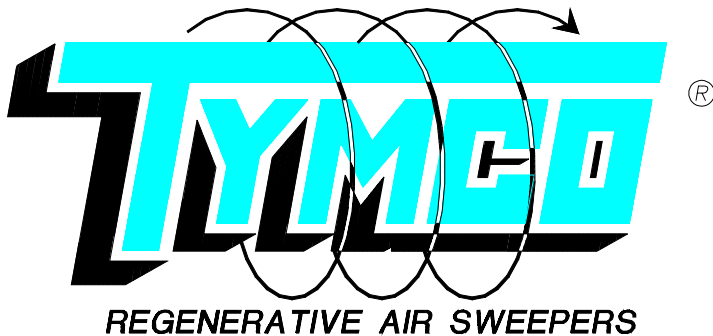
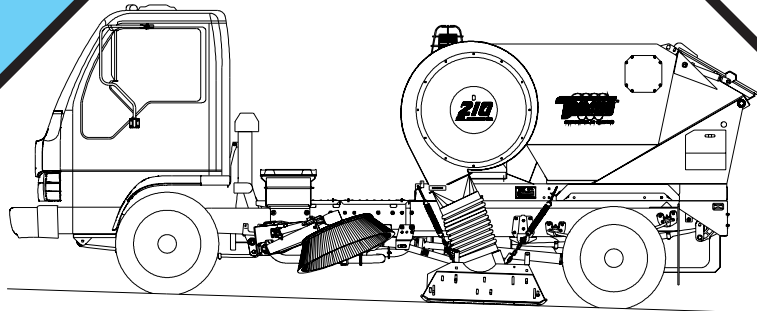


MODEL 210



OPERATOR'S
MANUAL

2008

TYMCO
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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 210

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.

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2008 EDITION

INTRODUCTION

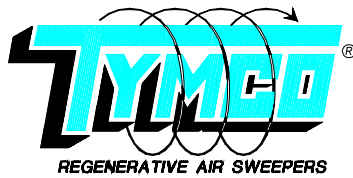
To insure proper understanding of operation, cleaning and maintenance of your TYMCO REGENERATIVE AIR SWEEPER, it is necessary that this Operator's Manual and the Service & Parts Manual be read and studied from cover to cover by the operator. A full understanding of this equipment will help the operator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

**CLEAN OUR STREETS AND PARKING AREAS
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



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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.

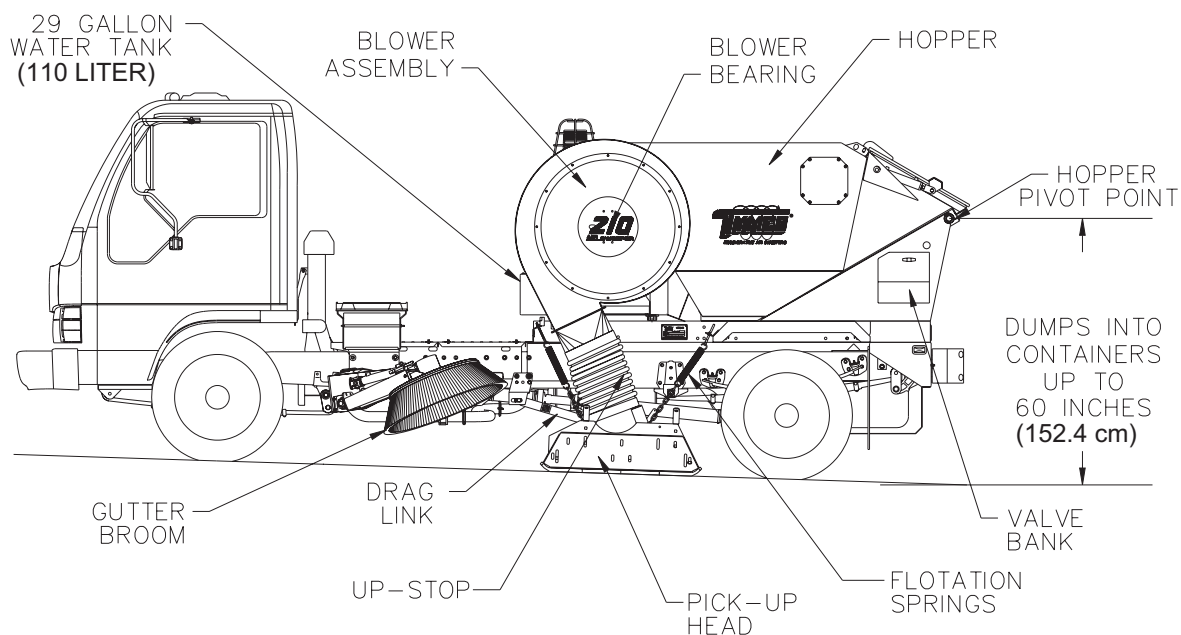
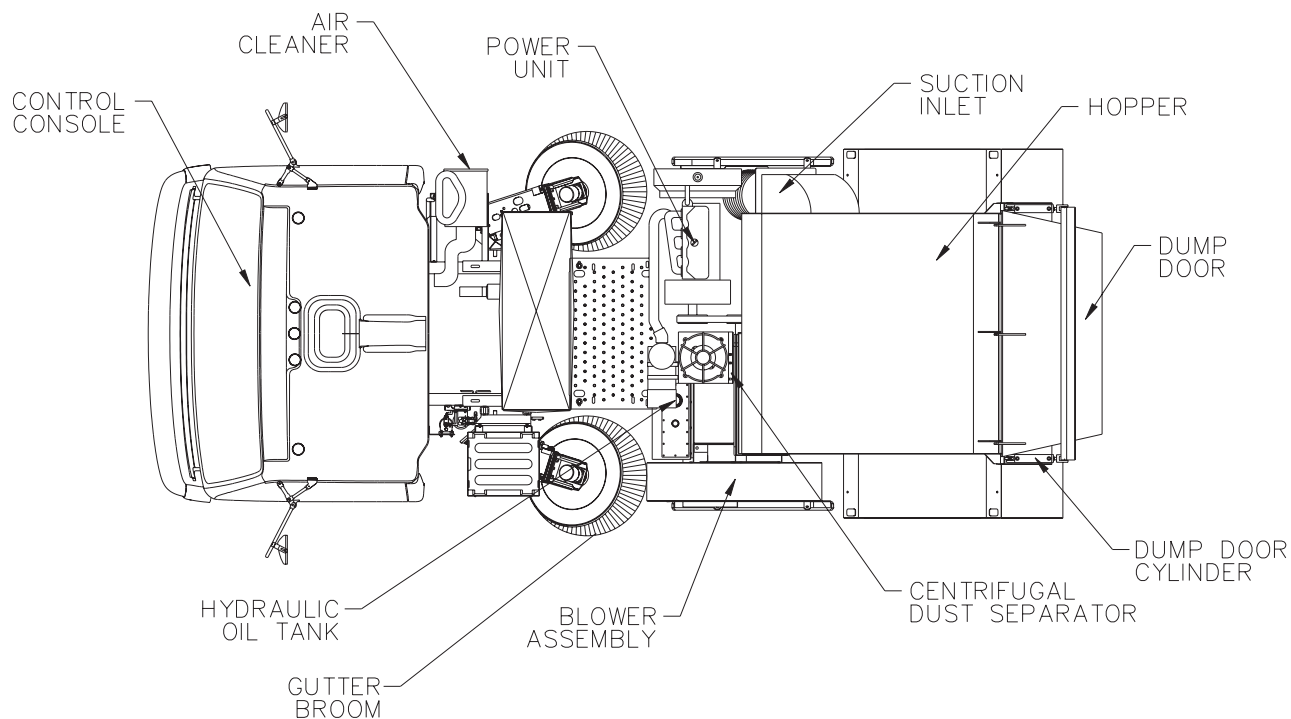
This sweeper is not a Vacuum Cleaner. Cleaning is actually done by a stream of high velocity air the full width of the pick-up head. A blower furnishes both pressure and suction. Air pressure from the blower passes over the surface being swept within the pick-up head, blows up debris in its path, and 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 2400 (2000 if sweeper is equipped with a turbo charged auxiliary engine). 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.**

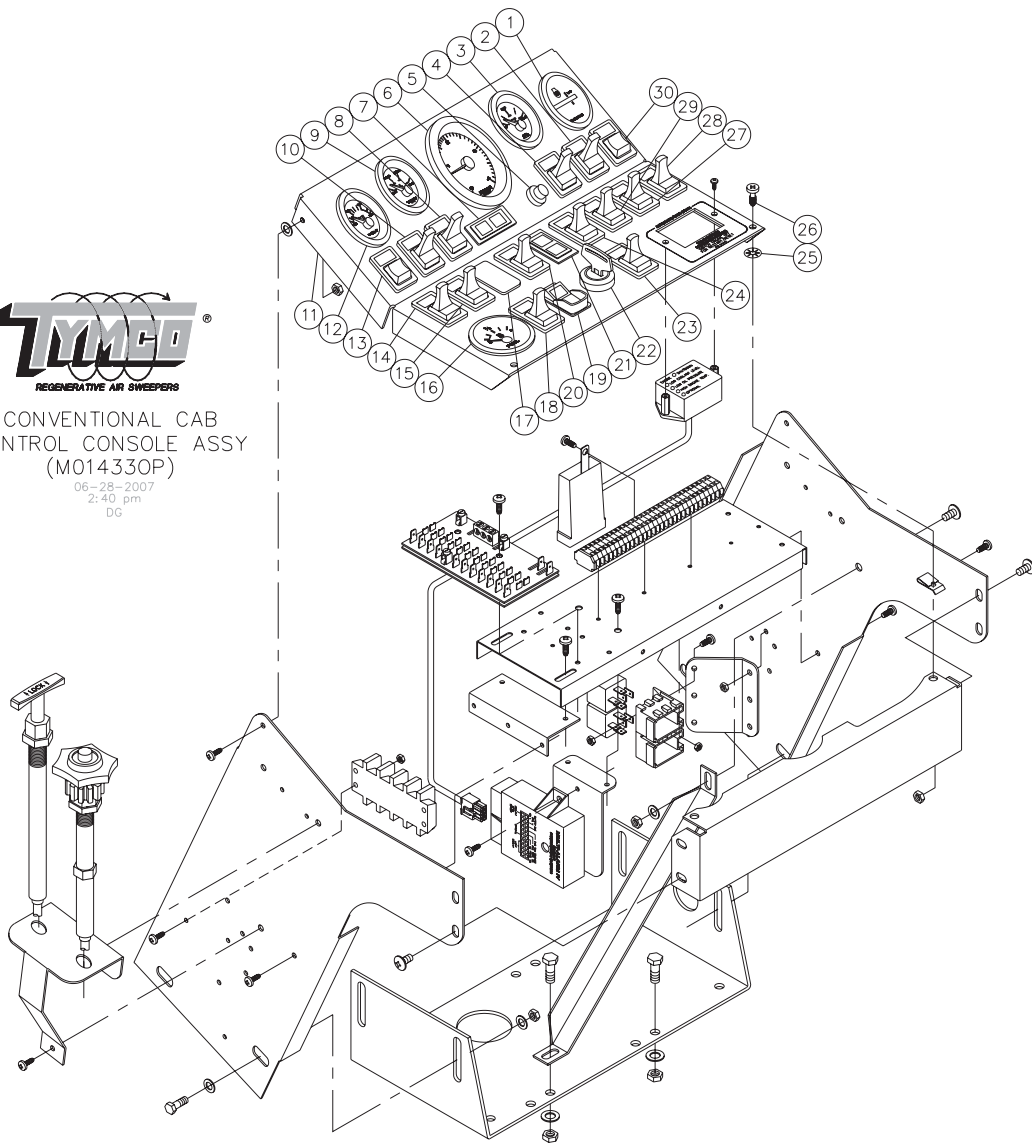
MODEL 210 (M00790)





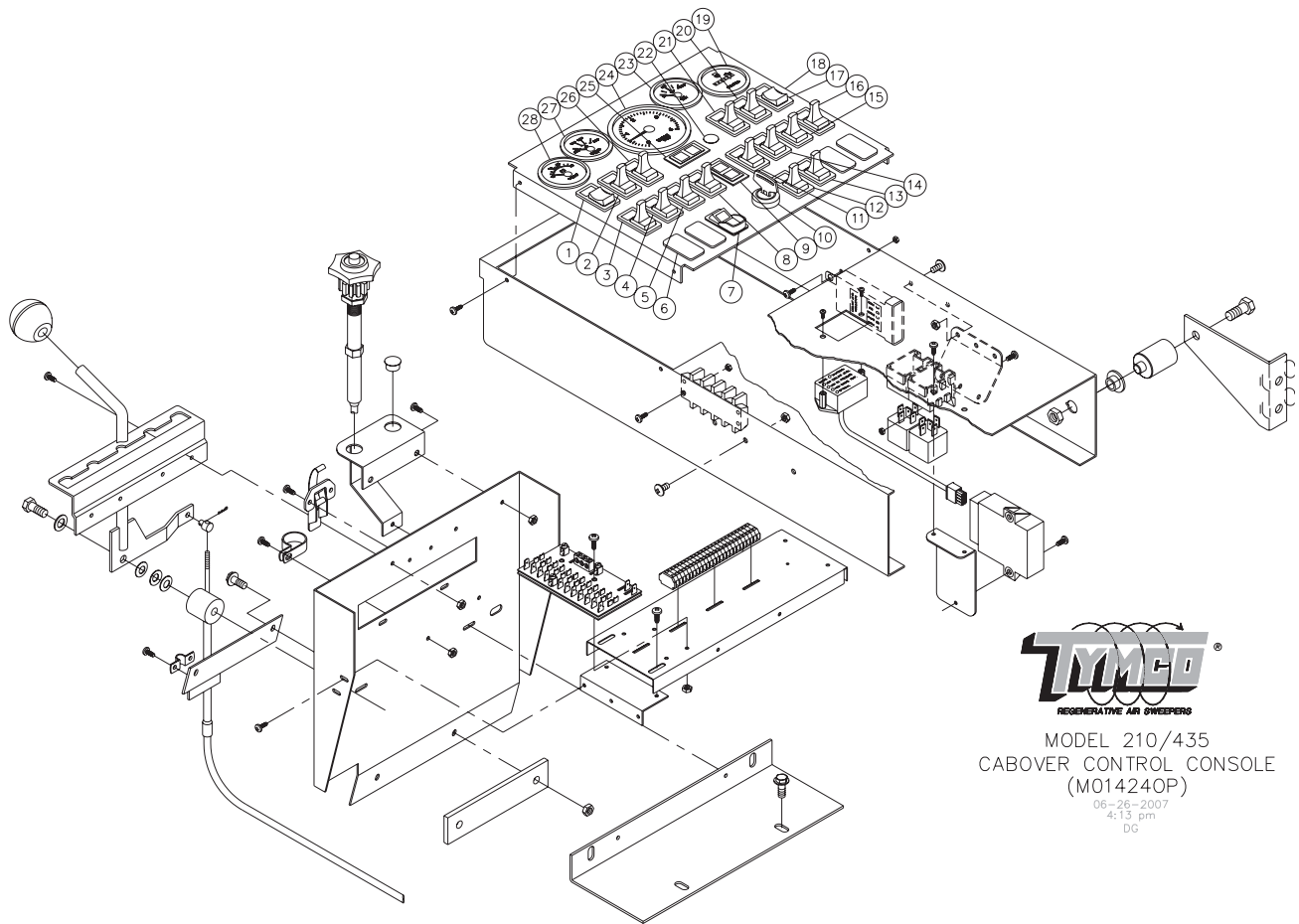
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CONTROL CONSOLE ASSY
(M014330P)

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**TYMCO MODEL 210
CONVENTIONAL CAB CONTROL CONSOLE COMPONENTS**

ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	Gauge - Hour Meter	16	Gauge - Extra Fuel
2	Switch - Gutter Broom Light - LH	17	Blank - Control Panel
3	Gauge - Engine Oil Pressure	18	Switch - Pressure Bleeder
4	Switch - Pick Up Head	19	Switch - Dump Door
5	Switch - Run Auxiliary Hydraulics	20	Switch - Auxiliary Hydraulics
6	Gauge - Tachometer	21	Pilot Lamp Assembly - Lo Water/Pmp On
7	Pilot Lamp Assembly - Pre Heat/Blank	22	Switch - Kubota Ignition
8	Switch - Warning Lights	23	Switch - Engine RPM
9	Gauge - Water Temperature	24	Switch - Water System
10	Switch - Gutter Broom Light - LH	25	Retainer - #12 Passivated
11	Control Panel Plate	26	Screw - #12 Quick Opening Captive
12	Gauge - Voltage Meter	27	Switch - Hopper Water
13	Switch - Gutter Broom - LH	28	Switch - Broom Water - RH
14	Switch - Gutter Broom Water - LH	29	Switch - Pick Up Head Water/Press. Trans.
15	Switch - Work Lights	30	Switch - Gutter Broom - RH



MODEL 210/435
CABOVER CONTROL CONSOLE
(M014240P)

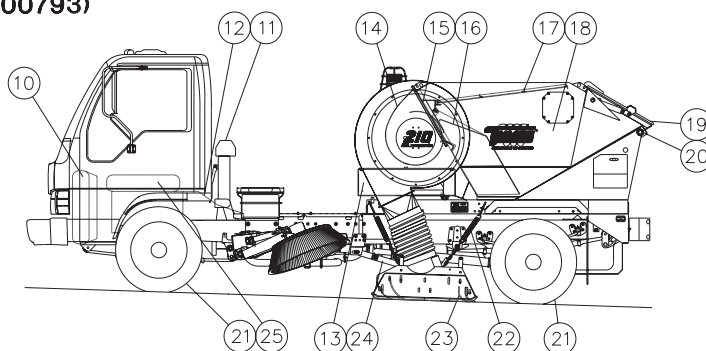
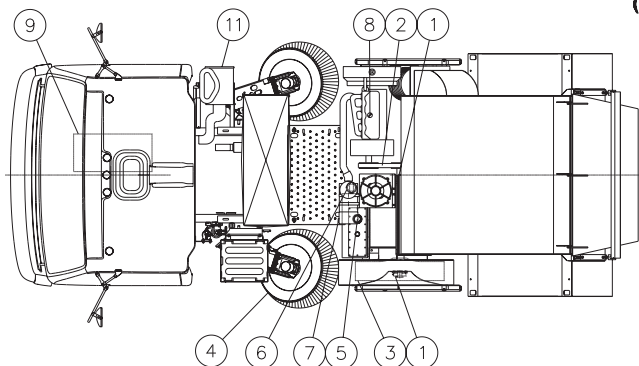
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TYMCO MODEL 210 CAB-OVER CONTROL CONSOLE COMPONENTS

ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	Switch - Gutter Boom - LH	15	Switch - Broom Water - RH
2	Switch - Broom Light - LH	16	Switch - Broom Tilt - RH
3	Switch - Broom Tilt - LH	17	Switch - Gutter Broom - RH
4	Switch - Broom Water - LH	18	Control Panel Plate
5	Switch - Work Lights	19	Gauge - Hour Meter
6	Blank - Control Panel	20	Switch - Broom Light - RH
7	Switch - Dump Door	21	Switch - Pick-Up Head
8	Switch - Hopper Water	22	Plug - 5/8
9	Pilot Lamp Assy - Lo Water/Pmp On	23	Gauge - Engine Oil Pressure
10	Switch - Kubota Ignition	24	Gauge - Tachometer
11	Switch - Water System	25	Pilot Lamp Assembly - Pre Heat/Blank
12	Switch - Engine RPM	26	Switch - Warning Light
13	Switch - Pressure Bleeder	27	Gauge - Water Temperature
14	Switch - PUH Water/Press. Trans	28	Gauge - Voltage Meter

MODEL 210

QUICK REFERENCE SERVICE CHART (M00793)



ITEM	DESCRIPTION	RECOMMENDED SERVICE
1.	Blower Bearings	Grease once a week or every 25 hours of operation.
2.	Blower Power Band	Re-tension after initial 10 hours; then check every 150 hours.
3.	Blower Wheel	Inspect monthly for wear. DO NOT REACH INTO BLOWER HOUSING FOR ANY REASON!
4.	Gutter Broom / Wafer	Check DAILY for string, cassette tape, etc on motor shaft. Re-tension spring when new wafers are installed.
5.	Hydraulic Reservoir	Drain oil after initial 100 hours; then every 1000 hours or once a year. Check oil level DAILY.
6.	Hydraulic Oil Filter	Change every 100 hours.
7.	Aux. Engine Air Cleaner	Replace when restriction indicator shows red.
8.	Auxiliary Engine	Change oil every 100 hours, for additional service refer to engine manual. Check oil level DAILY.
9.	Console Fuse Panel	Always replace fuse with identical amp rating.
10.	Both Engine Radiators	Check DAILY. CAUTION - Check only when cold.
11.	Truck Air Cleaner	Service every 25 hours or when restriction gauge indicates.
12.	Transmission	Change oil & filter every 15,000 miles or once a year.
13.	Water Tank	Drain tank DAILY.
14.	Centrifugal Separator	Wash out DAILY! Cleanout door provided on engine side.
15.	Separator Seal	Clean seal DAILY. Hopper must be airtight and fit snugly against seal when lowered.
16.	Skimmer Hood	Inspect DAILY! Skimmer hood must swing freely when hopper is raised in order to clean itself of debris.
17.	Hopper Screen	Wash DAILY to prevent air blockage.
18.	Hopper	Wash out at end of each shift to prevent rusting.
19.	Dump Door Seal	Inspect DAILY; replace if damaged.
20.	Hopper Pivot Hinge	Grease every 25 hours of operation or once a week. CAUTION: Hopper must be raised in order to grease hinge. Always Install Pin in Lower Safety Strut!
21.	Truck Tires	Check DAILY for flats and correct air pressure.
22.	Spring Tension	Check skid plates weekly for wear; adjust spring tension as required.
23.	Pick-Up Head Curtains	Inspect DAILY; replace when worn out .
24.	Drag Link	Inspect DAILY for condition
25.	Truck Engine	Change oil and filter every 100 hours or 3000 miles of operation.

NEVER REACH INTO BLOWER HOUSING FOR ANY REASON!

HOPPER ASSEMBLY

The TYMCO® Model 210 hopper has a volumetric area of 2.4 cubic yards (1.8 m) 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. A small leak diminishes this vacuum tremendously.

To empty the load from the Model 210, the hopper is made to high dump into containers up to 60 inches (152.4 cm) high. Two large hydraulic cylinders are used to raise the hopper which pivots on a massive hinge.



WARNING! Never work under or around raised hopper without first installing pin in lower safety strut!



(M01216)

A. DUMP OPERATION & CLEAN OUT

To dump the hopper, use the following procedure:

1. Back sweeper to container or area for dumping.
NOTE: Raise the pick-up head before backing sweeper or damage could occur.
2. Start sweeper auxiliary engine and let idle.
3. Actuate dump toggle switch located on the left side of the sweeper behind cab so hopper raises and unloads debris. Work hopper door back and forth several times to fully discharge load.



WARNING: Do not work under or around fully or partially raised hopper without first installing pin in lower safety strut!

4. Lower hopper; never drive sweeper in transit with hopper in raised position.
5. At end of shift, raise hopper and install pin in safety strut. Wash out hopper, hopper screen and skimmer hood. Also wash out the separator, suction hose and bottom of pick-up head.

B. SERVICE



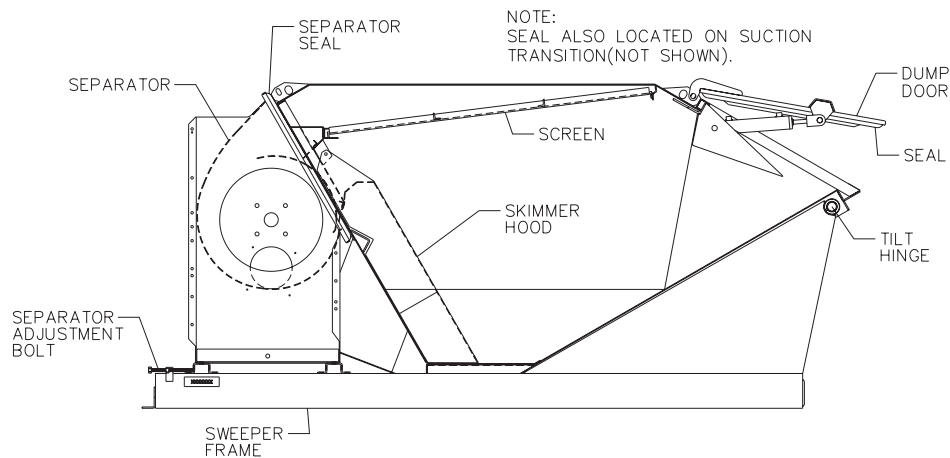
WARNING: Never work in or around the hopper with auxiliary engine running. Always shut off engine and remove ignition key prior to servicing.

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

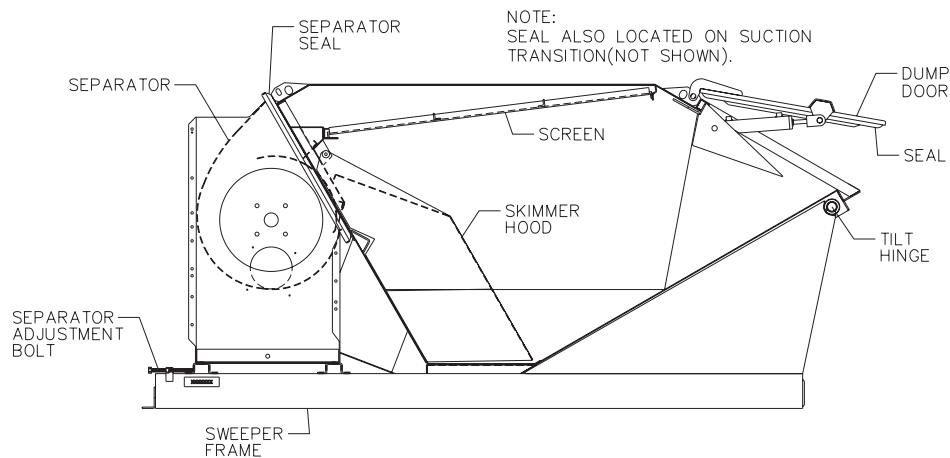
1. Hopper Hinge - The hopper must be raised in order to access the four grease zerks used to lubricate the hinge. **ALWAYS INSTALL PIN IN SAFETY STRUT BEFORE WORKING UNDER OR AROUND HOPPER BODY!** Lubricate hinge every 25 hours or once a week.
2. Hopper Seals - The hopper must be maintained air tight for the sweeper to perform adequately. Daily inspect the dump door seal, right side transition seal and separator seal. Replace seals if damaged.

EARLY MODEL 210 HOPPER ASSY.

M00794



LATE MODEL 210 HOPPER ASSY.



BLOWER ASSEMBLY

A large turbine type blower is used in the TYMCO Model 210 to generate both the vacuum and pressure air stream used to sweep. The blower assembly is found on the left side of the sweeper (See Page 3) and is driven by an auxiliary engine through a sheave and belt system.

⚠ WARNING: Never reach into 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 the blower.

To increase the blower speed, turn the vernier throttle cable knob counterclockwise to desired RPM.

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

B. BLOWER RPM SETTING

Blower RPM is 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 surface to be swept. The following RPM are recommended:

	Kubota Engine RPM	Diesel Turbo/Wis-Con Engine RPM
Paper, leaves, light trash, cans, bottles	1600 - 1800	1300 - 1500
Normal accumulation of dirt, sand, gravel	1800 - 2200	1500 - 1800
Heavy accumulation of dirt, sand, gravel *	2200 - 2400	1800 - 2000

*Sweeper forward travel must also be slower in order to remove this type of debris.

BLOWER SPEED - SRE OPTION

Auxiliary Engine RPM	Blower RPM (Standard)
1400	1725
1700	2100
2000	2450

C. SWEEPING SPEEDS

The best sweeping speeds for the TYMCO SWEEPER will be between 1-10 MPH and will be dependent upon how heavily concentrated the debris. 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, gravel	3-5
Heavy accumulation of dirt, sand, gravel	1-3

Traveling too slow when sweeping paper can sometimes cause it to build up in front of the pick-up head; however, sand, dirt, and pea gravel must be swept slower to prevent trailing. Of course, the best way to find out what the TYMCO Model 210 will pick up is to use it!

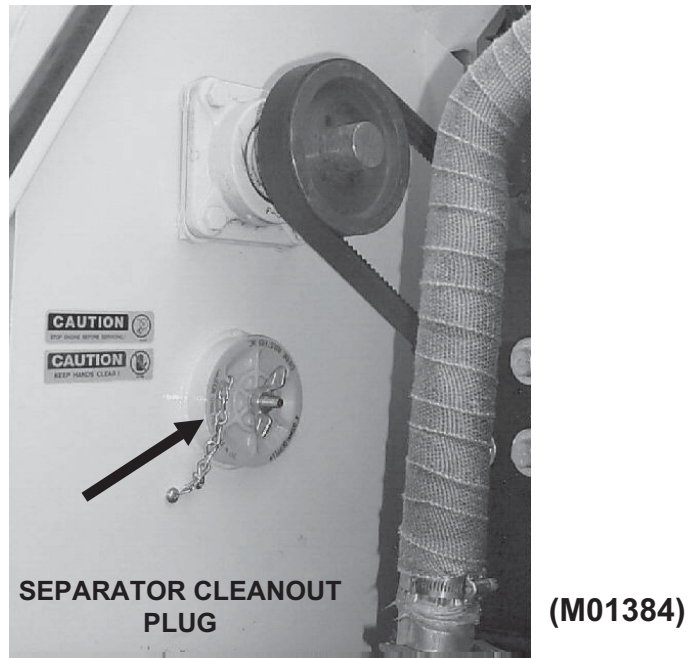
Higher speeds while maneuvering through repeated turns when sweeping a parking area will result in noticeable increased front tire wear.

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

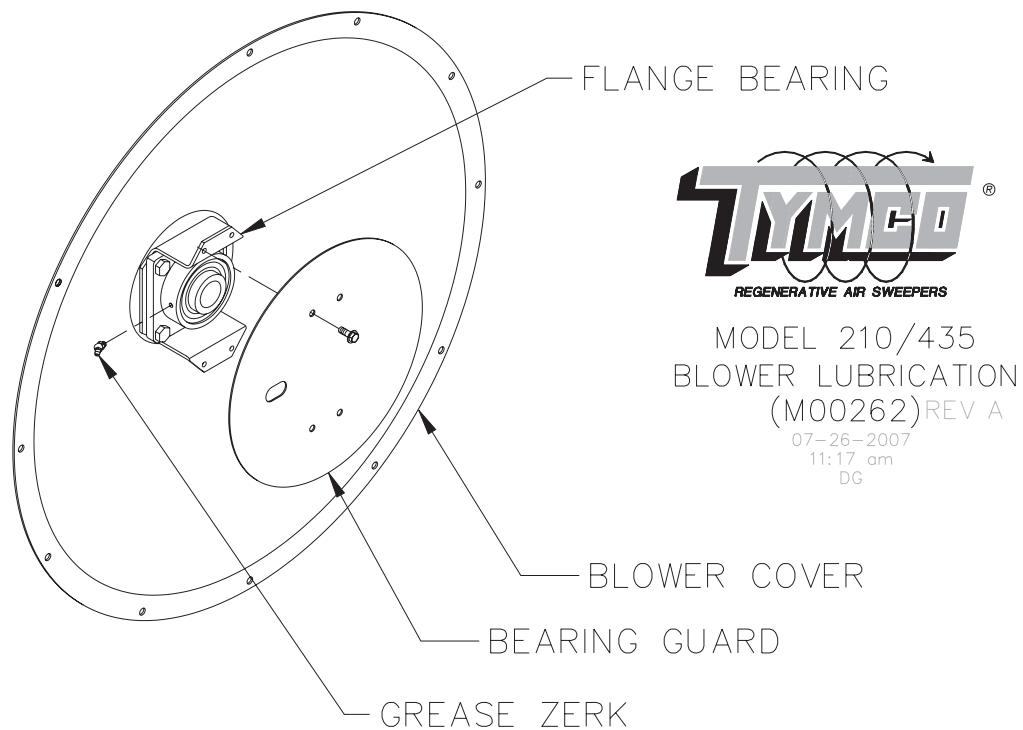


D. SERVICE

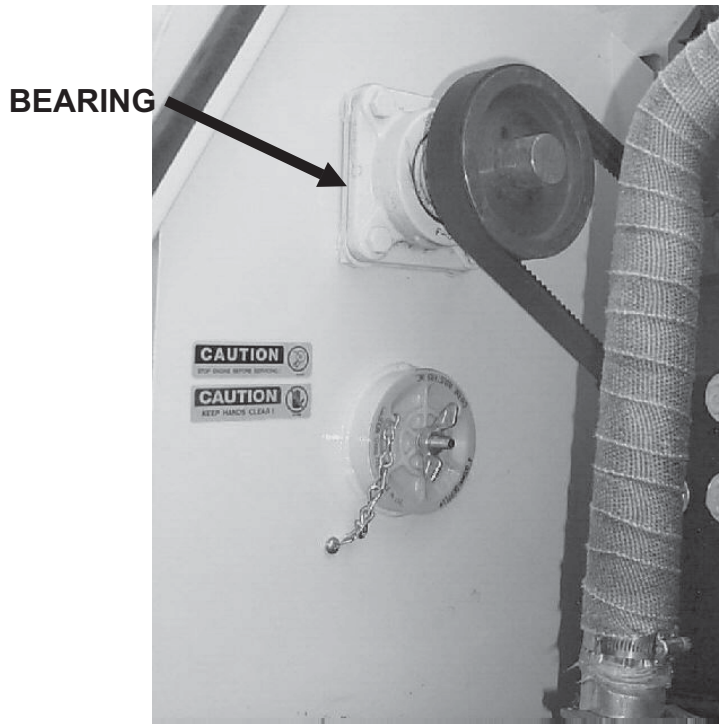
1. Wash out dust separator DAILY! Failure to clean separator will cause premature wear of blower. Separator clean-out plug is located on the engine side of the separator just below the flange bearing. Be cautious of belt drives when opening the separator clean-out plug - SHUT OFF SWEEPER ENGINE!



2. Two flange bearings are used on the blower assembly. One is located on the blower housing cover on the left side of the sweeper.



The second bearing is located on the right side of the separator next to the engine assembly. Both of these bearings require greasing once a week.



CAUTION:

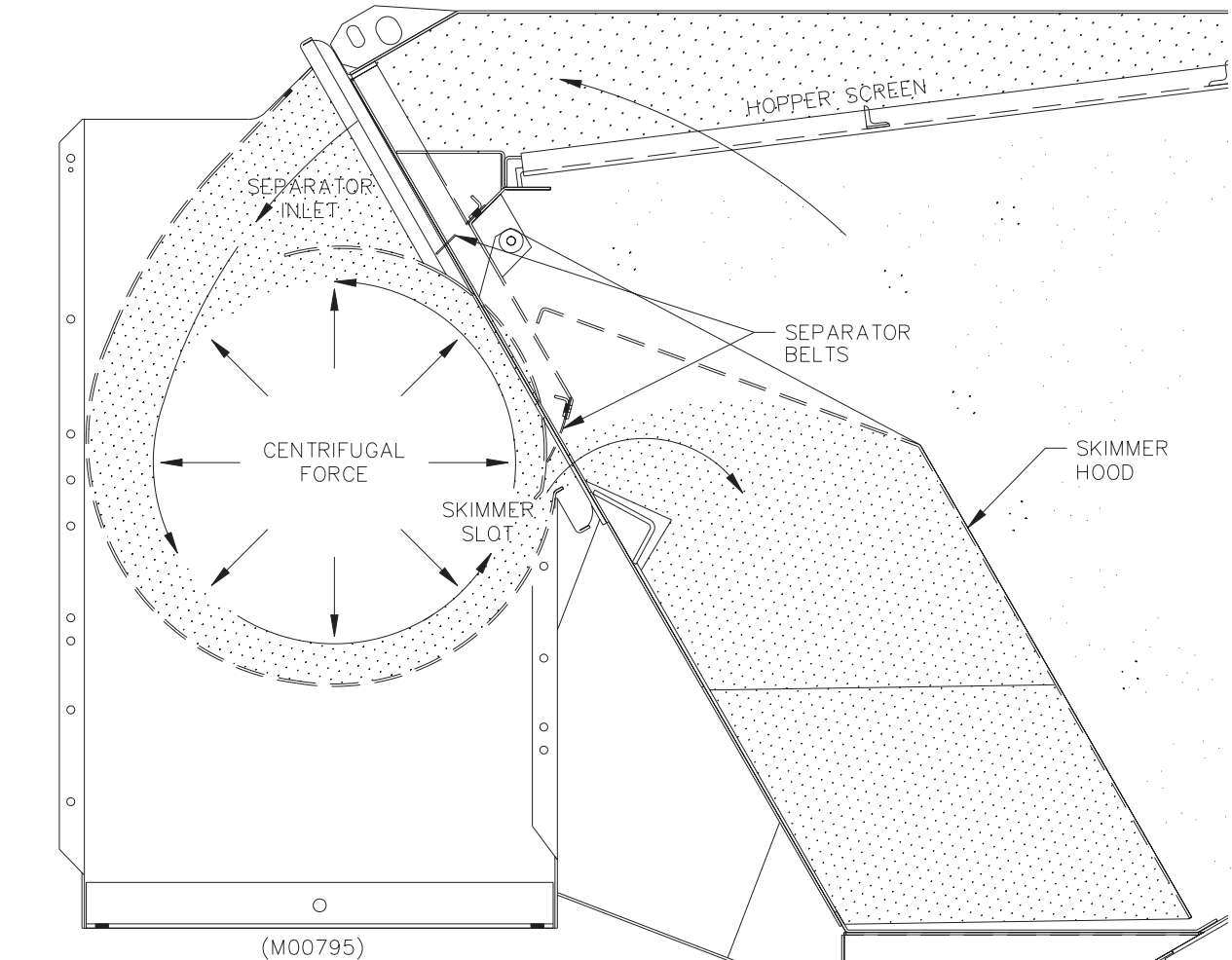


Grease engine side bearing only when engine is not running. Proximity to belt drives is hazardous when engine is running. Also note that the hopper must be raised to access bearing. Always install pin in lower safety strut before working beneath raised hopper.

When lubricating the bearing, be careful not to apply too much grease! Use manual hand type grease pump and pump the grease slowly into the bearing. A couple of pumps is all that is necessary; too much grease will force out bearing seals and cause premature bearing failure.

3. Have blower belt tensioned after initial 10 hours of operation; then every 150 hours of operation or once a month. A loose belt will allow slippage and result in poor sweeping performance as well as a damaged belt.

MODEL 210 SEPARATOR ASSEMBLY (M00795)



When the 210 is being used, the blower draws air from the top of the hopper. As the air is being drawn, it passes first through the hopper screen and then into the separator inlet. Once in the separator, the air begins to spin and centrifugal force throws dust particles against the separator wall where it is then expelled through the skimmer slot. Once expelled, the skimmer hood inside the hopper prevents the separated dust from being re-drawn into the separator inlet. Two separator belts are also used to prevent the expelled dust from being re-drawn back into the separator inlet. Operation of the 210 without either the skimmer hood or the separator belts will cause accelerated wear of the blower and its housing.

HYDRAULIC SYSTEM

Sweeper operation is dependent upon a properly functioning hydraulic system. Components such as the gutter broom, 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. Control Valves

A. HYDRAULIC RESERVOIR

The hydraulic reservoir is located on the left side of the sweeper between the cab and dust separator (See Page 3). The reservoir oil capacity is 8 gallons (30.3 liters) and the operator must check the oil level daily! The sight gauge is located on the front side of the hydraulic reservoir. If the oil level is low, fill reservoir before operating sweeper. **Use only 10W motor oil.** (See Parts & Service Manual for Equivalent Chart)

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

CAUTION:  Operator should never check for hydraulic leak using bare hand. High pressure used in the 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 belt driven by the sweeper auxiliary engine. Hydraulic pump belt tension is critical for proper component operation. After initial 20 hours of operation, re-tension belt. To access pump, hopper must be raised. **Always install pin in lower safety strut before working under hopper!**

Do not over-tension hydraulic belt! At center of belt span, use thumb and firmly depress belt. A properly tensioned belt should deflect approximately 1/2 inch (12.7mm).

A 3/8" (9.5 mm) J.I.C. flared male fitting for testing the system pressure is located at the output port on top of the pump. Use a test gauge rated to 3000 PSI (207 Bar) for system pressure checks.

CAUTION:  Never Work Around belt drives when sweeper engine is running!

C. CONTROL VALVES

The hydraulic control valve assembly is used to control the flow of oil to the various hydraulic components. The Model 210 valve assembly is located behind the door on the left rear hopper hinge panel (See Page 3).

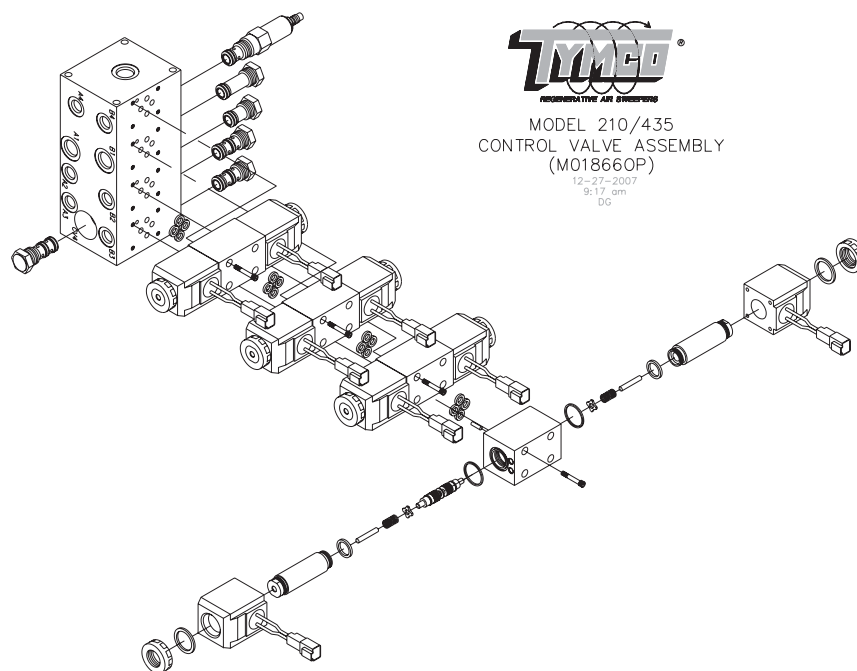
A relief valve is used to set the pressure for the Model 210 hydraulic system which is 1500 PSI (103.5 Bar) for the standard left-hand gutter broom option. For Dual Gutter Broom Option: 2500 PSI (172.5 Bar) for the primary pressure for the gutter brooms and 1500 PSI (103.5 Bar) for secondary pressure. Once set, no further adjustment is necessary; however, at least once a year, or if components appear sluggish, have pressure setting tested. (Refer to Parts & Service Manual for procedure.)

The control valves are solenoid actuated, meaning that they are shifted by use of electric toggle switches. These toggle switches are located on the control console panel inside the cab - except the dump switch which is located externally. Should toggle switch control fail to activate component, manual override buttons are provided at each valve to manually engage component. Before manually shifting valves, make sure the wires are plugged into the valve solenoids. Should the switch fail to activate the component, manual override buttons are provided on the 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: Gutter broom can only be raised when manually shifting valve. If an attempt is made to lower gutter broom manually, bristles may rotate, but broom will not lower due to lock valve engagement.

If a solenoid 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). To replace solenoid, refer to the Parts & Service Manual.



GUTTER BROOM

The Model 210 standard gutter broom utilizes a wafer type design which allows light debris, normally encountered in parking lot applications, to be brushed from the curb to the front of the sweeper's pick-up head. Use the gutter broom only to clean next to the curb and gutters. Otherwise, keep it in the raised position to avoid unnecessary wear.

The gutter broom is controlled from inside the cab with an electric toggle switch (See Page 4). The sweeper auxiliary engine must be running in order for the gutter broom to work. When the toggle switch control is sifted in the DOWN position, the gutter broom should begin to rotate and extend to the curb. Do Not force gutter broom into curb. Drive the truck so that bristle tips just contact curb; otherwise, the gutter broom may stall. **ALWAYS use care when gutter broom is down. NEVER ram gutter broom into curb or serious damage could occur. Also, NEVER back up with gutter broom lowered or it could possibly hang on stationary object resulting in damage.**

Gutter broom rotational speed is directly related to the sweeper engine RPM. Full gutter broom rotation speed is achieved at 1500 RPM.

A. ADJUSTMENTS

1. Conventional Cab

The gutter broom will require regular bristle contact pattern adjustment. As the bristles wear, it may be necessary to decrease the gutter broom spring tension in order to maintain bristle contact with the pavement surface. However, when new bristle segments are installed remember to re-tension gutter broom spring in order to prevent premature bristle wear due to excessive down pressure.

The gutter broom tilt should be set as flat as possible. If set with too much tilt, excessive pressure will be felt by the bristle tips when contracting the pavement causing them to bend severely and wear off prematurely. Also, too much bristle tilt will cause bristles to jam up against the truck frame when gutter broom is raised, deforming bristle slope and causing gutter broom to "hop" while rotating.

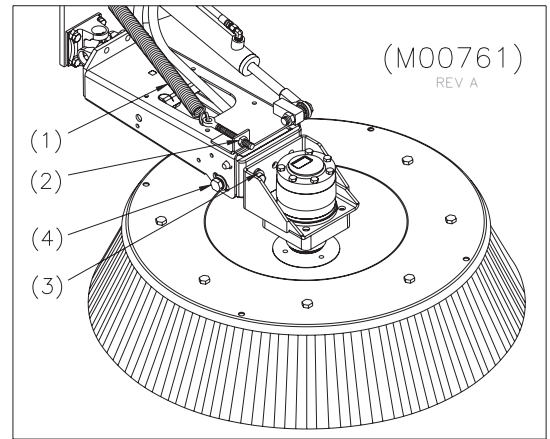
Gutter broom tilt is adjusted by slightly loosening the single adjustment nut (See Photograph) just enough that bristles can be moved to desired position. The simple ball and socket joint used on the conventional cab gutter broom allows the maximum amount of bristle adjustment.



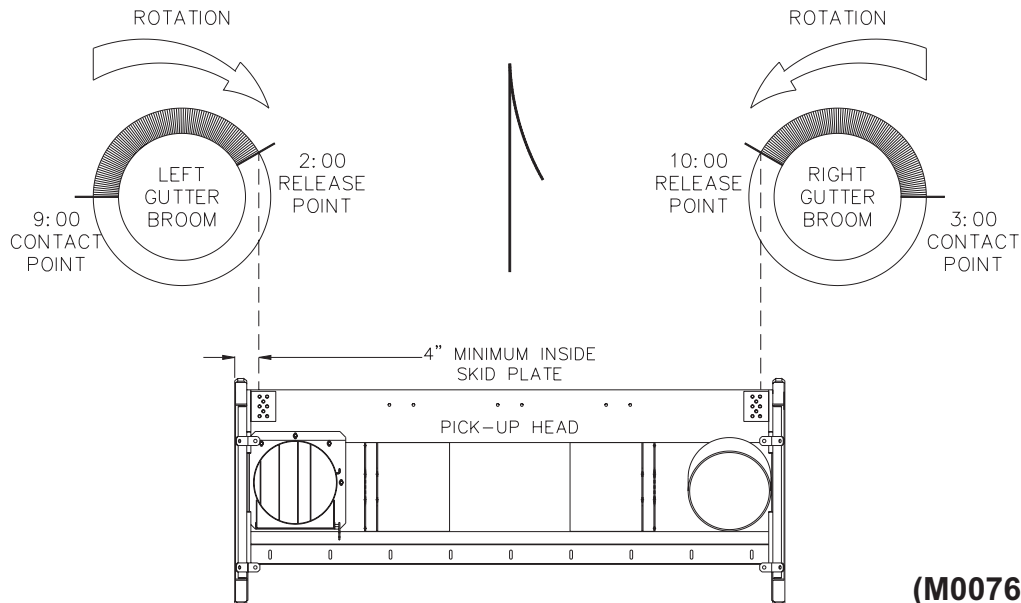
(M01219)

2. CAB-OVER

- a. **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 on gutter broom, the spring must be re-tensioned to counter the increased weight of the new bristles. Failure to re-tension the spring eye bolt nut will result in premature wear of the gutter broom bristles. Proper tension of the eye bolt nut for new segments is approximately one-half way up the eye bolt.
- b. **Tilt** - there is no established dimension for setting the gutter broom tilt because street curbs and gutters vary from place to place. To tilt the gutter broom, located on the end of the boom arm are the 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 the new bristle contact pattern for best results.



NEW BRISTLE CONTACT PATTERN



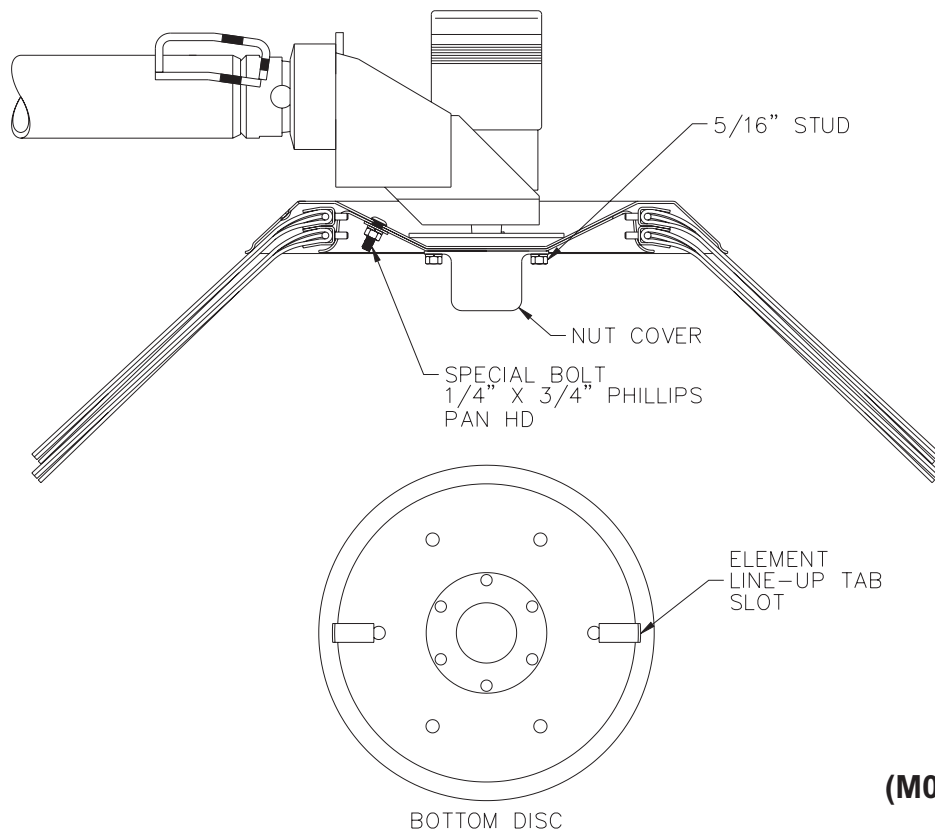
B. BRISTLE REPLACEMENT

It will be necessary to replace the bristles once they are worn out. To do so, use the following procedures:

1. Lower gutter broom and turn off sweeper engine.
2. Turn ignition switch on, but do not start engine. Shift gutter broom toggle switch to UP position and observe the gutter broom spring to slightly raise the gutter broom. Release the toggle switch once the gutter broom upward travel has stopped and turn off ignition switch.
3. Remove bristle and disc assembly from hub by removing the three nuts located on bottom side of disc assembly.
4. Remove three bolts holding top disc to bottom disc and separate discs. Discard old bristle elements.
5. When installing new bristle elements, note line-up tabs on bristle segment ring. These tabs insert into slot provided on bottom disc (See Drawing below). Failure to install bristles correctly could allow them to rotate in disc.
6. For re-assembly, reverse procedure outlined above.

NOTE: Be sure to tension gutter broom spring properly (if necessary) to prevent premature bristle wear.

For more service information, consult your Parts & Service Manual or contact your local TYMCO Dealer.



(M00692)

PICK-UP HEAD

The pick-up head is the most important component of the TYMCO Model 210 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 12" (30.5 cm) 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 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 78" (198 cm) 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 called the Blast Orifice. The blast orifice opening is 78" (198 cm) long with a 5/8" - 3/4" (16 - 19 mm) tapered opening (see Parts & Service Manual for adjustment procedures). The blower exhaust air is squeezed through this narrow opening which compresses the air into a powerful jet that is 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. Using the pick-up head toggle switch located on the control panel, lower pick-up head fully to pavement (lift chains should be slack). Pull forward a few feet allowing curtains to fold under the 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, lowering engine RPM, continue traveling forward for a few feet to allow any debris under the pick-up head a chance to be moved over to the suction nozzle and be picked up. Before raising the pick-up head, throttle down sweeper engine to idle, then raise pick-up head. When fully raised, the pick-up head will be secure against up-stop feet for sweeper transit.

PICK-UP HEAD MUST BE RAISED FOR TRANSIT!

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 friction and accelerate curtain wear.

NOTE: Rubber curtain 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 Parts & Service Manual.

C. PICK-UP HEAD ADJUSTMENT

1. **Blast Orifice** - The adjustable blast orifice assembly must be moved in such a manner as to create a 5/8" (16mm) gap on the left tapering to a 3/4" (19mm) gap on the right. Failure to adjust the blast orifice gap each time the blast orifice curtain is replaced will result in poor sweeper performance. (Refer to Parts & Service Manual)
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.

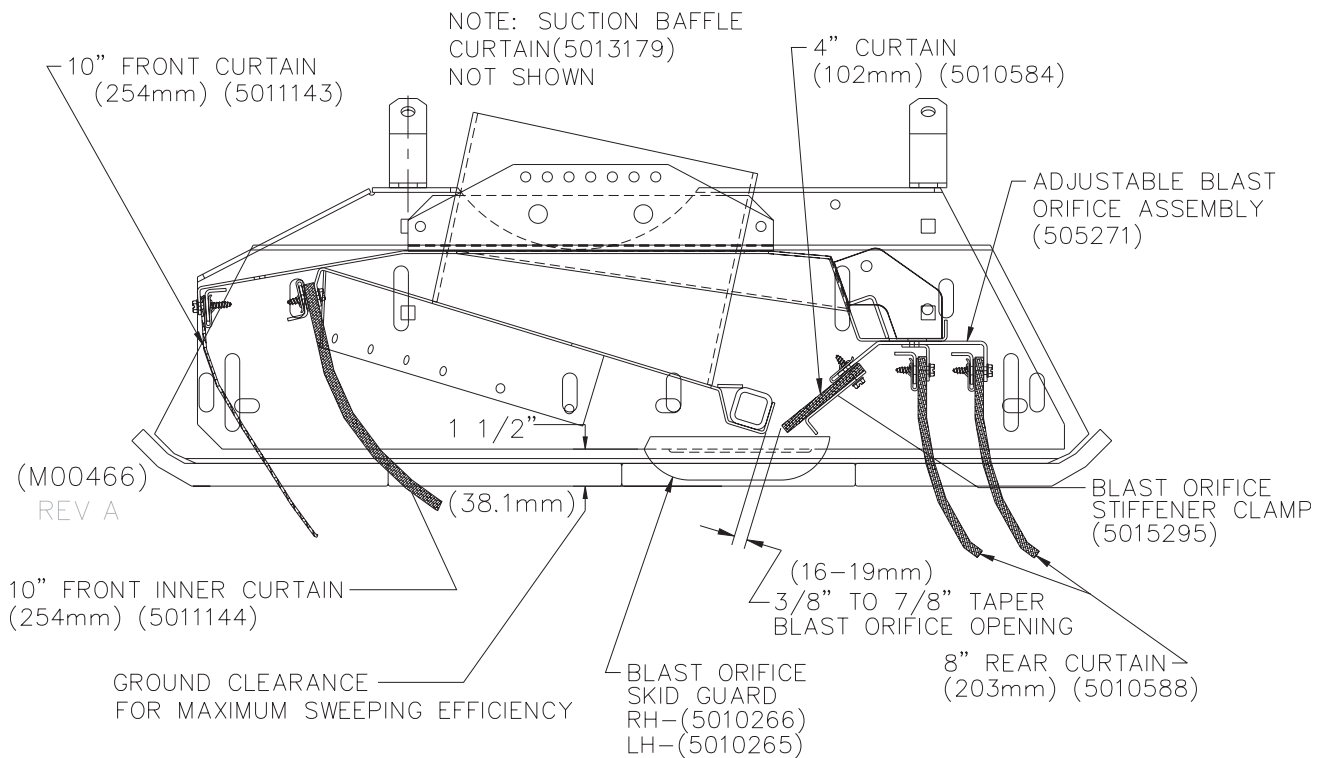
NOTE: Do Not lower skid plates in relation to the pick-up head when new curtain set is installed in order to prevent curtain wear, as lowering skid plates raises the blast orifice from the pavement and prevent curtains from properly sealing. Poor sweeper performance will result.

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: one, it prolongs the service life of the carbide skid plates; two, 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 adjustment, lower pick-up head and pull sweeper forward to fold curtains under into the sweep position. With the pick-up head lowered and the sweeper engine at idle RPM, springs should hold front of skid plates 1/2" to 3/4" (12.7 to 19 mm) off pavement. If front of skid plates are contacting pavement, spring tension should be increased until above description is observed. Rear of skid plates should be set just above or lightly contacting the pavement (See Drawing). Once the spring tension is set, increased sweeper 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 drawn down and seal itself to pavement. The pick-up head once drawn down should then be easily lifted by one hand which demonstrates the floating characteristics desired.

4. **Pick-Up Head Lock-Up Adjustment** - The pick-up head is raised and lowered by means of a hydraulic cylinder which rotates a lift arm assembly. Two chains (one on each side) attach the lift arms to the pick-up head. These chains are attached to the lift arms with an eye bolt (see Page 23). The pick-up head should fit snugly against the up-stops when fully raised. If not, check to see if the up-stops are bent. If up-stops are not bent, then use the lift chain eye bolts to take out slack in lift chains.

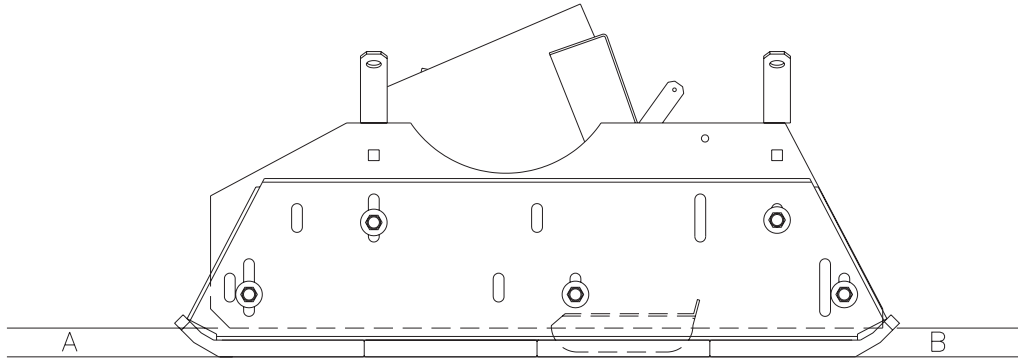
The pick-up head is locked in the UP or transit position hydraulically and electrically. A check valve in the hydraulic valve bank ensures the head from drifting down.



**CROSS SECTION THRU
MODEL 210 PICK-UP HEAD
(M00466)**

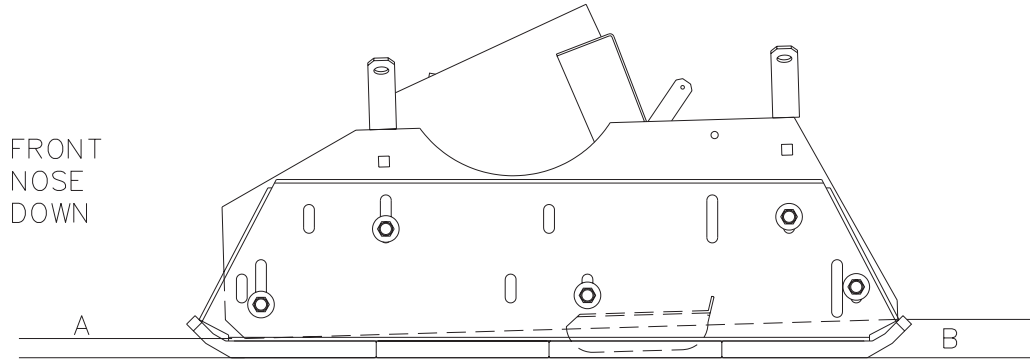
MODEL 210 PICK-UP HEAD SETTINGS

NORMAL DEBRIS SETTING



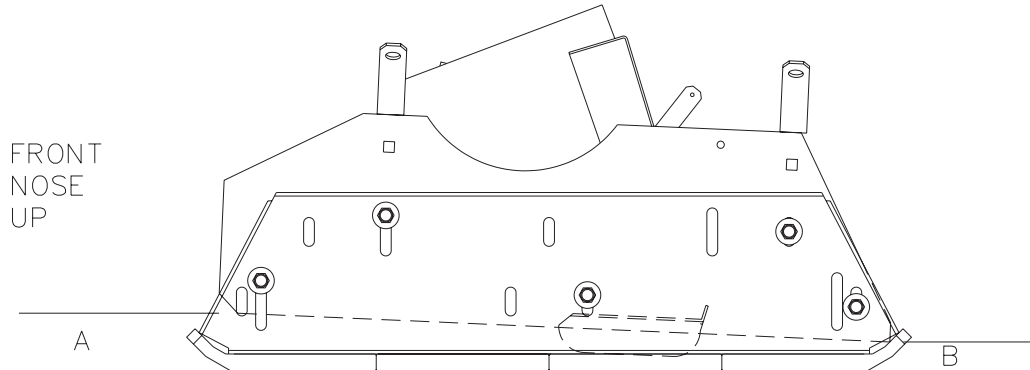
DIMENSIONS A=1 1/2" (38 mm)
 B=1 1/2" (38 mm)

HEAVY DEBRIS SETTING



DIMENSIONS A=1" (25.4 mm)
 B=2" (50.8 mm)

LEAF SWEEPING SETTING

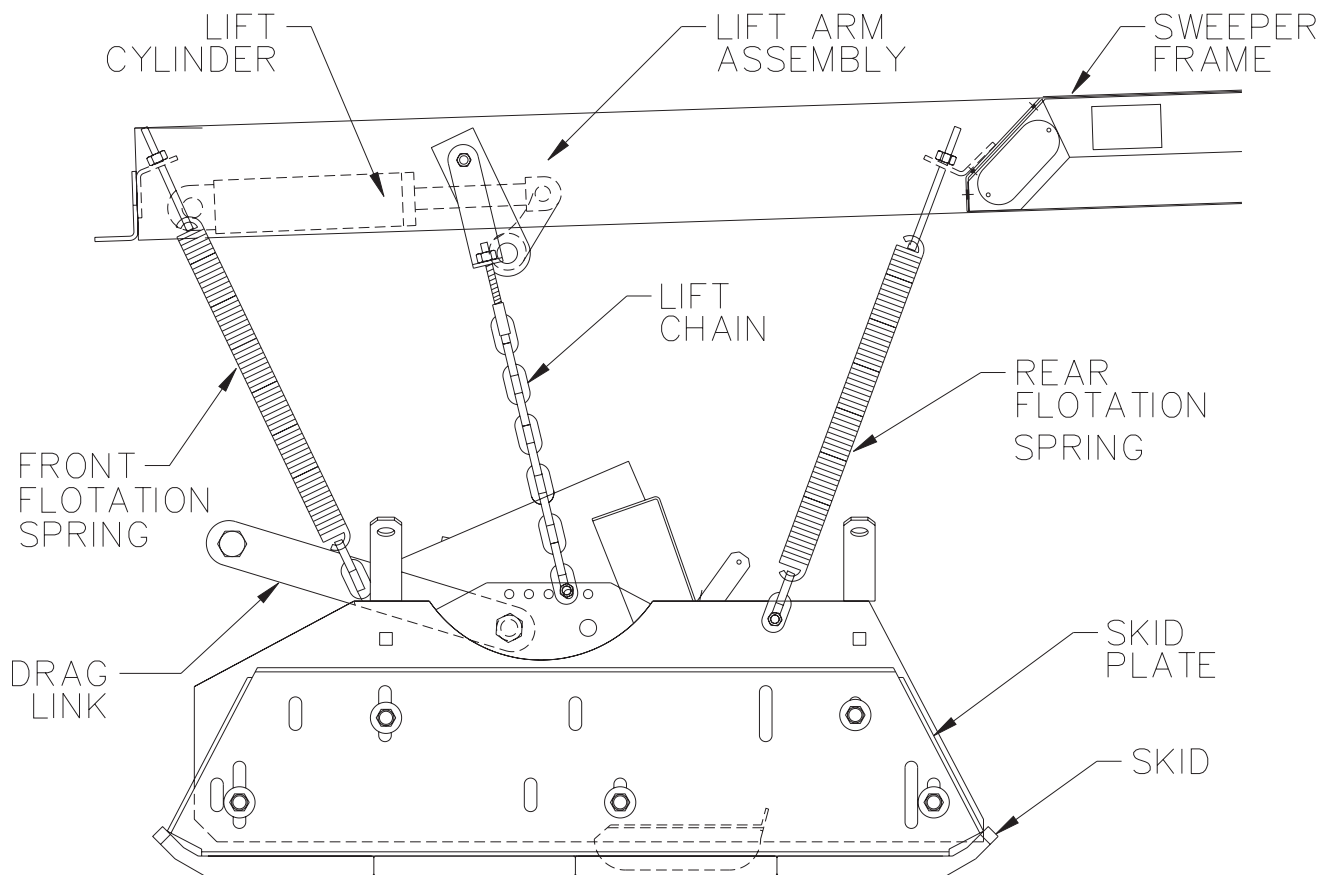


DIMENSIONS A=3" (76.2 mm)
 B=1 1/2" (38 mm)

REV A

(M00796)

MODEL 210 PICK-UP HEAD ASSEMBLY

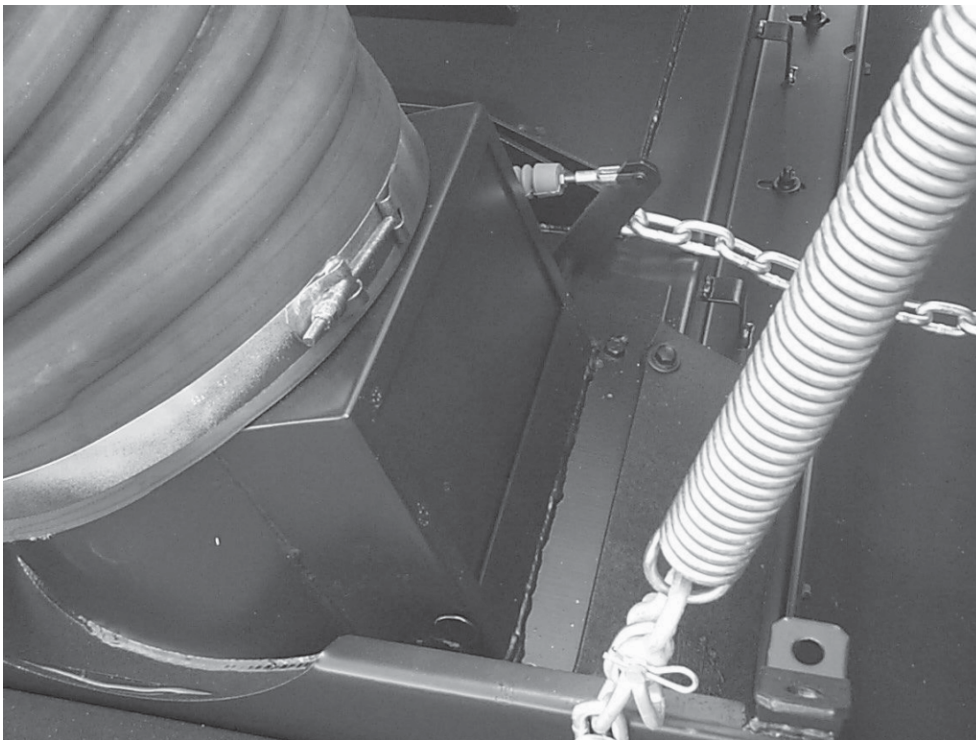


(M00799) REV A

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 operation should be done only when necessary to pick up light debris and the pressure bleeder kept closed at all other times.

**Open pressure bleeder door only when sweeping light debris;
otherwise pressure bleeder should be kept closed.**



(M01220)

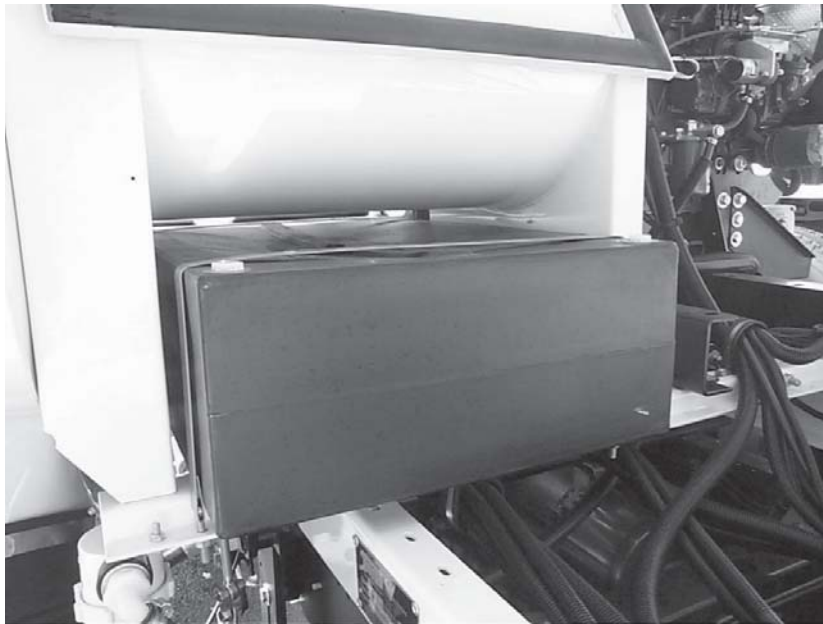
DUST CONTROL SYSTEM

The optional dust control system is designed to control the normal amounts of 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 bad door seals, worn pick-up head curtains, holes in the suction/pressure hoses can cause extremely dusty conditions which cannot be controlled by a properly functioning dust control system.

A. OPERATION

The following procedure is recommended for operation of the TYMCO® Model 210 dust control system:

1. Fill the water tank. A 29 gallon (110 liter) water tank is located on the left side of the sweeper just under the dust separator (See picture below). The tank fill/drain valve has a female adapter allowing the tank to be filled with a common garden hose. The tank is full when water is observed to run out vent tube on top of tank.



(M01221)

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 the water tank is emptied, the low water light will come on indicating that the water system has shut off automatically.
3. At end of shift, fill tank and then drain to flush out tank.

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:

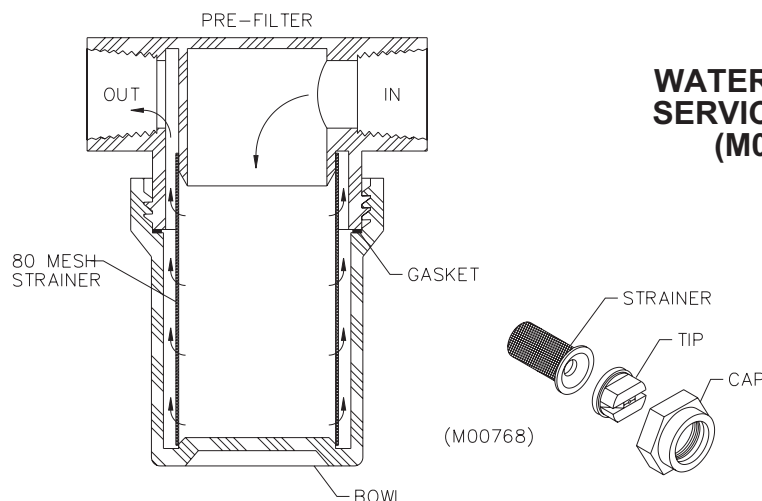
1. Water Tank - The water tank should be flushed at the end of each shift to remove contaminants. Fill tank and then allow to drain.
2. Pre-Filter - A pre-filter is located between tank and water pump to remove any contaminants before they reach the pump. The pre-filter has a removable cleanout bowl 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 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 210 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. 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 a wrench to tighten the cap which locks tip position.



C. WINTERIZATION

To winterize the Model 210 water system, the system should be filled with a 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. Turn ignition switch on. Turn water switch on until propylene glycol is observed to spray from nozzles. Then turn water switch off.
4. Make sure water tank is DRAINED!
5. System is now winterized.

WISCONSIN POWER UNIT STARTING PROCEDURE:

If sweeper is equipped with the Wis-Con Power unit, follow the procedure below to start the engine.

1. Make sure the throttle is fully shut and the choke is OFF (Plate Open).
2. Engage the starter, spin engine for 3 seconds to allow engine speed to increase, then pull the choke cable fully out (Plate Closed). Push back in when the engine fires. Choke plate should not have to be closed for more than several seconds even in cold climates.
3. If the engine stalls, repeat the procedure, this time pushing the choke in slower after the engine fires.
4. Choking may not be necessary for hot restarts. If required, use only a quick pull of the choke after the engine is spinning, with an immediate return to open position.

HAND HOSE OPTION

A simple, yet effective, optional feature offered on the Model 210 sweeper is the hand hose attachment. The hand hose was designed to allow the cleaning of those areas that the sweeper can not get into, such as corners, between posts, ditches, etc. However, when using the hand hose, the street sweeping portion of the sweeper is disabled. The reason for this is that to use the hand hose the hopper suction inlet must be blocked off. By doing this, all the hopper vacuum is diverted to the hand hose. To operate the hand hose, use the following instructions:

1. Park the sweeper next to area to be cleaned within range of the hand hose nozzle.
2. Insert the shutter plate (stored inside the chassis cab) between suction transition seal and hopper inlet.
3. Remove hand hose from transit hangers.
4. Open hand hose door and swing hand hose assembly around and clamp to hand hose port.
5. Start the auxiliary engine; lower the pick-up head and turn on the hopper water system which supplies water to the hopper spray nozzle.
6. Set engine RPM according to the debris load:

	Engine RPM
Paper, leaves, cans & bottles	1500-1800
Heavy dirt and gravel	1800-2200
Water, mud, shallow catch basin	2000-2200

NOTE: When using hand hose to remove water or mud, do not submerge end of nozzle. The hand hose picks up debris by the in-rush of air; if no air is allowed to enter nozzle, then no debris will be picked up. Hold nozzle end just slightly above water or mud for best results.




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

7. Once the hand hose operation is completed, always turn hopper water and auxiliary engine off and unlatch hand hose from port before swinging assembly around to re-clamp to transit hangers.
8. After hand hose has been clamped to transit hangers, remove shutter plate from hopper suction inlet. Failure to do so will render sweeper inoperable as debris from pick-up head is blocked off from hopper.

AUTO SWEEP INTERRUPT OPTION

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!

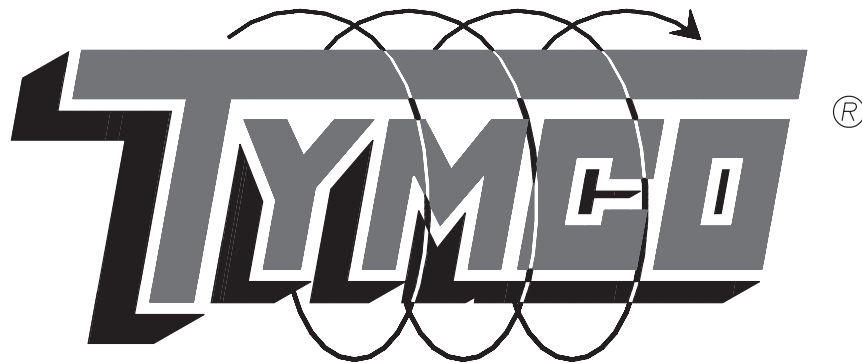
FUNCTION

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.

