



# Maintenance Management Order

**SUBJECT:** Preventive Maintenance for Daifuku  
Automated Guided Vehicle (AGV) Tow  
Motors

**DATE:** May 7, 2021

**TO:** All Sites Using Daifuku AGV Tow Motors

**PUB NO:** MMO-097-20  
**FILE CODE:** P  
**FILE ID:** mm20097  
**REV LEVEL:** ah

Online Change Record		
Change #	Date	Description of Change
2	02/17/2022	In Attachment 2, Item No. 23, added a new Step 3.
1	05/20/2021	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 Preventive Maintenance Guidelines for Daifuku Automated Guided Vehicle (AGV) tow motors (tuggers). This bulletin applies to Acronym AGV, Class Code UT.

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, it is suggested that current SDS be 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.



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- Attachments
1. Summary Workload Estimate For AGV\_UT
  2. Master Checklist 03-AGV-UT-001-M – AGV\_UT Preventive Maintenance (PM)

**ATTACHMENT 1**  
**SUMMARY WORKLOAD ESTIMATE**  
**FOR AGV\_UT SYSTEM**

**SUMMARY WORK LOAD ESTIMATES FOR AGV UT**

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 Hrs/Yr OpM x 1	2 Tours Hrs/Yr OpM x 2	3 Tours Hrs/Yr OpM x 3
5 Days	82.90	24.87	107.77	10.78	118.54	118.54	118.54	118.54
6 Days	97.63	29.29	126.92	12.69	139.61	139.61	139.61	139.61
7 Days	112.36	33.71	146.07	14.61	160.68	160.68	160.68	160.68

\* 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 PER MACHINE		
	Daily (7 day)	103.13			
	Weekly	0.00			
	Monthly	3.25	5 Day	One Tour	Two Tours
	Bi-Monthly	4.23	6 Day	0	0
	Quarterly	0.00	7 Day	0	0
	Semi-Annual	1.00			
	Annual	0.75			
	Bi-Annual				



**ATTACHMENT 2**

**AGV MASTER CHECKLIST**

**03-AGV-UT-001-M**

**AGV\_UT PREVENTIVE MAINTENANCE (PM)**

**Time Total: (146) minutes**

U.S. Postal Service Maintenance Checklist	IDENTIFICATION												
	WORK CODE		EQUIPMENT ACRONYM					CLASS CODE		NUMBER			TYPE
	0	3	A	G	V				U	T	0	0	1
Equipment Nomenclature Automated Guided Vehicle		Equipment Model Daifuku AGV Tow Motor					Bulletin Filename mm20097			Occurrence Daily			

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><b>COMPLY WITH ALL SAFETY PRECAUTIONS.</b> 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><b>THE USE OF COMPRESSED OR BLOWN AIR IS PROHIBITED.</b> 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><b>WARNING FOR EWP/PPE:</b> 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><b>WARNING:</b> 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	07			

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: EXTERIOR	2	<b>Wipe down the exterior of the AGV using a lint-free rag.</b>	2	07			C
VEHICLE: LAMPS	3	<b>Clean lenses of lamps and indicators as required.</b>  Wipe off each lens of indicator lights (five on each side), and blue travel light on top mast with microfiber cloth (PSN 8540-16-000-3306).	1	07			C
VEHICLE: NAVIGATION LASER	4	<b>Inspect and clean the navigation laser.</b>  Wipe navigation laser with a microfiber cloth (PSN 8540-16-000-3306).	1	09			C
VEHICLE: CAMERA	5	<b>Remove SD card from front and rear facing cameras to format and reinsert.</b>  Refer to MTSC KB0013572.	15	10			M
VEHICLE: VEHICLE	6	<b>Vacuum the control compartment.</b>	5	07			S
VEHICLE: VEHICLE	7	<b>Ensure all wire connections are clean and secured tight.</b>  With the AGV off and power disconnected, perform a pull test on wire connections to ensure connection. Consult maintenance manual for additional information.	5	07			S
VEHICLE: BATTERY	8	<b>Check battery cable connections for debris/corrosion and clean as needed.</b>	2	07			C
VEHICLE: VEHICLE	9	<b>Ensure that all screws and fasteners are firmly tightened.</b>	5	07			C
VEHICLE: DRIVE BRAKE	10	<b>Check brake adjustment and rotor wear.</b>  Use feeler gauge to determine if air gap is sufficient in four locations around the friction disc. Air gap should be below 0.8 mm with a variance of less than 0.2 mm between locations. Consult maintenance manual for additional details.	15	09			S
VEHICLE: LUBRICATION	11	<b>Check the lubrication of the following parts.</b>  If needed, lubricate per MTSC KB0013513. <ul style="list-style-type: none"> <li>• Drive Unit</li> <li>• Wheel/Caster Assemblies</li> <li>• Lower Steering Bearing</li> <li>• Hitch Pin</li> </ul>	15	09			C

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: WHEELS	12	<b>Inspect drive wheel and casters for damage.</b> Remove any debris and ensure no excessive wear or damage to the wheel.	5	09			S
VEHICLE: CHARGE COLLECTOR	13	<b>Clean and inspect the charging shoes.</b> Check that they have full range of motion. Shoes are to have a vertical motion of roughly 3/16". Consult maintenance manual for additional information.	4	09			C
VEHICLE: LUBRICATION	14	<b>Grease bearings.</b> Replace the lubrication in drive unit and upper steering bearing. Consult maintenance manual or MTSC KB0013513 for additional information.	45	09			A
VEHICLE: MAINTENANCE SWITCH	15	<b>Check proper function of maintenance switch.</b> Turn the key switch to <b>MAINT</b> mode and verify blue indicator light illuminates on the mast.	1	07			C
VEHICLE: LAMPS	16	<b>Verify all lamps and indicators are operating correctly.</b> Perform audiovisual test from the HMI. Consult maintenance manual for additional information.	1	09			C
VEHICLE: CAMERA	17	<b>Verify the cameras are aimed properly and connected to power.</b> Forward and rearward facing cameras should be aimed accordingly and connected to power.	1	07			C
VEHICLE: SAFETY MAT	18	<b>Verify proper operation of man-aboard function and that the AGV switches from Auto to Manual mode when a rider detected on safety mat.</b>  1. With the vehicle in the <b>Ready</b> state, step onto the mat and verify that the vehicle goes into manual mode. 2. Reset to Automatic mode when finished.	2	07			C
VEHICLE: E-STOP SWITCHES	19	<b>Verify proper operation of E-stops.</b>  1. In manual mode, push E-stop on each side to engage. 2. Move tiller throttles in forward and reverse, verify vehicle DOES NOT move. 3. Pull E-stop to release and verify vehicle will move both forward and reverse.	2	07			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: LASER SAFETY BUMPERS	20	<b>Verify proper functioning of laser safety bumper(s) and that the AGV slows and/or stops at obstructions.</b>  Check each bumper by slowly moving in toward the bumper and observe the indicator LEDs on the bumper change from green to yellow to red.	4	09			C
VEHICLE: EXTERIOR	21	<b>Walk around the AGV and inspect for any damage.</b>  1. Inspect for any loose parts and/or hardware 2. If any loose parts or damage is found, generate a work order and repair prior to putting vehicle in service.	2	09			D
VEHICLE: STATIC DISSIPATION CHAIN	22	<b>Inspect static dissipation chains (one per side) free of obstruction or debris.</b>	1	09			D
CHASSIS: LASER SAFETY BUMPERS	23	<b>Clean and inspect laser safety bumpers (three lower, one upper), camera lenses, indicator lights, and load present sensor as needed and check surrounding areas for damage and/or debris.</b>  1. Check all laser sensors and camera lenses, ensure no scratches or blemishes on lenses, 2. Wipe with microfiber cloth (PSN 8540-16-000-3306) or a microfiber glove (PSN 8415-06-000-7500): 3. Verify the indicator LEDs on each bumper change state when entering and exiting the bumper sensor field.  • Two sensors on lower rear corners of vehicle. • One sensor on hood of vehicle. • One sensor near front bumper. • Dash cams on top of vehicle, one front, and one rear.	3	09			D
VEHICLE: HORN	24	<b>Verify operation of vehicle horn.</b>  Momentarily press each red button on the tiller.	1	07			D
VEHICLE: DRIVE BRAKE	25	<b>Check for proper brake function.</b>  With vehicle in <b>Manual</b> mode, bring the AGV to a complete stop by pressing the red brake button on the tiller handle.	2	07			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.
FINAL-CLEANUP	26	<b>Clean Up</b> 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			