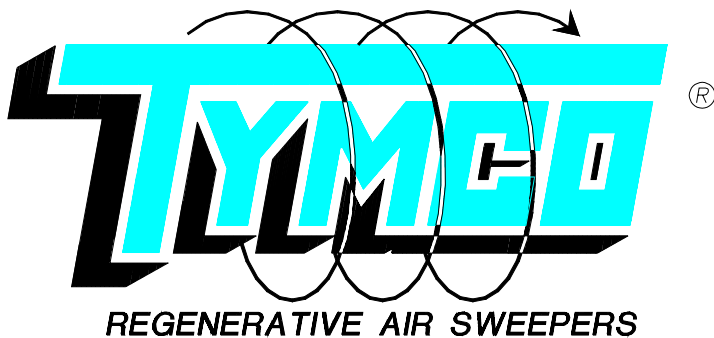
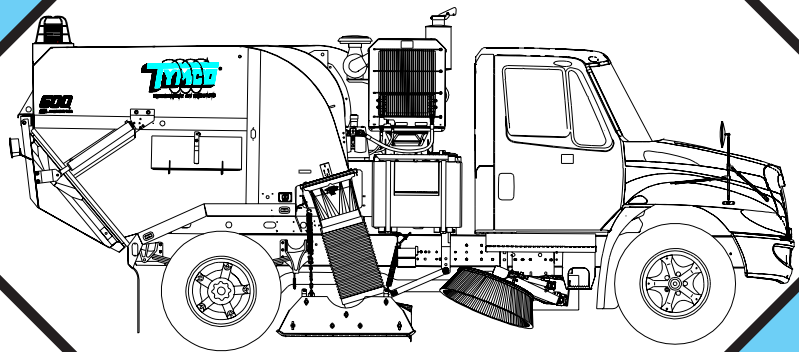


MODEL 600



OPERATOR'S
MANUAL

2008

TYMCO
P.O. BOX 2368, WACO, TEXAS 76703
(Shipping Address)
225 INDUSTRIAL EAST WACO, TEXAS 76705
PHONE: 254-799-5546 • FAX: 254-799-2722
WEB SITE: www.tymco.com
E-MAIL ADDRESS: info@tymco.com



CONGRATULATIONS

You have just purchased the finest AIR SWEEPER produced. Yet, for all of its advanced engineering, in spite of all the skills that have gone into it — your sweeper is only as good as its operator.

TYMCO REGENERATIVE AIR SWEEPER
MODEL 600

SOLD & SERVICED BY:

NOTE: Do not destroy any part of this manual. It contains pertinent information on parts, operation and maintenance of your TYMCO REGENERATIVE AIR SWEEPER and truck chassis.

An informed operator will do a better job. Make sure he/she has an opportunity to study this manual.

This Operator's Manual is the property of TYMCO, and is considered proprietary. It may not be reproduced by photocopying or otherwise without the express written permission of TYMCO. Violators will be prosecuted to the full extent of the law.

Copyright 1995, TYMCO

2008 EDITION

INTRODUCTION

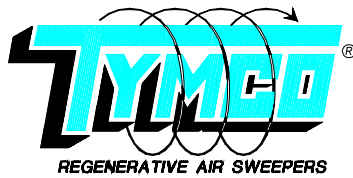
To insure proper understanding of operation, cleaning and maintenance of your TYMCO REGENERATIVE AIR SWEEPER, it is necessary that this Operator's Manual and the Service & Parts Manual be read and studied from cover to cover by the Operator. A full understanding of this equipment will help the operator achieve the results expected of this machine.

Though, seemingly, a very simple machine, the TYMCO REGENERATIVE AIR SWEEPER utilizes air instead of conventional rotary brushes, brooms and conveyers. Aerodynamic problems that arise in the REGENERATIVE AIR SWEEPER are not as easily identified and, therefore, necessitates a complete understanding of the machine.

The TYMCO REGENERATIVE AIR SWEEPER is designed to maintain cleaner surfaces at higher speeds and at lower cost. The performance capability of this truly modern machine is only limited by the initiative of those responsible for its operation. There are many different conditions found in sweeping, and we believe it impossible to answer all of the problems here. Most important in the operation and maintenance of this machine, is that it should be KEPT CLEAN.

The Operator's Manual includes the necessary checks, operating and adjustment procedures needed by the operator from day to day. For any specific adjustment, problem, or maintenance checks not explained in this manual, please refer to the Service & Parts Manual.

KEEP OUR STREAMS AND RIVERS CLEAN — PICK IT UP WITH YOUR TYMCO



Operating Procedure Guidelines

Complete Sweeper Inspection

- Check Auxiliary Engine Oil and Coolant
- Check for Seal leaks
- Check Warning and Work Lights
- Inspect Pick-Up Head
- Check Gutter Broom
- Adjust Mirrors
- Fill Fuel Tank
- Fill Water System

Sweeper Start-Up Procedures

1. Start Rear Engine (Must be in idle)
2. Turn on Warning Lights
3. Turn on Water System
4. Lower Pick-Up Head
5. Pull Sweeper forward to tuck Pick-Up Head Curtains
6. Throttle up Auxiliary Engine RPM to desired levels
7. Lower Gutter Broom(s)
8. Begin sweeping
9. **DO NOT BACK UP WITH PICK-UP HEAD DOWN.** Throttle down, raise head then back up. (Optional Reverse Pick-Up Head Chains allow you to back up with the head down.)

CNG Option Start-Up

1. *Slowly open fuel service valve on each CNG fuel tank, if not already open.*
 2. *Slowly open fuel shutoff valves 1/4 turn.*
 3. *Start engine and idle for five minutes to allow time for warm-up before engaging transmission.*
 4. *Start auxiliary engine and idle for five minutes to allow time for warm-up before raising RPM.*
- NOTE: This procedure supplements the sweeper Start-Up Procedure above. Read and comply with both.**

Leaf Pressure Bleeder Procedures

- Closed for heavy debris such as Sand, Gravel, Dirt; Etc. (Use BAH when necessary)
- Open 100% when sweeping light debris such as Leaves, Paper Cups, Etc.
- Adjust opening 25% to 75% for mixed debris

Sweeper Shutdown Procedures

1. Lower Auxiliary Engine RPM to idle speed (1000 RPM)
2. Raise Gutter Brooms - (Must hold switch in the up position to fully retract gutter broom)
3. Raise Pick-Up Head - (Must hold switch to retract to the travel position)
4. Turn off Water System
5. Turn off Warning Lights
6. Turn off Auxiliary Engine

CNG Option Shutdown

1. *Bring all sweeper components to their stowed position.*
 2. *Lower engine RPM to idle on both engines for a minimum of 3 minutes to allow engine to cool down.*
 3. *Ignition switches may now be turned off.*
- NOTE: If sweeper is to be parked in an enclosed area, close both 1/4 turn fuel shutoff valves and allow engines to run until both shut down due to fuel starvation, then close the service valve on each CNG tank. This procedure supplements the sweeper Shutdown Procedure above. Read and comply with both.**

Wash Out Procedures (DAILY)

- Clean Hopper Screens
- Clean out Hopper
- Clean out Dust Separator
- Clean under Pick-Up Head
- Wash exterior of Sweeper and Chassis
- Wash off Radiators

Parking Procedures

- Raise Hopper and lower on 2x4 Wood Blocks - Do not close rear door (Model 210 - 435)
- Leave Hopper Door and Inspection Door(s) open (All Model 600s)

TYMCO REGENERATIVE AIR SWEEPER INSPECTION AND REPETITIVE TASK SCHEDULE

INSPECT	MODEL			
	600	500X	435	210
GUTTER BROOM(S) FOR IMPACT DAMAGE/WEAR	D	D	D	D
PICK-UP HEAD BLAST ORIFICE FOR LODGED FOREIGN MAT'L/ADJUSTMENT	D	D	D	D
PICK-UP HEAD TURNING VANES FOR WEAR/FOREIGN MATERIAL	100 HRS	100 HRS	100 HRS	100 HRS
PICK-UP HEAD SKID PLATES FOR WEAR AND IMPACT DAMAGE	D	D	D	D
PICK-UP HEAD CURTAINS FOR WEAR/DAMAGE	D	D	D	D
PRESSURE AND SUCTION HOSES FOR WEAR	100 HRS	100 HRS	100 HRS	100 HRS
HYDRAULIC SYSTEM FOR PLUMBING OR COMPONENT LEAKAGE	D	D	D	D
WATER PUMP OIL LEVEL (IF APPLICABLE)	D	D	D	D
WATER FILLER HOSE FILTER SCREEN	D	D	N/A	N/A
WATER PUMP SUCTION HOSE PRE-FILTER	D	D	D	D
ALL HOPPER AND TRANSITION SEALS FOR WEAR/DAMAGE	D	D	D	D
HOPPER SCREEN FOR DAMAGE	D	D	D	D
DUST SEPARATOR LINER FOR WEAR/DAMAGE	D	D	N/A	N/A
DUST SEPARATOR DOOR CLOSED BEFORE OPERATING	D	D	N/A	N/A
BLOWER WHEEL FOR WEAR/DAMAGE	100 HRS	100 HRS	100 HRS	100 HRS
ACCESSIBLE AREAS OF BLOWER HOUSING LINER FOR WEAR/DAMAGE	100 HRS	100 HRS	100 HRS	100 HRS
BLOWER LIP FOR WEAR/DAMAGE	100 HRS	100 HRS	100 HRS	100 HRS
ENGINE AIR INTAKE FILTER RESTRICTION INDICATORS	D	D	D	D
MOUNT TRUCK TIRES	D	D	D	D

PERFORM	MODEL			
	600	500X	435	210
ADJUSTMENT OF GUTTER BROOM(S)	A/R	A/R	A/R	A/R
CLEANING OF GUTTER BROOM TORQUE MOTOR SHAFT AREA	D	D	D	D
ROTATE PRESSURE AND SUCTION HOSES 1/4 TURN	75 HRS	75 HRS	75 HRS	75 HRS
CHECK OF HYDRAULIC TANK FLUID LEVEL	D	D	D	D
CHANGE OF HYDRAULIC SYSTEM FILTER	100 HRS	100 HRS	100 HRS	100 HRS
TANK BREATHER FILTER	N/A	100 HRS	N/A	N/A
RETURN LINE FILTER - RESTRICTION INDICATOR	N/A	100 HRS	N/A	N/A
CHARGE LOOP FILTER - RESTRICTION INDICATOR	N/A	100 HRS	N/A	N/A
HYDRAULIC SYSTEM OIL CHANGE NOTE: INITIAL CHANGE AT 100 HRS	1000 HRS	1000 HRS	1000 HRS	1000 HRS
CHANGE OF WATER PUMP OIL (IF APPLICABLE)	150 HRS	150 HRS	150 HRS	150 HRS
CLEANING OF SPRAY NOZZLE TIPS AND SCREENS	A/R	A/R	A/R	A/R
DRAIN WATER TANK	D	D	D	D
CLEANING OF HOPPER AND DUST SEPARATOR CHAMBER	D	D	D	D
AUXILIARY ENGINE FLUID LEVEL CK.	D	D	D	D
WASHDOWN OF ENGINE RADIATOR(S)	D	D	D	D
FUNCTIONAL TEST SWEEPER LIGHTS	D	D	D	D
FUNCTIONAL TEST OF TRUCK BRAKES	D	D	D	D
FUNCTIONAL TEST OF TRUCK LIGHTS	D	D	D	D
MOUNT TRUCK FLUID LEVEL CHECK	D	D	D	D

D = DAILY
HRS = HOURLY INTERVALS
A/R = AS REQUIRED



TABLE OF CONTENTS

TYMCO REGENERATIVE AIR SYSTEM	1
TYMCO SWEEPER Capabilities.	1
Detailed Drawing.	3
Console Control Panel	4
Quick Reference Service Chart.	5
Hopper Assembly	6
Blower Assembly	10
Hydraulic System	14
Gutter Broom	16
Pick-Up Head	20
Pressure Bleeder	25
Dust Control System	26
Hand Hose Operation	28
Auto Sweep Interrupt (ASI).	30
Warranty	31

THE TYMCO REGENERATIVE AIR SYSTEM

DESCRIPTION

The blower generates a constant blast of high velocity air that is directed down the pressure side of the machine and into the pick-up head. Blast air travels across the pick-up head, picking up normal debris and refuse in its path and sending it up the suction side of the machine.

At the same time that the blower is directing pressure down the pressure side, it is taking air from inside the hopper, creating a suction; and consequently, it pulls debris up into the hopper. The debris is deposited into the hopper while dusty air passes through the screen to a multipass, centrifugal dust separator. The fines are then deposited back into the hopper through the skimmer slot. Air, containing very fine dust, then moves into the blower and repeats its cycle.

The unique REGENERATIVE AIR SWEEPER uses no restricting filters, resulting in more energy to do your work. Since the blower is used to push and pull, restriction due to clogging or modification to any of the air passages will greatly affect the sweeper's performance. In other words, PRESSURE FOR THE BLAST depends on ample volume of air through the suction; SUCTION depends on the discharge of air from the blast orifice.

Another point to consider is the fact that a very small air leak at the dump door, inspection doors, hand hose door, or suction hose will often cause a dusty condition. If the leak is severe enough, air will have a slower velocity and performance will be lowered.

**DO NOT ALLOW EVEN A SMALL AIR LEAK
CLEAN FRESH AIR DRAWN IN WILL BE DISCHARGED AS DUST**

TYMCO REGENERATIVE AIR SWEEPER CAPABILITIES

We at TYMCO honestly believe that government officials, contractors and all personnel directly responsible for the performance and maintenance of equipment in their charge are concerned with all phases of their operation.

Sweepers are one of the most controversial pieces of equipment with reference to operating cost, performance, and maintenance. The general public does not realize the problems and depends on people knowledgeable in this area. You, therefore, the person responsible for the performance and maintenance of the sweeper should use your knowledge and experience to achieve the results expected.

The TYMCO REGENERATIVE AIR SWEEPER can achieve your anticipated results while keeping cost at a minimum. However, to realize the full potential of the *TYMCO REGENERATIVE AIR SWEEPER*, *YOU MUST UNDERSTAND ITS CAPABILITIES AND ADHERE CLOSELY TO OPERATING AND JOB FUNCTIONS FOR WHICH IT WAS DESIGNED.*

It is a fact that a licensed driver can operate this equipment; however, we strongly recommend that the same driver operate it daily. It is proven that ability on the equipment is increased with experience. We suggest that every operator thoroughly read and study the manual to make sure that he/she understands its operation before ever attempting to operate the sweeper. It is very important that every new operator be given this opportunity and that he does not rely solely on methods of previous operators.

A TYMCO REGENERATIVE AIR SWEEPER can be expected to clean normal debris that may accumulate on streets, parking lots, and other flat paved surfaces. Using the machine for more than it was originally designed will cause excessive wear and failure to achieve the desired results.

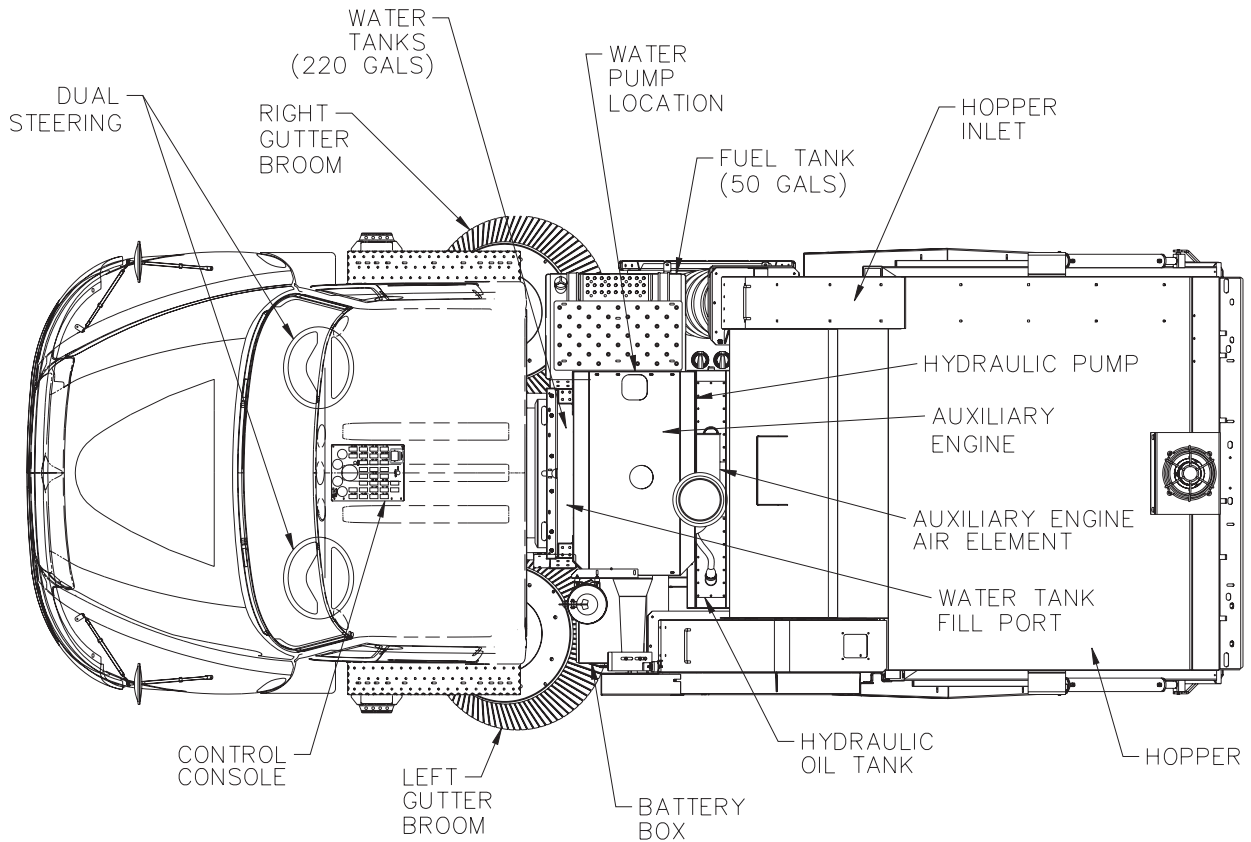
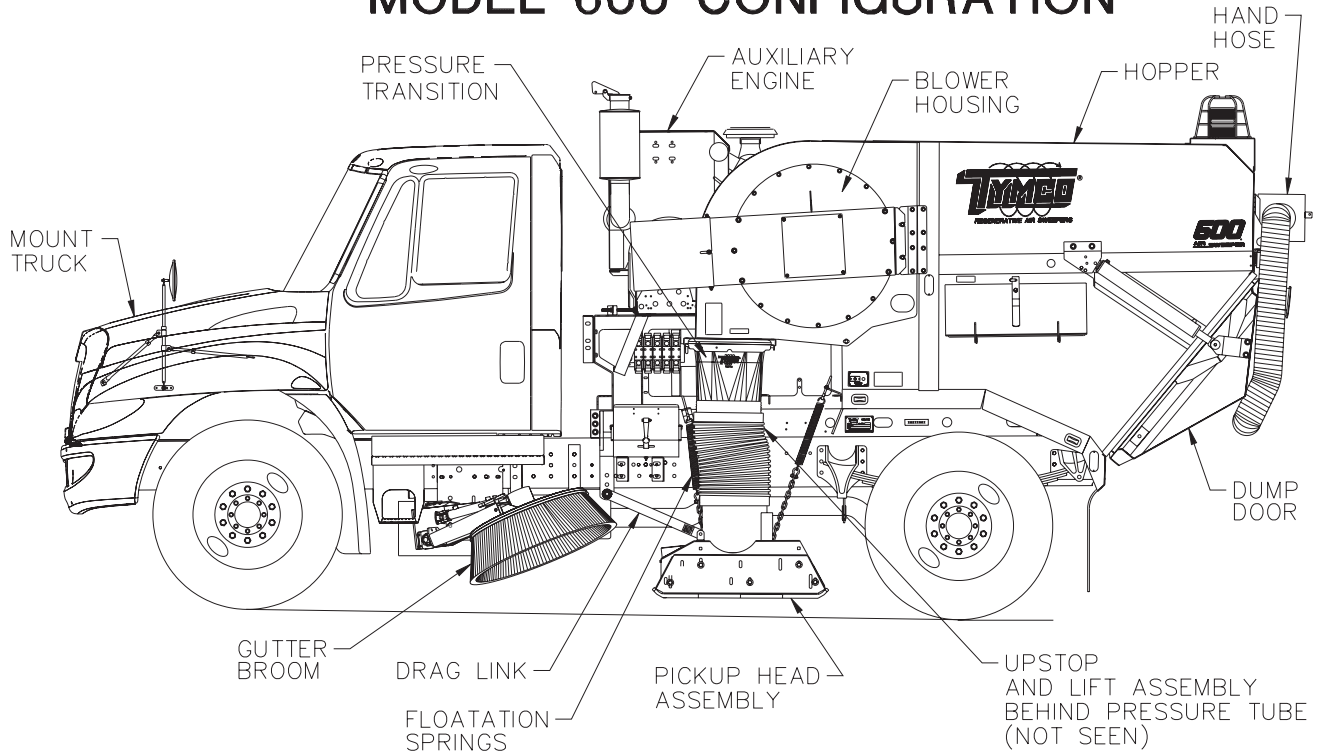
This sweeper is not a Vacuum Cleaner. Cleaning is actually done by a stream of high velocity air the full width of the pick-up head. A blower furnishes both pressure and suction. Air pressure from the blower passes over the surface being swept within the pick-up head, blows up debris in its path, and the suction pulls it into the hopper, where it is separated. Air continues on into the blower and the cycle is repeated.

The TYMCO REGENERATIVE AIR SWEEPER is not intended nor is it expected to replace a shovel crew or a front end loader. An inspection at the dump site, however, may reveal that there are rocks and large objects in the hopper. This is due to air currents in the TYMCO REGENERATIVE AIR SYSTEM having the potential to pick up various large objects and retain them. The mixture of light debris will sometimes boost the large objects into the air stream and carry them into the hopper. Objects such as cans, bottles, glass, paper, leaves and light stringy refuse or normal daily accumulation of debris are easily picked up by the sweeper's unique REGENERATIVE AIR SYSTEM.

We can not say what blower RPM or truck speed at which you can achieve your sweeper's full capabilities because of the various types of sweeping encountered. However, engine RPM should not exceed 2000. For parking lot sweeping consisting of paper, broken glass, cans, leaves, etc., engine RPM can be reduced as desired. The sweeper can be operated at truck speeds up to 10 MPH without changing blower RPM. The above limits are intended for smooth wide open spaces that are sparsely scattered with debris. Slower truck speeds are advisable for curb and gutter work or where there are many obstacles. This prevents damage and wear to pick-up head and gutter broom. Faster speeds may be necessary under your particular conditions. However, you may expect considerably more wear, not only by the hour as a result of more coverage, but also by the mile. The heat generated at higher speeds will result in softening of the materials in contact with the surface. We would advise consideration of these facts before allowing high speed operation, overloading and machine neglect.

**SAVE FUEL, REDUCE NOISE, WEAR AND DUST.
OPERATE AT THE LOWEST POSSIBLE R.P.M. TO ADEQUATELY DO THE JOB.**

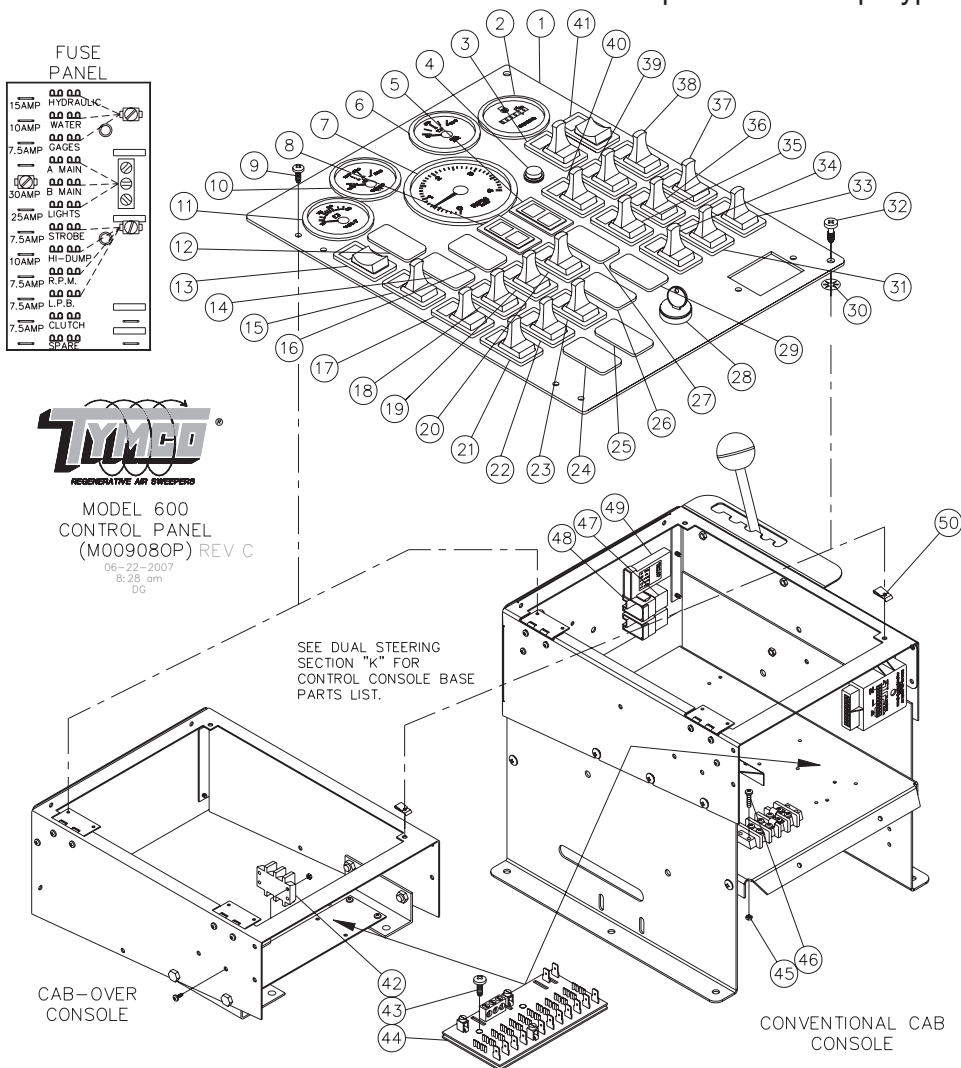
MODEL 600 CONFIGURATION



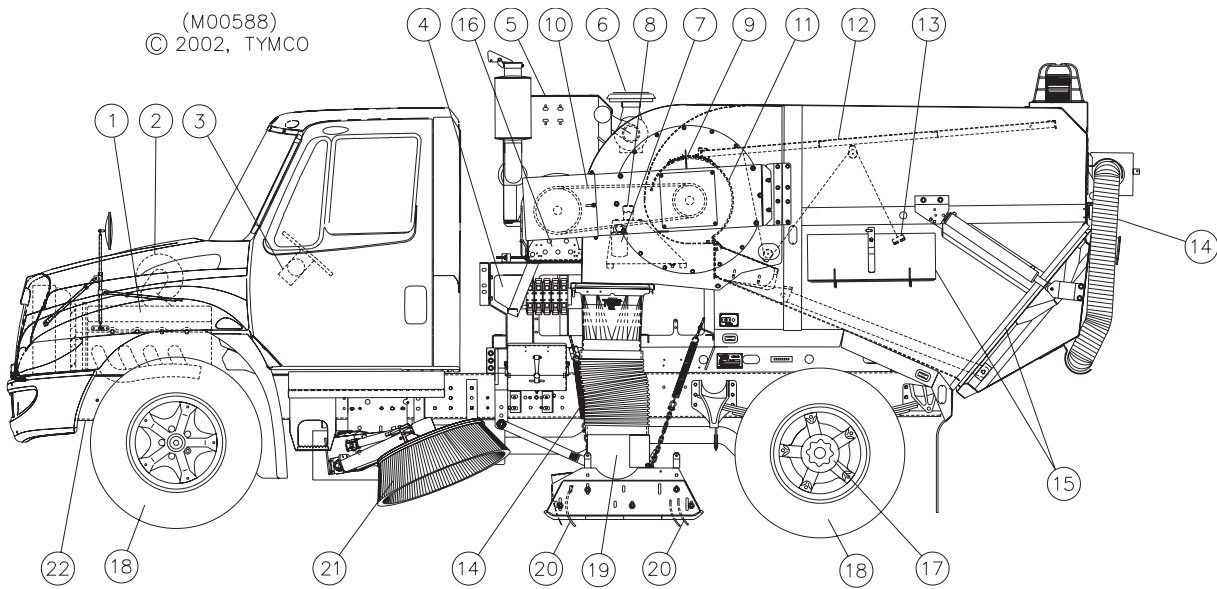
(M00773)
REV A

CONTROL CONSOLE MODEL 600

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. 600 Control Panel w/Decal (Punched) 2. Gauge - Hour Meter 3. Switch - Pick-Up Head 4. Switch - Aux. Hyd. Sys. Run Button 5. Light Indicator - Aux. Hyd./BAH On 6. Gauge - Engine Oil Pressure 7. Gauge - Tachometer 8. Light Indicator - Low Water/Pump On 9. Screw - #10-24 x 1/2 Pan Hd Taptite 10. Gauge - Water Temperature 11. Gauge - Volt Meter 12. Blank - Control Panel 13. Switch - Gutter Broom (LH) 14. Blank - Control Panel 15. Switch - Broom Tilt (LH) 16. Blank - Control Panel 17. Switch - Broom Water (LH) 18. Switch - Hopper Water 19. Switch - Hi/Output Water (LH) 20. Switch - Water System 21. Switch - Broom Light (LH) 22. Switch - Warning Lights 23. Switch - Work Lights 24. Blank - Control Panel 25. Blank - Control Panel | <ol style="list-style-type: none"> 26. Blank - Control Panel 27. Blank - Control Panel 28. Switch - Ignition (Sweeper) 29. Blank - Control Panel 30. Retainer 31. Switch - Pressure Bleeder 32. Screw - Quick Opening Captive - #12 33. Switch - Broom Light (RH) 34. Switch - Engine RPM 35. Switch - Hi/Output Water (RH) 36. Switch - Head Water 37. Switch - Broom Water (RH) 38. Switch - Broom Tilt (RH) 39. Switch - BAH 40. Switch - Auxiliary Hydraulic 41. Switch - Gutter Broom (RH) 42. 2 Pole Terminal Block 43. Screw - #10-24 x 3/4 Self Tap 44. Fuse Panel 45. Bolt - #10-24 x 1 46. Nut - #10-24 Kept 47. Liquid Level Sensor Relay 48. Liquid Level Sensor Relay Receptacle 49. Liquid Level Sensor Module 50. Receptacle - #12 Clip Type "J" |
|--|--|



(M00588)
© 2002, TYMCO



**MODEL 600
QUICK REFERENCE SERVICE CHART
(M00588)**

ITEM	DESCRIPTION	RECOMMENDED SERVICE
1.	Truck Engine	Check oil level DAILY! Change oil and oil filter every 100 hours or every 3000 miles.
2.	Truck Air Cleaner	Inspect restriction indicator DAILY!
3.	Dual Steering Gear Box	Inspect monthly. Install grease as required.
4.	Water Tank	Drain tank DAILY!
5.	Auxiliary Engine	Change oil and oil filter every 100 hours. Check oil level DAILY!
6.	Auxiliary Engine Air Cleaner	Inspect restriction indicator DAILY!
7.	Hydraulic Oil Filter	Change every 100 hours.
8.	Hydraulic Oil	Check DAILY. Change out after initial 100 hours; then every 1000 hours (21.5 gal. reservoir) Use 10W motor oil.
9.	Separator Inlet Scroll	Remove hopper screen and clean inlet every 500 hours.
10.	Blower Power Band	Re-tension after initial 10 hours; then every 500 hours.
11.	Separator Door	Open and wash out separator chamber DAILY!
12.	Hopper Screen	Thoroughly wash screen DAILY; Never use sweeper with large tears in screen.
13.	Separator Door Opener	Wash sheave and cable DAILY!
14.	Suction/Pressure/ Hand Hoses	Check DAILY for holes and wear.
15.	Sweeper Door Seals	Inspect door seals DAILY; Hopper must be airtight. Replace leaking or damaged seals.
16.	Electric Water Pump	Protect from freezing. No daily service necessary.
17.	Truck Differential	Follow manufacturers recommended service program.
18.	Truck Tires	Inspect each tire DAILY for flats and correct air pressure.
19.	Turning Vanes/Pick-Up Head	Inspect DAILY! Remove any material collected on vanes. Replace as needed.
20.	Pick-Up Head Curtains	Inspect DAILY! Replace as required.
21.	Gutter Broom	Check DAILY for string, wire, cassette tape etc. on motor shaft.
22.	Truck Chassis	Grease every 100 hours or 3000 miles.
*	CNG Filters (Optional)	Check Weekly.

NEVER REACH INTO BLOWER HOUSING FOR ANY REASON !

HOPPER ASSEMBLY

The TYMCO Model 600 hopper has a volumetric area of 7.3 cubic yards and is subjected to the most severe working conditions of any area on the sweeper. The worst enemy of the hopper assembly is CORROSION! To prevent the hopper from rusting, it should be thoroughly washed at the end of each shift. It should be pointed out that even a small rust-through area on the hopper will have dramatic effect on the sweeper's performance. The hopper is the vessel from which the blower draws air; thus, creating the vacuum necessary to lift debris from the pavement. Even a small seal leak diminishes this vacuum tremendously.

A. DUMP OPERATION & CLEAN OUT

To dump the hopper, use the following procedures:

1. Back into area for dumping. **NOTE:** Make certain pick-up head is in UP position before backing sweeper or serious damage could occur.
2. Start sweeper auxiliary engine and let idle.
3. Actuate dump toggle switch located on left side of sweeper just above the left fender and work hopper door back and forth several times to fully discharge load.
4. Assure that separator door remains closed and latched throughout dumping procedure and prior to returning to sweeping activities. End plates on skimmer hood should be flush on top of raker plate.

WARNING: Use care when dumping sweeper that no one is between dump door and hopper when closing dump door!

5. At end of shift, drive sweeper to wash area; open dump door and inspection doors. Shut off auxiliary engine and open separator door/skimmer hood assembly using draw cable located at left inspection door. Wash out hopper making certain to clean the hopper screen, separator, suction hose and bottom of pick-up head.

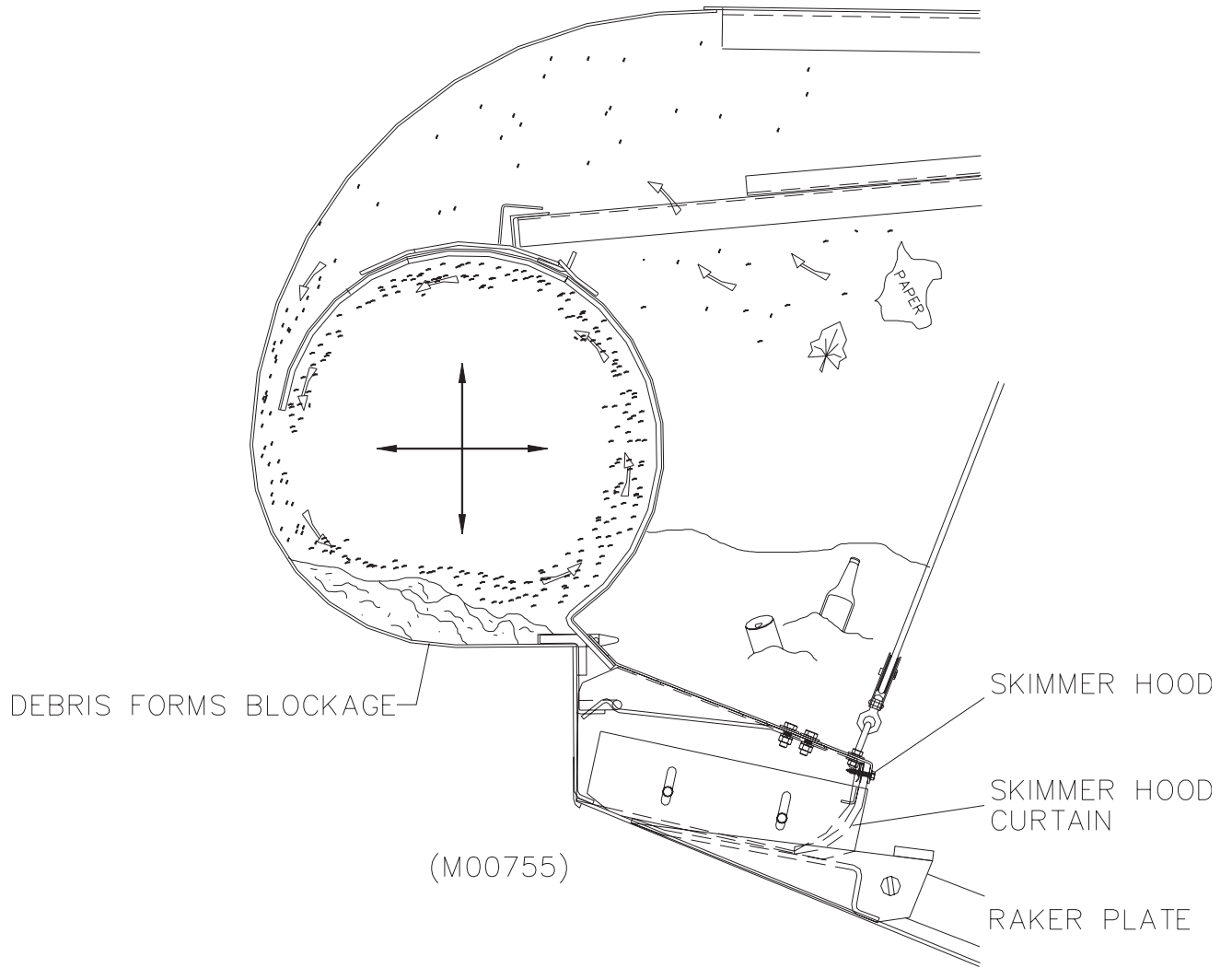
B. SERVICE

WARNING: Never work in or around hopper with auxiliary engine running. Always shut engine off before servicing.

Aside from routinely washing out hopper, the hopper assembly requires very little service.

1. *Separator Assembly* - the separator is a drum-like area found inside the very front of the hopper. Its function is to rid the airstream of dust particles through use of centrifugal force rather than filters. (See Page 7) Service separator daily by using pull cable handle located behind LH inspection door to open separator door and wash interior of separator chamber.

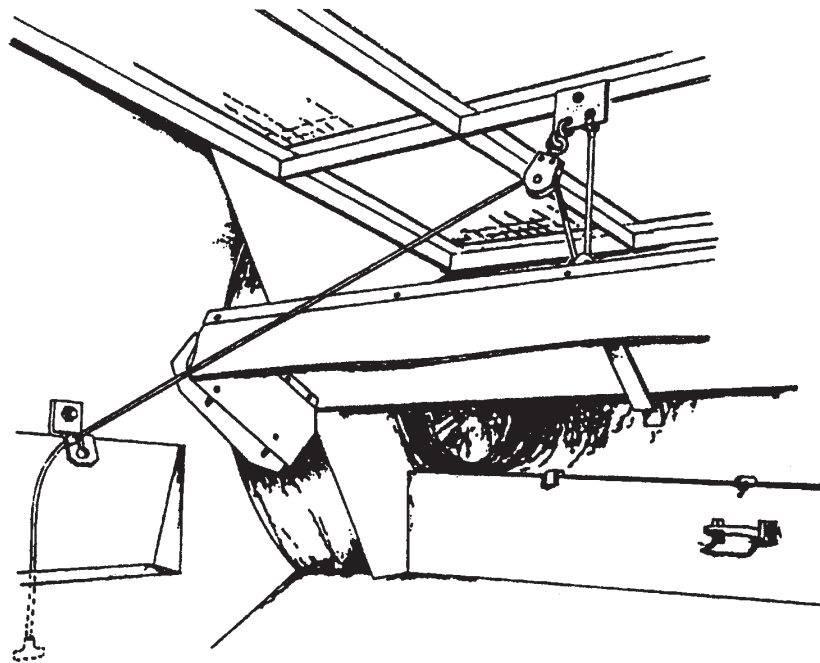
NOTE: Separator door is held in open position by pulling cable stop through key-hole in retainer bracket and sliding up slot and releasing. (See Page 8)



Service separator daily by using pull cable handle located behind left hand inspection door to open separator door and wash interior of separator chamber.

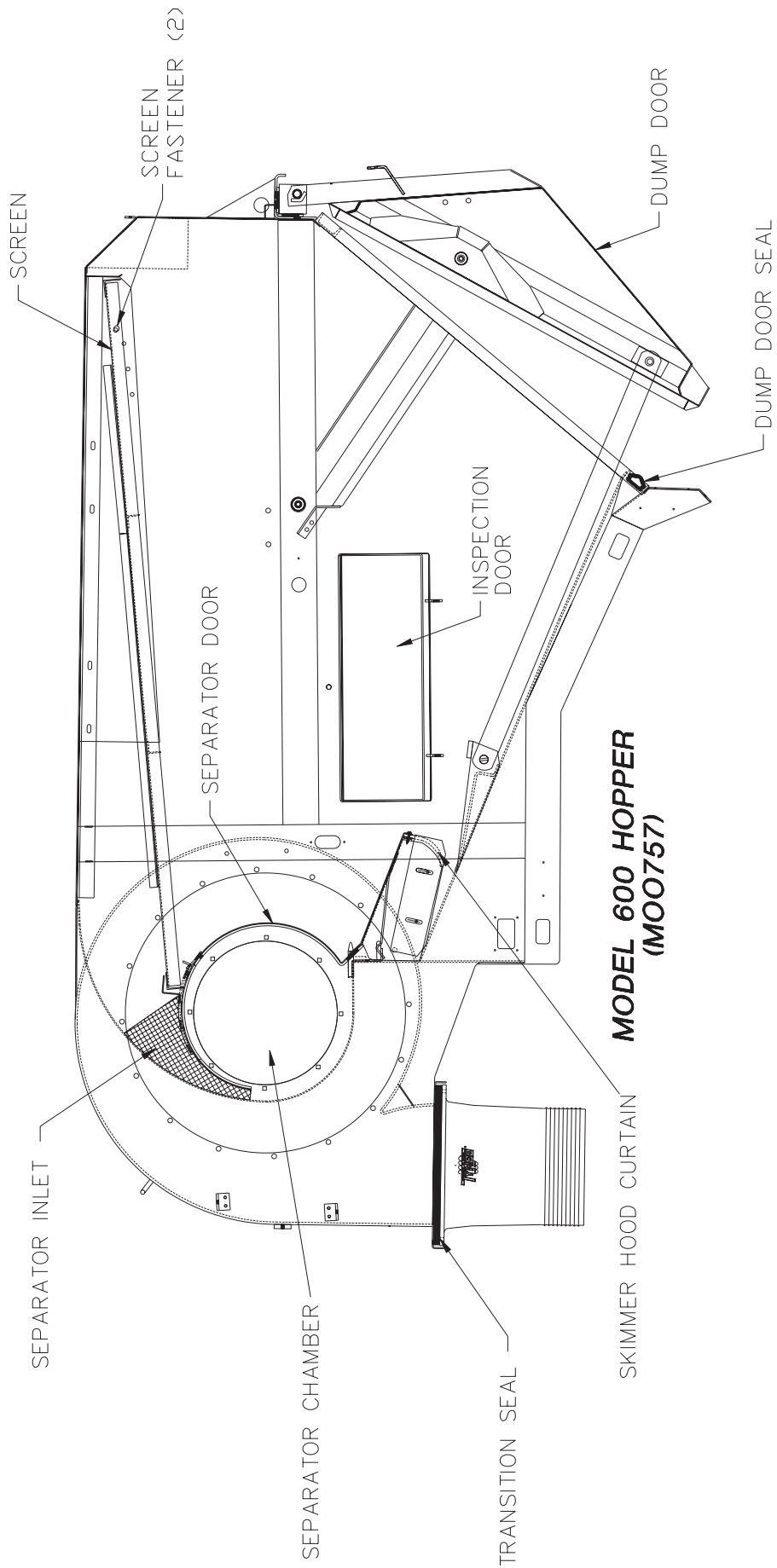
2. *Hopper Seals* - The hopper must be maintained air tight for the sweeper to perform adequately. Daily inspect the inspection door seal, dump door seal, transition seals and, if hand hose attachment is used, the hand hose door seal. If any section of the seal material is missing, replace the seal. Refer to Page 9 for seal locations.
3. *Hopper Screen* - The large screen found inside the hopper is very important for preventing large debris from entering the separator and blower assembly. Inspect the screen daily. If any large holes are found, do not operate sweeper until screen has been repaired or replaced. Refer to Page 9 for screen location. Once every 500 hours the hopper screen should be removed and the inlet area above separator should be cleaned thoroughly. If allowed to become stopped up, the sweeper efficiency is drastically reduced. Refer to Page 9 for separator inlet location.
4. *Skimmer Hood* - Inside the Model 600 hopper is a shielded area attached to the separator door. This shielded area is formed by what is called the Skimmer Hood and is designed to create a void area into which the fine dust removed by the separator skimmer slot can accumulate. The skimmer hood protects the separator skimmer slot from being choked off by debris being deposited in the hopper during operation.

IMPORTANT: Always close the separator door before closing the dump door. Opening the dump door retracts the raker plate so that the separator door latches properly when closed.



SEPARATOR DOOR/SKIMMER HOOD IN OPEN POSITION FOR CLEANOUT AND WASHDOWN.

(M00756)



BLOWER ASSEMBLY

A large turbine type blower is used in the TYMCO Model 600 to generate both the vacuum and pressure air stream with which to sweep. The blower assembly is found on the left side of the sweeper in the blower housing (see Page 3) and is driven by an auxiliary engine through a sheave and belt system.

WARNING: Never reach into the blower housing for any reason if blower power band is installed!

WARNING: Always remove ignition key from sweeper control panel and/or disconnect battery ground when working on or near the blower or blower belt.

A. OPERATION

The blower begins to rotate as soon as the auxiliary engine is started. No clutch is used to engage or disengage blower.

To increase blower speed, use vernier throttle control on sweeper console. Turn the knob counter-clockwise to desired RPM. **NOTE:** If sweeper is equipped with an electric linear actuator, use the throttle switch.

Reverse procedure to decrease blower RPM. Use vernier override button on top of throttle knob ***only for emergency shutdowns.***

B. BLOWER RPM SETTING

The Model 600 standard Turbo Charged Auxiliary Engine uses a sheave ratio of 1.45 to 1 - meaning that the blower RPM is 1.45 times faster than the engine RPM. Blower RPM is; therefore, set by reading the auxiliary engine tachometer. As a rule, the higher the blower RPM, the heavier the debris which can be picked up providing the sweeper is in good operating condition. However, higher RPM results in faster component wear so engine RPM should be set according to the debris load on the street. The following RPM settings are recommended:

	ENGINE RPM
Paper, Leaves, Light Trash	1500
Normal Accumulation of Dirt, Sand and Gravel	1600
Heavy Accumulation of Dirt, Sand and Gravel	1800

DO NOT EXCEED 2400-STD. (2000-TURBO) ENGINE RPM WITHOUT FIRST CONSULTING THE FACTORY.

C. SWEEPING SPEEDS

The best sweeping speeds for the TYMCO SWEEPER will be between 1-10 MPH and will be dependent upon how heavy the street curb is loaded. The lighter the curb debris, the faster the sweeper can sweep. However, faster speeds will cause faster wear of the pick-up head curtains and skid plates.

The best all-around results are obtained when moderate blower RPM and moderate sweeping speeds are used. The following speeds are recommended:

	MPH SPEED
Paper, leaves, light trash	1-10
Normal accumulation of dirt, sand and gravel	3-5
Heavy accumulation of dirt, sand and gravel	1-3

CAUTION: Street sweeping requires a great deal of concentration by the operator to avoid road hazards such as parked cars, pedestrians, chuckholes, etc. Judge street conditions and operate sweeper at safe speed, regardless of how heavy or light the curb debris.

D. SERVICE

WARNING! Never work on or around blower assembly or components without removing ignition key from sweeper control panel and/or disconnecting the negative ground from battery.

Periodic servicing of the blower assembly should be performed on the following areas:

1. **Blower Power Band** - should be re-tensioned after the initial 10 hours of operation; every 500 hours thereafter. Refer to Service & Parts Manual for proper procedure.
2. **Blower Bearings** - bearings are pressed into an aluminum hub which is bolted to the blower housing cover. These bearings are sealed and no greasing is required. The operator should be made aware of their location and should listen for any unusual noise coming from the blower housing indicating a bearing problem. Sweeper should be serviced immediately when a bearing problem is detected.
3. **Blower Service** - for longer blower life, clean the dust separator daily. (Refer to hopper section of this manual.)

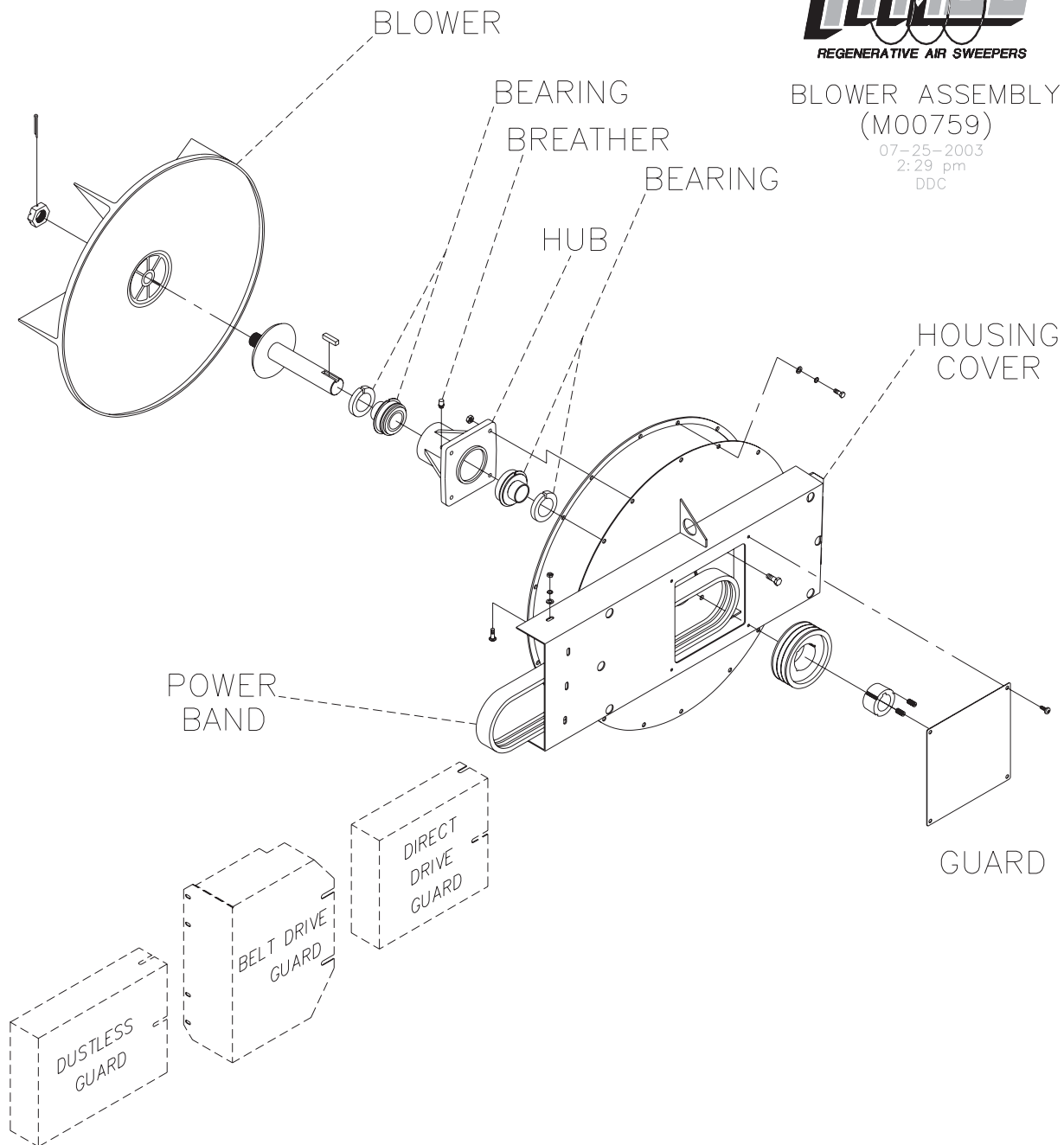
NOTE: A thorough periodic inspection of the blower and blower housing should be performed by a qualified mechanic at maximum intervals of 500 operating hours. This inspection requires removal of the blower assembly.

- A. Blower - Wear on the blower is normal; however, the blower should be replaced when sweeping performance is noticeable reduced.
- B. Blower Housing Liner and Blower Lip - A rubber bolt-in wear liner is used to protect the metal scroll in the blower housing. The liner should be inspected every 500 hours of sweeper operation and replace if expanded metal is evident. The blower lip should be inspected along with the blower housing liner and reversed or replaced if worn.



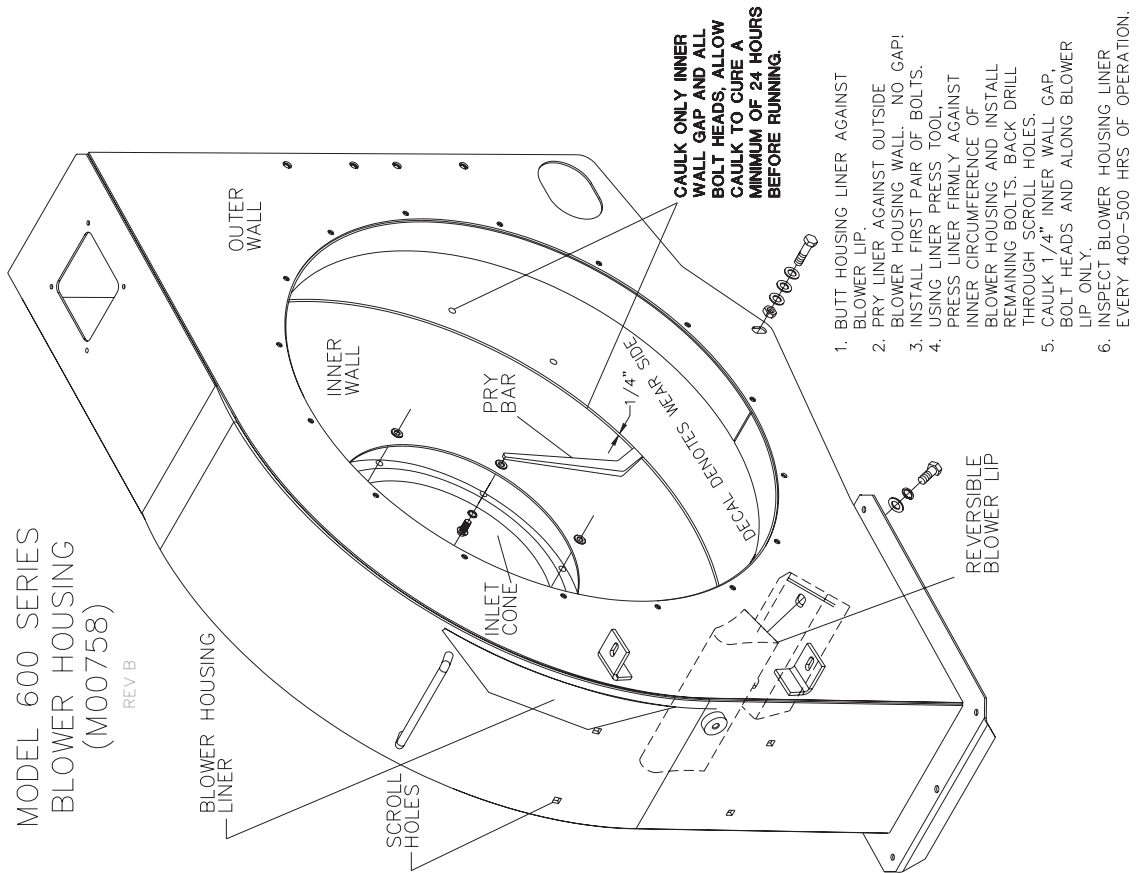
BLOWER ASSEMBLY
(M00759)

07-25-2003
2:29 pm
DDC



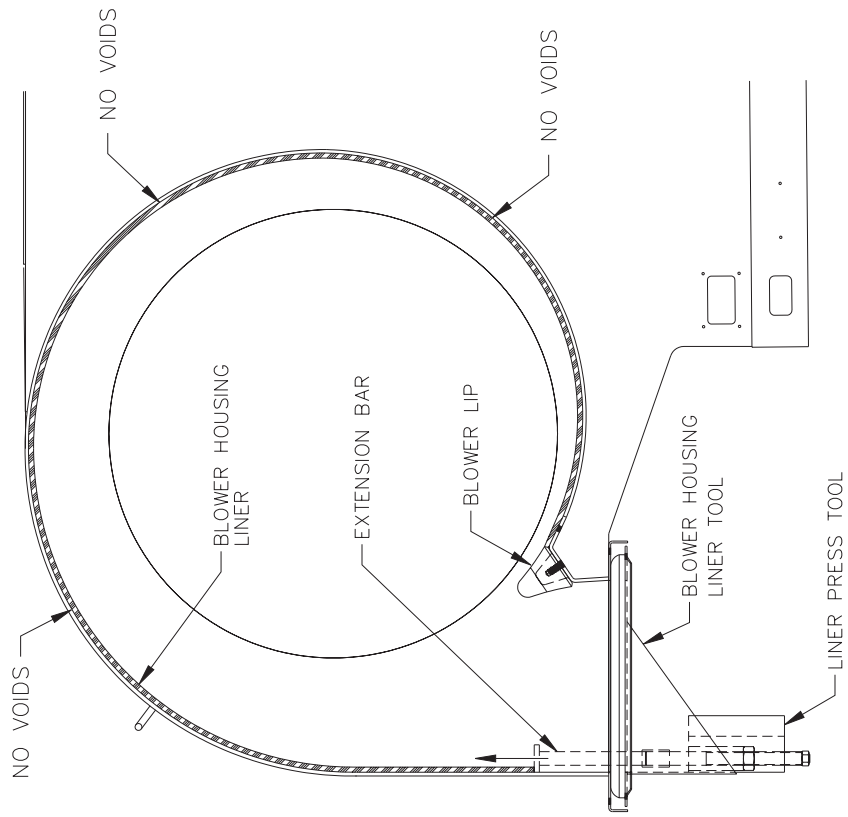
MODEL 600 SERIES
BLOWER HOUSING
(M00758)

REV B



BLOWER HOUSING LINER
INSTALLATION TOOLS

LINER MUST BE PRESSED INTO HOUSING SCROLL TO ELIMINATE ALL VOID SPACES BEHIND LINER. VOIDS CAUSE PREMATURE WEAR OF LINER.



HYDRAULIC SYSTEM

Proper sweeper operation is dependent upon a properly functioning hydraulic system. Components such as the gutter broom(s), pick-up head lift assembly and hopper dump are all dependent on the hydraulic system for their proper operation.

The main hydraulic system components to be familiar with are:

- A. Hydraulic Reservoir
- B. Hydraulic Pump
- C. Valve Bank

A. HYDRAULIC RESERVOIR

The hydraulic reservoir is located on the left side of the sweeper between the auxiliary engine and blower housing (See Page 3). The reservoir oil capacity is 21.5 gallons and the operator must check the oil level daily! The sight gauge is located on the side of the reservoir for easy checking. If the oil level is at the "ADD" mark or below, refill reservoir before operating sweeper. **Use 10W engine motor oil.** (See Parts & Service Manual for list.)

Located on the hydraulic reservoir is the hydraulic system oil filter. The filter should be changed every 100 hours of sweeper service. The hydraulic oil filter is a spin-on automotive type (TYMCO P/N 5010080).

NOTE: *Drain the break-in oil after initial 100 hours of operation*, then once every 12 months or 1000 hours, whichever occurs first. Drain hose is located on the bottom of the reservoir.

WARNING: Operator should never check for hydraulic leak using bare hand. High pressure used in system could result in oil being injected into hand causing serious injury. Always turn sweeper off before servicing.

B. HYDRAULIC PUMP

The hydraulic pump is driven by the sweeper auxiliary engine.

C. CONTROL VALVES

The hydraulic valve assembly is used to control the flow of oil to the various hydraulic components. The Model 600 valve assembly is located on the left side of the sweeper just below the PTO assembly. The standard valve assembly is made up of four control valve segments attached to a common manifold. The first pair of valves control the gutter brooms, with the second pair controlling the dump door and pick-up head. Additional valves will be found if optional hydraulically controlled equipment is ordered on the sweeper.

Separating the first two valves from the rear two valves is a relief valve and a by-pass valve. The relief valve reduces the pressure from 2500 PSI to 1450-1500 PSI. Therefore, the primary system pressure of 2500 PSI from the pump is necessary for gutter broom operation but is reduced to 1450-1500 PSI for the pick-up head and the dump door. The control valves are solenoid actuated meaning that they are shifted from inside the cab by use of electric switches. These switches are located on the sweeper control console panel with the exception of the dump switch which is located externally on the left-side of the sweeper just above the fender well.

D. CONTROL VALVE SERVICE

Should the switch fail to activate the component, manual override buttons are provided on top and bottom of each valve segment. Use the following procedure to engage the manual override buttons:

1. Locate valve segment not functioning.
2. Set auxiliary engine RPM at idle.
3. Use a screwdriver or similar device to push manual override button into valve (considerable force must be exerted to overcome springs inside valve).

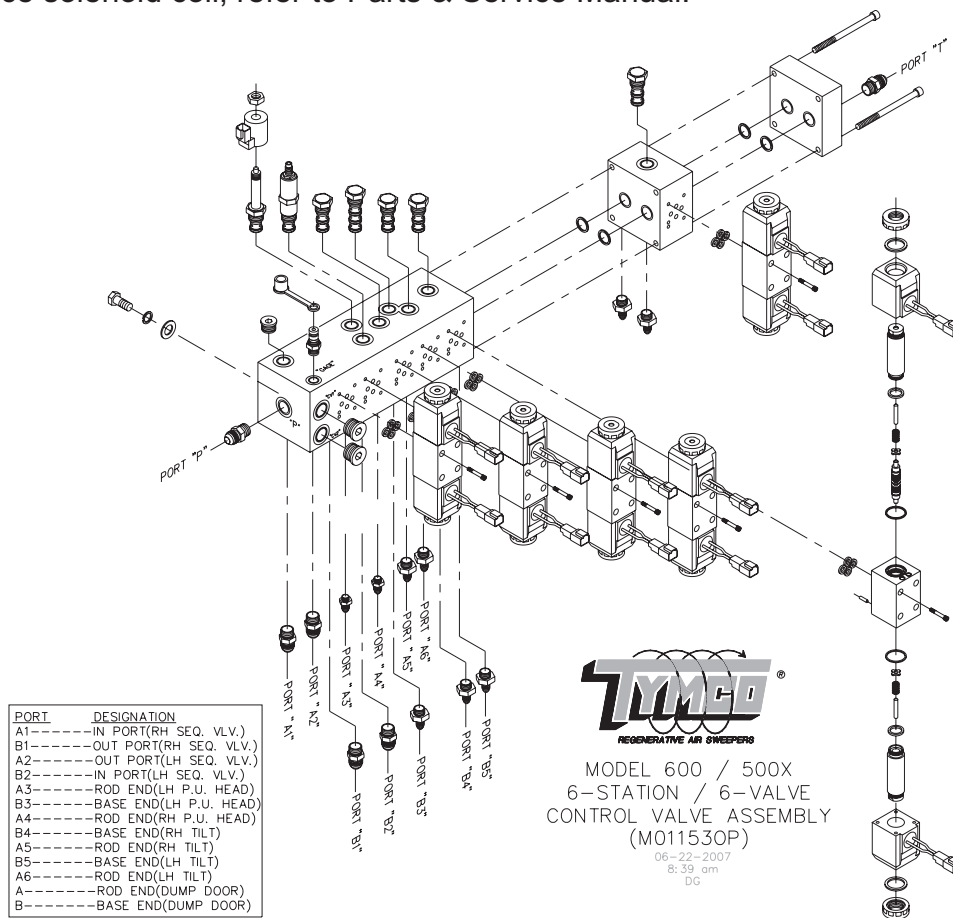
NOTE: In order to manually override dump door or pick-up head, by-pass valve override button must be depressed at the same time.

4. If component goes in wrong direction or does not activate, push opposite override button.

NOTE: Gutter brooms can only be raised when manually shifting valve. In trying to lower gutter broom manually, bristles will rotate but broom will not lower due to the electric lock valve located on the cylinder.

If a valve segment solenoid coil shorts out, it will cause the hydraulic system fuse to blow. The fuse is located at the control console assembly inside the cab (see Page 4) and is a ATO fuse rated at 15 amps.

To replace solenoid coil, refer to Parts & Service Manual.



GUTTER BROOM

The Model 600 utilizes a vertical digger design enabling the gutter broom to remove heavy debris from the gutter and transfer it in front of the pick-up head. The gutter broom is also designed such that it will fold under the cab if run into the curb or any other stationary object.

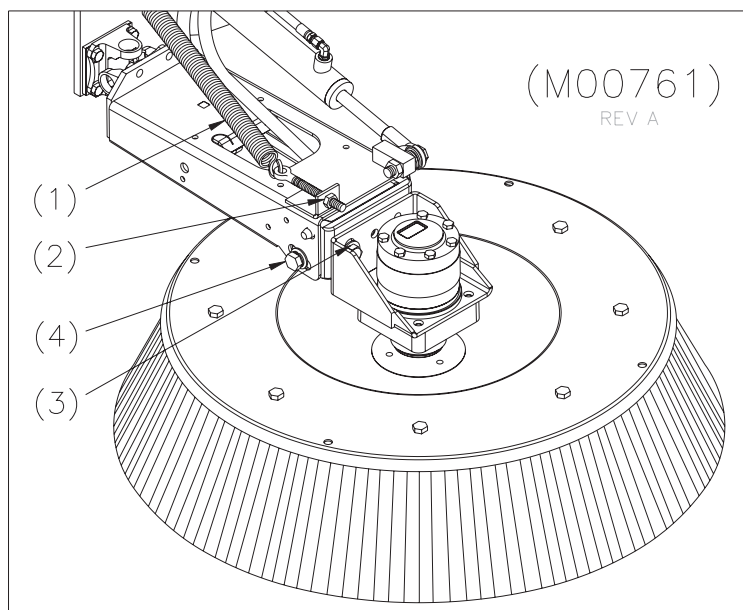
The gutter broom is controlled from inside the cab with an electric toggle switch located on the control console panel. The sweeper auxiliary engine must be running in order for the gutter broom(s) to work. When the toggle switch control is shifted in the DOWN position, the gutter broom rotational speed is directly related to the sweeper auxiliary engine RPM. As the engine RPM is increased, gutter broom rotation increases.

Always use care when gutter broom is down. Never back up with broom down or broom could hang on stationary object resulting in severe damage!

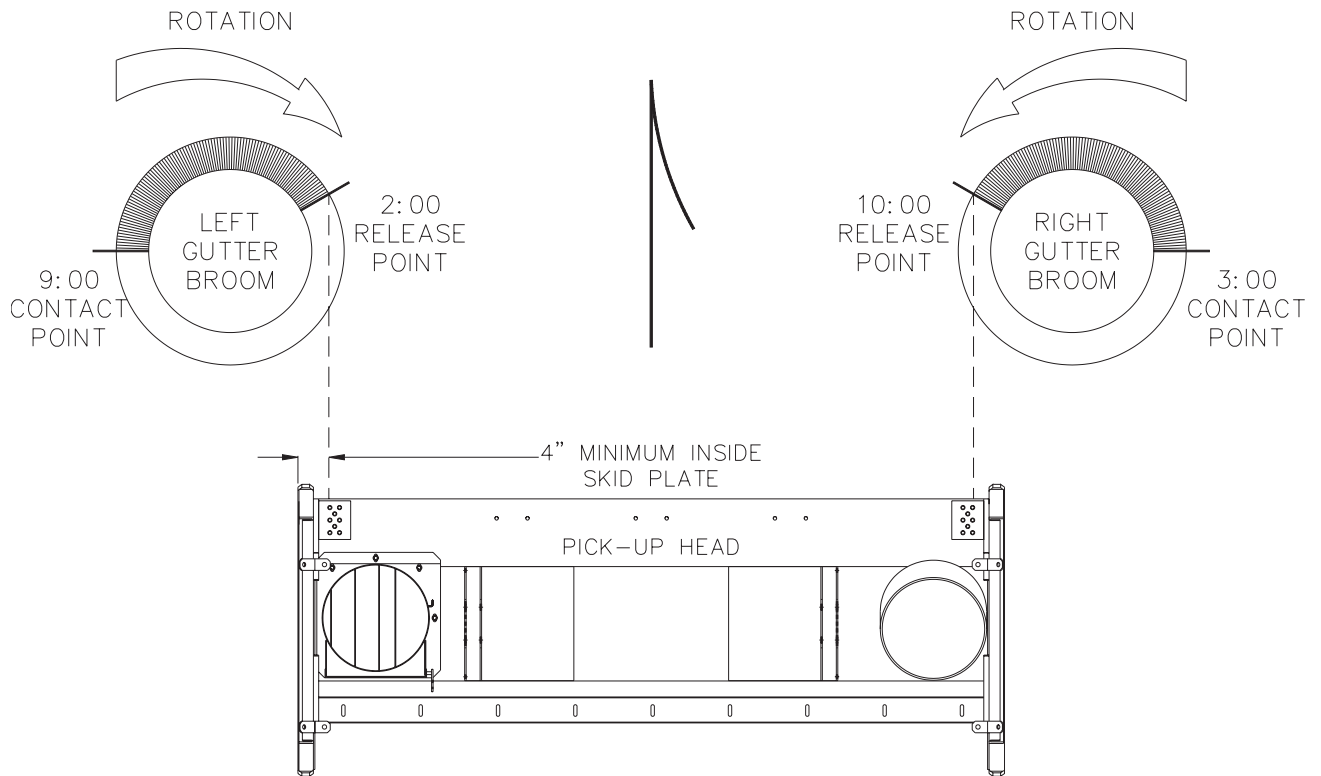
WARNING: Never work on or near rotating gutter broom or exit cab with gutter broom down and rotating.

A. ADJUSTMENTS

1. **Spring** - a long spring (1) is used to counter-balance the gutter broom assembly. As the gutter broom bristles wear out, this spring tension must be reduced by backing off the eye bolt nut (2) used to attach spring to the boom arm. However, when new bristles are installed onto gutter broom, the spring must be re-tensioned to counter the increased weight of the new bristles. Failure to reset the spring eye bolt nut will result in premature wear of the gutter broom bristles. Proper position of the eye bolt nut for new segments is approximately one-half way up the eye bolt.
2. **Tilt** - there is no established dimension for setting the gutter broom tilt because street curbs and gutters vary from place to place. Located on the end of the boom arm are the gutter broom wrist and hand. The hand adjustment allows forward tilt; the wrist allows side to side tilt. Both require a 15/16" wrench to release locking bolts. To adjust the hand two bolts are found behind the torque motor (3). Two bolts lock the wrist adjustment: one bolt is found on each side of the wrist bracket (4). When setting the gutter broom tilt, approximate Drawing on Page 17 for best results.



NEW BRISTLE CONTACT PATTERN



(M00762)

CAUTION: Street sweeping requires a great deal of concentration by the operator to avoid road hazards such as parked cars, pedestrians, chuckholes, etc. Judge street conditions and operate sweeper at safe speed, regardless of how heavy or light the curb debris.

B. BRISTLE REPLACEMENT

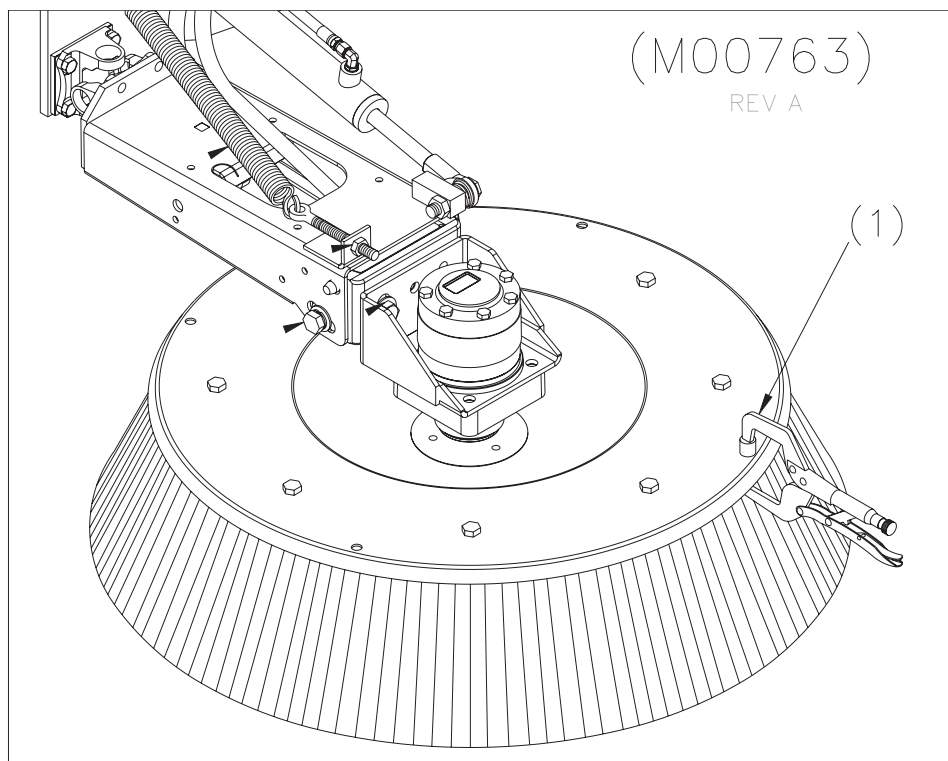
Currently, two types of vertical digger bristles are available from TYMCO:

1. Polypropylene
2. Steel

These two types are not interchangeable without replacing the gutter broom spring. Polypropylene bristles (Part No. 500393) require Spring No. 5010232; whereas steel bristles (Part No. 500392) require Spring No. 5010960.

To replace bristles, use the following procedure:

1. Lower gutter broom; turn sweeper engine off.
2. Remove bolts from bristle segments one segment at a time. TYMCO segments use two course threaded 5/8" bolts to lock segment to disc. No nut is used on bottom side. Also, a small 3/8" bolt is used to give support to center of each segment. There is a nut used for this center support bolt. Remove and insert it into the new segment.
3. Available for the sweeper is a set of segment installation clamps (1) (see Section TK - Parts & Service Manual) which look similar to vice clamps but the ends have round dowel pins welded on. The pin on the lower jaw of the clamp inserts into the center support hole on the new bristle segment. The pin on the upper jaw inserts into the center support hole on the gutter broom disc. Lock the clamp in place to hold segment which now allows the segment holes to be aligned with the disc holes and the bolts to be installed with ease.



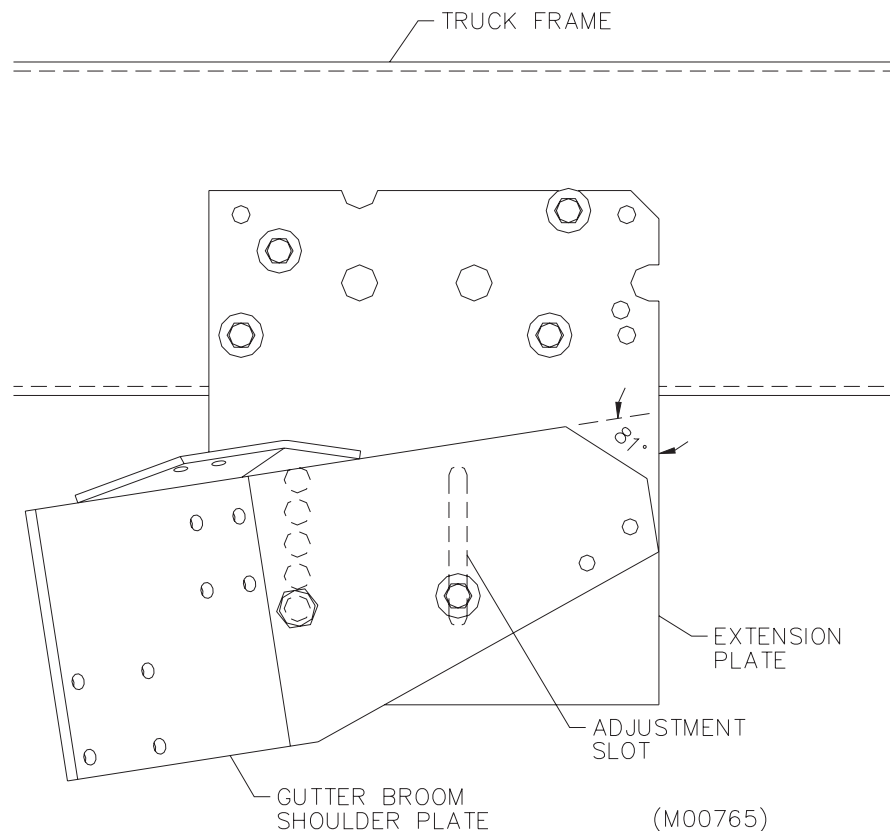
4. Remove segment clamp and install 3/8" center support bolt.
5. Once all four segments have been installed, check spring tension and tilt setting.

C. SERVICE

1. **Torque Motor Shaft** - routine service of the gutter broom requires DAILY inspection of the torque motor output shaft. Remove any buildup of grass, string, cassette tape, etc. that has wound around the shaft. Failure to do so will cause rapid failure of the high pressure shaft seal and possible damage to output shaft. If oil is observed to collect in disc, check torque motor hose fittings; if OK, then torque motor high pressure seal must be serviced. Refer to Parts & Service Manual for rebuild procedure.
2. **Shoulder Plate Setting** - the gutter broom mount plate is bolted to the truck chassis extension plate. The gutter broom mount plate referred to as the shoulder plate is adjusted so that when the hydraulic cylinder retracts the gutter broom it also causes the broom to raise. Should this plate get out of adjustment, the broom may retract but not raise. Two bolts hold this plate in position; one 3/4" bolt requiring a 1-1/8" wrench, and one 1/2" bolt requiring a 3/4" wrench and socket. With the gutter broom in the DOWN position and off, set the shoulder plate as shown in the drawing.

NOTE: If shoulder plate is set with too much forward slope, the gutter broom will strike the bottom of the cab or step when raised.

MODEL 600 SHOULDER PLATE SETTING



PICK-UP HEAD

The pick-up head is the most important component of the TYMCO MODEL 600 REGENERATIVE AIR SWEEPER. But, because the pick-up head must be dragged on the pavement, it can be seriously damaged by careless operation. Even when the pick-up head is fully raised, it is still close to the pavement and care must be taken not to damage it in transit.

DO NOT:

1. Back up with pick-up head lowered.
2. Raise pick-up head before lowering engine RPM.
3. Increase engine RPM above idle before lowering pick-up head.
4. Forget to raise pick-up for transit.
5. Cut corners while in transit.
6. Drive over speed bumps or divider turtles higher than two inches.

To lift debris from the ground, a 14" diameter suction nozzle is located on the right side of the pick-up head. The sweeper blower draws air from the hopper creating a vacuum. A flexible hose is then used to connect the hopper vacuum to the pick-up head suction nozzle whereby debris is lifted from the ground and deposited into the hopper. However, because the pick-up head is 87 inches wide some means must be used to move debris across to the suction nozzle. Just as debris is lifted into the hopper by the vacuum generated by the blower, the exhaust air of the blower is used to blow debris over to the suction nozzle. This is done by forcing the blower exhaust air through an elongated pressure nozzle. TYMCO calls this the Blast Orifice. The blast orifice opening is 87 inches long with a 1/2" to 3/4" tapered opening. The blower exhaust air is squeezed through this narrow opening which compresses the air into a powerful jet that is then used to blast debris from the ground, forcing it over to the suction nozzle.

A. DESCRIPTION OF OPERATION

When at sweeping location, start sweeper auxiliary engine and let idle. Lower pick-up head fully to pavement (lift chains should be slack). Then pull forward a few feet and allow curtains to fold under pick-up head into the sweep position. Increase sweeper auxiliary engine speed to desired RPM and begin sweeping. Once sweeper auxiliary engine speed is increased and the sweeper is moving forward, the pick-up head skid plates should become firmly sealed against the pavement.

When sweeping operation has been completed, lower engine RPM and continue traveling forward for a few feet to allow any debris under the pick-up head a chance to make it over to the suction nozzle and be picked up. Before raising the pick-up head, throttle down sweeper auxiliary engine to idle, then raise pick-up head. When fully raised, pick-up head should be secured against up-stop feet for sweeper transit.

**PICK-UP HEAD MUST BE RAISED FOR TRANSIT!
NEVER BACK SWEEPER WITH PICK-UP HEAD LOWERED UNLESS
EQUIPPED WITH OPTIONAL REVERSE PICK-UP HEAD CHAINS!**

B. PICK-UP HEAD CURTAINS

Because high velocity air is used by the pick-up head to remove debris from the pavement, the pick-up head must be sealed by rubber curtains to the pavement. These rubber curtains will incur wear as the pick-up head is dragged along the pavement and will require periodic replacement. Failure to replace worn out pick-up head curtains will result in poor sweeper performance and excessively dusty conditions. Seal curtain life will depend on pavement texture and sweeping speeds. Fast sweeping speeds increase curtain friction and accelerate curtain wear.

NOTE: Rubber curtain seal material is critical for proper wear life and sweeper performance. Use only TYMCO replacement curtains in order to guarantee sweeper performance. To replace curtains, refer to Service & Parts Manual.

C. PICK-UP HEAD ADJUSTMENTS

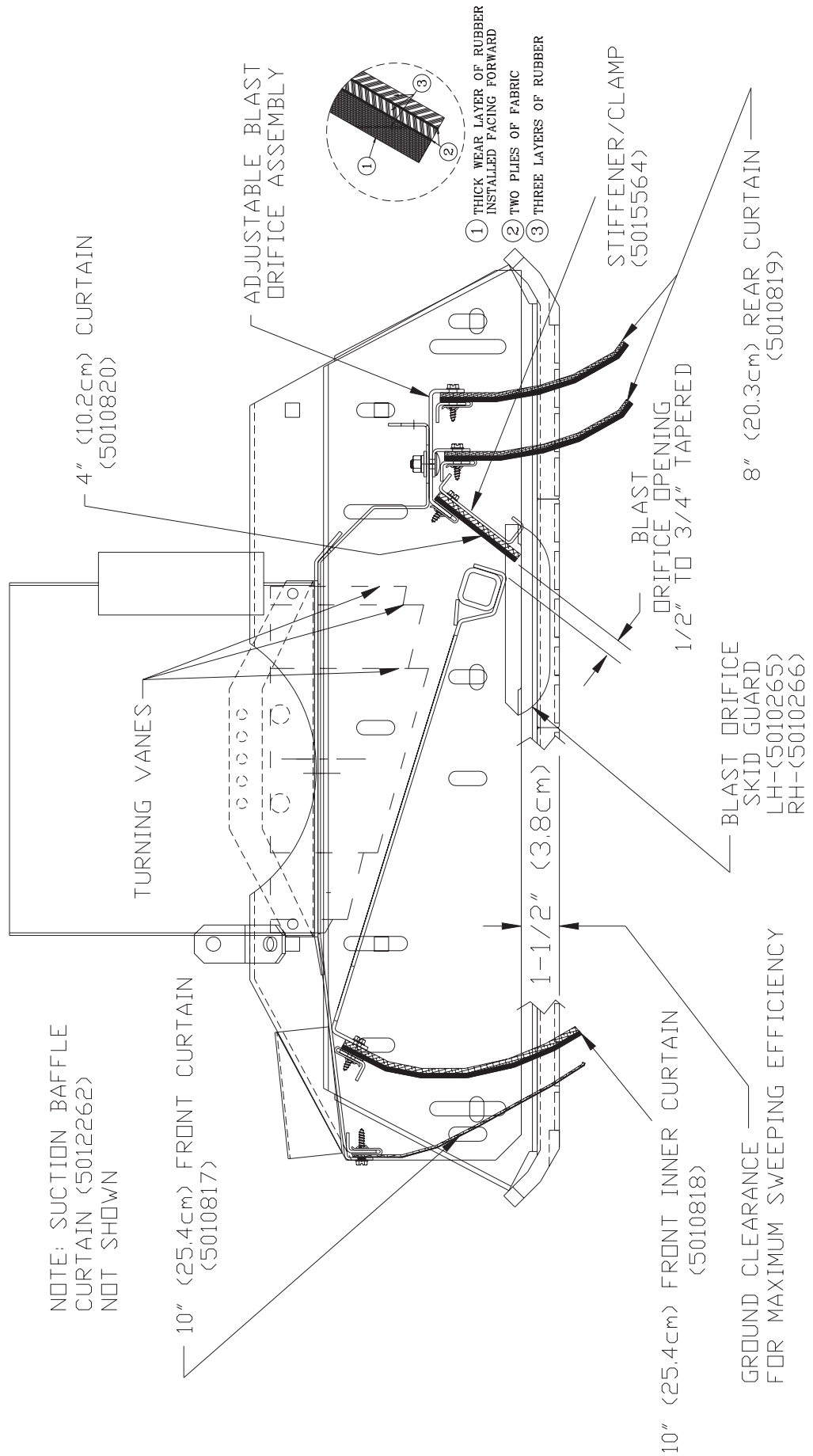
1. **Blast orifice** - The Model 600 pick-up head incorporates a bolt-on blast orifice flange. Each time the pick-up head curtains are replaced, the blast orifice gap should be tapered at 1/2" pressure side to 3/4" suction side by sliding the bolt-on flange in or out. Failure to adjust the blast orifice gap properly will result in poor sweeper performance.
2. **Skid Plate Adjustment** - The pick-up head is dragged on two skid plates (one on each side of the pick-up head). These skid plates use carbide runners to prolong their service life. The skid plates are used to adjust the height of the blast orifice from the pavement. Refer to drawings for correct settings.

NOTE: Do not lower skid plates when new curtain set is installed in order to prevent curtain wear, as lowering skid plates raises the blast orifice from the pavement and prevents curtains from properly sealing. Poor sweeper performance will result!

3. **Pick-Up Head Spring Adjustment** - Four springs are used (two on each side) to suspend the pick-up head from the sweeper carriage. The spring suspension is designed to give the pick-up head a floating effect as it is dragged along the pavement. This serves two purposes: (1) it prolongs the service life of the carbide skid plates; (2) it forms a shock absorption system that helps to protect the pick-up head from sharp impacts. Failure to keep spring suspension system in proper adjustment will result in premature wear of skid plates.

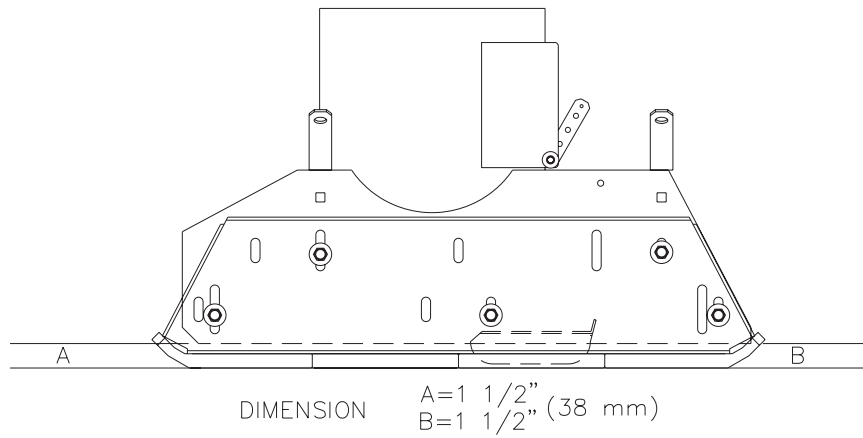
For proper spring adjustments, refer to drawings. Once spring tension is set, increase sweeper auxiliary engine speed to 2000 RPM and pull sweeper forward. The increase in air velocity through the pick-up head should cause pick-up head to draw down and seal itself to the pavement. The pick-up head once drawn down should then be easily lifted by one hand which demonstrates the floating characteristics desired.

STANDARD PICK-UP HEAD CROSS-SECTION (M00770)

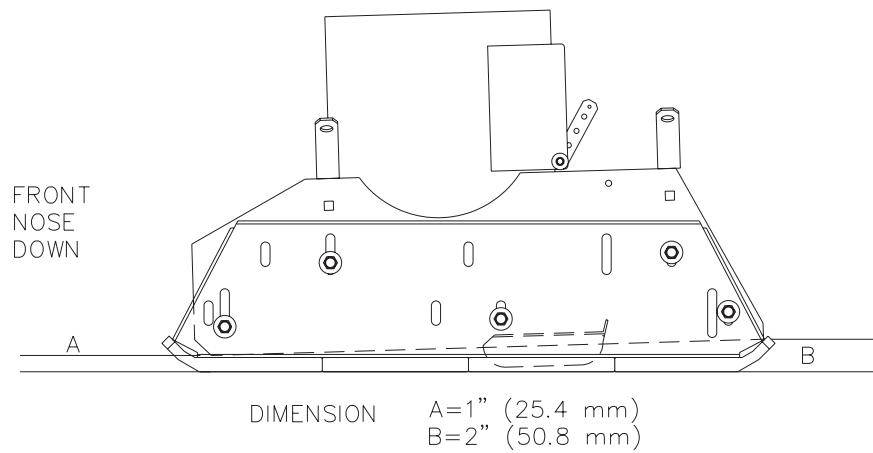


MODEL 600 SKID PLATE SETTING

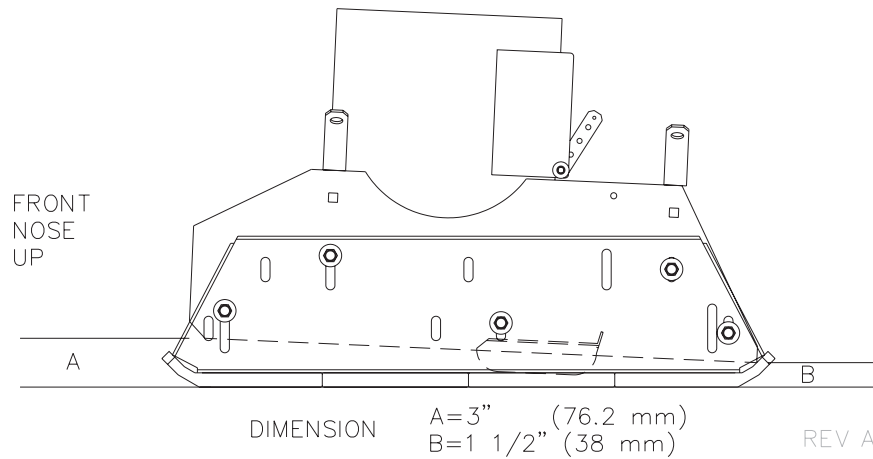
NORMAL DEBRIS SETTING



HEAVY DEBRIS SETTING



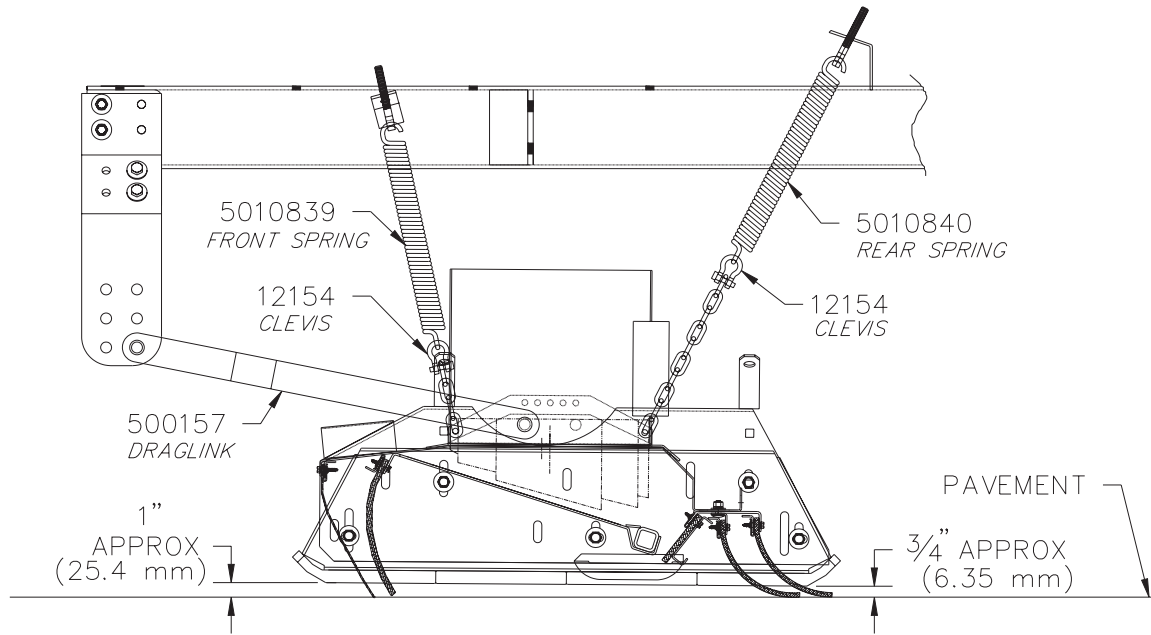
LEAF SWEEPING SETTING



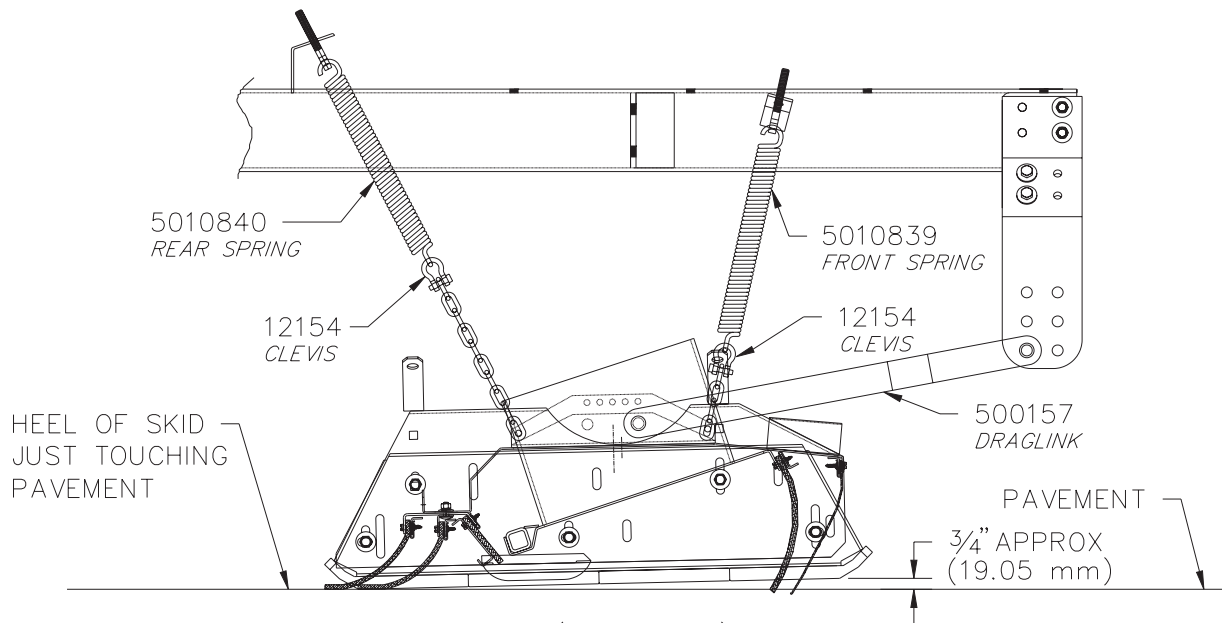
(M00771)

MODEL 600 SPRING SETTING

SPRING SETTING BLOWER SIDE



SPRING SETTING SUCTION SIDE

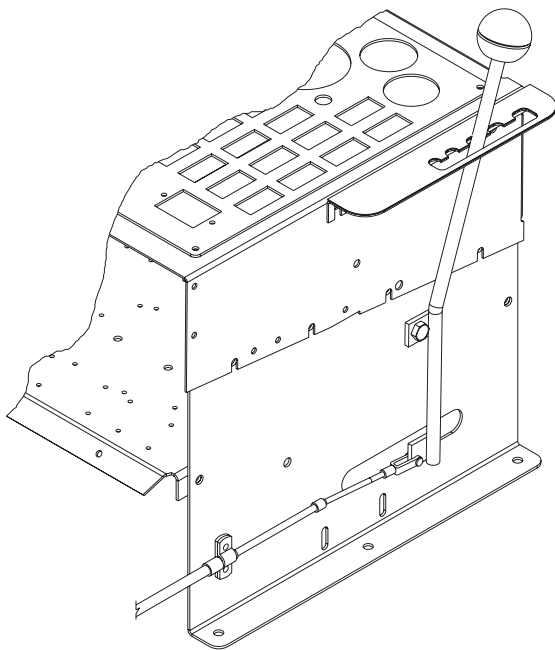


(M00772)REV A

PRESSURE BLEEDER

The pressure bleeder is a small door located on the pick-up head pressure ring just below the pressure hose. When the pressure bleeder door is opened by controls within the cab, part of the pressure air stream is diverted to the atmosphere. This causes the vacuum beneath the pick-up head to be intensified; thus, lifting the front curtain. This allows light debris to be drawn under the pick-up head. This procedure should be done only when necessary to pick up light debris and pressure bleeder door kept closed at all other times.

**OPEN PRESSURE BLEEDER DOOR ONLY WHEN SWEEPING LIGHT DEBRIS;
OTHERWISE, PRESSURE BLEEDER SHOULD BE KEPT CLOSED.**

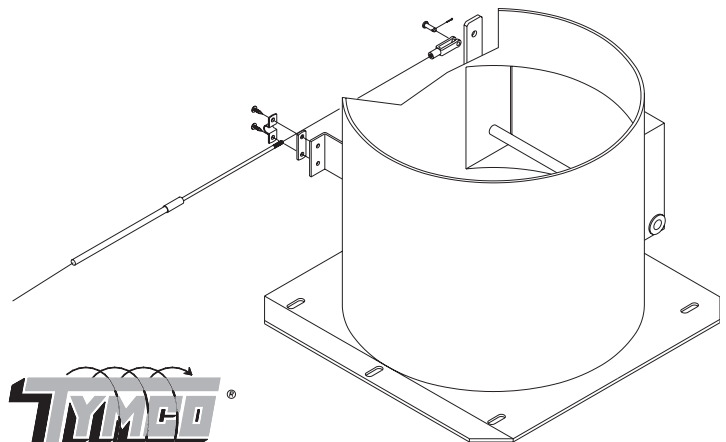


CABLE
CONTROLLED



MODEL 600
LEAF PRESSURE BLEEDER
ACTUATOR ASSEMBLY
(M005300P) REV A

12-27-2007
10:49 am
DG



ELECTRICALLY
CONTROLLED
(SWITCH IN CAB)

DUST CONTROL SYSTEM

The dust control system is designed to control the dust created by the operation of the sweeper under normal sweeping conditions. The dust control system (often referred to as the water system) is only effective when the sweeper is operating properly. Problems such as damaged or worn door seals, worn pick-up head curtains, holes in the suction/pressure hoses can cause extremely dusty conditions that cannot be controlled by a properly functioning dust control system.

A. OPERATION

The following procedure is recommended for operation of the TYMCO Model 600 dust control system:

1. Fill water tank. A 220 gallon water tank is standard and is located just below the auxiliary engine. The filler port is located on the top front of the tank. The 2-1/2" fire hose provided with the sweeper attaches to the filler port and is stored in a bin provided on the right side of the sweeper. In the end of the fire hose which attaches to the hydrant is a cone shaped strainer.

Always purge the fire hydrant before attaching the fire hose to fill the tank. The tank is full when water is observed to spill from around the suction manifold on top of the tank. The TYMCO tank filling system is an anti-siphon system as water is put into the tank from the filler neck on top of the tank. At end of shift, open drain valve to flush tank.

2. Controls for the dust control system are located in the cab on the control console panel. To activate system, start sweeper engine, then turn on main water toggle switch which activates the water pump. If the tank contains water, select the desired water distribution switches and water will continue to spray until sweeper engine is shut off, water toggle switch is turned off or water tank is emptied. If water tank is emptied, low water light will come on, indicating that the water system has shut off automatically.

B. SERVICE

There are essentially four service areas for the water system:

1. Water Tank
2. Pre-Filter
3. Water Pump
4. Spray Nozzles

Service these areas routinely according to the following directions:

1. **Water Tank** - The water tank should be flushed at the end of each shift to remove contaminants. Fill tank and then allow to drain.
2. **Pre-Filter** - A pre-filter is located between tank and water pump to remove any contaminants before they reach the pump. The pre-filter has a removable cleanout bowl which should be removed and cleaned once a day. **USE CARE NOT TO LOSE THE BOWL GASKET WHEN CLEANING OR WATER SYSTEM WILL NOT WORK DUE TO AIR LEAK.**

3. **Water Pump** - The heart of the standard TYMCO water system is an electric pump capable of 5 GPM. The system relief valve is set at 25 PSI.
4. **Spray Nozzles** - The operator is responsible for keeping the spray nozzle tips clean and spraying.

ATTENTION: On the Model 600 it is important to use only the correct output spray tips in order to realize proper water system spray time and pressure.

- a. If a spray nozzle is clogged, the entire tip assembly must be removed for cleaning. To clean tip, use the edge of a knife or razor to clear tip spray slot. Then grasp the tip between the index finger and thumb with slotted side facing up and strike the tip sharply against a clean, hard surface to dislodge blockage.

DO NOT USE DRILL TO MAKE ORIFICE LARGER!

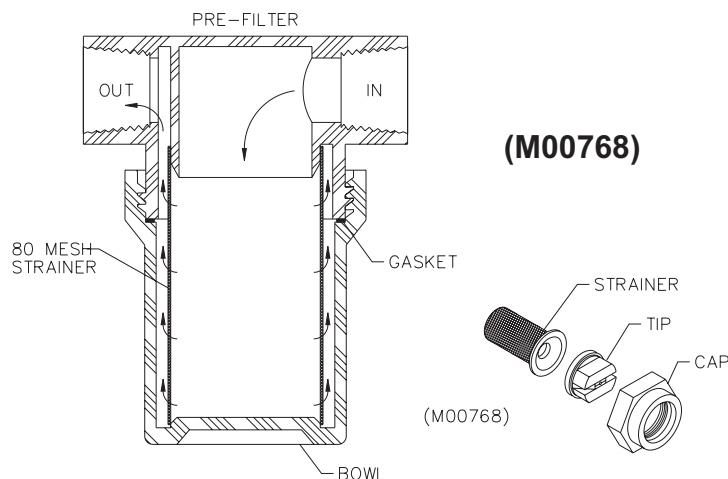
- b. To re-install tip, insert tip into cap and hand tighten cap to nozzle assembly. Hold tip in desired position with the use of pliers in one hand. With the other hand, use wrench to tighten cap which locks tip position.

C. WINTERIZATION

To winterize the Model 600 water system, the system should be filled with solution of propylene glycol. Follow procedures outlined below:

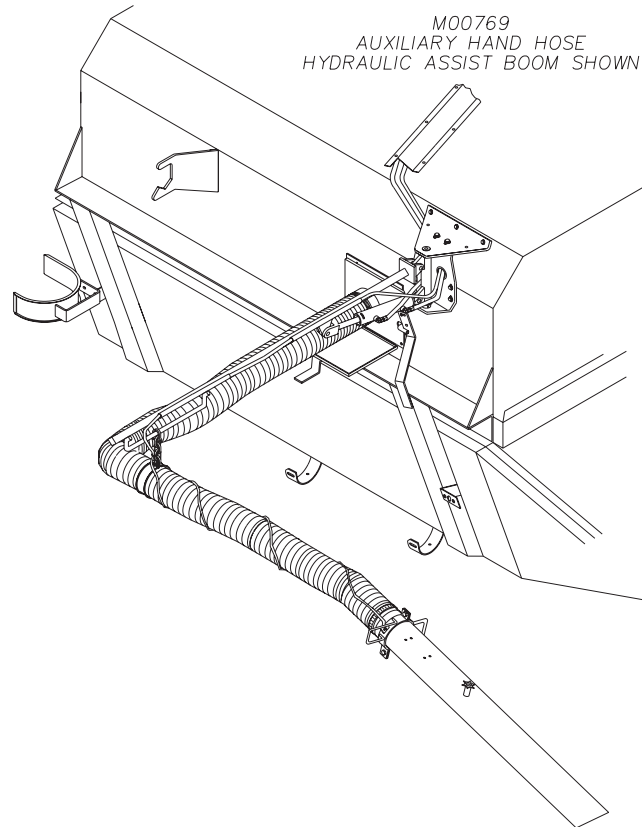
1. Disconnect siphon hose from water tank.
2. Submerge hose end into container of propylene glycol.
3. Start auxiliary engine and run at idle. Turn water switch on until propylene glycol is observed to spray from nozzles. Turn water switch off.
4. Drain water tank.
5. System is now winterized.

WATER SYSTEM SERVICE AREAS



HAND HOSE ASSEMBLY (OPTIONAL)

WARNING: Never direct hand hose nozzle at another person as serious injury may occur.



The optional auxiliary hand hose is designed to clean areas inaccessible to the sweeper during normal operation, such as shallow catch basins, highway medians, railing, etc. The standard hand hose is a flexible hose with an aluminum 52 inch extension. A shutter plate is placed between the removable suction transition and hopper inlet so that the air suction will be diverted to the hand hose.

OPERATION

1. **STOP AUXILIARY ENGINE AND REMOVE IGNITION KEY.**
2. Disconnect suction transition located on right side of sweeper from hopper and place shutter plate (normally stored in cab) between transition and hopper suction inlet and latch transition in place.
NOTE: This is done to divert total suction to hand hose hopper inlet. Hand hose suction will be very weak if shutter plate is not installed properly.
3. Open hand hose inlet door at rear of hopper.
4. Loosen hand hose storage straps and swing hand hose assembly around until suction inlet contacts door seal. Secure in this position with latch.
5. Start auxiliary engine, lower the pick-up head and turn on hopper water nozzle switch.

6. Set RPM to desired engine speed.

Turbo Engine

A. Paper, leaves, cans and bottles -	1500 RPM
B. Heavy dirt and gravel -	1600 RPM
C. Water, mud, shallow catch basins -	1800 RPM

NOTE: ***Do not submerge nozzle in liquids or mud; hold slightly above for best results.***

7. Once hand hose operation is complete, turn off hopper water, raise pick-up head and turn auxiliary engine off.
8. Unlatch hand hose assembly from hopper inlet and secure inlet door.
9. Swing hose around to storage position and strap in place.
10. **Remove shutter plate** from hopper transition and store in cab. Latch transition back in normal sweeping position.

AUTO SWEEP INTERRUPT (OPTIONAL)

DESCRIPTION OF OPERATION

WARNING! The ASI System does not automatically inhibit the sweeper from backing up. The ASI System signals the operator when all the sweeper systems are safe to back up. Backing the sweeper is still in the control of the sweeper operator and care must be taken to avoid accident or injury from backing sweeper.

Manual/Auto switch must be in Auto position for ASI to work. Upon placing the transmission gear selector in the reverse position, the auxiliary engine will automatically be idled and the sequence of the raising operations will begin. Also, to notify the operator that the sequence of operations is in progress, a red warning light located on the console will start flashing. As soon as the pick-up head is fully raised, the green light will turn on to notify the operator that the sweeper is ready to back up. To resume sweeping, the transmission must be taken out of reverse (turning the red light off) and the INTERRUPT/RESET switch can then be pressed (turning the green light off) which will automatically lower the gutter broom(s), if previously ON, and lower the pick-up head. Operator must manually increase the throttle RPM!

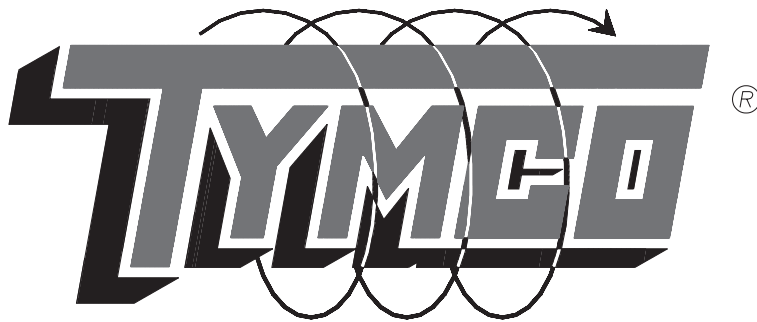
FUNCTION

The pick-up head is designed to operate (or be pulled) in only the forward sweeping direction. Therefore, to prevent damage to the pick-up head assembly, the sweeper should never be “backed-up” with the pick-up head in the DOWN position. Before backing the sweeper, the operator should ALWAYS return the auxiliary engine to the idle speed, and raise the pick-up head and gutter brooms. The Auto Sweep Interrupt (ASI) circuit was designed to automatically accomplish this sequence of operations in an elapsed time of approximately 10 seconds.

When the ASI System is enabled, to interrupt sweeping for backing, the auto-sequence of operations begins immediately when the sweeper chassis is shifted into reverse or by pressing a INTERRUPT/RESET switch mounted at the sweeper control console. The auto-sequence of operations is in the following order:

1. The auxiliary engine is idled and the gutter broom(s) and the BAH (Broom Assist Head) broom, if equipped, are stopped.
2. The water system is turned OFF.
3. The left gutter broom is raised.
4. The right gutter broom is raised.
5. The pick-up head is raised (Including the BAH broom.)

To reset the sweeper in order to resume sweeping, the transmission must be taken out of reverse and the INTERRUPT/RESET switch pressed. All systems, *except the throttle*, will return to their previous mode. The gutter broom(s) will automatically lower, the water system will resume, the pick-up head will lower if each were previously ON. After an approximate 4 second time delay (which is adjustable) to insure that the pick-up head is on the sweeping surface, *the operator may pull forward and manually raise the auxiliary engine speed and resume sweeping.*



REGENERATIVE AIR SWEEPERS

REGENERATIVE AIR SWEEPER WARRANTY

TYMCO REGENERATIVE AIR SWEEPERS are warranted to be free from defective materials and workmanship for a period of 12 months or 1,000 hours from date of delivery and such period being hereinafter referred to as "warranty period". It is the sole obligation of Seller with respect to this warranty period to replace free of charge, F.O.B. Waco, Texas, any part or parts which may prove to be defective due to defective workmanship or materials within the warranty period provided no disarrangement of using unauthorized parts or changes to the machinery be made voluntarily or by incompetency, carelessness, negligence, accident, or need of attention upon the part of purchaser, agents, employees or other parties.

This warranty shall not cover normal maintenance and adjustments, and the same not include nor shall Seller be liable or responsible for material for normal wear and usage for any damages by reason of loss of production, down time or loss of profits or income arising from any reason whatsoever. Seller reserves the right to change the design and construction of said sweeper when in its sole opinion any such change represents an improvement of the sweeper. All outside purchased equipment and accessories are guaranteed only to the extent that the manufacturer's guarantee may apply and are not subject to this warranty nor to any implied warranty.

This warranty is in lieu of all other warranties, expressed or implied. No person is authorized to give any other warranties or to assume any other liability on the Company's behalf unless made in writing by the Company, and no person is authorized to give any warranties or to assume any liabilities on the Seller's behalf unless made in writing by the Seller.

