

MAINTENANCE TECHNICAL SUPPORT CENTER
HEADQUARTERS MAINTENANCE OPERATIONS
UNITED STATES POSTAL SERVICE



Maintenance Management Order

SUBJECT: Preventive Maintenance for Seegrid
Automated Guided Vehicle (AGV) Pallet
Jacks

DATE: May 10, 2021

TO: All Sites Utilizing Seegrid AGV Pallet Jacks

PUB NO: MMO-095-20
FILE CODE: P
FILE ID: mm20094
REV LEVEL: ag

Online Change Record		
Change #	Date	Description of Change
1	5/20/2021	Attachment 1, added "**** Allotment for LDC 37 (excludes modifications, alterations, training, and non-productive allowances)." to Routine Servicing column and key.

This Maintenance Management Order (MMO) provides calendar based Preventive Maintenance Guidelines for Seegrid Automated Guided Vehicle (AGV) pallet jacks. This bulletin applies to Acronym AGV, Class Code SP.

The workhours represented in this MMO reflect the maximum workhours required to maintain the equipment. Given local conditions, management may modify task frequencies.

The minimum maintenance skill level required to perform each task is included in the Minimum Skill Level column of each checklist. This does not preclude higher level bargaining unit employees from performing any of this work.

WARNING

Various products requiring Safety Data Sheets (SDS) may be utilized during the performance of the procedures in this bulletin. Ensure the current SDS for each product used is on file and available to all employees. When reordering such a product, ensure the current SDS is requested. Refer to SDS for appropriate personal protective equipment.

WARNING

The use of compressed or blown air is prohibited. An alternative cleaning method such as a HEPA filtered vacuum cleaner, a damp rag, lint-free cloth, or brush must be used in place of compressed or blown air.

WARNING

Steps contained in this bulletin may require the use of Electrical Work Plan (EWP) Personal Protective Equipment (PPE). Refer to the current EWP MMO for appropriate EWP PPE and barricade requirements.

For questions or comments concerning this bulletin contact the MTSC HelpDesk, either online at **MTSC>HELPDESK>Create/Update Tickets** or call (800) 366-4123.



Frederick L. Jackson III
Manager
Maintenance Technical Support Center
HQ Maintenance Operations

- Attachments
1. Summary Workload Estimate For Seegrid Pallet Jacks with AGV Systems
 2. AGV Master Checklist 03-AGV-SP-001-M – Preventive Maintenance (PM)

ATTACHMENT 1

**SUMMARY WORKLOAD ESTIMATE FOR
SEEGRID AGV PALLET JACKS**

Operation Days	Routine Servicing per Machine (Hrs/Yr)***	Repair Time per Machine (Hrs/yr) *	Routine Servicing + Repair Time (Hrs/Yr)	Non- Productive Time per Machine (Hrs/yr) **	Total Servicing per Machine (Hrs/Yr)	Operational Maintenance + Total Servicing		
						1 Tour	2 Tours	3 Tours
						Hrs/Yr OpM x 1	Hrs/Yr OpM x 2	Hrs/Yr OpM x 3
5 Days	81.21	24.36	105.58	10.56	116.14	116.14	116.14	116.14
6 Days	95.08	28.52	123.60	12.36	135.96	135.96	135.96	135.96
7 Days	108.95	32.68	141.63	14.16	155.79	155.79	155.79	155.79
* Repair maintenance estimates based on 30% of preventive maintenance.								
** Based on 10% of total PM and repair.								
*** Allotment for LDC 37 (excludes modifications, alterations, training, and non-productive allowances).								
			THRESHOLDS and PM TIME SUMMARY Hrs PER Year			OPERATIONAL MAINTENANCE		
			Daily (7 Day)	97.07	5 Day 6 Day 7 Day	PER MACHINE		
			Weekly	0.00		One Tour	Two Tours	Three Tours
			Monthly	3.25		0.00	0.00	0.00
			Bi-Monthly	6.72		0.00	0.00	0.00
			Quarterly	0.00		0.00	0.00	0.00
			Semi-Annual	0.00				
			Annual	1.92				
			Bi-Annual	0.00				
			0	0.00				
			0	0.00				

THIS PAGE BLANK

ATTACHMENT 2**AGV MASTER CHECKLIST****03-AGV-SP-001-M****PREVENTIVE MAINTENANCE (PM)****Time Total: (208) minutes**

U.S. Postal Service Maintenance Checklist	IDENTIFICATION													
	WORK CODE		EQUIPMENT ACRONYM						CLASS CODE		NUMBER			TYPE
	0	3	A	G	V				S	P	0	0	1	M
Equipment Nomenclature Automated Guided Vehicle			Equipment Model Seegrid GP8 Pallet Jack					Bulletin Filename mm20094			Occurrence			

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.
SAFETY STATEMENT	1	<p>COMPLY WITH ALL SAFETY PRECAUTIONS. Disconnect power and apply lockouts when required by this instruction. Refer to current local lockout procedures to properly shut down and lock out this machine. Check for suspicious dust or unusual debris. If any unusual substance is found, notify supervisor prior to proceeding with any further action on the equipment.</p> <p>THE USE OF COMPRESSED OR BLOWN AIR IS PROHIBITED. When cleaning is required, an alternative cleaning method such as a HEPA filtered vacuum cleaner or a damp rag must be used in place of compressed or blown air. A lint-free cloth or brush may be used on optical equipment only when other cleaning methods cannot be used. Report safety deficiencies to your supervisor immediately upon detection.</p> <p>WARNING FOR EWP/PPE: Steps contained in this bulletin may require the use of Electrical Work Plan (EWP) Personal Protective Equipment (PPE). Refer to the current EWP MMO or appropriate EWP PPE and barricade requirements.</p> <p>WARNING: Various products requiring Safety Data Sheets (SDS) may be utilized during the performance of the procedures in this bulletin. Ensure the current SDS for each product used is on file and available to all employees. When reordering such a product, it is suggested that current SDS be requested. Refer to SDS for appropriate personal protective equipment.</p>	1	All			

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.
VGU	2	Verify the VGU (Visual Guidance Unit) is secure by checking that the VGU mast attachment bolts (4 ea.) are tight, all connectors, including the ground wire are seated and secure, and that the VGU is level. Verify all cameras are clean (10) including the 2 mounted on the top.	4	09			C
GRAPHICAL OPERATOR INTERFACE	3	Verify GOI (Graphical Operator Interface) is secure and all connectors are seated and secure including ground wires.	2	09			C
PRIMARY OBSTRUCTION SENSOR:	4	Inspect lens for scratches, debris, fibers. Wipe Lens with Microfiber cloth (PSN 8540-16-000-3306). Scratches in the lens will require Lens replacement and a work order when performed.	1	09			C
LIGHT CURTAIN ASSEMBLY	5	Inspect sensor and mirrors for scratches, debris, fibers. Wipe Lens with Microfiber cloth (PSN 8540-16-000-3306) . Scratches in the lens will require Lens replacement and a work order when performed.	1	09			C
FORK TIP SENSORS	6	Inspect the sensors for scratches, debris and fibers. Wipe Lens with Microfiber cloth (PSN 8540-16-000-3306). Scratches in the lens will require Lens replacement and a work order when performed.	1	09			C
HOOD	7	Inspect for damage. Verify no twisting of the base plate. Verify extrusion screws are in place and tight.	1	09			C
VIM	8	Verify VIM (Vehicle Interface Module) is secure and all connectors are seated and secure including ground wires.	2	09			C
PDM	9	Verify the PDM (Power Distribution Module) is secure, and all connectors are seated and secure, including ground wires.	2	09			C
STEERING ASSEMBLY	10	1. Verify target fasteners are tight. 2. Verify chain is tensioned according to spec. (minimal slack) 3. Verify a light lubrication film on the chain. 4. Check the home/limit sensor and brackets are tight. 5. Inspect sprocket for looseness. 6. Check encoder for security and that the setscrews are tight. Use Service Manual to determine settings.	2	09			C
CHASSIS LUBRICATION	11	1. Lubricate the steering bearings. 2. Lubricate the fork pivot points. 3. Lubricate the wheel assemblies. 4. Inspect for leaks.	11	09			C
CHASSIS WHEELS	12	1. Check Drive Wheel for wear. 2. Check torque of Drive Wheel mounting bolts (100 ft/lbs. each).	5	09			A

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.
WHEELS	13	The following steps will require lifting the vehicle. Use of low profile, 6 ton, automotive floor jacks is recommended and support the lifted vehicle with 6 ton jack stands or wood cribbing that is in good condition. 1. Check caster for correct calibration. Use Maintenance Manual for proper procedure. 2. Check casters for flat spots, cracks and missing pieces. 3 Check Load wheels for flat spots, cracks, missing pieces and separation from the hubs. 4. Check drive wheels for flat spots, cracks, missing pieces and separation from the hubs.	5	09			C
SAFETY DECALS	14	Verify all safety decals and stickers are present and intact. (Use Maintenance Manual to locate all Decals)	1	07			C
CHASSIS TRANSMISSION	15	Change System Transmission Oil (check Maintenance Manual for type).	30	07			A
CHASSIS HYDRAULIC SYSTEM	16	1. Drain Hydraulic oil from tank. 2. Change Micron Filter in Hydraulic System. 3. Fill Hydraulic Tank with new oil (use Maintenance Manual to determine proper hydraulic oil).	45	07			A
CHASSIS DRIVE BRAKE	17	Check Brake Air Gap. Follow procedure in Maintenance Manual. (Air Gap should be 0.3mm to 0.8mm)	5	09			A
CHASSIS STEERING ASSEMBLY	18	Lubricate Steering assembly drive Chain (use Maintenance Manual to determine proper oil).	5	07			A
CHASSIS	19	Check Pallet Lift Fork assembly bearings for wear and operation. If any are in need of replacement generate a work order and replace as soon as possible. Use Service Manual to determine wear.	5	09			A
VEHICLE: CAMERA	20	Remove SD card from front and rear facing cameras to format and reinsert. Refer to MTSC KB0013572.	15	10			M

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.
CHASSIS MAINTENANCE	21	1. Clean and inspect motor brushes, Use only vacuum, cloth or brush. Replace brushes if they are worn to the limit. 2. Remove dust from the motor. Use only vacuum, cloth or brush to remove dust. 3. Inspect all wiring, bolts and nuts. 4. Clean drive motor. 5 Check brake operation and stopping ability. 6. Lubricate all chassis links (see manual for lubrication points). 7. Check tiller/steer end handle. Return to full up smoothly with brake on. 8 Check entire truck for loose items, wiring, linkage, nuts and bolts. 9. Check hydraulic hoses for leaks. 10. Check steer handle mounting. 11. Check for cracks or damage to forks. 12. Check the frame and pivot points for worn bearings. 13. Inspect brake rotor and linings.	21	09			C
E-STOP SWITCHES	22	Press each e-stop (3) and verify AGV will not move. Release e-stop and verify AGV movement is normal.	3	09			C
STEERING CALIBRATION	23	Test and correct steering calibration as needed. Reference Maintenance Manual for proper procedures.	5	09			C
CHASSIS VEHICLE	24	Check Amp draw of main Drive Motor, Steering Motor and of Hydraulic Pump Motor. Use Maintenance Manual for location of Test points and reference settings.	10	09			A
VGU CAMERA	25	Take Camera Snaps per Maintenance Manual for Camera Calibration (must be sent to Vendor).	10	10			A
VEHICLE	26	Perform normal shutdown of vehicle.	2	All			D
VEHICLE	27	Perform a walk around of the AGV and inspect for damage. 1. Ensure all Warning Labels are legible. 2. Check that all tires and wheels are in good condition. 3. Check that Brakes are functional in forward and reverse.	1	All			D

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.
VEHICLE	28	Inspect obstruction sensors, camera lenses, and surrounding area for damage or debris. 1. Check all sensors and camera lenses, 10 on VGU, dash cams, and 1 near front bumper. 2. Check light curtain sensor and mirrors. 3. Check reverse sensors. 4. Clean dirt and debris with a microfiber cloth, gently wipe lenses clean. (NSN 8540-16-000-3306) available from Grainger Custodial supplies. 5. Use a microfiber cloth or microfiber gloves (NSN: 8415-06-000-7500) to clean VGU cameras and sensors.	1	09			D
VEHICLE	29	Start AGV 1. Power keyswitch to "ON". Wait for display to show "Manual Mode Screen" or "Main Menu". 2. Honk horn. 3. Steer left and right full travel to check for freedom of movement. 4. Press each e-stop and verify vehicle will not move with application of throttle. (confirm operation of each e-stop [3] in sequence) 5. Release e-stop and confirm normal vehicle operation. (confirm operation of each e-stop [3] in sequence) 6. Turn mode selector switch to "AUTO" mode and follow on screen instructions. 7. Confirm AGV completes steering alignment.	5	All			D
VEHICLE	30	Confirm battery charge of at least 75% for non-opportunity charging operation or at least 40% for opportunity charging.	1	All			D
FINAL CLEANUP	31	Clean Up 1. Ensure all tools, lubricants, rags, etc., are removed from the work area. 2. Note any deficiencies and generate a work order/report them to supervisor.	5	All			