound – M4703P3
- 35 Pound – M4711P3
- 55 Pound – M4924P3

CE GASES refer to *Installing CE Gas Drying Tumblers* section, the above data does not apply to the CE.

Gas Requirements

Turn on gas and check all pipe connections (internal and external) for gas leaks with a non-corrosive detection fluid. Purge air in gas service line by operating the tumbler in the drying mode. If burner does not light and unit goes into lockout, open and close the door and restart. Repeat these steps until burner ignites. **Use pipe compound, resistant to actions of L.P. Gas, on all pipe threads.**



WARNING

Check all pipe connections, internal and external, for gas leaks using a non-corrosive leak detection fluid. To reduce the risk of explosion or fire, DO NOT USE AN OPEN FLAME TO CHECK FOR GAS LEAKS! Gas connections should be checked twice a year for leakage.

W635

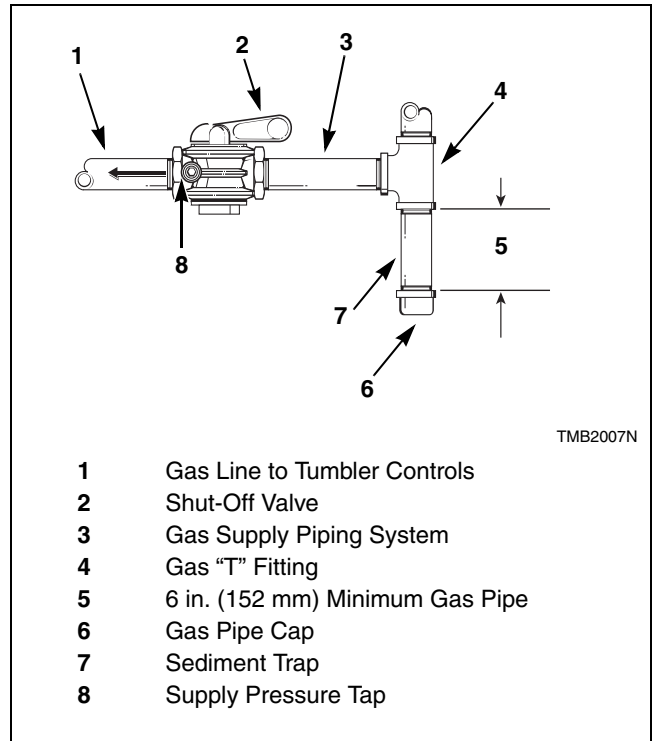
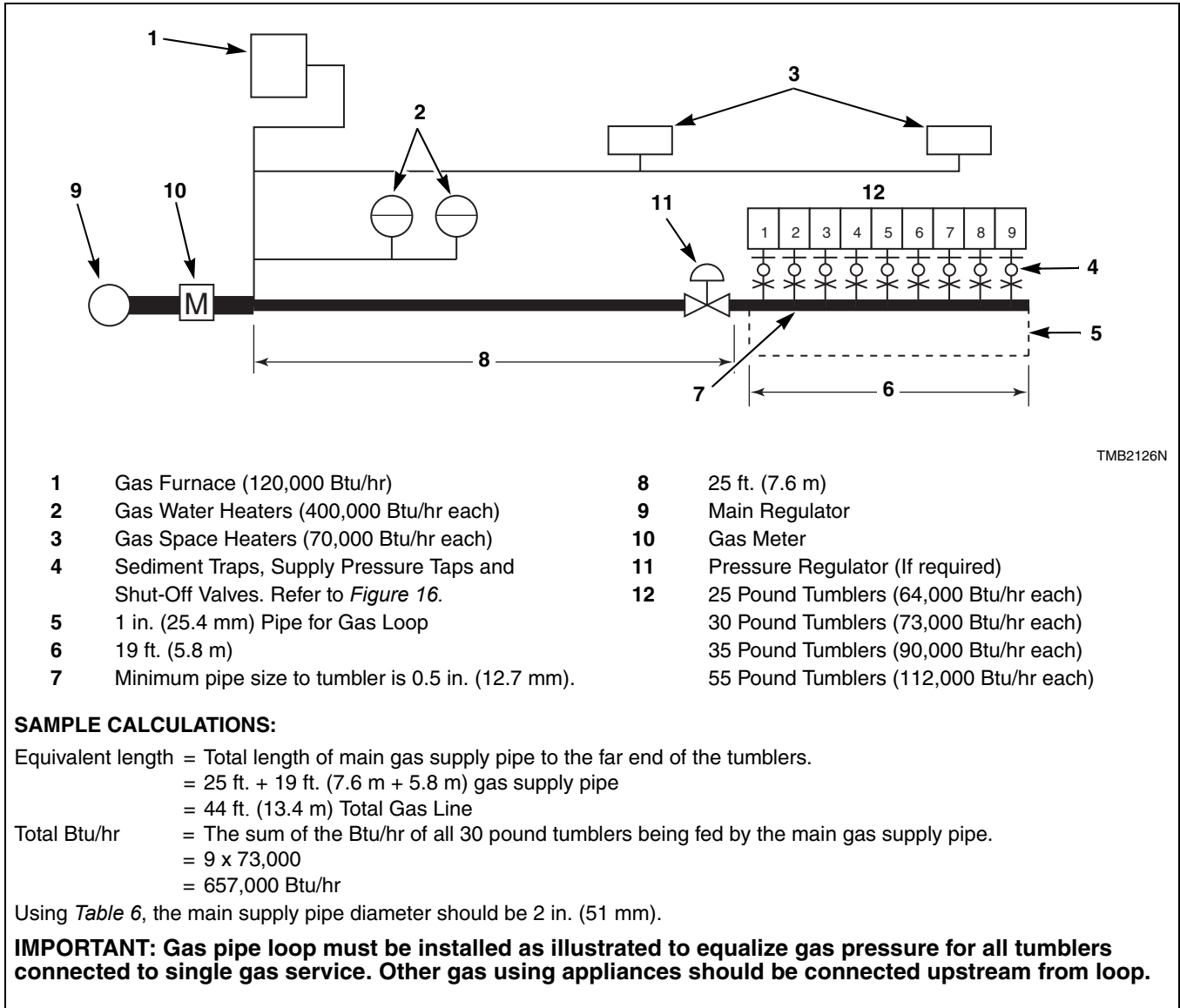


Figure 16

Gas Supply Pipe Sizing and Looping



TMB2126N

Figure 17

Gas Requirements

Gas Pipe Size Required for 1000 Btu Natural Gas — 0.64 Specific Gravity at 7 ± 1.5 inches (17.4 ± 4 mbar, 1.74 ± 0.37 kPa) Water Column Pressure						
Gas Appliances Total Btu/hr	Equivalent Length					
	25 feet (7.63 m)	50 feet (15.25 m)	75 feet (22.88 m)	100 feet (30.50 m)	125 feet (38.13 m)	150 feet (45.75 m)
	Based on 0.3 in. Water Column Pressure Drop for Length Given Sizes shown in inches (mm)					
100,000	0.75 (19.05)	0.75 (19.05)	1 (25.40)	1 (25.40)	1 (25.40)	1 (25.40)
120,000	0.75 (19.05)	1 (25.40)	1 (25.40)	1 (25.40)	1 (25.40)	1 (25.40)
140,000	0.75 (19.05)	1 (25.40)	1 (25.40)	1 (25.40)	1 (25.40)	1.25 (31.75)
160,000	0.75 (19.05)	1 (25.40)	1 (25.40)	1.25 (31.75)	1.25 (31.75)	1.25 (31.75)
180,000	1 (25.40)	1 (25.40)	1 (25.40)	1.25 (31.75)	1.25 (31.75)	1.25 (31.75)
200,000	1 (25.40)	1 (25.40)	1.25 (31.75)	1.25 (31.75)	1.25 (31.75)	1.5 (38.10)
300,000	1 (25.40)	1.25 (31.75)	1.25 (31.75)	1.5 (38.10)	1.5 (38.10)	1.5 (38.10)
400,000	1.25 (31.75)	1.25 (31.75)	1.5 (38.10)	1.5 (38.10)	1.5 (38.10)	2 (50.80)
500,000	1.25 (31.75)	1.5 (38.10)	1.5 (38.10)	2 (50.80)	2 (50.80)	2 (50.80)
600,000	1.5 (38.10)	1.5 (38.10)	2 (50.80)	2 (50.80)	2 (50.80)	2 (50.80)
700,000	1.5 (38.10)	2 (50.80)	2 (50.80)	2 (50.80)	2 (50.80)	2.5 (63.50)
800,000	1.5 (38.10)	2 (50.80)	2 (50.80)	2 (50.80)	2.5 (63.50)	2.5 (63.50)
900,000	2 (50.80)	2 (50.80)	2 (50.80)	2.5 (63.50)	2.5 (63.50)	2.5 (63.50)
1,000,000	2 (50.80)	2 (50.80)	2 (50.80)	2.5 (63.50)	2.5 (63.50)	2.5 (63.50)
1,100,000	2 (50.80)	2 (50.80)	2.5 (63.50)	2.5 (63.50)	2.5 (63.50)	2.5 (63.50)
1,200,000	2 (50.80)	2 (50.80)	2.5 (63.50)	2.5 (63.50)	2.5 (63.50)	2.5 (63.50)
1,300,000	2 (50.80)	2.5 (63.50)	2.5 (63.50)	2.5 (63.50)	2.5 (63.50)	3 (76.20)
1,400,000	2 (50.80)	2.5 (63.50)	2.5 (63.50)	2.5 (63.50)	3 (76.20)	3 (76.20)
1,500,000	2 (50.80)	2.5 (63.50)	2.5 (63.50)	2.5 (63.50)	3 (76.20)	3 (76.20)
1,600,000	2 (50.80)	2.5 (63.50)	2.5 (63.50)	3 (76.20)	3 (76.20)	3 (76.20)
1,700,000	2 (50.80)	2.5 (63.50)	2.5 (63.50)	3 (76.20)	3 (76.20)	3 (76.20)
1,800,000	2.5 (63.50)	2.5 (63.50)	3 (76.20)	3 (76.20)	3 (76.20)	3 (76.20)
1,900,000	2.5 (63.50)	2.5 (63.50)	3 (76.20)	3 (76.20)	3 (76.20)	3 (76.20)
2,000,000	2.5 (63.50)	2.5 (63.50)	3 (76.20)	3 (76.20)	3 (76.20)	3.5 (88.90)
2,200,000	2.5 (63.50)	3 (76.20)	3 (76.20)	3 (76.20)	3.5 (88.90)	3.5 (88.90)
2,400,000	2.5 (63.50)	3 (76.20)	3 (76.20)	3 (76.20)	3.5 (88.90)	3.5 (88.90)
2,600,000	2.5 (63.50)	3 (76.20)	3 (76.20)	3.5 (88.90)	3.5 (88.90)	3.5 (88.90)
2,800,000	2.5 (63.50)	3 (76.20)	3 (76.20)	3.5 (88.90)	3.5 (88.90)	3.5 (88.90)
3,000,000	2.5 (63.50)	3 (76.20)	3.5 (88.90)	3.5 (88.90)	3.5 (88.90)	4 (101.60)

For L.P. Gas, correct the total Btu/hr by multiplying it by 0.6. The answer is the equivalent Btu on the above chart.

The installation must conform with local codes or, in the absence of local codes:

- with the latest edition of the “National Fuel Gas Code,” ANSI Z223.1/NFPA 54 in the U.S.A.,
- with CAN/CSA-B149.1 or Natural Gas and Propane Installation Code in Canada,
- and Australian Gas Association/Australian L.P. Gas Association requirements in Australia.

Table 6

High Altitude Burner Orifice Sizing

For CE models, consult local gas supplier.


For proper operation at altitudes above 2000 feet (610 m), the gas burner orifice size must be reduced to ensure complete combustion. Refer to *Table 7*.

Model	Gas	Altitude		Burner Orifice				New Rate (Btu/hr)*	
		feet	meters	#	inches	mm	Quantity		Part No.
25 Pound	Natural Gas	2001-4000	610-1220	26	0.1470	3.7	1	M401000	58,880
		4001-6000	1221-1830	27	0.1440	3.7		M400998	53,760
		6001-8000	1831-2440	28	0.1405	3.6		M401014	48,640
		8001-10,000	2441-3050	29	0.1360	3.4		M400997	43,520
	L.P. Gas	2001-6000	610-1830	43	0.0890	2.3		M406184	58,880
		6001-8000	1831-2440	44	0.0860	2.2		M401011	48,640
		8001-10,000	2441-3050	46	0.0810	2.1		M401003	43,520
30 Pound	Natural Gas	2001-4000	610-1220	22	0.1570	4.0	1	M402996	67,160
		4001-6000	1221-1830	24	0.1520	3.9		M402980	61,320
		6001-8000	1831-2440	26	0.1470	3.7		M401000	55,480
		8001-10,000	2441-3050	28	0.1405	3.6		M401014	49,640
	L.P. Gas	2001-6000	610-1830	42	0.0935	2.4		M403017	67,160
		6001-8000	1831-2440	43	0.0890	2.3		M406184	55,480
		8001-10,000	2441-3050	44	0.0860	2.2		M401011	49,640
35 Pound	Natural Gas	2001-4000	610-1220	17	0.1730	4.4	1	M411374	82,800
		4001-6000	1221-1830	18	0.1695	4.3		M402988	75,600
		6001-8000	1831-2440	20	0.1610	4.1		M401002	68,400
		8001-10,000	2441-3050	22	0.1570	4.0		M402996	61,200
	L.P. Gas	2001-4000	610-1220	38	0.1015	2.6		M411376	82,800
		4001-6000	1221-1830	39	0.0995	2.5		M401007	75,600
		6001-8000	1831-2440	41	0.0960	2.4		M401015	68,400
		8001-10,000	2441-3050	42	0.0935	2.4		M403017	61,200
55 Pound	Natural Gas	2001-4000	610-1220	10	0.1929	4.9	1	M402994	104,360
		4001-6000	1221-1830	12	0.1890	4.8		M411372	99,562
		6001-8000	1831-2440	14	0.1811	4.6		M411371	92,324
		8001-10,000	2441-3050	16	0.1772	4.5		M411373	87,321
	L.P. Gas	2001-4000	610-1220	32	0.1142	2.9		M402444	104,354
		4001-6000	1221-1830	33	0.1142	2.9		M401022	99,027
		6001-8000	1831-2440	35	0.1102	2.8		M402487	93,838
		8001-10,000	2441-3050	36	0.1063	2.7		M411375	87,630

*Btu/hr derate of 4% per 1000 feet (305 meters) of altitude.

Table 7

Electrical Requirements


	WARNING
<p>To reduce the risk of electric shock, fire, explosion, serious injury or death:</p> <ul style="list-style-type: none">• Disconnect electric power to the tumbler before servicing.• Close gas shut-off valve to gas tumbler before servicing.• Close steam valve to steam tumbler before servicing.• Never start the tumbler with any guards/panels removed.• Whenever ground wires are removed during servicing, these ground wires must be reconnected to ensure that the tumbler is properly grounded. <p style="text-align: right;">W002</p>	
<p>To reduce the risk of fire and electric shock, check with a qualified serviceman for proper grounding procedures. Improper connection of the equipment grounding conductor may result in a risk of electric shock.</p> <p style="text-align: right;">W068</p>	
<p>To reduce the risk of fire and electric shock, if electrical supply is coming from a three phase service, DO NOT connect a “High Leg” or “Stinger Leg” to a single phase machine. On a three phase machine, if there is a “High Leg” or “Stinger Leg” it should be connected to L3.</p> <p style="text-align: right;">W069</p>	


Grounding Instructions

NOTE: To ensure protection against shock, this tumbler **MUST** be electrically grounded in accordance with the local codes or, in the absence of local codes, with the latest edition of the National Electrical Code ANSI/NFPA No. 70. In Canada the electrical connections are to be made in accordance with CSA C22.1 latest edition Canadian Electrical Code, Part I, and/or local codes.

This tumbler must be grounded. In the event of malfunction or breakdown, grounding will reduce the risk of electric shock by providing a path of least resistance for electric current. This tumbler must be connected to a grounded metal, permanent wiring system; or an equipment grounding conductor must be run with the circuit conductors and connected to the appropriate ground location.

- Metal conduit and/or BX cable is not considered ground.
- Connecting the Neutral from the electrical service box to the tumbler ground screw does not constitute a ground.
- A dedicated ground conduit (wire) must be connected between the electrical service box ground bar and the tumbler ground screw.

	WARNING
<p>All electrical connections should be made by a qualified electrician.</p> <p>To reduce the risk of electrical shock, de-energize the electrical circuit being connected to the tumbler before making any electrical connections. Never attempt to connect a live circuit.</p> <p style="text-align: right;">W070</p>	

	CAUTION
<p>Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.</p> <p style="text-align: right;">W071</p>	

For CE Models Only

All manually operated models are factory-equipped with an emergency stop button on the front panel. If the emergency stop function is desired on coin-operated models, an external emergency stop button may be installed as specified on the machine wiring diagram.

NOTE: Activation of the emergency stop button stops all machine control circuit functions, but **DOES NOT** remove all electrical power from machine.

Service/Ground Location

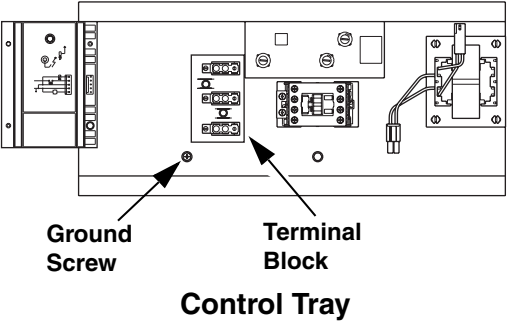
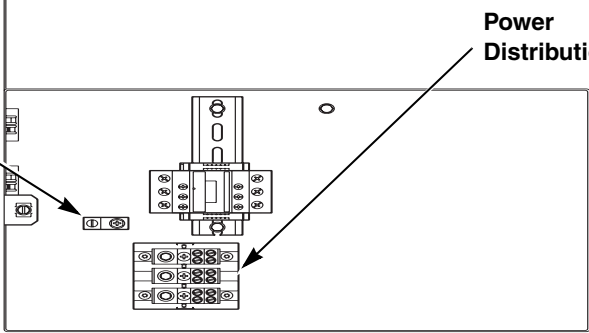
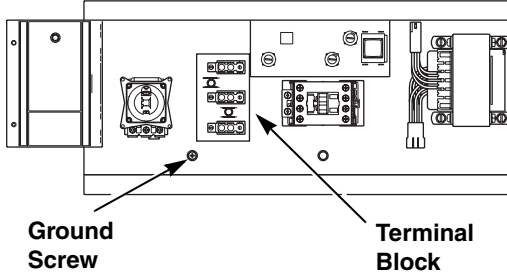
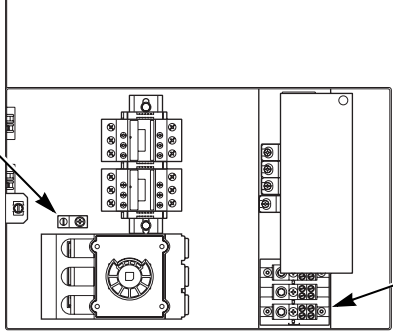
Model	Heat Source	Ground and Terminal Block Locations
Non-CE	Gas or Steam	 <p>Ground Screw</p> <p>Terminal Block</p> <p>Control Tray</p> <p>TMB2127N</p>
Non-CE	Electric	 <p>Ground Lug</p> <p>Power Distribution Block</p> <p>Accessory Box (located below control tray)</p> <p>NOTE: Do not make service connections in control tray.</p> <p>TMB2128N</p>
CE	Gas or Steam	 <p>Ground Screw</p> <p>Terminal Block</p> <p>TMB2129N</p>
CE	Electric	 <p>Ground Lug</p> <p>Power Distribution Block</p> <p>TMB2130N</p>

Figure 18

Electrical Requirements

Connecting Electrical Service

The following steps outline the procedure for connecting electrical service to the tumbler.

- **3 Phase Models – Each tumbler must be connected to its own individual branch circuit breaker, not fuses, to avoid the possibility of “single phasing” and causing premature failure of the motor(s).**
- **Electrical service must be connected using the appropriate permanent rigid metal conduit system.**
- **Service conductors must be copper only.**

For an existing service, determine your service voltage and conductor amperage. Carefully review the tumbler serial plate ratings and *Electrical Requirements* section of this manual. If service is inadequate it must be upgraded by a qualified electrical contractor. Never connect an improper or inadequate service to any machine.

Configuring Your Tumbler for Other Service Voltages

Several gas and steam tumbler models have been designed to be field convertible to other service voltages. Refer to *Table 8* for these models:

If your Serial Plate voltage is:	Your tumbler can be converted to the following voltages:
120 Volt/60 Hertz/ 1 Phase	208-240 Volt/60 Hertz/ 1 Phase
200-220 Volt/60 Hertz/ 1 Phase	100 Volt/60 Hertz/ 1 Phase
200 Volt/50 Hertz/ 1 Phase	100 Volt/50 Hertz/ 1 Phase
240 Volt/60 Hertz/ 3 Phase	200-208 Volt/60 Hertz/ 3 Phase
380 Volt/50 Hertz/ 3 Phase	400-415 Volt/50 Hertz/ 3 Phase

Table 8

NOTE: Electric models are not field convertible and must be connected to service specified on serial plate.

If tumbler requires conversion for use on another service voltage, complete the steps detailed in the *Conversion Instructions* section **prior to connecting service to machine.**

If tumbler does not require conversion or has been converted according to the *Conversion Instructions* section of this manual, continue with step 1.

NOTE: The wiring diagram is located inside the junction or contactor box.

1. For new service, install a circuit breaker or fused disconnect of proper voltage and current rating as close to each tumbler as possible.
2. Route service conduit from service breaker panel or disconnect panel to tumbler service connection box. Conduit routing should not obstruct access for maintenance or servicing. Refer to *Service/ Ground Location*.
3. Pull conductors through conduit and attach to circuit breaker and ground connection. Secure service ground wire to the grounding screw or lug. Attach service conductors to appropriately labeled positions on the terminal block. Make sure all connections are secure.
4. Complete ferrite installation instructions for all gas and steam OPL Micro.
5. Check electrical service phase sequence (3 Phase models only) as follows:
 - a. Energize the electrical service and momentarily start the tumbler. Check the direction of cylinder rotation. If the cylinder rotates clockwise as viewed from the front, the phase sequence is correct. If the cylinder rotates counterclockwise, proceed with step b.
 - b. Disconnect power to machine, disconnect and reverse the L1 and L2 connections on the terminal block.

Conversion Instructions

If serial plate voltage is:	Tumbler can be converted to the following voltages:
<p>120 Volt/60 Hertz/ 1 Phase 2W&G</p>	<p>208-240 Volt/60 Hertz/1 Phase Models: 3W&G</p> <ol style="list-style-type: none"> Prior to connecting service, locate the black/red wire which runs between terminal block and the motor relay or contactor. Refer to figure below. <div data-bbox="630 468 1336 779" style="text-align: center;"> </div> <p style="text-align: right;">T3811</p> <ol style="list-style-type: none"> Disconnect the black/red lead from L1 of the terminal block and connect to L2 of the terminal block. Sign and date conversion sticker located on back of tumbler. Follow the instructions covered in <i>Connecting Electrical Service</i> section.
<p>240 Volt/60 Hertz/ 3 Phase 3W&G</p>	<p>200-208 Volt/60 Hertz/3 Phase Models: 3W&G</p> <ol style="list-style-type: none"> Prior to connecting electric service, locate transformer configuration jumper in junction box area. Remove the 240 Volt jumper and replace it with the 208 Volt jumper located in the literature packet in cylinder. Sign and date conversion sticker located on back of tumbler. Follow the instructions covered in <i>Connecting Electrical Service</i> section.

Electrical Requirements

If serial plate voltage is:	Tumbler can be converted to the following voltages:
<p>200-220 Volt/60 Hertz/ 1 Phase</p> <p>2W&G</p> <p>200 Volt/50 Hertz/ 1 Phase</p> <p>2W&G</p>	<p>100 Volt/60 Hertz/1 Phase INTERNATIONAL Models: 2W&G</p> <p>100 Volt/50 Hertz/1 Phase INTERNATIONAL Models: 2W&G</p> <ol style="list-style-type: none"> 1. Prior to connecting electric service, locate transformer configuration jumper in junction box area. 2. Remove the 208 Volt jumper and replace it with the 100 Volt jumper located in the literature packet from cylinder. 3. Remove small access cover from back of the fan motor. Locate the two internal jumper wires, brown and blue connected to motor terminals #6 and #2. Move brown wire from terminal #6 to terminal #2 and blue wire from terminal #2 to terminal #4. Be careful not to confuse light blue motor harness wire with the dark blue internal jumper. 4. Carefully check motor wire connections with wiring diagram and verify that the motors are configured for low voltage operation before replacing covers. 5. Sign and date conversion sticker located on back of tumbler. 6. Follow the instructions covered in <i>Connecting Electrical Service</i> section.
<p>380 Volt/50 Hertz/ 3 Phase</p> <p>3W&G</p>	<p>400-415 Volt/50 Hertz/3 Phase Models: 3W&G</p> <ol style="list-style-type: none"> 1. Prior to connecting electric service, locate transformer configuration jumper in junction box area. 2. Remove the 380 Volt jumper and replace it with the 415 Volt jumper located in the literature packet from cylinder. 3. Sign and date conversion sticker located on back of tumbler. 4. Follow the instructions covered in <i>Connecting Electrical Service</i> section.

Ferrite Ring Installation

Gas and Steam OPL Micro Control Models Only

The ferrite ring provided in the literature packet must be installed over the power leads during connection of electrical service. The ferrite protects the sensitive electronic controls from destructive electrical disturbances which may be present on power lines to the machine. Failure to properly install the ferrite ring may result in damage to the electronic controls and will void control warranty.

To Install:

1. Immediately after connection of power leads and before applying power to machine, locate each of the incoming service leads including ground.
2. Snap the ferrite ring closed over all of the service leads inside of the control tray as shown. It is important that the ferrite ring be installed inside the control tray. Refer to *Figure 19*. Do not install the ferrite outside of the box or other area. Make sure that service leads are in the center of the ferrite before closing the ring so as not to pinch or damage leads.

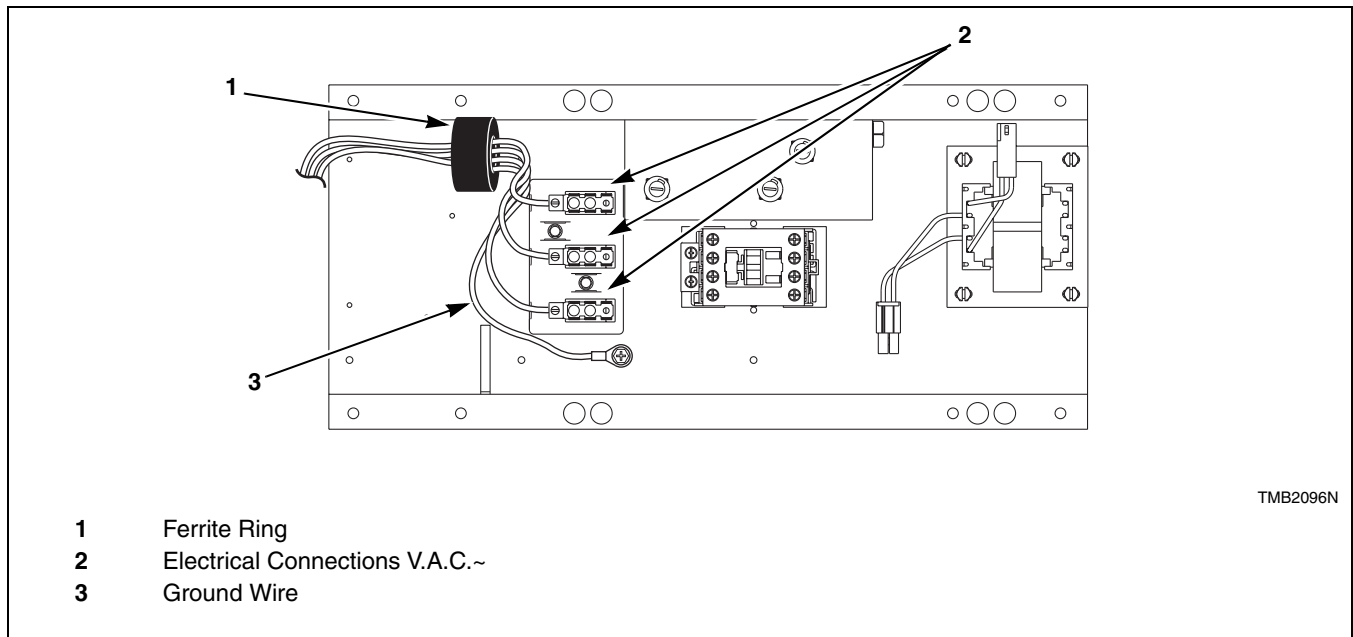


Figure 19

Electrical Requirements

Electrical Requirements for Gas and Steam Models

Refer to *Table 9* and *Table 10*.

NOTE: Minimum wire sizes are obtained from Canadian Electrical Code for 75°C Conductors and are intended for use as a guideline only. Electrical connections should be made only by a qualified electrical contractor in accordance with all applicable local and national requirements.

NOTE: Electrical specifications below are subject to change without notice. Always refer to product serial plate for most current specifications of product being installed.

NOTE: Use copper conductors only.

NOTE: 3 Phase Only – Each tumbler must be connected to its own individual branch circuit breaker, not fuses, to avoid the possibility of “single phasing” and causing premature failure of the motor(s).

For 25, 30 and 35 Pound Gas and Steam Models:

Serial Plate Voltage	Terminal Block Connections Required	Current (Amps)	Recommended Fuse or Breaker Rating (Amps)	Breaker Poles	Recommended Minimum Conductor Size [AWG (mm ²)]
120V/60Hz/1ph	L1, Neutral, and ground	12.0	15	1	14 (2.08)
208-240V/60Hz/1ph	L1, L2, Neutral, and ground	6.7	10	2	14 (2.08)
120V/60Hz/1ph	L1, Neutral, and ground	7.5**	10	1	14 (2.08)
208-240V/60Hz/1ph	L1, L2, Neutral, and ground	4.5**	10	2	14 (2.08)
100V/60Hz/1ph	L1, Neutral, and ground	11.0	15	1	14 (2.08)
200-220V/60Hz/1ph	L1, Neutral, and ground	5.8	10	1	14 (2.08)
100V/50Hz/1ph	L1, Neutral, and ground	12.1	20	1	12 (3.31)
200V/50Hz/1ph	L1, Neutral, and ground	7.5	10	1	14 (2.08)
230-240V/50Hz/1ph	L1, Neutral, and ground	7.5	10	1	14 (2.08)
200-208V/60Hz/3ph	L1, L2, L3, and ground	3.2	10*	3	14 (2.08)
240V/60Hz/3ph	L1, L2, L3, and ground	3.2	10*	3	14 (2.08)
200V/50Hz/3ph	L1, L2, L3, and ground	2.9	10*	3	14 (2.08)
230-240V/50Hz/3ph	L1, L2, L3, and ground	3.5	10*	3	14 (2.08)
380V/50 or 60Hz/3ph	L1, L2, L3, and ground	1.5	10*	3	14 (2.08)
400-415V/50Hz/3ph	L1, L2, L3, and ground	1.6	10*	3	14 (2.08)
460-480V/60Hz/3ph	L1, L2, L3, and ground	1.6	10*	3	14 (2.08)

* 3 Phase machines should not have fuses, breakers only.

** Special low Amp blower model, 25 Pound only

Table 9

For 55 Pound Gas Models:

Serial Plate Voltage	Terminal Block Connections Required	Current (Amps)	Recommended Fuse or Breaker Rating (Amps)	Breaker Poles	Recommended Minimum Conductor Size [AWG (mm ²)]
120V/60Hz/1ph	L1, Neutral, and ground	9.2	15	1	14 (2.08)
208-240V/60Hz/1ph	L1, L2, Neutral, and ground	6.5	10	2	14 (2.08)
100V/60Hz/1ph	L1, Neutral, and ground	9.8	15	1	14 (2.08)
200-220V/60Hz/1ph	L1, Neutral, and ground	4.9	10	1	14 (2.08)
100V/50Hz/1ph	L1, Neutral, and ground	9.8	15	1	14 (2.08)
200-208V/60Hz/3ph	L1, L2, L3, and ground	4.0	10*	3	14 (2.08)
240V/60Hz/3ph	L1, L2, L3, and ground	3.9	10*	3	14 (2.08)

* 3 Phase machines should not have fuses, breakers only.

Table 10

Electrical Requirements

Electrical Requirements for Electric Models

Refer to *Tables 11, 12, 13 and 14.*

NOTE: Minimum wire sizes are obtained from Canadian Electrical Code Table 2 for 75°C Conductors and are intended for use as a guideline only. Electrical connections should be made only by a qualified electrical contractor in accordance with all applicable local and national requirements.

NOTE: Electrical specifications below are subject to change without notice. Always refer to product serial plate for most current specifications of product being installed.

NOTE: Use copper conductors only.

NOTE: 3 Phase Only – Each tumbler must be connected to its own individual branch circuit breaker, not fuses, to avoid the possibility of “single phasing” and causing premature failure of the motor(s).

For 9 kW 25 Pound Electric Models:

Serial Plate Voltage	Terminal Block Connections Required	Current (Amps)	Recommended Fuse or Breaker Rating (Amps)	Breaker Poles	Recommended Minimum Conductor Size [AWG (mm ²)]
400V/50Hz/3ph	L1, L2, L3, and ground	16	20*	3	12 (3.31)

For 12 kW 25 Pound Electric Models:

Serial Plate Voltage	Terminal Block Connections Required	Current (Amps)	Recommended Fuse or Breaker Rating (Amps)	Breaker Poles	Recommended Minimum Conductor Size [AWG (mm ²)]
208V/60Hz/1ph	L1, L2, Neutral, and ground	64	80	2	4 (21.2)
240V/60Hz/1ph	L1, L2, Neutral, and ground	57	80	2	4 (21.2)
200V/50Hz/1ph	L1, Neutral, and ground	63	80	1	4 (21.2)
230-240V/50Hz/1ph	L1, Neutral, and ground	58	80	1	4 (21.2)
200-208V/60Hz/3ph	L1, L2, L3, and ground	37	50*	3	6 (13.3)
200V/50Hz/3ph	L1, L2, L3, and ground	36	50*	3	6 (13.3)
230-240V/50Hz/3ph	L1, L2, L3, and ground	33	50*	3	6 (13.3)
240V/60Hz/3ph	L1, L2, L3, and ground	33	50*	3	6 (13.3)
380V/50 or 60Hz/3ph	L1, L2, L3, and ground	20	25*	3	10 (5.26)
400-415V/50Hz/3ph	L1, L2, L3, and ground	18	25*	3	10 (5.26)
460-480V/60Hz/3ph	L1, L2, L3, and ground	16	25*	3	10 (5.26)

* 3 Phase machines should not have fuses, breakers only.

Table 11

For 21 kW 30 Pound Electric Models:

Serial Plate Voltage	Terminal Block Connections Required	Current (Amps)	Recommended Fuse or Breaker Rating (Amps)	Breaker Poles	Recommended Minimum Conductor Size [AWG (mm ²)]
208V/60Hz/1ph	L1, L2, Neutral, and ground	108	150	2	1/0 (53.5)
240V/60Hz/1ph	L1, L2, Neutral, and ground	94	125	2	1 (42.4)
200V/60Hz/1ph	L1, Neutral, and ground	108	150	1	1/0 (53.5)
200V/50Hz/1ph	L1, Neutral, and ground	105	150	1	1/0 (53.5)
230-240V/50Hz/1ph	L1, Neutral, and ground	95	125	1	1 (42.4)
200-208V/60Hz/3ph**	L1, L2, L3, and ground	62	80*	3	4 (21.2)
200V/50Hz/3ph**	L1, L2, L3, and ground	60	80*	3	4 (21.2)
230-240V/50Hz/3ph**	L1, L2, L3, and ground	55	70*	3	4 (21.2)
240V/60Hz/3ph**	L1, L2, L3, and ground	54	70*	3	4 (21.2)
380V/50 or 60Hz/3ph**	L1, L2, L3, and ground	33	45*	3	8 (8.37)
380V/50 or 60Hz/3ph (035E Model)	L1, L2, L3, and ground	34	45*	3	8 (8.37)
400-415V/50Hz/3ph**	L1, L2, L3, and ground	31	40*	3	8 (8.37)
460-480V/60Hz/3ph**	L1, L2, L3, and ground	27	35*	3	8 (8.37)

* 3 Phase machines should not have fuses, breakers only.

** These serial plate voltages are only options available on the 30 pound electric models.

Table 12

Electrical Requirements

For 24 kW 35 Pound Electric Models:

Serial Plate Voltage	Terminal Block Connections Required	Current (Amps)	Recommended Fuse or Breaker Rating (Amps)	Breaker Poles	Recommended Minimum Conductor Size [AWG (mm ²)]
208V/60Hz/1ph	L1, L2, Neutral, and ground	122	175	2	2/0 (67.5)
240V/60Hz/1ph	L1, L2, Neutral, and ground	107	150	2	1/0 (53.5)
200V/60Hz/1ph	L1, Neutral, and ground	122	175	1	2/0 (67.5)
200V/50Hz/1ph	L1, Neutral, and ground	119	150	1	1/0 (53.5)
230-240V/50Hz/1ph	L1, Neutral, and ground	108	150	1	1/0 (53.5)
200-208V/60Hz/3ph	L1, L2, L3, and ground	71	90*	3	3 (26.7)
200V/50Hz/3ph	L1, L2, L3, and ground	65	90*	3	3 (26.7)
230-240V/50Hz/3ph	L1, L2, L3, and ground	62	80*	3	4 (21.2)
240V/60Hz/3ph	L1, L2, L3, and ground	62	80*	3	4 (21.2)
380V/50 or 60Hz/3ph	L1, L2, L3, and ground	38	50*	3	6 (13.3)
400-415V/50Hz/3ph	L1, L2, L3, and ground	35	45*	3	8 (8.37)
460-480V/60Hz/3ph	L1, L2, L3, and ground	31	40*	3	8 (8.37)

* 3 Phase machines should not have fuses, breakers only.

Table 13

For 27kW 55 Pound electric Models:

Serial Plate Voltage	Terminal Block Connections Required	Current (Amps)	Recommended Fuse or Breaker Rating (Amps)	Breaker Poles	Recommended Minimum Conductor Size [AWG (mm ²)]
208V/60Hz/1ph	L1, L2, Neutral, and ground	129	175	2	2/0 (67.5)
240V/60Hz/1ph	L1, L2, Neutral, and ground	115	150	2	1/0 (53.5)
200V/60Hz/1ph	L1, Neutral, and ground	122	175	1	2/0 (67.5)
200-208V/60Hz/3ph	L1, L2, L3, and ground	79	90*	3	3 (26.7)
240V/60Hz/3ph	L1, L2, L3, and ground	65	80*	3	4 (21.2)

* 3 Phase machines should not have fuses, breakers only.

Table 14

Steam Requirements

NOTE: Machines require a constant 80 to 100 psig (5.62 to 7.03 kg/sq. cm) steam service for optimum operation. The maximum allowable steam pressure for use with 60 Hertz or 50 Hertz tumblers is 125 psig (8.6 bar). In no case may the pressure exceed the above value.

Obtain specific steam service pipe sizes from the steam system supplier or a qualified steam fitter.

- Refer to *Figure 20* for proper steam pipe configurations.
- To prevent condensate draining from headers to tumbler, piping should have a minimum 12 inch (305 mm) rise above respective header. Do not make steam connection to header with a horizontal or downward facing tee or elbow.
- Whenever possible, horizontal runs of steam lines must drain, by gravity, to respective steam header. Water pockets, or an improperly drained steam header, will provide wet steam, causing improper operation of tumbler. If pockets or improper drainage cannot be eliminated, install a bypass trap to drain condensate from the low point in the steam header to the return.
- In both steam supply and steam return line, it is recommended that each have a pipe union and shut-off valve. This will enable you to disconnect the steam connections and service the tumbler while your laundry facility is in operation.
- Connect the steam solenoid valve to the related steam coil inlet connection with nipples, flex hoses, unions and tee.
- Strainers may require cleaning due to materials from hoses or pipes.
- Install vacuum breaker (optional), bucket trap with built-in strainer and check valve. For successful operation of tumbler, install trap 18 inches (457 mm) below coil and as near to the tumbler as possible. Inspect trap carefully for inlet and outlet markings and install according to trap manufacturer's instructions. If steam is gravity returned to boiler, omit trap but install optional vacuum breaker and check valve in return line near tumbler. Gravity return requires entire return plumbing be below steam coil outlet.
- Install union and shut-off valve in return line and make final pipe connections to return header.

NOTE: To prevent water hammering, route return lines below outlets of steam coils.

Piping Recommendations

- Trap each steam coil individually. Always keep the trap clean and in good working condition.
- When tumbler is on the end of a line of equipment, extend header at least 4 feet (1.2 m) beyond tumbler. Install shut-off valve, union, check valve and bypass trap at end of line. If gravity return to boiler, omit trap.
- Insulate steam supply and return line for safety of operator and safety while servicing tumbler.
- Keep tumbler in good working condition. Repair or replace any worn or defective parts.



WARNING

All system components must have a 125 psig (8.6 bar) working pressure. Shut-off valves must be installed upstream of the steam solenoid valve and downstream of each steam trap so components can be isolated for maintenance or emergency purposes.

All components (solenoid valve, traps) must be supported to minimize loads on the tumbler steam coil connections.

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Installing Steam Trap and Making Condensate Return Connections

The steam trap must be installed and the coil outlet connections must be connected to the condensate return lines. The following steps outline the procedure for installing the steam trap and connecting the condensate return lines. Refer to *Figure 20* for typical installations.

1. Use flexible lines between steam inlet solenoid and steam coils, as well as outlet between steam coil and traps.
2. If necessary, install a strainer at the end of each flexible hose.
3. Install a steam trap to each strainer.

IMPORTANT: Steam trap must be installed a minimum of 18 inches (457 mm) below the steam coil outlet connections.

4. Install a shut-off valve to each steam trap.
5. Connect to the condensate return lines.
6. For steam solenoid valve wiring connections, refer to Wiring Diagram supplied with tumbler.



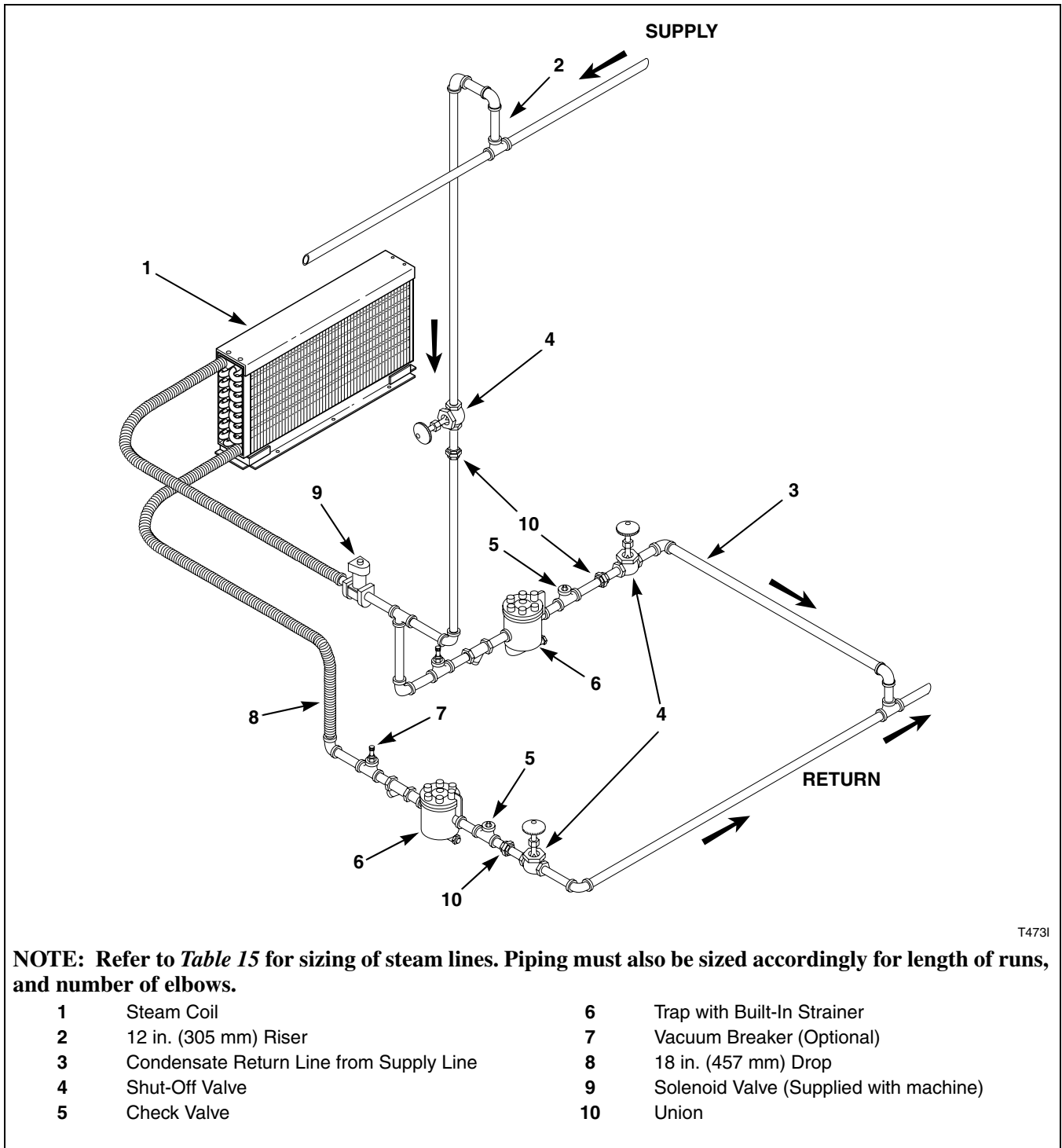
WARNING

The flexible steam hoses connecting the coil outlet connections and steam traps must have a minimum of 125 psig (pounds per square inch gauge) (8.79 kg/sq. cm.) working pressure. A shut-off valve must be installed downstream from each steam trap so the condensate return line can be isolated in event a steam trap requires maintenance.

Each steam trap must be supported so minimum load is exerted on the coil outlet connection.

W066

Steam Requirements



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Figure 20

Model	Steam Pressure PSI (bar)	Minimum Pipe Diameter	Steam Trap Size* (Pounds Condensate/Hour)
25/30 Pound	15-100 (1- 6.9)	3/4 in. NPT	134
35 Pound	15-100 (1- 6.9)	3/4 in. NPT	166

* Based on 100 psi.

Table 15

Adjustments

Loading Door Switch

The door switch should be adjusted so the cylinder stops when door is opened 2 inches (51 mm) plus or minus 0.25 inch (6 mm). This switch is a normally open switch and is closed by the hinge cam when the door is closed. If adjustment is required, refer to *Figure 21* and proceed as follows:

1. Close door and start tumbler, slowly open loading door. Cylinder and heat system should shut off when door is open 2 inches (51 mm) plus or minus 0.25 inch (6 mm).
2. Slowly close the loading door. When door is 2 inches (51 mm) from being fully closed, the door switch actuating bracket (located on the door) should depress the button and the switch arm with an audible “click.”
3. If the actuating bracket does not operate the switch at the appropriate door closure, bend the actuating switch arm in or out to achieve proper actuation.

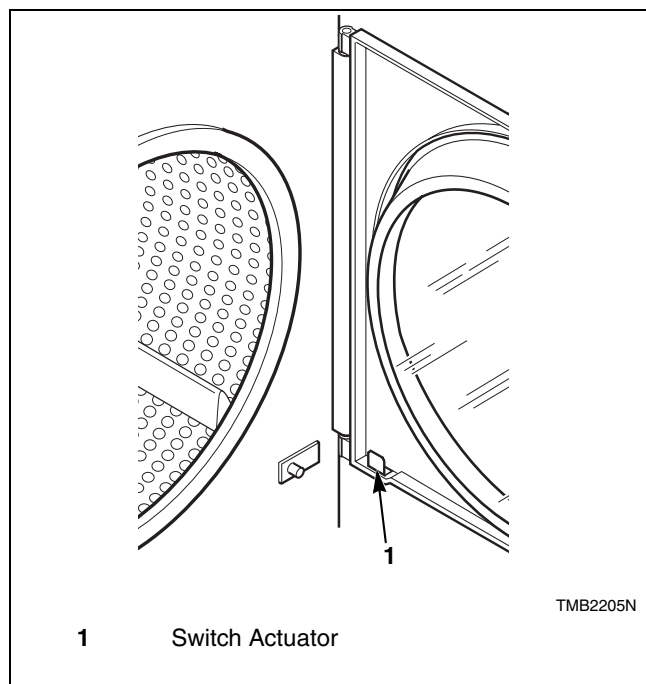


Figure 21

Airflow Switch

The airflow switch is set at the factory for proper operation. No adjustment necessary.

The airflow switch operation may be affected by shipping tape still in place, lack of make-up air, or an obstruction in the exhaust duct. These should be checked and the required corrective action taken.

	WARNING
The tumbler must not be operated if the airflow switch does not operate properly. Faulty airflow switch operation may cause an explosive gas mixture to collect in the tumbler.	
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IMPORTANT: Airflow switch vane must remain closed during operation. If it opens and closes during the drying cycle, this indicates insufficient airflow through the tumbler. If switch remains open, or pops open and closed during the cycle, the heating system will shut off. The cylinder and fan will continue to operate even though the airflow switch is indicating insufficient airflow.

NOTE: To properly mount the airflow switch bracket, or in case of a load not drying, the airflow switch bracket may need to be checked for proper alignment. Be sure the locator pins are securely in their respective holes before tightening the bracket mounting screws. This will assure proper alignment of the airflow switch arm in the channel of the airflow switch bracket and prevent binding of the arm.

Adjustments

Door Strike

The door strike must be adjusted to have sufficient tension to hold loading door closed against force of the load tumbling against it. There is proper adjustment of pull force when 8 to 15 pounds (35.6 N – 66.7 N) is required to open door.

If adjustment is required, refer to *Figure 22* and proceed as follows:

To adjust, open door, loosen acorn nut, and turn door strike screw in or out as required. Retighten acorn nut.

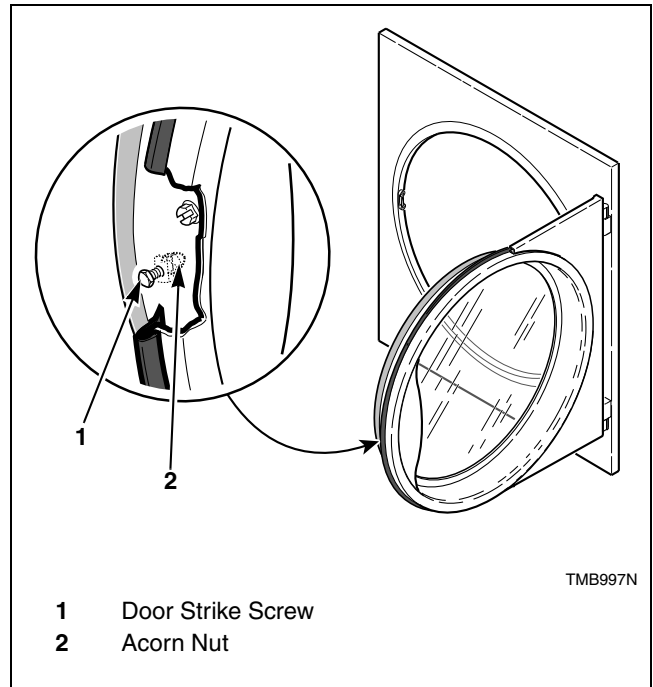


Figure 22

Removing Tumbler from Service

If the tumbler is to be removed from service, perform the following steps where applicable:

- Turn off electrical supply external to machine.
- Turn off electrical disconnect on machine.
- Turn off gas supply external to machine.
- Turn off manual gas shut-off valve on machine.
- Turn off steam supply external to machine.
- Remove all electric, gas and steam connections.