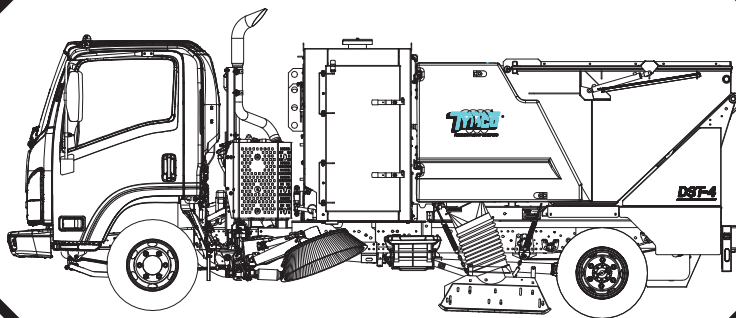


MODEL DST-4

DUSTLESS
SWEEPING
TECHNOLOGY



OPERATOR'S MANUAL

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2019



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 DST-4
(Dustless Sweeping Technology)
SND SERIES**

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.
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2019 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 Procedures Guidelines Model DST-6 & DST-4

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 DEF Tank(s) (if equipped)
- Fill Water System
- Check Dustless Box, Pre-cleaner, and Scavenge Hose

Sweeper Start-up

1. Lower Pick-Up Head using Auxiliary Hydraulics
2. Start Rear Engine (Must be in idle)
3. Turn on Warning Lights
4. Turn on DC System and Air Purge System
5. Pull Sweeper Forward to Tuck Pick up Head Curtains.
6. Turn on Water System
7. Throttle up Auxiliary Engine RPM to desired levels. Wait 45 seconds before starting sweeping.
8. Lower Gutter Broom (s)
9. Begin Sweeping
10. **DO NOT BACK UP WITH PICK-UP HEAD DOWN.** Throttle down, pick up head then back up. (Reverse Pick-Up Head Chains – allow you to back up with the head down.)

Sweeper Shut Down

1. Lower Auxiliary Engine RPM to idle speed (1100 RPM for Model DST-4 and 1000 for Model DST-6) and turn off Purge System
2. Raise Gutter Brooms (Must hold switch in the up position to fully retract gutter broom)
3. Turn off Auxiliary Engine
4. Turn on Auxiliary Engine Switch, **DO NOT** start.
5. Using Auxiliary Hydraulic System, raise Pick-Up Head.
6. Turn off Water System if on
7. Turn off Warning Lights
8. Turn off Auxiliary Engine Switch

Clean Out Procedures (DAILY)

- Clean Hopper Screens
- Clean out Hopper
- Clean out Dust Separator
- Clean under Pick-up Head
- Clean around gutter brooms
- Clean Exterior of Sweeper and Chassis
- Clean off Radiators

Dustless Operations (Shutdown)

- Idle down auxiliary engine.
- Turn on purge system and listen for air guns to discharge approximately every 17 seconds.
- Allow purge system to operate for approximately 5 minutes.
- Check pressure relief port for proper function.
- Drain any accumulated moisture from the water/air filter located at the top of the filter assembly box.

- Open pre-cleaner door and **CAREFULLY** remove pre-cleaner assembly. Shake off any dust and if necessary, use “shop air” to blow out any accumulation of dust from pre-filter openings and wash thoroughly. Must be completely dry before next sweeping day.

NOTE: Clean scavenge bin and scavenge hose daily with water.

- With filter side door open, look at the 4 Torit-Tex® filters, if excessive amount of dust is present, reassemble all hoses and insure that all doors are closed and latched and attach shop air to the air hose fitting located on left bottom of dust box below air manifold tank. Filters purge system can be run without auxiliary engine running. Auxiliary engine can also be used to operate purge system after system has been fully charged (100 psi) if desired.
- Always insure that on/off switch is in the OFF position and purge all air from the air tank before beginning any service work in dustless box assembly.
- Check all water spray nozzles daily to insure they are spraying properly. **(Never operate gutter brooms without dust control system engaged and all water toggle switches in “on” position.)**

Parking Procedures

- Leave Hopper Door and Inspection Door(s) Open

TYMCO REGENERATIVE AIR SWEEPER INSPECTION AND REPETITIVE TASK SCHEDULE

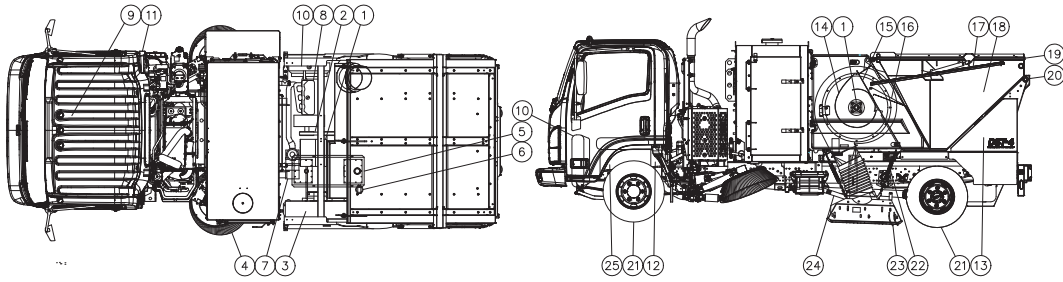
Inspect		Perform	
Gutter broom(s) for impact damage/wear	Daily	Cleaning of gutter broom torque motor shaft area	Daily
Pick-up head blast orifice for lodged foreign material/adjustment	Daily	Check of hydraulic tank fluid level	Daily
Pick-up head skid plates for wear/impact damage	Daily	Draining water tank	Daily
Pick-up head curtains for wear/damage	Daily	Cleaning of hopper and dust separator	Daily
Hydraulic system for plumbing or component leakage	Daily	Wash down of engine radiator(s)	Daily
All hopper and transition seals for wear/damage	Daily	Functional test sweeper lights	Daily
Hopper screen for damage	Daily	Functional test truck brakes	Daily
Tires	Daily	Functional test truck lights	Daily
Hydraulic oil return line filter restriction	Daily	Check of truck fluid level	Daily
Water pump oil level	Daily (If applicable)	Check of auxiliary engine fluid level	Daily (If applicable)
Water filler hose filter screen	Daily (If applicable)	Rotation pressure and suction hoses 1/4 turn	100 Hours
Water pump suction hose pre-filter	Daily (If applicable)	Grease PTO driveshaft	100 Hours (If applicable)
Dust separator liner for wear/damage	Daily (If applicable)	Change of water pump oil	150 Hours (If applicable)
Dust separator door closed before operating	Daily (If applicable)	Change of hydraulic oil return line filter	1000 Hours or when Indicated
Engine air intake filter restriction indicators	Daily (If applicable)	Change of hydraulic system oil	2000 Hours or by oil analysis
Pick-up head turning vanes for wear/foreign material	Weekly	Adjustment of gutter brooms	As required
Blower belt tension	100 Hours (Minimum) (If applicable)	Cleaning of spray nozzle tips and screens	As required
Pressure and suction hoses for wear	100 Hours		
Blower wheel for wear/damage	100 Hours		
Accessible areas of blower housing liner for wear/damage	100 Hours		
Blower lip for wear/damage	100 Hours		



MODEL DST-4

QUICK REFERENCE SERVICE CHART

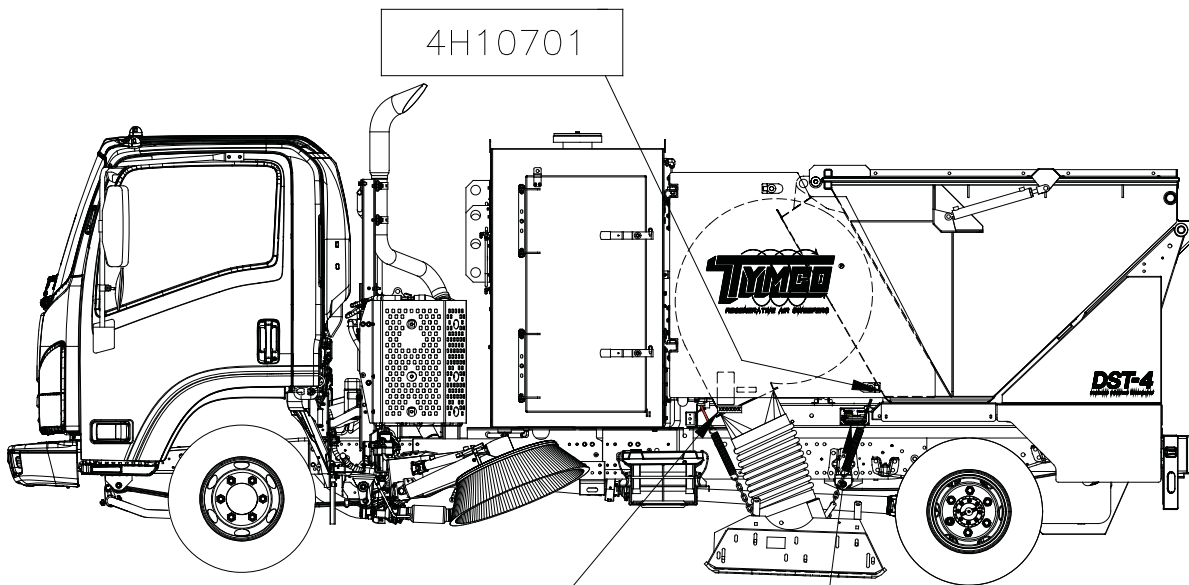
(M01864) REV B



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 100 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	Change oil every 2000 hours or by oil analysis recommendation. Check oil level DAILY.
6.	Hydraulic Oil Filter	Change every 1000 hours or as indicated by restriction indicator.
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!



4H10701

FRAME NUMBER PLATE
4F10701

		WACO, TEXAS	
MODEL	<input type="text"/>	DATE BUILT	<input type="text"/>
SERIAL NO.	<input type="text"/>		
CODE	<input type="text"/>		
<small>COVERED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,077,444 5,077,445 5,077,446 5,077,447 5,115,100 5,115,101 5,115,102 5,115,103 ADD'L. U.S. AND INTERNATIONAL PATENTS PENDING</small>			

TYMCO SERIAL NUMBER PLATE

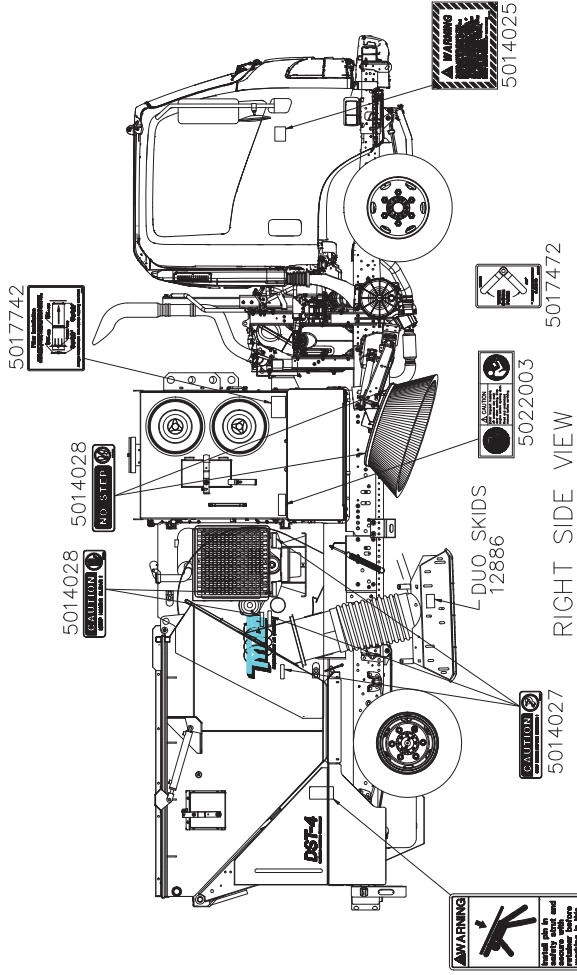


MODEL DST-4
IDENTIFICATION PLATE
LOCATIONS
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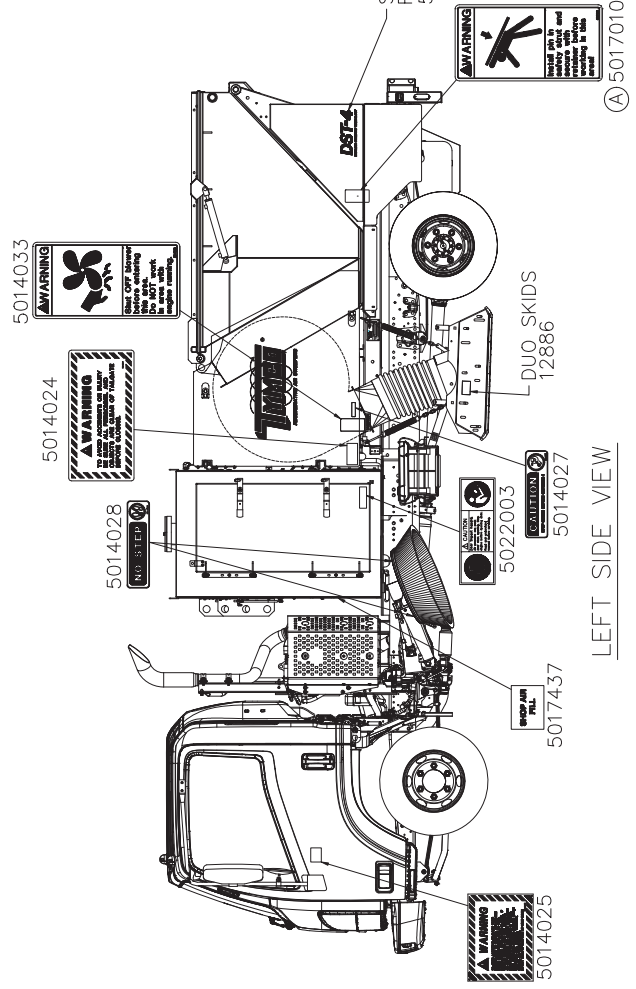


MODEL DST-4
 DECAL LOCATION LAYOUT
 (M01874)REV C
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 12:48 pm
 SC



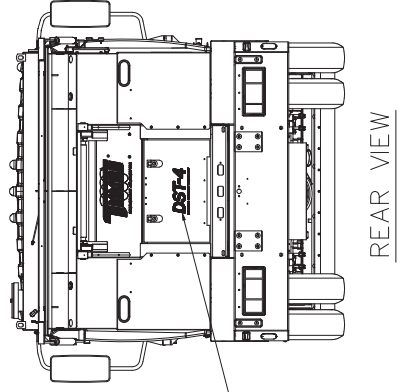
RIGHT SIDE VIEW

Ⓐ 5017010



LEFT SIDE VIEW

NOTE:
 A. INSIDE OF FRAME.



REAR VIEW

MODEL DST-4 COMPONENTS (M02200)

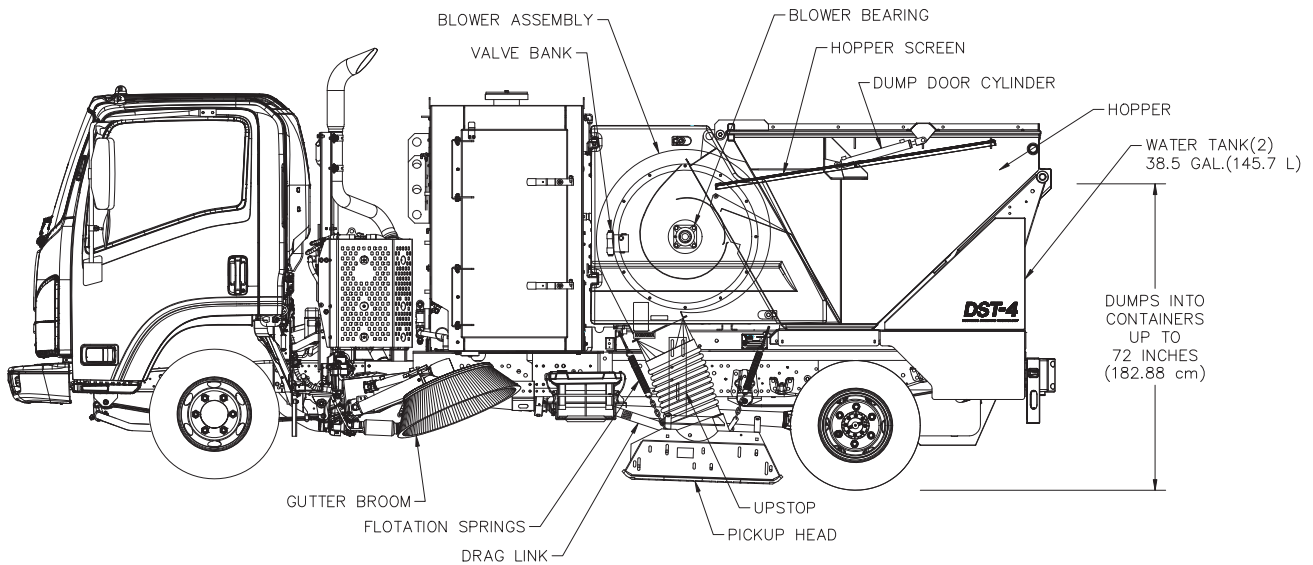
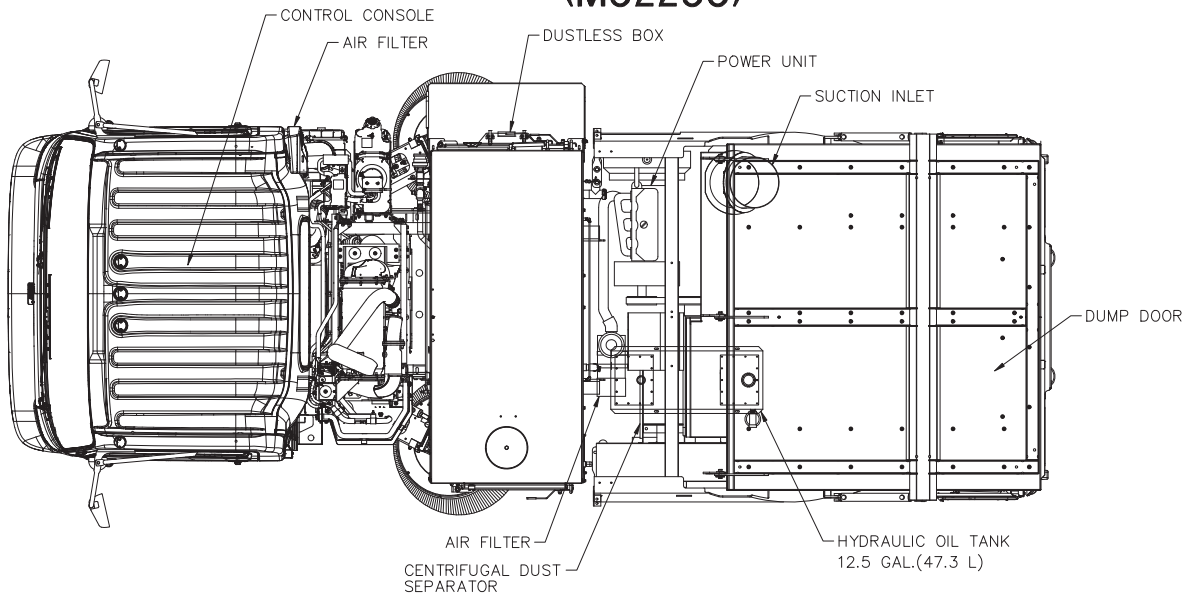


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THE TYMCO REGENERATIVE AIR SYSTEM

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 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.**

DST-4 SYSTEM

FUNCTION

Sweepers equipped with the optional 435 Dustless Sweeping Technology (DST) allow the pickup head to sweep virtually dust free without the use of external water spray nozzles. A filter box assembly is located just behind the cab and is used to filter a small percentage of air bled from the pressure side of the sweeper. Bleeding this air creates more suction beneath the pickup head causing the dustless effect.

DESCRIPTION OF OPERATION

Control of the amount of air bled off is fully automated and requires the operator to simply turn on the DST-4 control switch (labeled "DC" for short) at the sweeper console in the cab. Turning on the DC switch activates a control system which opens and closes a flue plate (See M01307) to control the amount of air bled from the pressure side of the sweeper. The system has been set to bleed off the minimum amount of air required to maintain the dustless sweeping effect regardless of blower RPM. The lower set point is 1.8 inches of water column and the upper set point is 2.2 inches creating a 2 inch nominal setting. Should the operator increase or decrease the blower RPM, the system reacts to open or close the flue plate to maintain the 2 inch nominal reading. The set points are not adjustable.



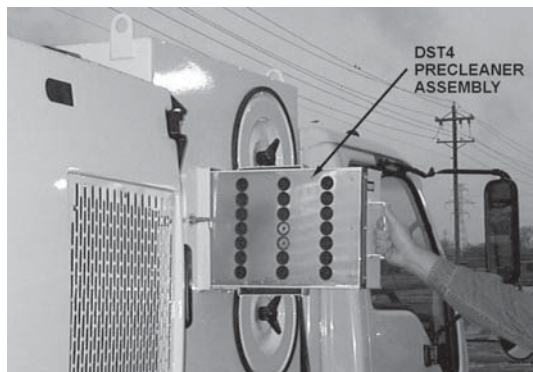
M01307

Should too little air be bled off, over pressure of the pickup head will occur and dust blow out will result. Too much air bled off will decrease filter operational life as excess air flow will deposit more dust on the filter media.

PRECLEANER

The air which has been bled off is sent through a centrifugal precleaner that rids the air of most dust particles before passing the air through four large filter cartridges and is then exhausted to atmosphere. The precleaner also removes moisture from the air stream protecting the filters and thereby allowing the sweeping of intermittent accumulations of water, such as water puddles from sprinkler systems, without jeopardizing the filtration components.

The precleaner dumps the separated debris into a scavenge bin that has a scavenge hose attached and routed back to the hopper. The hopper vacuum draws the dust from the precleaner scavenge bin through the scavenge hose back to the sweeper hopper for deposit. Proper performance of the precleaner requires that the scavenge hose be kept open and free flowing. The precleaner should be removed once a day and dumped out to insure good separation and unloading of dust into the scavenge bin. The scavenge bin then can be inspected to see that it is NOT full of dust and that the scavenge hose is pulling the unloaded dust back to the hopper. If the scavenge bin is full of dust, the scavenge hose has become blocked and must be cleaned. **The scavenge hose should be cleaned daily.**



M01507

To insure the best operation of the precleaner, the **HOPPER WATER** should be **turned on** and run whenever possible. The hopper water rids the air stream of a significant amount of dust and reduces the particulate load seen by the precleaner.

Once the air has passed through the precleaner, it enters the filter box. Four (4) filter cartridges on two separate rows make up the filter pack. Dust accumulating on the filter cartridges is periodically purged by alternately discharging a high velocity back pulse of air into the filter row. The back pulse of air dislodges the dust from the filter media and deposits it in the filter box hopper.

NOTE: The purge system control switch is located on the sweeper console in the cab.

Proper performance of the dustless sweeper requires the filters be kept free flowing as measured by the minihelic restriction indicator gauge at the sweeper control console in the cab. Readings **above 8"-10" water column (WC)** generally result in dust blowing out the sides of the pickup head. The operator should stop and allow the purge system to clean the filters back down to **3"-5" WC restriction** and then proceed with sweeping. Depending on the age of the filters, purging the filters clean could take from 5-15 minutes. Again, running the hopper water will significantly increase the filter operational life.

A control provision has been made to allow the operator to turn off the dustless feature of the sweeper. This is separate from the filter purging system. When the DST-4 control switch is turned off, air is no longer exhausted through the DST-4 box. This allows the operator to purge the filters much quicker because no dirty air is flowing to them. This also allows the sweeper to sweep in wet weather conditions where the dustless feature is not required.

Additionally, a shop air provision (See Illustration M01306) has been made to allow the purging of the DST-4 filter pack without running the sweeper auxiliary engine. The shop air must be regulated to 95-100 PSI, **excessive pressure will damage the filter media!** This provision allows the filters to be purged without dirty air recharging them and can be done for an extended time such as at the end of the week to get the sweeper ready for the next week of operation.



M01306

Finally, to protect the filtration box from over pressurization, a pressure relief port limits the box pressure to 25 inch WC.

PRECAUTIONS

The TYMCO DST feature is intrinsically simple and safe to operate. However, a few operational and service precautions should be followed when working around the filter box area.

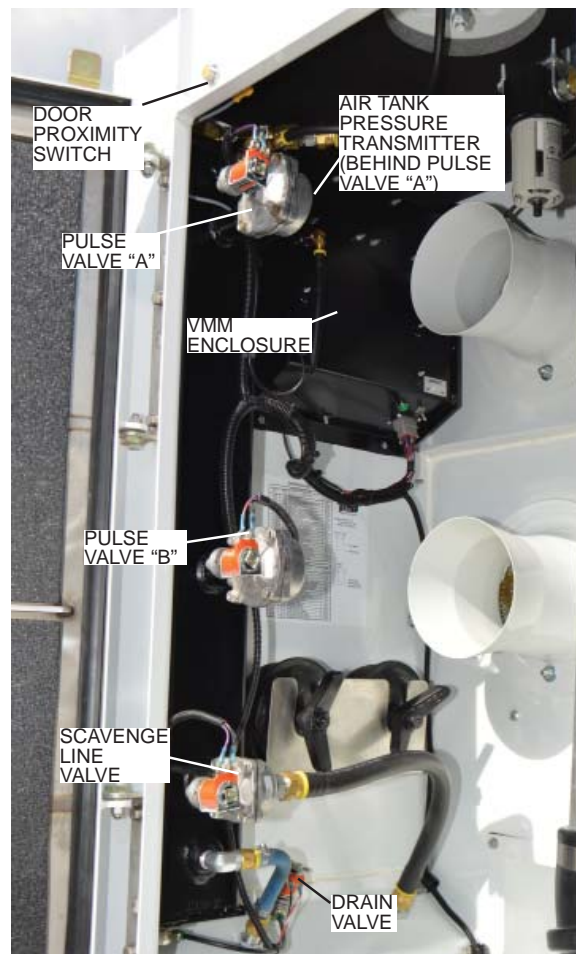
SAFETY

Do Not open the filter box large access door without first turning off the sweeper ignition key on the sweeper control console in the cab. This prevents the high velocity purge back pulse from discharging when in this area. A proximity sensor at the top of the service door also prevents the purge system from engaging when the door is open.

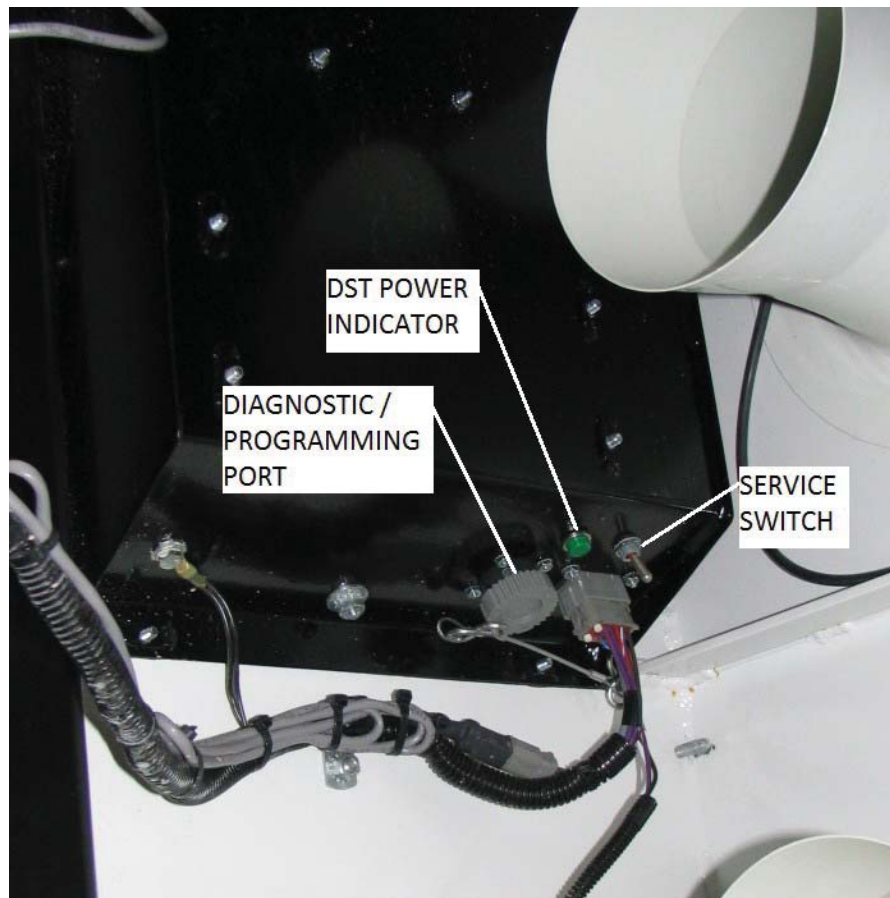
Always bleed down the air tank pressure before working inside the DST box. Use the ball valve at the shop fill port to drain the air tank.

Once the access door is open, turn off the service switch located on the bottom of the VMM enclosure. (Illustration M01309). This turns off the power to the VMM control module and all components of the DST system. If the door is open, with the sweeper ignition and the service switch is in the on position, the DST Power Indicator Light will flash to indicate the system is still active. If the Power Indicator Light is on solid, the purge system is active and could fire at any time! This condition cannot occur with the door open, unless the service door proximity switch is bypassed.

Use a dust mask when servicing the filters or precleaner or when cleaning out the filter box hopper.



M01309



M01309A

SERVICE

ATTENTION: TYMCO guarantees that the DST Sweeper will perform properly provided that only TYMCO supplied replacement components are used when servicing the sweeper. REQUEST ONLY TYMCO BRAND REPLACEMENT PARTS!

Do Not over service the four large filters! Restriction readings below 6" WC, clean filters by turning on purge system as described previously.

TYMCO filter cartridges (P/N 12734) may be washed off using **LOW** pressure hose and gently spraying the filter pleats. Allow filter to dry overnight before using.

Use care not to drop the filter or otherwise damage the metal filter ends.

Should the filter become coated with dry mud, wet down, allow to soften, then wash as described above.

Any filter found to have a hole in the filter media should be replaced.

The purge system uses up to 100 PSI of air pressure, always bleed down the system before servicing components. Use the ball valve at the shop fill port to drain the purge manifold.



WARNING! Do not service air compressor until after it has cooled. Severe burns can occur from touching compressor exhaust components.

BASIC OPERATION:

The operator should already be familiar with the safety precautions and operation of a standard TYMCO Model DST-4 street sweeper:

1. To begin sweeping in dustless mode, use the auxiliary hydraulic system to lower the pickup head and pull forward to seat the pickup head seal curtains.
2. Start the auxiliary engine and set RPM to 2100, turn on the DST Mode Switch and observe the pressure gauge at the sweeper control panel.
3. Turn on the Purge Switch next to the DST Mode switch and begin sweeping. A loud popping sound every 15-17 seconds indicates the purge system is working.

NOTE: Pressure should rebuild to 95-100 PSI between purge valve discharges. Discharge interval is 15 to 17 seconds.

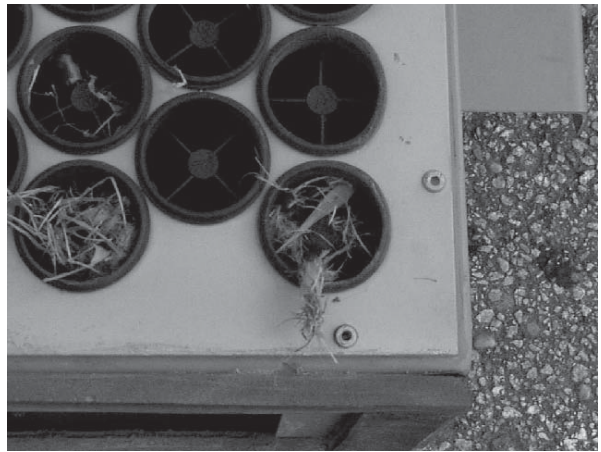
4. If conditions allow, turn on the hopper water for longer operational life of the filters.
5. The sweeper is now ready for normal street sweeping operation.
6. The operator should observe the DST Filter Restriction Gauge to check filter restriction. The sweeper should perform virtually dustless up to 8" WC (water column) depending upon the weight of the debris load.
7. Should the sweeper filter restriction gauge reach 8-10" WC and dust is being created, stop forward travel and allow the purge system to pulse the filters for a few minutes until the restriction gauge registers in the 3-5" WC range.



ROUTINE MAINTENANCE

Follow standard Model 435 guidelines for after shift maintenance of the main sweeper assembly. End of shift requirements of the dustless filtration box are noted below:

1. Remove precleaner assembly and clean, make sure to remove any grass or paper clippings caught inside the separator tubes. (Illustration M01308)
2. Inspect that scavenge bin is clear and that the scavenge hose is free flowing. Reinstall the precleaner.
3. Open the large access door and drain the filter/water separator (top of box) by pushing on the drain cock till empty (Illustration M02143).TYMCO MODEL DST-4



**M01308
REMOVE TRASH FROM
PRECLEANER TUBE
OPENINGS**

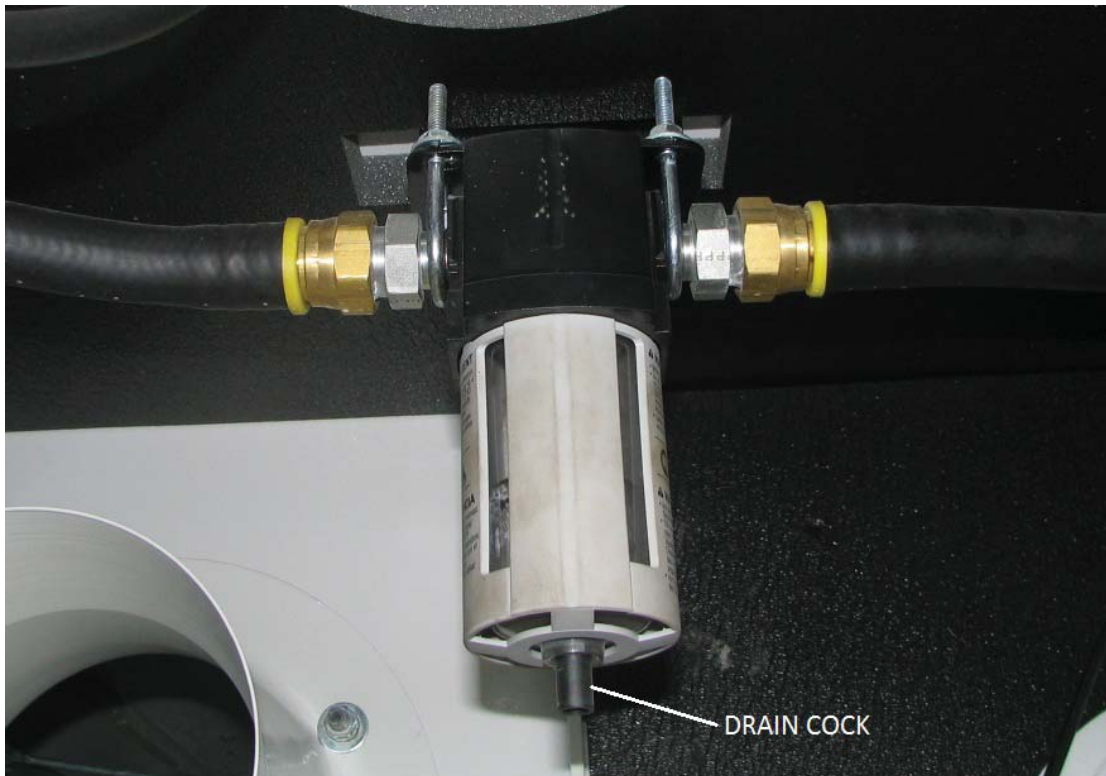


ILLUSTRATION M02143

NOTE: Bowl will normally be full of water, drain till empty.

TROUBLESHOOTER'S GUIDE

PROBLEM	CAUSE	SOLUTION
Sweeper blows out dust from pickup head skid plates	Damper flue plates closed	Make sure the DST Mode switch on the control panel is in the "ON" position and VMM Input #3 LED is on
Dustless system not functioning	Blown fuse or bad electrical connection	Check DST circuit fuse at sweeper console Check DST VMM power fuse at battery Make sure service switch is in the "ON" position and the VMM power light is on steady.
	Air leaks, bad seals or doors not closed	Make sure all seals are in good condition and all sweeper hopper service doors are closed. Make sure front pickup head curtains are in good condition. Check pickup head blast orifice gap, if too large, pickup head will "blow out".
	Precleaner stopped up	Remove precleaner and observe tube openings. Remove any trash or obstruction.
	Flue Plate fully open and will not close	Precleaner stopped up Curtain lifter on Blast orifice not set properly Bad flue actuator or harness

TROUBLESHOOTER'S GUIDE CONTINUED

PROBLEM	CAUSE	SOLUTION
Flue Plate fully open and will not close (Continued)	Thin air due to high altitude over 5000 feet	If the Magnesense gauge is reading below 1.8", and the head is set properly, block off some of the tubes in the precleaner.
Purge System will not pulse	Blown fuse	Check DST circuit fuse at sweeper console Check DST VMM power fuse at battery
	Door closed prox input #2 not on	Close door Check prox switch
	Air pressure not at correct PSI.	Check air pressure gauge at sweeper control panel. Pressure must be above 90 PSI. If air tank pressure is above 90 PSI, pressure switch input #7 should be on. Check and replace switch.
	Service switch not engaged	Turn on service switch
	Purge switch input #4 is not on	Make sure the Purge switch is in the "ON" position. Check harness between switch and module.
	No air pressure	Check that shop air valve has not been left open.
	Air compressor malfunction	Check condition of air compressor drive belt. Replace if needed. Check condition of air compressor regulator for low pressure.



— FOR SAFETY —
Stop all engines and set parking brake before servicing.
— READ YOUR MANUAL —



COMPRESSOR SERVICE

The compressed air system of the TYMCO DST-4 sweeping system is vital for the proper sustained performance of the dustless effect. Without the compressed air system, the four large filters used to clean all exhaust air would quickly become blinded over blocking the exhaust air flow and causing the sweeper to produce dust.

WARNING! Always bleed down compressed air system to 0 PSI before servicing components or severe injury will result.



WARNING! Before servicing, stop auxiliary engine and remove ignition key or disconnect negative battery cable.

A heavy duty air compressor is used to provide adequate volume and pressure for the filter air purge system used in the dustless conversion sweeper. This high quality air compressor requires very little service, but must be included in user's routine maintenance schedule. The TYMCO DST-4 unit uses a engine lubricated, water cooled compressor.

TYMCO does not stock service components for the compressor, contact the nearest manufacturer service outlet for assistance and parts.



WARNING! Check the compressor only when cool. Compressor external temperature can be in excess of 300 degrees Fahrenheit which can cause serious burn.

HOPPER

FUNCTION

The hopper is designed to provide a containment area for material picked up during sweeping operations and/or auxiliary hand hose use. Its shape serves to distribute the load evenly and centrally over the rear axle and aid in breaking loose the load as it shifts toward the hopper door opening when dumping. The configuration of the hopper, when fully raised, allows dumping into containers up to 72" (182.9 cm) in height.

By engaging the dump toggle switch located between the blower housing and the front storage compartment with the auxiliary engine at idle the dump door will open and then the hopper will raise and expel its contents. Energizing the dump switch in the opposite direction will lower the hopper and close the dump door.

A large screen at the top of the hopper stops lightweight debris from entering the dust separator and blower housing.

TROUBLESHOOTER'S GUIDE



WARNING: Before servicing, stop auxiliary engine and remove ignition key or disconnect negative battery cable. When working under or around raised hopper, *ALWAYS install pin in lower safety strut.*

PROBLEM	CAUSE	SOLUTION
Low sweeper efficiency	Faulty seals	Check door seal. Check suction intake seal. Check separator seal.
Excessively dusty condition	Screen clogged	Check cleanliness of screen.
	Dust control system inoperable	Check water tank (See Water System Troubleshooting Section)
Rear door will not open or close and hopper will not raise or lower	Loss of hydraulic pressure	See HYDRAULIC SYSTEM Section.
	Hydraulic valve will not operate	(See Hydraulic Troubleshooting Section.)
	Hydraulic leak	Check for leak in hydraulic system.
Rear door creeps open	Leak in hydraulic lock valve	Check for leak in hydraulic lock valve or hoses. Replace seals in valves. Replace valve.

SERVICE & MAINTENANCE

REMEMBER: "A CLEAN MACHINE RESULTS IN LONGER LIFE AND MAXIMUM PERFORMANCE."

After sweeping route is completed, the first procedure in maintaining the unit must be to clean and wash unit thoroughly. Raise the hopper/door to access internal parts of the hopper. Wash all built-up mud from the dirt deflector scroll and surrounding areas. Make sure to clean mud and debris from between the deflector scroll and the hopper door.

Wash all debris from the screen and surrounding area. Raise the hopper to full height and wash out all remaining debris. Visually inspect all openings and seals for debris. Make sure that the skimmer hood swings freely when hopper is raised. Check hinge pin and dump cylinder pins for proper security. Wash any mud and debris in suction transition and suction hose.

When hopper washing has been completed, lower hopper until suction transition is almost touching its seal and leave in this position while sweeper is not in use to allow the seals to conform to their original shape. This will extend the wear life of the seals. Visually inspect the screen to insure snug fit against hopper front panel.

IMPORTANT: It is not necessary to daily wash out the filter dust hopper. Just remove the loose dust on the hopper floor. Washing the filter hopper requires removing the four large filters from the hopper to prevent mudding them over by wash water over spray. Remove and wash the filters only when they cannot be purged clean down to 3-5" WC by the dustless purge system.

BLOWER

FUNCTION

The blower is the most important part of the TYMCO AIR SWEEPER[®] as it furnishes both pressure for the blast orifice as well as suction for the suction nozzle. The blower is designed for maximum performance with low noise and is constructed of an aluminum alloy for light weight. Blower life can be effectively increased by keeping the dust separator clean and functioning properly. More importantly, operating the blower at as slow an RPM as possible will reduce abrasive wear not only to the blower but throughout the machine.

TROUBLESHOOTER'S GUIDE



WARNING: Before servicing, stop auxiliary engine and remove ignition key or disconnect negative battery cable.

PROBLEM	CAUSE	SOLUTION
Unusual noise/vibration	Blower wearing, out of balance, worn bearings	Remove & replace
Blower bearings overheating	Worn bearings	Replace
	Bearings need grease	Lubricate
Reduced blower performance	Loose drive belt	Tighten
	Drive belt and sheaves worn or damaged	Replace.
	Blocked blast orifice, suction hose, screen	Clean
	Cut or torn pressure hose	Replace

HYDRAULIC SYSTEM

FUNCTION

The Model DST-4 Hydraulic Pump constantly circulates hydraulic oil through the system while the auxiliary engine is in operation, thus supplying controlled flow and pressure upon demand. When a hydraulic component control switch is activated, it transmits a signal to the control valve to divert hydraulic energy to the selected work station.

NOTE: The hydraulic system reservoir capacity is 12.5 gallons and requires ISO 46 grade hydraulic oil (See end of section for oil spec).

TROUBLESHOOTER'S GUIDE

PROBLEM	CAUSE	SOLUTION
Extreme heat; unusual noise from pump; poor pump performance	Clogged lines; filter	Remove filter and check for clogging. Check lines.
	Dirty hydraulic oil	Drain oil reservoir and flush. Replace oil and filter.
	Low oil level	Check reservoir; fill as needed.
	Worn hydraulic pump	Replace.
	Lose belt	Tighten
PROBLEM	CAUSE	SOLUTION
Dump hatch will not open but hopper raises	Dump hatch seal stuck to opening	Raise hopper until travel is stopped and continue to hold toggle switch in UP position. Dump hatch should open due to increase in system pressure. If not, have assistant pry door open.

WARNINGS:

Never work under or around Model DST-4 hopper without first *shifting safety prop under its socket and securing in position with pin.*

Never check for hydraulic leaks using bare hand as pressure in system could cause oil to be injected into the skin; thus causing serious injury.

Do not work on or around sweeper when auxiliary engine is running. Use caution when performing troubleshooting tests that require auxiliary engine to be running.

TROUBLESHOOTER'S GUIDE

(continued)

PROBLEM	CAUSE	SOLUTION
Hopper will not raise	Control valve coil not energizing	Check hydraulic system fuse; check wiring to see that it is attached to control valve coil. use test light to see if wire is getting electrical current; manually shift control valve by pressing in override buttons provided on end of tube assemblies. If valve will not manually shift, replace valve segment. Refer to valve Drawing M01021.
	Bad coil in control valve bank	If hopper raises when control valve is manually shifted (auxiliary engine will be running) remove coil from another control valve; insert in place of suspected bad coil. If valve operates, replace bad coil. If valve fails to operate, disassemble and check for foreign material.
	Low hydraulic system pressure	If hopper does not raise when manual overrides are depressed, install pressure test gauge on test port at pump. Refer to Page I-6. Test system pressure by lowering pickup head to ground; after it is fully lowered, continue to hold toggle switch in DOWN position and read pressure gauge. Reading should be 1500 PSI (103.5 Bar). If less, increase system pressure. If pressure reading is 1500 PSI (103.5 Bar), try to raise hopper and observe reading; if 1500 PSI (103.5 Bar), hopper is overloaded.
	Blocked hydraulic line in one or both lift cylinders	If hopper is not overloaded, then hydraulic lines to lift cylinders may be plugged; check for foreign material in lines.
	Cylinder seal leak	Check cylinder for internally ruptured seals. Remove cylinder from sweeper and disassemble. Refer to section pertaining to particular cylinder in question.

SERVICE & MAINTENANCE



WARNING: Before servicing, stop auxiliary engine and remove ignition key or disconnect negative battery cable.

HYDRAULIC SYSTEM ADJUSTMENTS

Dual Gutter Broom Option - Refer to Hydraulic System Drawings and control valve assembly drawing. In order to check or set the pressures required, which is 2500 PSI (172.5 Bar) for the primary pressure (Gutter Brooms) and 1500 PSI (103.5 Bar) for the secondary pressure (Pickup Head and Dump), a gauge with a pressure range of 0 to 3000 PSI (0 to 207 Bar) is necessary. See section TK of this manual for part number of correct test gauge. With auxiliary engine off, install test gauge on male quick disconnect test port. **NOTE:** All pressure testing should be done with hydraulic oil at operating temperature. Start auxiliary engine and raise either gutter broom. Hold switch to "raise" position after gutter broom has completed its travel and read primary pressure which should be 2500 PSI (172.5 Bar). **NOTE:** The primary pressure reading is direct from the pump and is not adjustable within the sweeper system. To test the secondary pressure, leave test gauge in the same position and with the auxiliary engine running, lower the hopper to its full travel, hold the switch to the "Lower" position and read the test gauge, 1500 PSI (103.5 Bar) should be the pressure reading. If adjustment is required, loosen jam nut on relief valve and turn setting clockwise to raise pressure and counterclockwise to lower pressure and tighten jam nut.

Standard L.H. Gutter Broom - When sweeper is equipped with a single gutter broom, all functions are operated at 1500 PSI (103.5 Bar) and set as described in the secondary pressure setting method noted above.

Hydraulic Oil Reservoir - The hydraulic oil reservoir has an operating capacity of 12.5 gallons (47.3 L) and its level should be checked DAILY prior to sweeping operations by observing the sight gauge located on the left side of the reservoir. The reservoir and the system filter are positioned beneath the dust separator assembly. The hydraulic system motor oil should be changed after 2000 hours or as needed according to oil analysis. The system filter should be changed every 1000 hours of use.

FILTER SERVICE REQUIREMENTS AND SPECIFICATIONS

NOTE: The oil and filter service requirements must be followed to maintain hydraulic parts warranty. See Hydraulic Oil Specification section for recommended oil usage.

There are two hydraulic filters in the hydraulic system. A return filter and a reservoir vent filter. Only recommended filters should be used so that the hydraulic components warranty is maintained. Keeping accurate service records is required for warranty purposes.

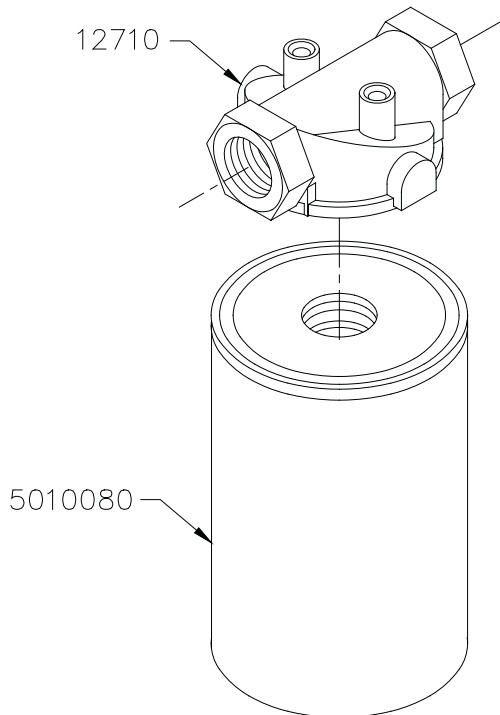
Recommended Return Filter Service (Screw-On Filter, P/N 5010080)

The return filter has a restriction indicator on it that should be checked daily. The hydraulic oil temperature should be above 100°F before checking restriction indicator. The Gutter brooms should be running when checking the restriction indicator gauge. The filter needs to be changed before the restriction indicator needle reaches the red region of the gauge.

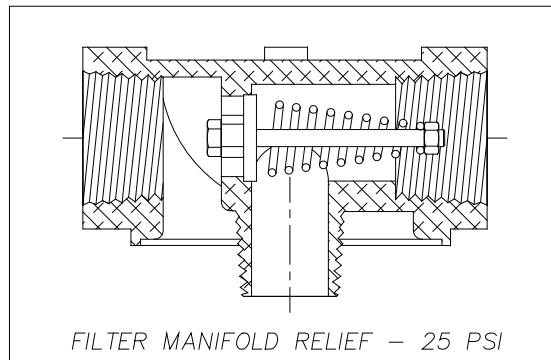
WARNING: Before servicing, stop auxiliary engine and remove ignition key or disconnect negative battery cable.

CROSS REFERENCE FOR FILTER ELEMENT

Wix	51551
Fram	P1653
Napa	1551
Gresen	1551
Motor Craft (Ford)	FH 10
A-C Delco	PF 16
Hastings	P 122
Cross	1A9021



RETURN LINE FILTER DWG-M00026



NOTE: MANIFOLD HAS BUILT IN RELIEF VALVE PRE-SET. (M00026)
REV A

POWER UNIT

FUNCTION

The Power Unit drives the blower and hydraulic pump and is, therefore, the source of energy for the sweeping operation. All standard controls and gauges for the Power Unit are located inside the truck cab for operator convenience. The V2403-CR-TE4B Final Tier 4 engine is an electronic engine and requires an engine control module (ECU). The ECU communicates with the BlueLogic control system over the CAN datalink. See BlueLogic Control System section of this manual for details. The ECU and BlueLogic control system monitor and control the engine throttle. The engine will start and run at 1100 RPM. The engine speed is variable, in 25 RPM increments, up to the maximum high idle speed of 2100 RPM. The maximum high idle speed can be adjusted up to 2200 RPM for heavy duty applications or down to 1600 RPM for economy sweeping. See the Control System Section for details. Note that operation of the sweeper in excess of the factory maximum speed setting (2100 RPM) will affect optimum component life, noise, and fuel economy. Refer to the applicable Power Unit Operator's Manual for detailed information.

Note: All Power Unit parts must be purchased through the engine manufacturer dealer network.

ENGINE PROTECTION

The ECM monitors and protects the engine and communicates all engine data through the CAN datalink to the HMI display module on the control panel. The HMI display module displays the engine speed, engine load at current engine speed, coolant temperature, oil pressure, engine hours, system voltage, etc. as well as Kubota fault codes. If the ECM detects an engine fault it will:

1. Send an engine fault code message to the HMI display
2. Automatically derate and/or shutdown the engine after a specified time to protect the engine from damage.

The display will notify the operator of the fault via a visual message and an audible alarm. The operator can check the display for any active fault codes, but will need to take the sweeper to an authorized Kubota industrial engine service provider for diagnosing any engine fault codes that become active or that have previously occurred.

DIESEL FUEL REQUIREMENTS

Diesel fuel must meet certain requirements for lubricity, cetane, sulfur content, and cold filter plugging point to ensure proper operation and prevent damage to the engine, fuel system and exhaust system.

- Cetane number: 43 minimum, 47 preferred
- Fuel lubricity: See Kubota manual
- Sulfur Content: Use only ultra low sulfur diesel fuel (15 ppm max)
- Bio diesel 7% (B7) maximum

ENGINE COOLANT REQUIREMENTS

TYMCO recommends the use of ethylene glycol based extended life coolant/antifreeze that meets ASTM D6210 and contains a nitrite free additive package. It should be a 50/50 dilution with quality water. A proper coolant mixture has been used upon the initial filling of the system during manufacture. The coolant has a 12,000 hour, 6 year service life. If needed, top off with

a proper mixture of:

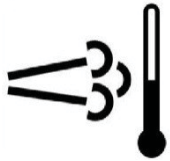
Chevron Delo® Extended Life Coolant/Antifreeze - Nitrite Free

ENGINE OIL REQUIREMENTS

Use only API CJ-4 engine oil. Use of Kubota OEM filters is recommended. The engine oil and filter should be changed after the first 50 hours of operation. Thereafter, the recommended engine oil service interval is 250 hours.

EXHAUST SYSTEM REGENERATION

The exhaust system diesel particulate filter (DPF) gets continuously loaded with soot from exhaust gas and will continuously do passive regeneration if the exhaust temperature is above 572°F (300° C). The engine will periodically require an active regeneration to further raise the exhaust temperatures and clean soot from the DPF. The Engine ECU calculates when active regeneration needs to take place. This is determined based fuel consumption, elapsed time, engine operating conditions and the delta pressure sensor signal. This can occur without operator intervention while sweeping. The high exhaust temperature icon will illuminate to indicate cleaning is active.

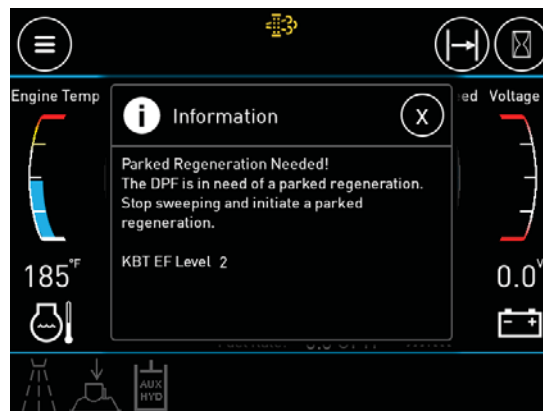


High Exhaust Temperature Icon

If operator initiated regeneration is needed, the Exhaust Filter Indicator will illuminate along with a diagnostic trouble code message. If the operator initiated regeneration is not completed, additional engine fault codes and engine derate will occur. See the Controls Section for information on initiating regeneration.



Exhaust Filter Icon



Parked Regeneration Message

TROUBLESHOOTER'S GUIDE



WARNING: Before servicing, stop auxiliary engine and remove ignition key or disconnect negative battery cable.

PROBLEM	CAUSE	SOLUTION
Blower shaft not turning	Belt not tight	Tighten. See Blower Assembly-Disassembly and Assembly Section.
	Defective flex coupling or PTO Shaft	Remove and Replace
	Loose sheave	Tighten. Replace key as necessary.
Poor engine performance	Engine problems	Refer to engine manual supplied with sweeper for tune-up, etc.

SERVICE & MAINTENANCE

In order to simplify the service and maintenance on the engine which powers the sweeper unit, refer to the Engine Operator's Manual for the routine service and maintenance procedures and schedules. (By days, hours, miles, etc.)

Power Unit drive belts shall be checked on a regular basis for correct tension. Belts should be inspected at a minimum of every 100 hours of operation. If excessive "belt slap" or vibration is noticed before the minimum check interval, then retention the belt immediately. Failure to do so can result in premature failure of belt, bearings, and coupling assembly. Incorrect belt tension can also promote metal fatigue which can cause brackets, mounts, and other components to crack.

SWEEPER BLOWER SHEAVE RATIO

The blower is belt driven through a set of sheaves with a 1.194:1 speed up ratio.

Engine Low/High RPM	Blower Low/High RPM
1100/2100	1313/2507

HAYS BEARING SUPPORTED STUB SHAFT ASSEMBLY MAINTENANCE

Grease both grease zerks on the Hayes bearing supported stub shaft with an unleaded extreme pressure lithium grease with NLGI No. 2 Grade as follows:

Bearing Housing - The grease zerk is located on the bearing housing with a low pressure relief valve 180 degrees across. Depending on general maintenance schedule, greasing of the bearing housing should not exceed 2000 hours of run time. Remove any excessive grease or grit from the low pressure relief valve and make sure it is actuating freely. Push the relief valve pin all the way in. Pump several shots of grease into the bearing housing grease zerk using a standard grease gun until the relief valve pin pops out. If the relief valve pin does not pop out after several shots, remove the valve and grease until grease protrudes from the hole and reinstall valve.

Coupling Spline - The grease zerk is located on the end of the stub shaft. During general maintenance cycle, pump 2 to 3 shots of grease using a standard grease gun into the shaft grease zerk.

AIR CLEANER MAINTENANCE

Proper air cleaner servicing will result in maximum engine protection against the ravages of dust. Proper servicing will save you time and money by maximizing filter life and cleaning efficiency. The most common problem with air cleaner service is over servicing. Air filter elements increase in dust cleaning efficiency as the dust builds up in the media and they become seasoned. **DO NOT BE FOOLED** by air filter appearance; it should look dirty. The sweeper's engine air filter has a very efficient precleaner and high dirt holding capacity for long life. Service the filter based on restriction indicator. The sweeper is equipped with an restriction indicator to warn the operator when the air inlet restriction reaches 25" w.c. The indicator may be on the air cleaner or on the control console depending on options ordered. The air cleaner element should be inspected and serviced when indicated. Failure to service the air cleaner element when indicated may reduce fuel economy, reduced engine performance, and risk damage to the engine.

The air cleaner utilizes a precleaner to remove much of the dust before it reaches to element. This precleaner also spins out incidental water in the air stream. Avoid spraying water directly into the air cleaner inlet.

Follow these steps to properly service the air cleaner element.

1. Shut off engine. Unlatch and remove the housing service cover.
2. Remove primary filter. Pull the filter out of housing. Using the handle, push down on the filter to loosen the seal, which will tilt the filter to approximately a 5° angle.
3. Clean the inside of the air cleaner housing with a damp cloth.
4. Remove safety filter. Using the plastic handle on the face of the safety filter, pull the filter toward the center of the housing and remove. Note: A safety filter only needs to be replaced at every third primary air filter change.
5. Inspect the new filter before installing. Visually check for cuts, tears, or indentations on the sealing surfaces before installation. If any damage is visible, do not install. Using the plastic handle on the safety filter, slide the filter at an angle into the outlet side and push in place until the filter seats firmly and evenly within the housing. Insert the safety filter tab into the positioning slot before pushing the filter in place.
6. Insert the primary filter. Slide the filter down at approximately a 5° angle until it hits the end of the housing. Rotate the filter toward the outlet section to complete the seal.
7. Replace the service cover. Place the service cover in position and fasten the latches. Note: If the cover doesn't seat, remove and re-check the filter position. The cover will be difficult to install if the filter isn't installed correctly.
8. Visually inspect your inlet and outlet connections. Inspect the vacuator valve. Replace if any signs of wear or damage are visible.

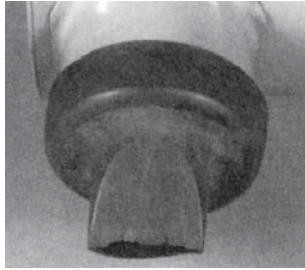
REPLACEMENT VACUATOR™ VALVES

The Vacuator Valve, standard on the majority of Donaldson air cleaners, is an important part of the functionality of the air cleaner. It is an integral part of the pre-cleaning stage on 2-stage air cleaners.

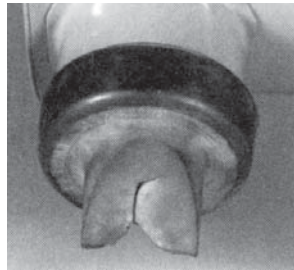
The dust cup, where pre-cleaned dust is collected, is normally under a slight vacuum when the engine is running. The normal engine pulsing of the vacuum causes the Vacuator Valve (located at the lowest point on the dust cup) to open and close. This action automatically

expels any collected dust and water. The Vacuator Valve also unloads when the engine is stopped.

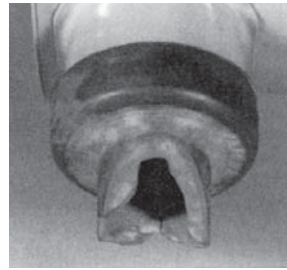
Replace That Damaged Vacuator Valve! If your valve is cracked, torn, remains open or is missing, dust particles that are normally expelled can deposit themselves onto the filter and will shorten air filter service life. **REPLACE IT!**



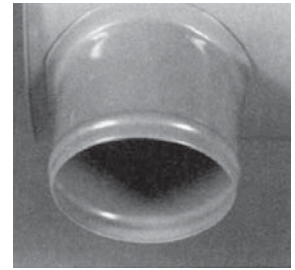
Does it remain open?



Is it cracked?



Is it torn?




Is it missing?


GUTTER BROOM

FUNCTION

As a complement to the REGENERATIVE AIR SYSTEM, the gutter broom is designed to dig material loose from the gutter or similar areas and move it in front of the pick-up head where it can be easily picked up by the air sweeping action of the pick-up head. The gutter broom is designed to hydraulically relieve and flex up and over or in-and-out around stationary obstacles. When not in use, the gutter broom is retracted under the cab, off the pavement, and hydraulically locked in position. The remote tilt option provides the operator with the capability of adjusting the gutter broom to the pitch of the surface being swept without the use of hand tools or the need to exit the cab.

TROUBLESHOOTER'S GUIDE

 **WARNING:** Before servicing, stop auxiliary engine and remove ignition key or disconnect negative battery cable.

 **WARNING:** Never check for hydraulic leaks using bare hand as pressure in system could cause oil to be injected into the skin; thus causing serious injury.

PROBLEM	CAUSE	SOLUTION
Gutter broom lowers but will not raise	No electrical power to valve bank coil.	Check for defective switch and/or wiring problem. Replace/repair as required to obtain full 12V to coil.
	Flow control valve out of adjustment or clogged	Adjust and/or clean (see SERVICE AND MAINTENANCE Section)
	Valve bank coil defective	Check for 6.2 OHM resistance reading on ohmmeter RX1 scale.
	No ground between valve bank coil and sweeper	Check ground wire connectors.
	Defective cylinder packing or components	Repair/replace as required.
	Bent or damaged structural components in boom arm or mounting	Repair or replace.

PROBLEM	CAUSE	SOLUTION
Gutter broom motor stalls easily	Replace O-ring; check sequence valve block bore for burrs or rough spots.	Clean foreign material from valve seat. Replace cartridge if damaged seat/poppet exists.
	Cartridge valve poppet not seating properly	
Gutter broom raises but drifts back down	Note: Gutter broom will rotate backward while switch is in "up" position if either or both of the above two conditions exist	Rebuild or replace (See SERVICE AND MAINTENANCE Section). See Hydraulic Section.
	Gutter broom torque motor defective	
	Hydraulic pump pressure low	
	Cylinder by-passing internally	
Gutter broom will not lower but motor turns	Electric lock valve defective	Replace lock valve.
	No electrical power to lock valve coil	Check electrical circuit for 12V to lock valve coil repair as required.
	Lock valve coil not grounded	Check ground wire, check connector ground and common power.
Gutter broom drops down but will not extend	Defective coil	Check for 7.0 OHMS resistance on RX1 scale. Replace a required. Check coil cold.
	Lock valve stuck closed	Replace
	Sequence valve improperly adjusted	Gutter broom sequence valve suggested adjustment is: Steel Vertical Digger bristles - 2-1/2 turns in. Poly Vertical Digger and Poly Wafer bristles - 2 turns in. Refer to SERVICE AND MAINTENANCE in this manual section for more detail.
	Spring improperly adjusted	Tighten eye bolt adjustment (See SERVICE AND MAINTENANCE Section).

PROBLEM	CAUSE	SOLUTION
	Damaged structural components	Repair or replace.
	Universal joints stuck or damaged	Replace
Excessive bristle wear	Improper adjustments	See SERVICE AND MAINTENANCE Section.
Gutter broom does not move debris in front of pick-up head properly	Bristles worn out	Replace.
	Improper angle adjustments	See SERVICE AND MAINTENANCE Section.
Gutter Broom tilt will not move	No electrical power to tilt system	Check switch and electrical wiring.
	Wrist at motor mount binding	Free up mechanical bind. Note: Wrist attaching bolts must be loose enough to allow free movement of motor mount assembly.
	Flow restrictor plugged	Remove and Clean. Location at control valve
	No hydraulic pressure	See Hydraulic Troubleshooting section.
Tilt will move in one direction only	Defective control valve coil	Check for shortened or defective coil. Should read 6.2 OHM resistance on Ohmmeter RX1 scale.
	Improper ground	Check ground wire for good connections.
	Defective control valve	See Hydraulic Troubleshooting Section
Tilt drifts out of position after setting	Defective lock valve	Remove and replace lock valve cartridge.
	Tilt cylinder by-passing	Re-pack cylinder.
Torque motor cap seal leaks or failure	Gutter broom retraction speed to fast	Set flow control to regulate retraction time to 2-1/2 to 3 seconds.

SPECIAL INSTRUCTIONS

To check and clear blocked lines, disconnect hydraulic lines one at a time at the sequence valve block. After disconnection, put hydraulic system into operation momentarily, and the force of the hydraulic oil will normally clear line of foreign materials. Also, check opening at sequence valve block while line is disconnected for any foreign material.



WARNING: Never check for hydraulic leaks using bare hand as pressure in system could cause oil to be injected into the skin; thus causing serious injury.

DOWN PRESSURE ADJUSTMENT

Always place broom on a smooth surface when making adjustments. The hydraulically operated gutter broom is spring suspended to help counter the hydraulic cylinder force for proper down pressure (depending on the bristle type) the cartridge sequence valve must be properly adjusted. Using a 3/16 Allen wrench, set the adjustment screw on the top of the valve as follows - suggested settings:

- Steel Vertical Digger Bristles - 2-1/2 turns in on sequence valve, 1 turn in on flow control valve
- Poly Wafer and Poly Digger Bristles - 2 turns in on sequence valve, 1 turn in on flow control valve

Once adjusted, no further sequence valve setting should be required unless the bristle type is changed.

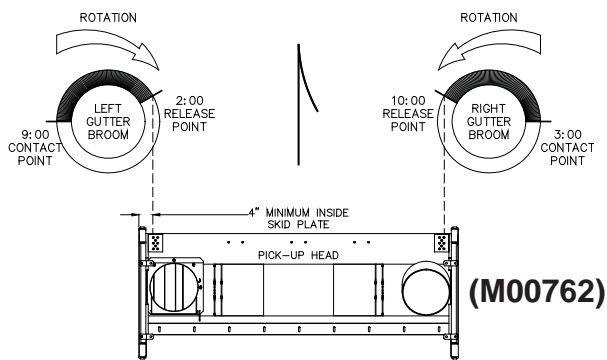


Attention: Adjusting the sequence valve adjustment screw too far into the valve will make the broom too rigid and may result in damage to the broom components!

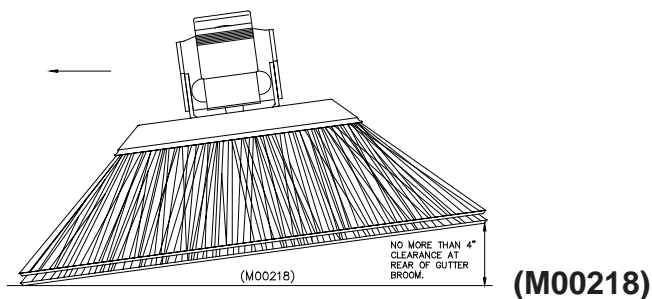
BRISTLE WEAR ADJUSTMENT

The most frequent adjustments made on the gutter broom will be spring tension and angle. Operating the gutter broom with a minimum of bristle wear is encouraged and, by keeping proper spring tension, the bristles will have a much longer life.

Do not adjust the cartridge valve to raise or lower the broom. The gutter broom spring counteracts the hydraulic cylinder force. With the gutter broom turned off and in the down position, the spring should be adjusted to hold the broom from 1 to 2 inches (25.4 to 50.8 mm) off the ground without the help of hydraulics. As the bristles wear, the broom should be lowered with spring adjustment to compensate for the shorter bristles. Simply loosen the nut on the eye bolt. The steel gutter broom bristles are replaced when the wire becomes approximately four inches long. When replacing broom with new filler, the spring must be tightened so that the tips of the bristles are 1 to 2 inches (25.4 to 50.8 mm) off the ground with no hydraulic pressure as mentioned.



NEW BRISTLE FORWARD TILT SETTING

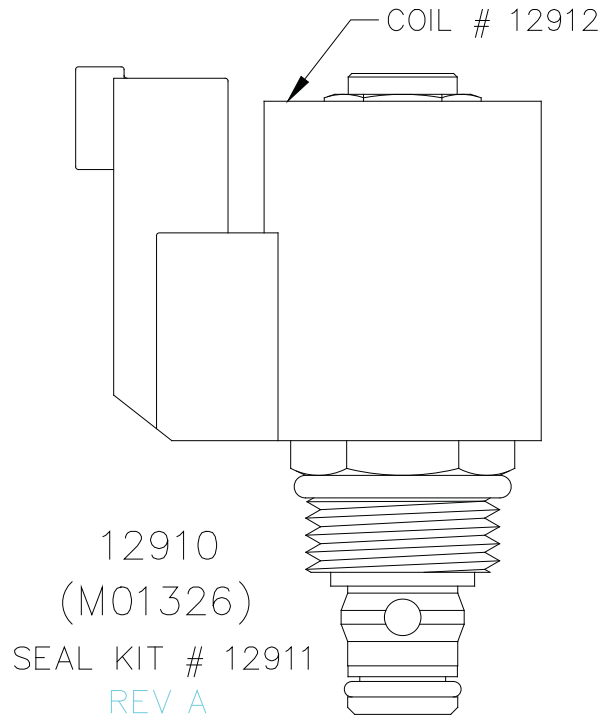


ANGLE ADJUSTMENT

The Gutter Broom utilizes a unique ball and socket design for gutter broom bristle tilt adjustment. A single nut (found behind the gutter broom torque motor) is used to lock the moveable socket to the boom arm ball. To adjust bristles, lower the gutter broom to the pavement and turn broom off. Make sure the spring tension is adjusted correctly. If the bristles still need adjusting, use a 1-7/8" open wrench to loosen the nut behind the torque motor. Due to the ball and socket design, the bristle setting can now be set to virtually any pattern regardless of bristle length. Hold the bristle setting and re-tighten the 1-7/8" nut behind the torque motor. When adjusting bristle tilt, adjustment to spring tension may be necessary also.

(A)
ELECTRIC LOCK VALVE
DWG-M01170

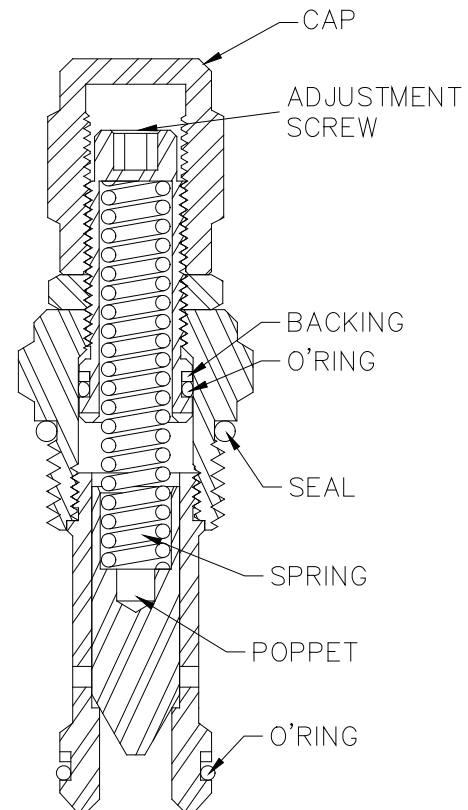
The Electric Lock Valve is used to hold the gutter broom up when the sweeper is in transit or the broom is not in use. A 12V DC current to the lock valve coil is required to lower the broom. No maintenance is required for the lock valve assembly. However, adequate voltage and ground is necessary for proper function. Normal coil resistance when cold is 7.0 OHMS.



(B)
CARTRIDGE SEQUENCE VALVE
DWG-M01327
(505172)

The cartridge valve is found screwed into the top of the aluminum sequence valve block. An adjustment screw is found on the top of the valve and is adjusted using a 3/16 Allen wrench. This setting puts just enough hydraulic pressure to base end of cylinder so that broom will go down and stay extended but also lets broom retract if it hits the curb or any other solid object. If adjustment screw is adjusted too far into the valve head, too much hydraulic pressure at the base end of gutter broom cylinder will occur and broom could be damaged if run into the curb. Always tighten jam nut and reinstall cap after adjusting.

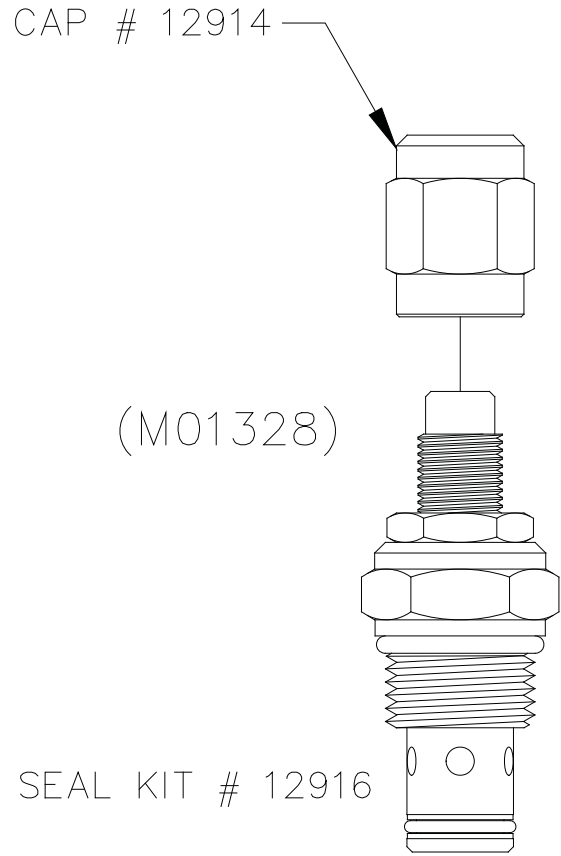
Seal Kit Part No. 5011237



SEAL KIT # 5011237
 CARTRIDGE VALVE ASSY
 (M01327)

(C)
FLOW CONTROL VALVE
DWG-M01328
(12915)

The flow control valve controls how fast the gutter broom raises by restricting the flow of oil from the base end port of the gutter broom cylinder. Set broom retraction speed from 2.5 to 3.0 seconds. Faster speeds can cause torque motor seal damage. The flow control valve has an adjustable screw used to set the upward speed for the gutter broom. Before the screw can be adjusted, a jam nut must be released to unlock the screw. To slow upward speed of the gutter broom, turn the screw clockwise using 3/16 Allen wrench. Once the desired rate of ascent is obtained, tighten jam nut and reinstall cap.



PICK-UP HEAD

FUNCTION

The pick-up head is the most important assembly on the sweeper. With proper cleaning, care and adjustment, the unit will perform as it was designed to perform.

Pressurized air from the blower enters the pick-up head through the pressure inlet assembly where turning vanes distribute it equally across the full width of the pick-up head pressure chamber. The air then exits the pressure chamber at a very high velocity through a slot called the Blast Orifice. The approximate 45 degree forward pitch of the blast orifice results in debris being dislodged from the sweeping surface and entrained in the swirling left to right movement of the high speed airstream. After reaching the extreme right side of the pick-up head, the debris-laden air encounters a suction inlet nozzle where it is drawn up the suction tube and into the hopper. The turbulent high velocity air is contained beneath the pick-up head by seal curtains in front and back and skid plates on either side.

NOTE: Any modification or restriction of the blast orifice, pressure inlet nozzle, tube or suction inlet will greatly effect overall performance of the machine.



WARNING: Before servicing, stop auxiliary engine and remove ignition key or disconnect negative battery cable.

The raising and lowering of the pick-up head is accomplished hydraulically with the control valve being actuated by a toggle switch located on the operator's console inside the truck cab. When lowered, the pick-up head lift chains have slack so that its weight is suspended on the four flotation springs. With the sweeper engine at operating RPM, the springs should be adjusted so that the pick-up head can be lifted off the ground slightly with one hand and slid from side to side with ease.

A break-away transition is provided on the suction side of the machine to allow the operator to check for build up of dirt and debris in the suction hose. A check of the suction and pressure hose at various times may reveal wear. As areas of wear become evident, rotate the hose until wear is even on all inside surfaces.



CAUTION: For safety, check the pick-up head drag links for loose nuts or damage. Failure to do so could cause serious damage to truck rear tires and axle. Prevent an accident: check it!

TROUBLESHOOTER'S GUIDE

PROBLEM	CAUSE	SOLUTION
Low sweeper efficiency, excessively dusty condition	Faulty seal	Check all seals for leaks. Following seals should be air tight: Cleanout gripper plug (Separator) Dump door Pressure & Suction hose Separator Suction Transition Rubber flap seals (Hopper air entrance)
	Dirty dust separator	Repair or replace any worn or damaged parts Check cleanout gripper plug - be sure it is secure. Check for unusually large build-up of dust. Clean skimmer slot.
	Pick-Up head problem	Worn curtains. Measure blast orifice opening so it is adjusted as noted in service and maintenance instructions.. Check for blockage. Check pressure & suction hose for blockage, build-up or holes. Check skid plate adjustment. Clean skimmer hood inside hopper and check for free movement at hinge points.
	Hopper screen restricted	Clean as required.
	Blower wear	Check for excessive wear. Replace as required.
	Water spray nozzles blocked (If applicable)	Check and clean as required.
	Blast orifice damage	Repair as required. Check daily for condition and proper gap.

SERVICE AND MAINTENANCE



WARNING: Before servicing, stop auxiliary engine and remove ignition key or disconnect negative battery cable.

BLAST ORIFICE OPENING - LOCATION & ADJUSTMENT

The blast orifice directs the high velocity air from the blower at an approximate 45 degree angle to the ground. Its opening should measure 3/8 inch (9.5 mm) on the left side of the pick-up head tapering to 5/8 inch (22.2 mm) opening on the right side. A larger opening will reduce the velocity and a smaller opening will restrict the air volume. To adjust, loosen the eight (8) bolts at the rear of the pick-up head and slide blast orifice assembly in or out in slotted holes until proper gap is achieved. Tighten the eight (8) mounting bolts and re-measure to be sure assembly has not moved.

NOTE: All Blast orifice measurements must be taken with auxiliary engine off!

BLAST ORIFICE OPENING - PROPER CLEARANCE

The blast orifice opening must be maintained as noted above. The distance from the ground to the opening is also critical and must be maintained. See Cross Section Drawing for proper ground clearance setting. Loosen five (5) bolts and slide skid plate up or down in slotted holes for proper adjustment. Removing the skid plate for this adjustment is not necessary.

SUCTION AND PRESSURE HOSES

It is advisable to rotate the suction and pressure hoses 1/4 turn (90°) every 25-50 hours of use to prolong their wear life. This procedure distributes "Hot Spot" wear.

CURTAIN REPLACEMENT

USE ONLY TYMCO CURTAINS FOR REPLACEMENT

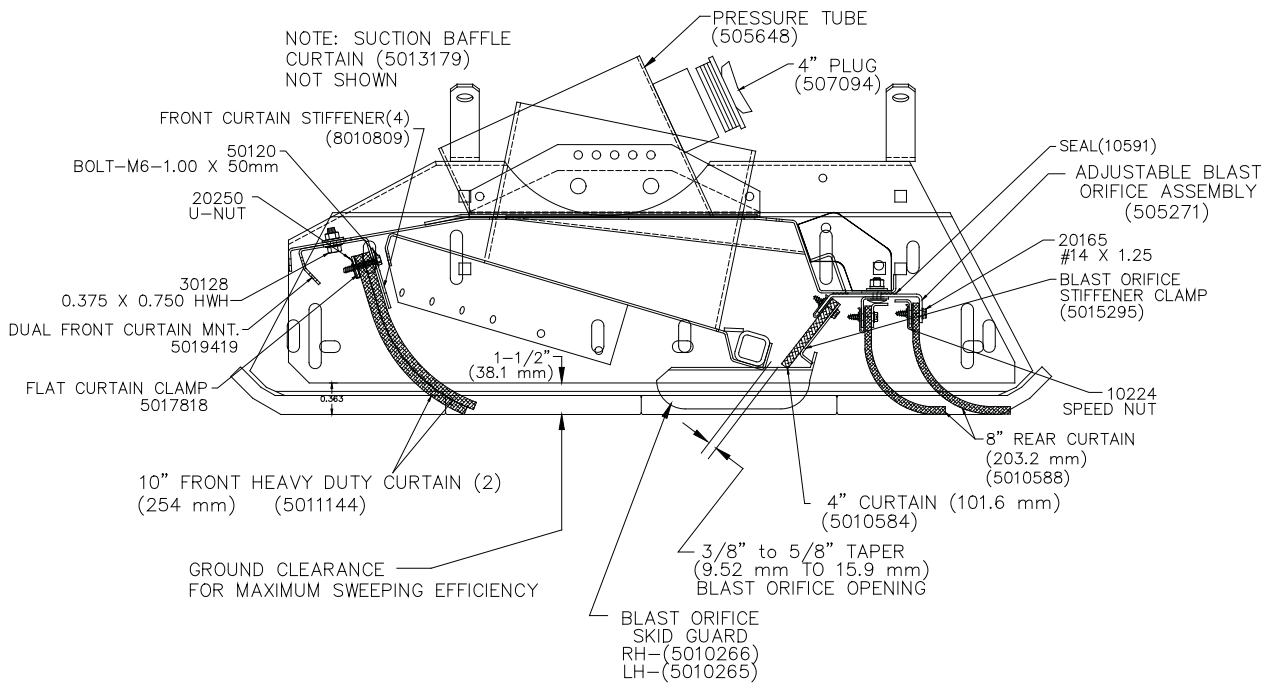
1. Remove pick-up head from under sweeper. Turn pick-up head over to expose bottom of head and curtains. Remove the screws and angle iron clamps. (Make note how angle iron clamps are oriented so they can be reinstalled correctly.) Remove small suction baffle curtain near the nozzle.



CAUTION: If sweeper is equipped with dust control system, take care not to damage water spray nozzles on pick-up head when turning it over.

2. Scrape off all debris accumulated on bottom of the pick-up head and wash off for easier rebuilding.
3. If sides of pick-up head are bent, straighten as close as possible to original configuration. Lay new curtains in place (see Cross Section drawing.) If a curtain is a little too long, trim equal amounts off each end until curtain lays perfectly flat in place.
4. Before bolting curtain in place, look closely at side of curtain and notice that it is made of a 2-ply material with a thicker layer of rubber on one side of the curtain. The thick layer is the wear surface and should be installed oriented toward the front of the pick-up head.

5. The curtains are now ready to be bolted on. If speed clips and screws are worn out, a complete replacement set is available from TYMCO, Part No. 500506. Make certain the angle iron clamps are installed properly.
6. When beginning to install the curtains, it is best to finger start all the curtain screws and then start tightening them from the center working gradually to each side. Do not skip around or a wavy curtain will result and faster curtain wear will occur.
7. The last curtain to install is the suction baffle curtain around the suction nozzle. Special elevator bolts are used here because their flat heads reduce restriction and do not wear as easily.
8. With all new curtains installed, adjust blast orifice opening and install pick-up head under the sweeper.



NOTE: FOR COMPLETE DST-4 CURTAIN SET ORDER # 503357.

APPLY TACKY TAPE TO ANY GAPS BETWEEN PICK UP HEAD SIDES & EDGES OF CURTAINS OR CURTAIN BRKTS.

**CROSS SECTION THRU
MODEL DST-4 PICKUP HEAD
(M00838) REV H**

06-15-2011
11:47 am
DG

WATER SYSTEM

FUNCTION

The TYMCO dust control system is designed to maximize dust suppression without minimizing sweeping efficiency. The REGENERATIVE AIR sweeping system is designed to remove fine particulates from the sweeping surface. Mechanical sweepers flood the surface creating a paste out of the fines, thereby, leaving them behind stuck to the pavement as a film. The TYMCO dust control system injects water spray into dust generation areas controlling the dust at its source which allows the fine particulates on the sweeping surface to be easily removed by the unique REGENERATIVE AIR sweeping system.

The dust control system is responsible for suppressing airborne dust created by a properly functioning sweeper under normal sweeping conditions. Excessively dusty sweeping is often not the fault of the dust control system, but that of a poorly functioning sweeper. It is extremely important for proper dust suppression that the sweeper pick-up head curtains be of adequate length, the hopper is properly sealed and that the pressure and suction tubes are in good condition. Even a small leak causes excessive dust and poor sweeping performance.

NOTE: This water system is NOT designed to flush the surface.

OPERATION AND COMPONENTS FLOW OF WATER AND FUNCTION OF MAJOR COMPONENTS

WATER TANKS

The Model DST-4 utilizes two 38.5 gallon (145.7 Liter) water tanks which can be filled by connecting the fill hose to a fire hydrant or a garden hose if a fire hydrant is not available.



CAUTION: The plastic water tank can be damaged by heat or fire. Protect the tank if nearby welding or cutting torch operations are necessary.

The water is drawn through a port at the bottom of the tank to a strainer located in the suction hose between the tank and the pump to prevent foreign particles from entering the system.

WATER PUMP (High Pressure-Belt Drive)

This pump is utilized only on sweepers equipped with the Hi/Low Wash Down option. It is a high pressure/low volume pump, belt driven through a clutch/sheave off the auxiliary engine.

WATER MANIFOLD

The water manifold assembly is located on the sweeper frame rail and consists of:

1. Electrically operated valves which control water distribution to strategically located spray nozzles. These valves are controlled by switches on the operator console in the cab.
2. A relief valve with a return line to tank.

LIQUID LEVEL SENSOR SYSTEM

The liquid level sensor system is an electrically controlled water level sensor which provides water pump protection when the water level in the water tank becomes depleted. The sensor turns off the water pump and illuminates a low water light on the control console located inside the truck cab. The liquid level sensor circuit is controlled by an electronic module and two relays located at the console. The liquid level sensor probe is usually located at the water tank suction/drain assembly.

SPRAY NOZZLES

One high volume nozzle is located in the right side wall of the hopper. There are spray mist nozzles mounted just forward of and above each gutter broom and on each side of the pick-up head. The nozzles are located in these positions to minimize airborne dust. The switches and indicator light for the water system are located on the operator console in the cab and are designated:

LEFT GUTTER BROOM WATER -	controls LH gutter broom nozzles
HOPPER WATER -	controls hopper nozzle
RIGHT GUTTER BROOM WATER -	controls RH gutter broom nozzles
YELLOW LOW WATER WARNING LIGHT -	illuminates upon water depletion

DUST CONTROL WATER SYSTEM OPERATION

1. Fill water tank.
2. Start auxiliary engine, lower pick-up head and set desired RPM for sweeping.
3. Turn WATER SYSTEM switch on.
4. Turn on selector switches for desired water distribution.

WASHDOWN SYSTEM OPERATION

The optional Hi / Lo Pressure Wash Down System feature allows a hose and high pressure wash down wand to be attached for cleaning. The water tank should be full when using the wash down system.

Hi/Lo Washdown without Hose Reel

To use the wash down system:

1. Turn the exterior water pump control switch, located on the suction side of the sweeper, to the off position.
2. Detach the water manifold hose from the quick coupler hose connector, also located on the suction side of the sweeper, and then attach the wash hose to the quick coupler.
3. Start the auxiliary engine, and turn on the water system.
4. With the wash-down wand in hand, turn the exterior water pump control switch to the on position.

The wash-down system is now ready for use; simply pull the trigger and you're ready to go. Remember to keep safety in mind. This is not a toy.

To disconnect the wand:

1. First turn off the exterior water pump switch, then depress the trigger to release any trapped pressure.
2. Disconnect the wash-down hose, and then reconnect the water manifold hose.

HI/Lo Washdown with Hose Reel

If your sweeper is equipped with a hose reel:

1. Turn the exterior water pump control switch, located on the suction side of the sweeper, to the off position.
2. Turn the ball valve to the Wash Position.
3. Start the auxiliary engine, and turn on the water system.
4. With the wash-down wand in hand, turn the exterior water pump control switch to the on position

Following use of the wash-down:

1. First turn off the exterior water pump switch, then depress the trigger to release any trapped pressure.
2. Turn the ball valve back to the sweep position and ensure the water pump switch back to the on position.

WINTERIZATION

The TYMCO water system requires freeze protection during freezing weather. The winterization procedure will vary depending on the type of water pump and optional winterization equipment provided with your sweeper. Your TYMCO BlueLogic® control system will assist you in successfully winterizing the water system. To begin the winterization procedure:

1. Turn on the sweeper ignition and do NOT start the auxiliary engine.
2. Press the menu button to access the page select menu.
3. Select Service Tools then Water System Winterization.
4. Follow on screen prompts to complete the winterization process.



Once completed, the water system will be electronically tagged as winterized. The winterized icon will be shown on the main page to indicate the water system is winterized. The winterization tag will be removed when the presence of water is sensed in the system. For more information on the winterization procedure, refer to your parts and service manual.



**WINTERIZED
ICON**

PROBLEM	CAUSE	SOLUTION
Low pressure	Worn nozzles	Replace with nozzles of proper size.
	Belt slippage	Tighten or replace, use correct belt.
	Air leak in inlet plumbing	Disassemble, reseal and reassemble.
	High pressure relief valve stuck open or improperly adjusted	Clean and adjust relief valve, check for worn and dirty valve seats.
	Inlet suction strainer clogged	Clean, check more frequently.
	Fouled or dirty inlet or discharge valves	Clean inlet and discharge valve assemblies.
	Worn inlet or discharge valves	Replace worn valves, valve seats.
Pump runs extremely rough, pressure low	Leaky discharge hose	Repair or replace.
	Inlet restrictions and/or air leaks. Damaged cup or stuck inlet or discharge valve	Clean out foreign material, replace worn or damaged cups or valves.
Water leakage from under the inlet manifold	Worn inlet manifold seals	Install new seals.
	Leaking sleeve o'rings	Replace o'rings.
Oil leaking between crankcase and pumping section Oil leaking in the area of crankshaft	Worn crankcase piston rod seals	Replace crankcase piston rod seals.
	Worn crankshaft seal or improperly installed oil seal retainer o'ring	Remove oil seal retainer and replace damaged o'ring and/or seals.
	Bad bearing	Replace bearing.
Excessive play in the end of the crankshaft pulley	Worn main bearing from excessive tension on drive belt	Replace bearing, properly tension belt.
Water in crankcase	May be caused by humid air condensing into water inside the crankcase	Change out in 3 months or 500 hour intervals using 30 weight non-detergent premium hydraulic oil with anti-wear and rust inhibitor additives.

PROBLEM	CAUSE	SOLUTION
Water in crankcase (cont.)	Leakage of inlet manifold seals and/or piston rod sleeve o'rings	Replace seals and/or sleeve o'rings.
Oil leaking from underside of crankcase	Worn crankcase seals	Replace seals.
Oil leakage from drain plug	Loose drain plug or worn drain plug o'ring	Tighten drain plug or replace o'ring.
Loud knocking noise in pump	Clutch assembly loose	Tighten.
Frequent or premature failure of the cups	Broken or worn bearing	Replace bearings.
	Scored rods or sleeves	Replace rods and sleeves.
	Damaged or worn cylinders	Replace cylinders.
	Running pump dry	DO NOT run pump without water. Check for suction leaks in the water suction line.
Pump will not run when adequate water is available in tank and console toggle switch is on	Defective console toggle switch	Replace switch.
	Water system fuse blown	Replace fuse and trouble shoot for electrical problem.
	Clutch not engaging	Check electrical circuit and pump ground.
	Debris collected in suction manifold/drain assembly	Open drain valve and flush thoroughly if necessary, partially disassemble and flush mud, wet sand, etc.
Pump continues to run for few seconds after water tank is depleted	Electrical problem	Check liquid level sensor relays at control console.
	Normal condition, result of slosh filter circuit in liquid level control module	None required.

AIR PURGE NOTICE

Sweeper dust control systems with liquid level sensor probe will experience pump failure due to piston cup wear if air purge valve is left in purge position when water system pump is turned on with water in tank(s). The liquid level sensor will allow the pump to run, but pump draws air through purge valve causing pump piston cups to fail due to friction. Dry run time of piston cups is approximately five minutes.

Always check purge valve position before running the system.

CONTROL SYSTEM



WARNING: Before servicing, stop auxiliary engine and remove ignition key or disconnect negative battery cable.

GENERAL NOTE:

Control system wiring diagrams have been extensively changed with the new control panel design (Flip-Up Panel) designated for use in all truck chassis carrying the model DST-4 sweepers. Information on standard and optional sweeper systems has been expanded to facilitate faster problem analysis and repair. Following TYMCO's policy of continual improvement of all sweeper models, TYMCO reserves the right to make minor updates in the Control System Design without notice or obligation.

FUNCTION

The operator control panel provides for all sweeper functions to be controlled from inside the cab. The control panel consists of a human-machine-interface or HMI display, one 8 bank switch pack for the main sweeping functions, several individual discrete switches for lighting and other auxiliary devices, and an auxiliary engine ignition key switch used to power up the sweeper and start the auxiliary engine.

User installed “extra” lights or electrical accessories.

Adding circuits to the sweeper control system should be done with the utmost consideration to the effects on the TYMCO installed electrical wiring. Total current draw should be less than the installed fuse or circuit breaker. Under no circumstances should the value rating of the installed fuse or circuit breaker be exceeded.

Added circuits that exceed the current draw of TYMCO Wiring are best controlled through the use of a relay which can utilize an existing TYMCO wire for the “Switch-on” signal. The main power for extra circuits should be separately fused.

Failure to follow these guidelines may VOID any warranties applicable as determined by TYMCO.

BlueLogic® System

The Model DST-4 Regenerative Air Sweeper uses a BlueLogic® control system to interface the auxiliary engine and control sweeper functions. BlueLogic® is a multiplexing control system which has the ability to process logic and communicate with other electronic devices on the sweeper. The BlueLogic control module is located on the front of dust separator and communicates with the HMI display, 8 bank switch pack, and the auxiliary engine control unit or ECU over the primary Control Area Network (CAN) datalink cable. The CAN datalink is made up of one cable consisting of three wires (green, yellow, and a shield wire). The control module is constantly monitoring the state of the 8 bank switch pack, the HMI display, and each discrete module input. The control module processes these state changes and activates its outputs or sends command messages over the primary CAN datalink to these devices as programmed.

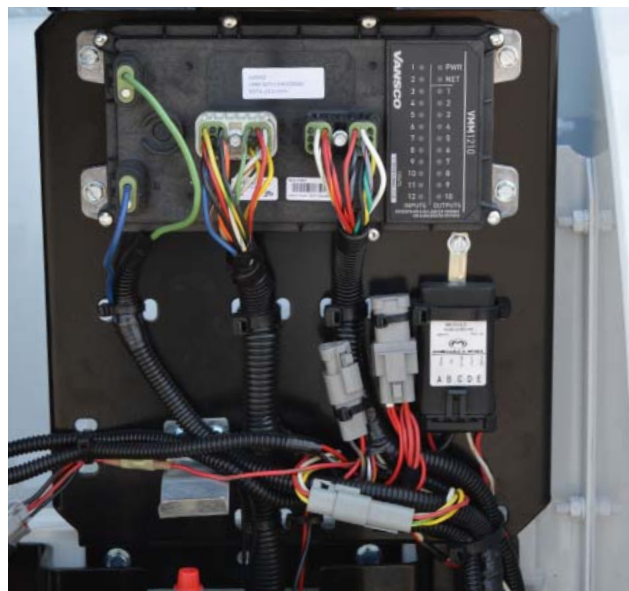
Some functions on the Model DST-4 are controlled discretely rather than through the BlueLogic® module. The functions controlled by the BlueLogic module are: gutter brooms, pickup head, main water system power, auxiliary hydraulics motor, and variable speed gutter broom valve. Some examples of the discrete switches are the work lights, individual water nozzle circuits, optional hydraulic circuits, etc.

The Model DST-4 with Final Tier 4 emissions is powered by an electronically controlled auxiliary engine. The engines ECU controls, monitors, and protects the engine from damaging itself. The ECU broadcasts engine information to the HMI display on the control panel. In the event of an engine derate or shutdown condition, the display will communicate the engine fault to the operator. The display also monitors and commands certain functions of the auxiliary engine over the primary CAN datalink such as the regeneration of the exhaust system and engine speed.

To protect the integrity of the BlueLogic control system, user installed lighting or electrical accessories should be avoided. All aftermarket installed circuits should be powered through the spare circuits on the fuse panel under the control panel or the auxiliary power distribution panel.

BlueLogic® CONTROL MODULE

The BlueLogic control module is powered by the 12V chassis electrical system and grounded through the module harness. The module is mounted to the front of the dust separator. See picture below.



Module Input / Output LED Diagnostics

The control module has 12 inputs and 10 outputs. Each input and output has a corresponding indicator LED located on the right side of the module in the status window. Most inputs are switched by a high side or positive voltage signal. Some are switched by a low side or grounded signal. When an input is switched, the corresponding input LED will illuminate to indicate that the input circuit is closed. When the circuit is opened, the input LED will turn off. All outputs switch to battery voltage (output 10 controls an optional circuit and can reduce the output voltage with pulse width modulation). When the corresponding output LED illuminates, the output closes the circuit to positive battery voltage supplying current to drive solenoid, light, and other circuits.

Output Overload Protection & Power Fault Detection


The control module also has output overload protection and power fault detection. If any of the module outputs overload due to a short circuit, the overloaded output will shut down internally. The corresponding output LED will blink when the module commands the output to turn on. This would indicate a shorted wire, solenoid, etc in that particular circuit. If there is no bus bar voltage for a group of outputs, any output in that group that is commanded to turn on will flash its corresponding LED indicating a power fault on that bus bar. Usually a power fault on the bus bar is due to a blown bus bar fuse.

Module Network Diagnostics

The control module has a PWR and NET LED that indicate module power and network communication status. The PWR LED will turn on when the module is powered up. It will flash to indicate a system fault. The NET LED will turn on indicating it is communicating with the network. If the NET LED turns off, this indicates the CAN datalink is disconnected from the module.

DST4 BlueLogic Module LED/Wire Information			
SWEEPER MODULE - VMM1			
PLUG # PIN #	IN/OUT LED	FUNCTION	WIRE COLOR
J1-1E	I1-1	IGNITION (+)	R
J1-2A	I1-2	PUH DOWN PRESSURE SWITCH (+)	R-BK
J1-2C	I1-3	AUX HYD REQUEST (+)	O-W
J1-2F	I1-4	LOW COOLANT (-)	Y
J1-3B	I1-5	REVERSE (+)	BL
J1-3E	I1-6	LOW WATER (-)	W-O
J2-1E	I1-7	HOPPER LOAD INDICATOR (-)	W
J2-1B	I1-8	WATER IN FUEL INDICATOR (-)	W-GR
J2-2B	I1-9	HYDRAULIC OIL TEMP SENSOR	BR-W
J2-2D	I1-10	OIL PRESSURE	BR-Y
J2-2E	I1-12	AIR FILTER RESTRICTION	GY-R
J1-3C	O1-1	RH GUTTER BROOM UP	BR-W
J1-3D	O1-2	LH GUTTER BROOM UP	Y-BK
J2-1C	O1-3	PICK-UP HEAD UP	R-Y
J2-3C	O1-4	SPARE	
J1-3F	O1-5	WATER SYSTEM	W
J1-1C	O1-6	PICK-UP HEAD DOWN	BK-W
J1-1D	O1-7	RH GUTTER BROOM DOWN	GR-R
J1-1F	O1-8	LH GUTTER BROOM DOWN	W-BL
J2-3D	O1-9	AUXILIARY HYDRAULICS RUN	GY-BK
J2-1D	O1-10	GUTTER BROOM SPEED	R-GR

DST MODULE - VMM2			
PLUG # PIN #	IN/OUT LED	FUNCTION	WIRE COLOR
J1-1E	I2-1	IGNITION (+)	R
J1-2A	I2-2	DOOR CLOSED PROX	R-BK
J1-3B	I2-5	CURTIAN LIFT SWITCH	BL-O
J2-2B	I2-9	PRECLEANER PRESSURE SENSOR	BK-W
J2-2D	I2-10	DST FILTER PRESSURE SENSOR	BL-Y
J2-2C	I2-11	AIR TANK PRESSURE SENSOR	BR-R
J1-3C	O2-1	TOP FILTER PULSE	P-R
J1-3D	O2-2	BOTTOM FILTER PULSE	P-O
J2-1C	O2-3	PULSE SYSTEM INDICATOR	GR-O
J2-3C	O2-4	SCAVENGE PULSE	P-Y
J1-3F	O2-5	DRAIN VALVE	R-W
J1-1C	O2-6	SENSOR POWER	BR
J1-1D	O2-7	CURTAIN LIFT UP	O-BL
J1-1F	O2-8	CURTAIN LIFT DOWN	GY-R
J2-3D	O2-9	FLUE ACTUATOR OPEN	BK-R
J2-1D	O2-10	FLUE ACTUATOR CLOSE	P-W



Program Version #: v3.X
Decal Part #: 5021895
Module Part #: 508952

PLUG # PIN #
J X - X X
Pin Location
Plug Number

IN/OUT LED
X X - X X
LED Number
Module Number
Input/Output (I/O)

The module has a custom program loaded on it to control the outputs based on module inputs and CAN inputs. The program version, program revision level, and I/O information are located on the Module LED/Wire Information Decal example shown above. The module status, I/O, and program version/revision can also be viewed on the HMI display on the control panel.

BlueLogic® System

The Model DST-4 Regenerative Air Sweeper uses a BlueLogic® control system to interface the auxiliary engine and control sweeper functions. BlueLogic® is a multiplexing control system which has the ability to process logic and communicate with other electronic devices on the sweeper. The BlueLogic control module is located on the front of dust separator and communicates with the HMI display, 8 bank switch pack, and the auxiliary engine control unit or ECU over the primary Control Area Network (CAN) datalink cable. The CAN datalink is made up of one cable consisting of three wires (green, yellow, and a shield wire). The control module is constantly monitoring the state of the 8 bank switch pack, the HMI display, and each discrete module input. The control module processes these state changes and activates its outputs or sends command messages over the primary CAN datalink to these devices as programmed.

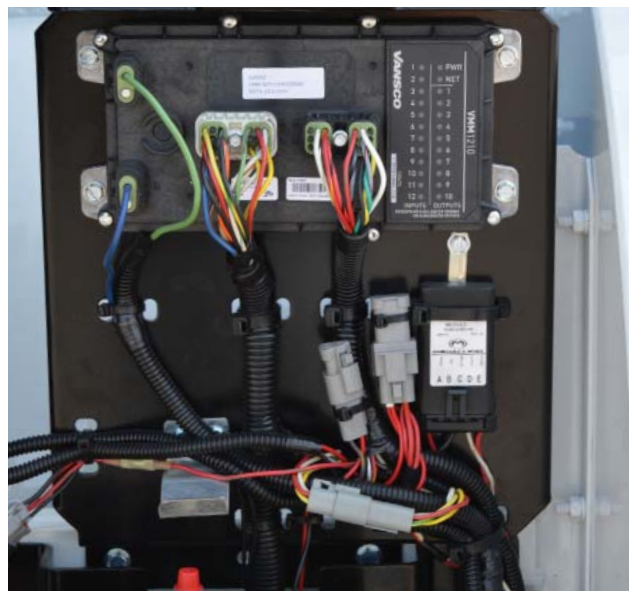
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To protect the integrity of the BlueLogic control system, user installed lighting or electrical accessories should be avoided. All aftermarket installed circuits should be powered through the spare circuits on the fuse panel under the control panel or the auxiliary power distribution panel.

BlueLogic® CONTROL MODULE

The BlueLogic control module is powered by the 12V chassis electrical system and grounded through the module harness. The module is mounted to the front of the dust separator. See picture below.



Module Input / Output LED Diagnostics

The control module has 12 inputs and 10 outputs. Each input and output has a corresponding indicator LED located on the right side of the module in the status window. Most inputs are switched by a high side or positive voltage signal. Some are switched by a low side or grounded signal. When an input is switched, the corresponding input LED will illuminate to indicate that the input circuit is closed. When the circuit is opened, the input LED will turn off. All outputs switch to battery voltage (output 10 controls an optional circuit and can reduce the output voltage with pulse width modulation). When the corresponding output LED illuminates, the output closes the circuit to positive battery voltage supplying current to drive solenoid, light, and other circuits.

Output Overload Protection & Power Fault Detection


The control module also has output overload protection and power fault detection. If any of the module outputs overload due to a short circuit, the overloaded output will shut down internally. The corresponding output LED will blink when the module commands the output to turn on. This would indicate a shorted wire, solenoid, etc in that particular circuit. If there is no bus bar voltage for a group of outputs, any output in that group that is commanded to turn on will flash its corresponding LED indicating a power fault on that bus bar. Usually a power fault on the bus bar is due to a blown bus bar fuse.

Module Network Diagnostics

The control module has a PWR and NET LED that indicate module power and network communication status. The PWR LED will turn on when the module is powered up. It will flash to indicate a system fault. The NET LED will turn on indicating it is communicating with the network. If the NET LED turns off, this indicates the CAN datalink is disconnected from the module.

DST4 BlueLogic Module LED/Wire Information			
SWEEPER MODULE - VMM1			
PLUG # PIN #	IN/OUT LED	FUNCTION	WIRE COLOR
J1-1E	I1-1	IGNITION (+)	R
J1-2A	I1-2	PUH DOWN PRESSURE SWITCH (+)	R-BK
J1-2C	I1-3	AUX HYD REQUEST (+)	O-W
J1-2F	I1-4	LOW COOLANT (-)	Y
J1-3B	I1-5	REVERSE (+)	BL
J1-3E	I1-6	LOW WATER (-)	W-O
J2-1E	I1-7	HOPPER LOAD INDICATOR (-)	W
J2-1B	I1-8	WATER IN FUEL INDICATOR (-)	W-GR
J2-2B	I1-9	HYDRAULIC OIL TEMP SENSOR	BR-W
J2-2D	I1-10	OIL PRESSURE	BR-Y
J2-2E	I1-12	AIR FILTER RESTRICTION	GY-R
J1-3C	O1-1	RH GUTTER BROOM UP	BR-W
J1-3D	O1-2	LH GUTTER BROOM UP	Y-BK
J2-1C	O1-3	PICK-UP HEAD UP	R-Y
J2-3C	O1-4	SPARE	
J1-3F	O1-5	WATER SYSTEM	W
J1-1C	O1-6	PICK-UP HEAD DOWN	BK-W
J1-1D	O1-7	RH GUTTER BROOM DOWN	GR-R
J1-1F	O1-8	LH GUTTER BROOM DOWN	W-BL
J2-3D	O1-9	AUXILIARY HYDRAULICS RUN	GY-BK
J2-1D	O1-10	GUTTER BROOM SPEED	R-GR

DST MODULE - VMM2			
PLUG # PIN #	IN/OUT LED	FUNCTION	WIRE COLOR
J1-1E	I2-1	IGNITION (+)	R
J1-2A	I2-2	DOOR CLOSED PROX	R-BK
J1-3B	I2-5	CURTIAN LIFT SWITCH	BL-O
J2-2B	I2-9	PRECLEANER PRESSURE SENSOR	BK-W
J2-2D	I2-10	DST FILTER PRESSURE SENSOR	BL-Y
J2-2C	I2-11	AIR TANK PRESSURE SENSOR	BR-R
J1-3C	O2-1	TOP FILTER PULSE	P-R
J1-3D	O2-2	BOTTOM FILTER PULSE	P-O
J2-1C	O2-3	PULSE SYSTEM INDICATOR	GR-O
J2-3C	O2-4	SCAVENGE PULSE	P-Y
J1-3F	O2-5	DRAIN VALVE	R-W
J1-1C	O2-6	SENSOR POWER	BR
J1-1D	O2-7	CURTAIN LIFT UP	O-BL
J1-1F	O2-8	CURTAIN LIFT DOWN	GY-R
J2-3D	O2-9	FLUE ACTUATOR OPEN	BK-R
J2-1D	O2-10	FLUE ACTUATOR CLOSE	P-W



Program Version #: v3.X
Decal Part #: 5021895
Module Part #: 508952

PLUG # PIN #
J X - X X
Pin Location
Plug Number

IN/OUT LED
X X - X X
LED Number
Module Number
Input/Output (I/O)

The module has a custom program loaded on it to control the outputs based on module inputs and CAN inputs. The program version, program revision level, and I/O information are located on the Module LED/Wire Information Decal example shown above. The module status, I/O, and program version/revision can also be viewed on the HMI display on the control panel.

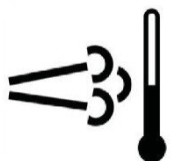
Programmed Sweeper Interlocks

The control module is preprogrammed with several standard sweeper interlocks as well as some optional. Some interlocks protect certain components from damage while others are for operator convenience. See the options section of this manual for more information on optional interlocks.

Low water level: When the low water sensor detects no water in the water tanks, the control module will shutdown the water system and prevent the water pump and water nozzle solenoids from activating.

Auxiliary Engine Exhaust System Regeneration (Regen)

The engine will automatically clean the exhaust system under normal sweeping operation through process of regeneration. This will occur as needed when the engine load is elevated, the pick-up head is down, and engine RPM is above idle. The high exhaust temperature icon will illuminate to indicate cleaning is active.

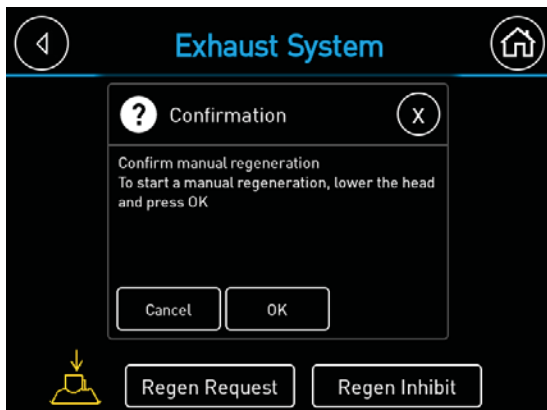


High Exhaust Temperature Icon

If operator initiated regeneration is needed, the Exhaust Filter Indicator will illuminate along with a diagnostic trouble code message.



To initiate a regeneration, go to the “Exhaust System” page and press “Regen Request”. Lower the pick-up head, and press the “OK” button to confirm and initiate regeneration.



The engine ECU will take control of engine throttle and complete the cleaning process. The manual Regen will be canceled if any of the following occur:

- Pick-up head is raised
- Engine RPM increase switch is pressed
- Engine RPM decrease switch is pressed
- Regen Inhibit is activated

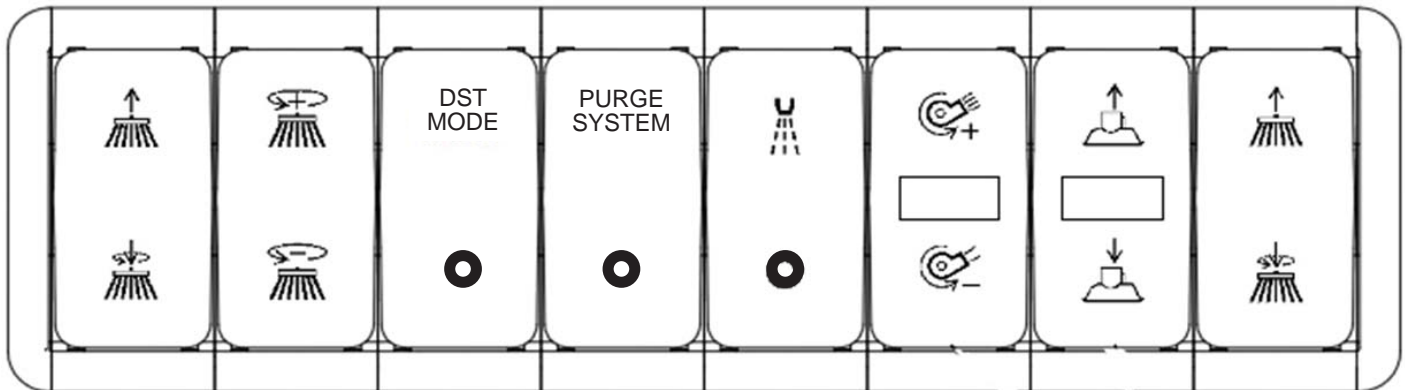
8 Bank Switch Pack Module Diagnostics

The switch pack module communicates each switch position over the CAN datalink to control module. Each switch controls a function such as gutter broom, pick-up head, etc. The switch pack has feed back LED indicators for each switch position on all eight switches. Below is a LED color chart to explain the switch and switch function status.

LED SWITCH / FUNCTION STATUS

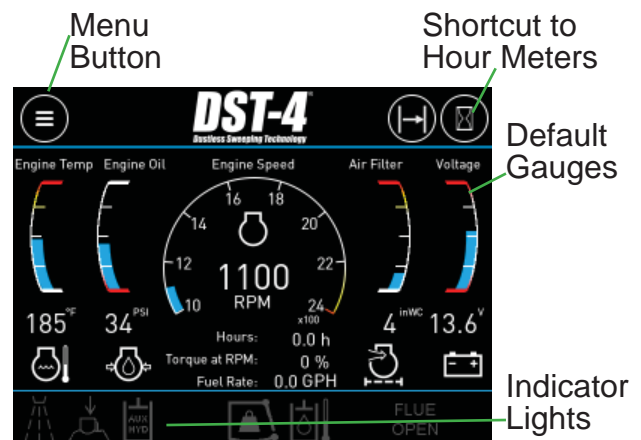
OFF: switch inactive, function inactive
 CYAN: switch active, function inactive
 GREEN: switch active, function active
 AMBER: switch active, function stand-by
 RED: switch active, function faulted

LEFT GUTTER BROOM UP/DOWN	GUTTER BROOM SPEED UP/DOWN	DST MODE	PURGE SYSTEM	WATER SYSTEM ON/OFF	BLOWER RPM UP/DOWN	PICK-UP HEAD UP/DOWN	RIGHT GUTTER BROOM UP/DOWN
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CONTROL PANEL COLOR DISPLAY

The Model DST-4 BlueLogic® control system includes a color human-machine interface (HMI) display. The display is used to convey system information to the user as well as allow the user to input information to the control system. The display utilizes multiple pages to communicate related groups of information. The operator can navigate these pages using the touch screen interface.



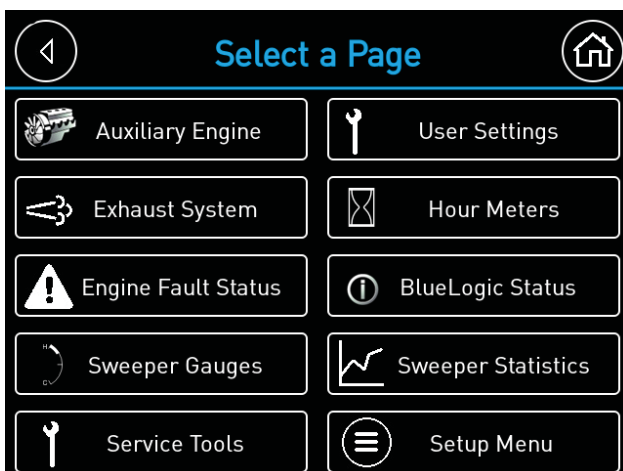
The available pages include:

Homepage

The Homepage is the main screen that will always show after the ignition is turned on. The bottom of the page will show sweeper status indicator lights. The icons will change color to indicate the state of the feature. A gray icon indicates the inactive state. The gauges and icons visible on the Homepage will vary depending on the options ordered. Engine Speed will always be displayed in the center of the screen. The left most gauge will display engine temperature. The gutter broom speed selection will also be shown here for a few seconds after the selection is changed. The middle left gauge position will either be engine oil pressure or the optional Leaf Pressure Bleeder Position Gauge. The middle right gauge will show optional variable speed broom setting or optional engine air filter restriction. The right most gauge will either be battery voltage or the optional dust suppression water level gauge. If the sweeper is equipped with optional gauges, the default engine gauges can be viewed on the engine data page. Pressing the HOME button on any page will bring you back to the Homepage. The display will automatically close all pages and return to the Homepage after 5 minutes.

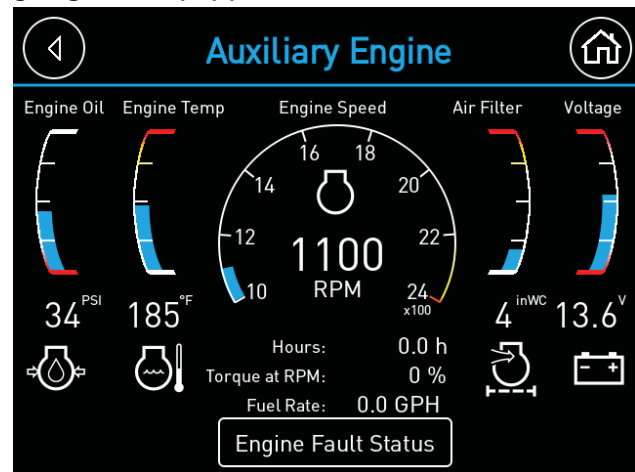
Page Selector

When on the Homepage, pressing the menu button will bring up the Page Selector screen. The available pages will vary based on the options ordered. Once on the Page Selector screen, simply touch the desired page to display it. From any page, press the Home Button to return to the Homepage. Press the Back button to go back one page.



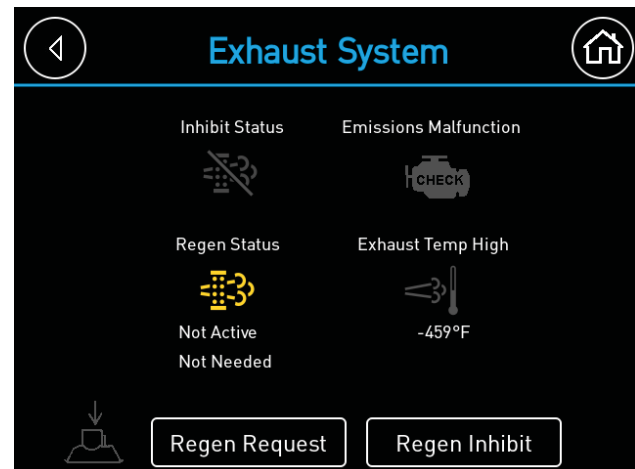
Auxiliary Engine

Engine speed, engine oil pressure, engine coolant temperature, and battery voltage will be displayed as well as engine hours, engine torque % and fuel rate. These gauges will always be present regardless of the options ordered. Pressing the Engine Fault Status button will bring up the Engine Fault Status page. This page may also include optional gauges if equipped.



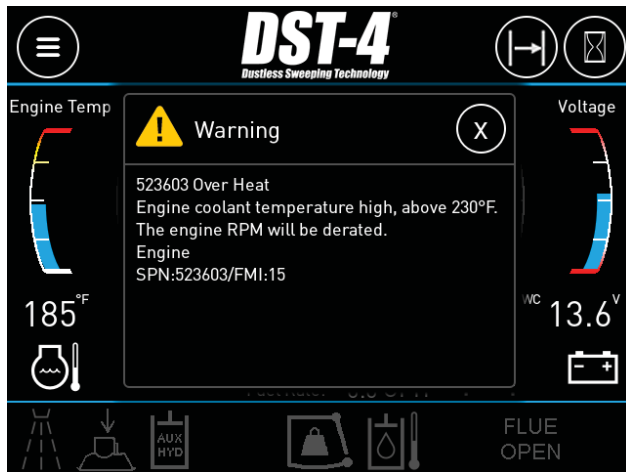
Exhaust System

Detailed information about the status of the auxiliary engine exhaust system can be viewed on the Exhaust System Page. If a manual regeneration is required, this is initiated by pressing the Regen Request button and following the prompts. The exhaust icons will also be displayed on the Homepage when active. Pressing the Regen Inhibit button will prevent the engine from cleaning itself when needed. This feature should not be used unless prompted by trained personnel.

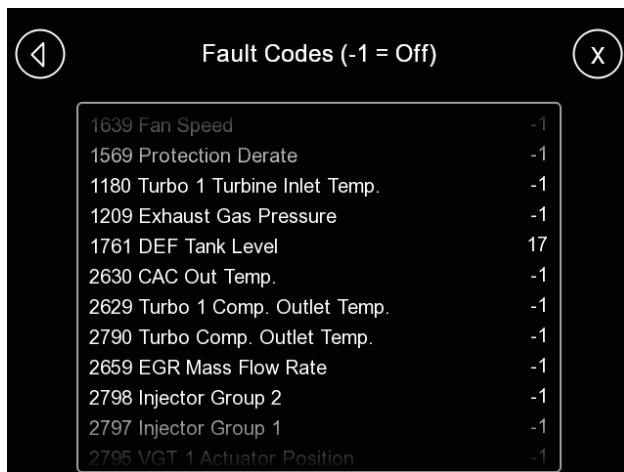


Engine Fault Status

When an active engine fault occurs a warning message will appear over the active page as shown below.

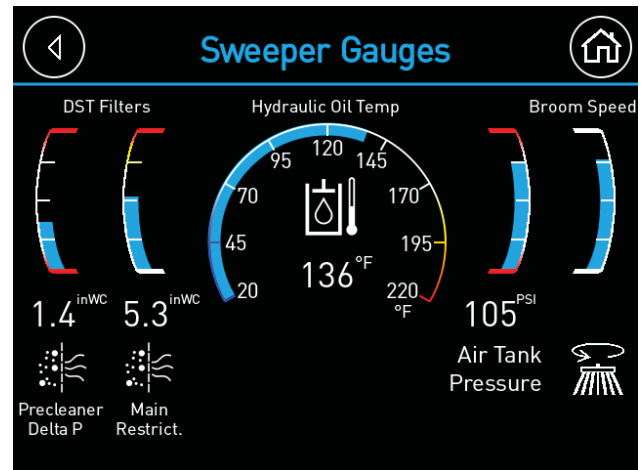


Once the fault is acknowledged, the message will disappear. The Engine Fault Status Page allows the user to view active faults after they are acknowledged. A value of -1 indicates the fault is inactive; any other number represents the FMI (Fault Mode Indicator) code of the fault. Swipe the screen vertically to scroll.



Sweeper Gauges

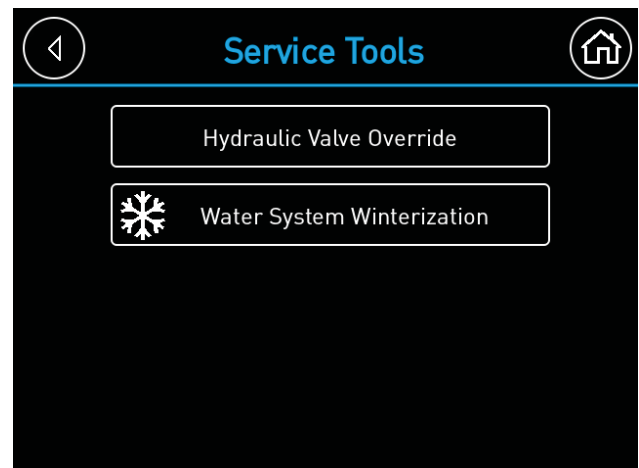
The hydraulic oil temperature as well as all non-engine related sweeper gauges will be displayed. The gauges displayed will vary depending on options ordered.



Service Tools

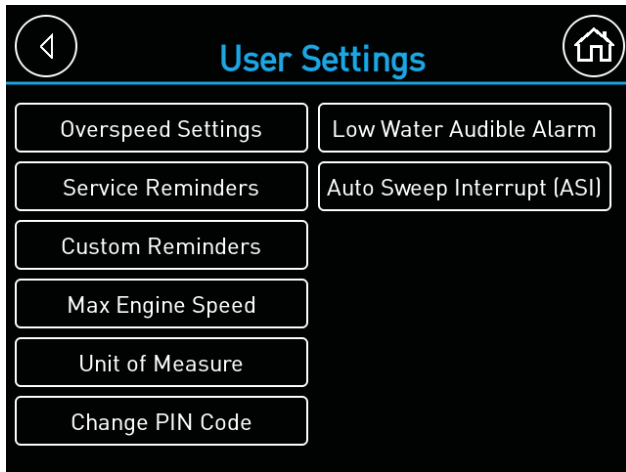
The Service Tools page has special diagnostic controls that can be used for troubleshooting and maintenance. The Hydraulic Valve Override button will direct the user to another page that will allow the user to send a request to turn on the bypass valve and variable speed broom control valve (if equipped). These valves must be on in order to use the manual override buttons on the hydraulic directional valves. This is useful in the event that a hydraulic solenoid coil fails on the directional valves.

The water system winterization controls are accessed from the service tools page. See the water system section or options section for instructions on winterizing the water system.



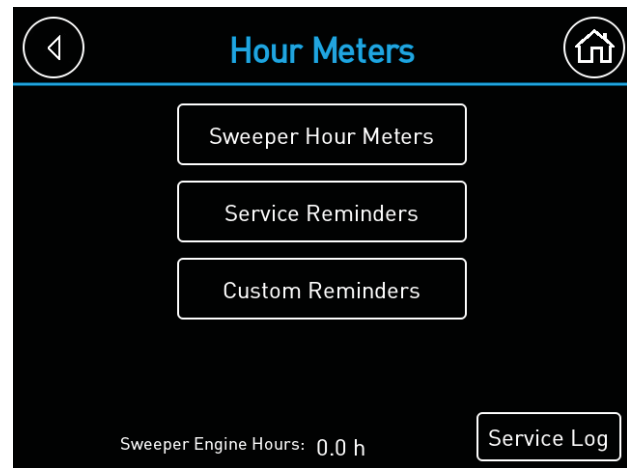
User Settings

There are some user configurable options. These can be adjusted by the operator or supervisor. To access this screen, the customer PIN code must be entered. The default PIN Code is “2345”. The PIN Code can be changed if desired. Press the Change PIN Code button and follow on screen prompts. If equipped, the overspeed warning set points can be adjusted within allowable parameters or disabled. Service reminders can be configured. If equipped, the ASI operation can be configured. See ASI section for details of available settings. The maximum auxiliary engine speed can be adjusted within allowable parameters. Unit of Measure will allow units to be switched from imperial (miles, psi/inwc, °F) to metric (km, kPa, °C).



Hour Meters

Non-resettable and resettable trip hour meters for engine, pick-up head, gutter broom (RH and LH), water pump, and blower functions are included with the BlueLogic® control system. In addition, programmable service reminders are provided for many scheduled maintenance items. The main hour meter page will show the engine hours.



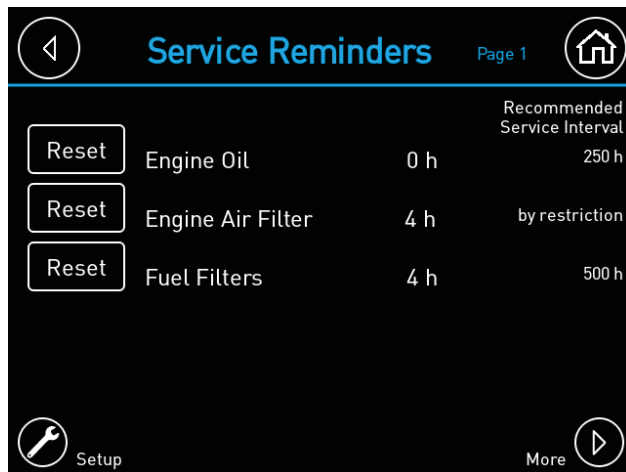
Pressing the “Sweeper Hour Meters” button will show the sweeper hour meters. To reset the trip hour meters, press the “Reset” button next to the hour meter to be reset. Press “OK” on the confirmation window to reset the trip hour meter.

	Total	Trip	
Engine	0.0 h	0.0 h	Reset
Pick Up Head	0.1 h	0.0 h	Reset
RH Gutter Broom	0.0 h	0.0 h	Reset
LH Gutter Broom	0.0 h	0.0 h	Reset
Water Pump	0.0 h	0.0 h	Reset
Blower	0.2 h	0.0 h	Reset
DST Main Filters	2.4 h	0.0 h	Reset

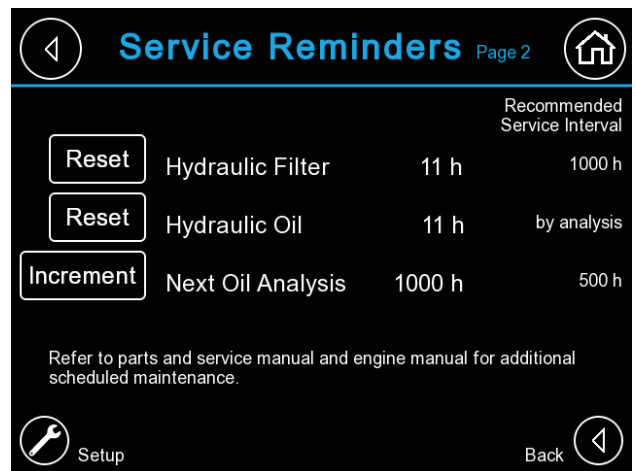
Pressing the “Service Reminders” button will show the Service Reminders page. The BlueLogic® control system monitors machine usage and will trigger a service message when many recommended service intervals are reached.



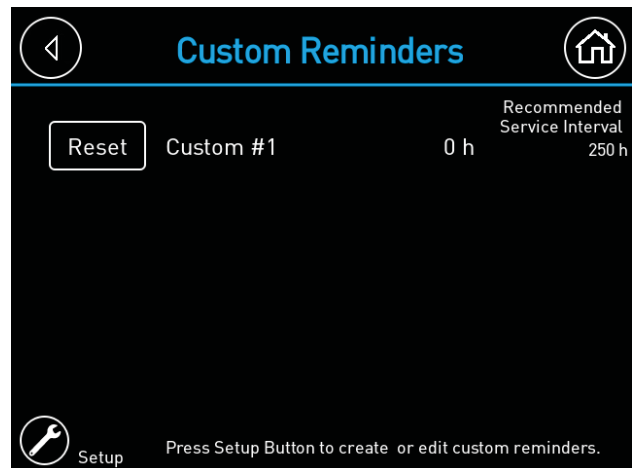
The Service Reminders Page is used to monitor and reset the service timers. The recommended service interval for each item will be shown on the right side of the screen. Once the service is completed, reset the timer by pressing the “Reset” button for the corresponding reminder. Press the “More” button to access additional reminders.



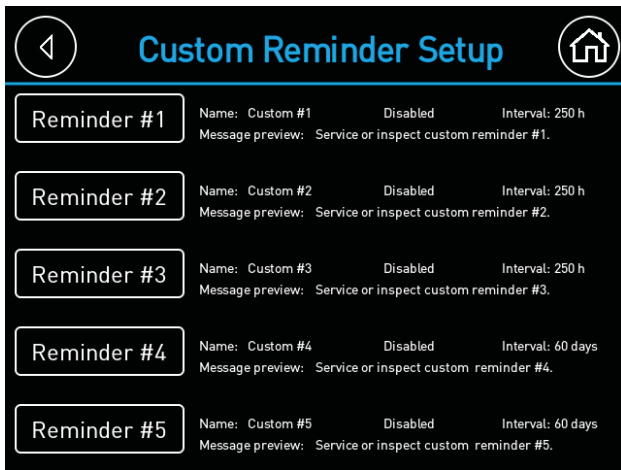
Page 2 of the service reminders includes hydraulic oil and filters. If a hydraulic oil sampling program is desired, the reminder can be configured to trigger sampling at 1000 hours and every 500 hours thereafter. After a good sample is completed, press the increment button to bump the sampling trigger point 500 hours. Resetting the hydraulic oil hour meter will reset the oil sampling trigger back to 1000 hours. To configure the service reminders press the setup button. Enter the User PIN code “2345” to access the settings.



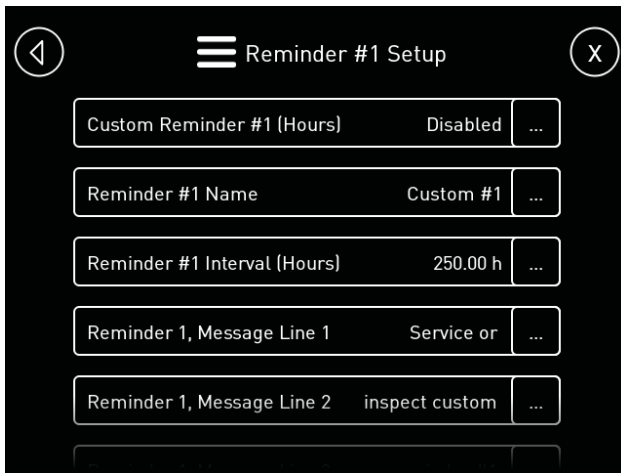
Five customizable service reminders are provided. To access these reminders, press the Custom Reminders button. To setup the custom reminders press the Setup button on the Custom Reminders page. Each reminder must be enabled and configured by the user.



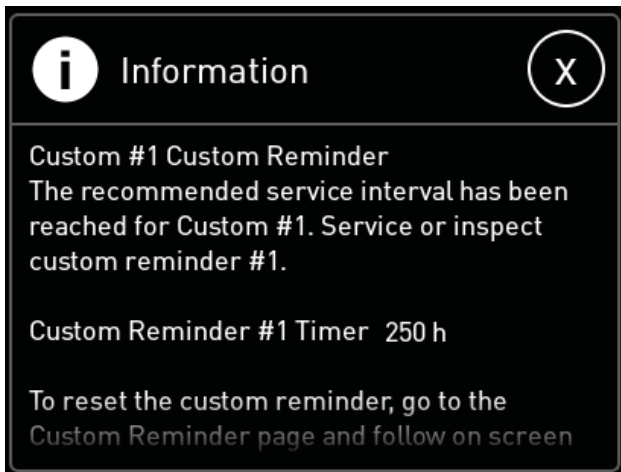
Each reminder allows the user to enter a 15 character description, a 45 character message, and the trigger interval. The trigger interval for Reminders 1 through 3 is based on engine hour run time and can be adjusted in 50 hour increments. The trigger interval for Reminders 4 and 5 is in calendar days. The date and time must be properly set for reminders 4 and 5 to function properly. The date and time may be lost if the battery is disconnected for extended periods of time.



To configure a reminder, press the corresponding Reminder # button to access the adjustable fields. Once the reminder is enabled, it will show up on the Custom Reminder page.



When the custom reminder service interval is reached, the custom reminder message will pop up with the custom message inserted. To reset the custom reminder, go to the Custom Reminder page and reset using the same procedure and the standard reminders.

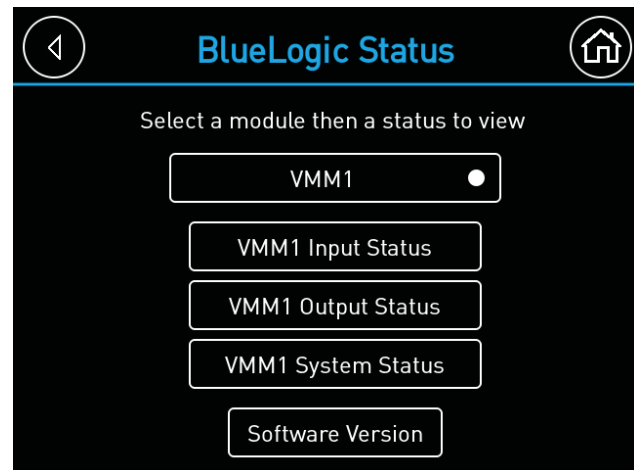


Each time a service timer is reset, it will be recorded in the Sweeper Service Log. The engine hours at the time of the service will be recorded. The log can be accessed by pressing the Service Log button on the main Hour Meters page.



BlueLogic Status

The status of the BlueLogic module (VMM) can be viewed on the VMM status page. The status mimics the diagnostic lights on the face of the VMM. VMM inputs, outputs, system status, and software version can be viewed by pressing the corresponding function key.



VMM Input Status		
I1-1 Sweeper Ignition	Off	
I1-2 Pick Up Head Down	Off	
I1-3 Aux Hyd Request	Off	
I1-4 Low Coolant	Off	
I1-5 Reverse Trigger	Off	
I1-6 Low Water	Off	
I1-7 Hopper Load Ind.	On	
I1-8 WIF Sensor	Off	
I1-10 Engine Oil Pressure	Off	10.2 V

Sweeper Statistics

The BlueLogic control system generates useful statistical information. The sweeper statistics page provides access to the sweeper odometer and fuel usage.

The screenshot shows a menu titled "Sweeper Statistics" with two main options: "Sweeper Odometer" (indicated by a right-pointing arrow icon) and "Fuel Usage" (indicated by a fuel pump icon).

The sweeper odometer keeps track of distance swept. The feature provides a non-resettable odometer, trip odometer, and an odometer trip hour meter. The average sweeping speed is provided for the trip odometer. The odometer is managed by the BlueLogic® Control System and logs distance any time the head is down (indicated by the amber head down indicator on the display) and the engine is above idle. To reset the trip odometer, hour meter, and average speed, press the "Reset Trip" button.

The screenshot shows the "Sweeper Odometer" screen with the following data:

Sweeper Odometer	6.2 mi
Sweeper Trip Odometer	0.0 mi
Odometer Trip Hours	0.0 h
Average Sweeping Speed	0.0 mph

A "Reset Trip" button is located at the bottom of the screen.

The BlueLogic system automatically calculates the auxiliary engine fuel consumption and reports it on the Fuel Usage page. This is a calculated fuel consumption based on instantaneous fuel rate. Actual fuel consumption may vary. Trip fuel usage, trip timer, average fuel economy, and instantaneous fuel rate are provided. To reset the trip fuel usage, fuel trip hours, and the average fuel economy, press the "Reset Trip" button and follow on-screen prompts.

The screenshot shows the "Fuel Usage" screen with the following data:

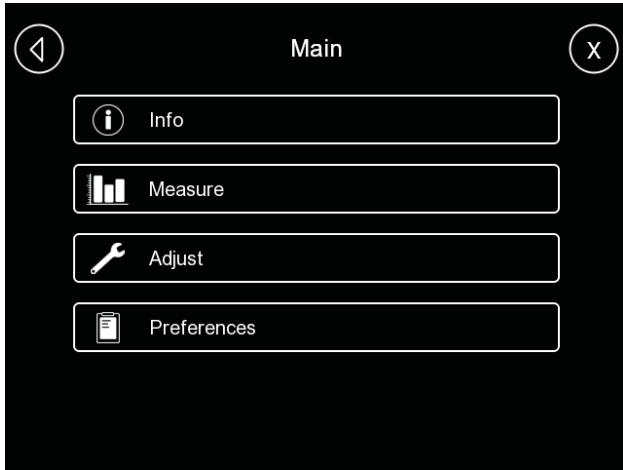
Fuel Usage, Trip	0.2 Gal
Fuel Trip Hours	0.0 h
Average Fuel Economy	13.0 GPH
Instantaneous Fuel Rate	0.0 GPH

A "Reset Trip" button is located at the bottom of the screen.





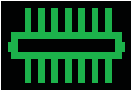



















Note: Fuel usage shown is a calculated fuel consumption for the auxiliary engine. Actual fuel consumption may vary.

Setup Menu

The Setup Menu is primarily used for factory setup and diagnostics. The Info tab provides access to event logs and module status. The Measure tab provides additional diagnostic information. The Adjust tab provides access to configurable options. Most adjustments are for factory configuration and are not accessible by the user. Under the Preferences tab, the backlight, date and time can be set.



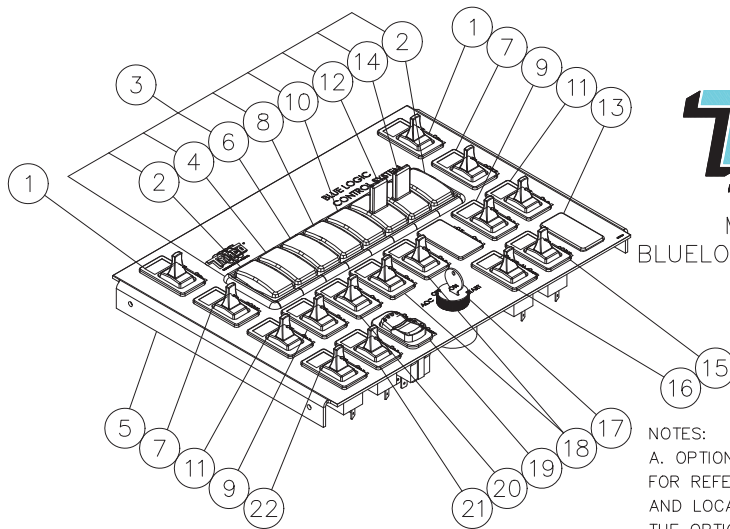
DISPLAY ICON LEGEND

 <p>Water System Amber = Standby Green = Pump on</p>	 <p>Dust Suppression Water Level Amber = Low Water</p>	 <p>Auxiliary Hydraulics Amber = Standby Green = Pump on</p>	 <p>Hydraulic Oil Temp Red = Oil very hot Amber = Oil hot Blue = Oil cold</p>
 <p>BAH Green = On Gray = Inactive (Models 600/500x/ DST-6 Only)</p>	 <p>Pick-Up Head Amber = Down Gray = Up</p>	 <p>Engine Air Filter Restriction Amber = > 20 inwc Red = > 25 inwc</p>	 <p>Hopper Load Indicator Amber/Red = Full</p>
 <p>Exhaust Aftertreatment Amber = Regeneration Active or Needed</p>	 <p>Regeneration Inhibited</p>	 <p>Exhaust System Temperature High – Normal during exhaust regeneration</p>	 <p>Hydraulic Filter Restriction Amber = Change filter</p>
 <p>Emissions System Malfunction Indicator</p>	 <p>Engine Warning Indicates active engine fault</p>	 <p>Engine Stop! Indicates serious engine fault and engine will shut down</p>	 <p>Low Hydraulic Oil Hydraulic oil level critically low- engine shut down</p>
 <p>Engine Coolant Temperature Red = Fault (overheated)</p>	 <p>Engine Oil Pressure Red = Fault</p>	 <p>Leaf Pressure Bleeder</p>	 <p>Sweeper Odometer</p>
 <p>Magnet Height Amber = Magnet Down</p>	 <p>Diesel Exhaust Fluid (DEF) Amber = Low</p>	 <p>Gutter Broom Speed</p>	 <p>Hour Meter</p>

USER INSTALLED “EXTRA” LIGHTS OR ELECTRICAL ACCESSORIES

Adding circuits to the sweeper control system should be done with the utmost consideration to the effects on the TYMCO installed electrical wiring. Total current draw should be less than the installed fuse or circuit breaker. Under no circumstances should the value rating of the installed fuse or circuit breaker be exceeded.

Added circuits that exceed the current draw of TYMCO Wiring are best controlled through the use of a relay which can utilize an existing TYMCO wire for the “Switch-on” signal. The main power for extra circuits should be separately fused. Failure to follow these guidelines may VOID any warranties applicable as determined by TYMCO.



MODEL DST-4
BLUELOGIC CONTROL PANEL
(M02838)

01-03-2018
2:40 pm
SC

NOTES:

A. OPTIONAL SWITCHES ARE SHOWN FOR REFERENCE. THE INCLUDED SWITCHES AND LOCATION MAY VARY BASED ON THE OPTIONS ORDERED.

TYMCO MODEL DST-4 BLUELOGIC CONTROL PANEL COMPONENTS

ITEM	DESCRIPTION
1	Switch - Broom Position (Optional)
2	Switch Actuator - Gutter Broom
3	HMI Switchpack Assembly
4	Switch Actuator - GB RPM
5	Control Panel
6	Switch Actuator - DST Mode
7	Switch - Broom Tilt (Optional)
8	Switch Actuator - Purge System
9	Switch - Broom Water
10	Switch Actuator - Main Water
11	Switch - Broom Light
12	Switch Actuator - Blower/Engine RPM
13	Switch Black Cover
14	Switch Actuator - Pick-Up Head
15	Switch - Curtain Lifter - DST-4
16	Switch - Pressure Bleeder (Optional)
17	Ignition Switch
18	Switch - H/O Water (Optional)
19	Switch - Dump Door (Optional)
20	Switch - Hopper Water
21	Switch - Warning Lights
22	Switch - Work Lights



MODEL DST-6 SNR/SNS AND DST-4 SND
 ELECTRICAL SYSTEM
 VMM CONTROLS
 (M02458) REV B

