MAINTENANCE TECHNICAL SUPPORT CENTER
HEADQUARTERS MAINTENANCE OPERATIONS
UNITED STATES POSTAL SERVICE

Maintenance Management Order

SUBJECT: Preventive Maintenance Guidelines for the Automated Delivery Unit Sorter (ADUS)

DATE: September 8, 2020

PUB NO: MMO-015-20
FILE CODE: R1F
FILE ID: mm20008
REV LEVEL: ag

TO: All ADUS Sites

Online Change Record		
Change #	**Date**	**Description of Change**
2	12/2/2021	Attachment 2, task 64. Added compressor lockout, zero energy state warning, and shutdown steps before topping up coolant.
1	8/30/2021	Transmittal Letter (TL): Removed references to eCBM Attachment 2, Occurrence cell: Changed from eCBM to Calendar Based.

This Maintenance Management Order (MMO) provides Operational and Preventive Maintenance Guidelines for the ADUS System. This bulletin applies to Acronym ADUS, Class Code AA.

The work hours represented in the MMO reflect the maximum work hours required to maintain the equipment. Actual workhour requirements and the frequency of tasks are dependent on run time and pieces processed. Therefore, Preventive Maintenance (PM) workhour requirements will vary day-to-day based on-site specific machine utilization. Management may modify task frequencies to address local conditions.

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 employees from performing any of this work.

PM guidelines provide maintenance employees with the recommended task based maintenance activities. The complete master PM checklist must be accessible to all maintenance employees when performing PM task-based maintenance activities.

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.

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

Attachments 1. Summary of Workload Estimate
2. Master Checklist 03-ADUS-AA-001-M–PM

ATTACHMENT 1

SUMMARY WORKLOAD ESTIMATE

FOR ADUS SYSTEM

SUMMARY WORK LOAD ESTIMATES FOR ADUS

Number of mail pieces Processed for 1 Year >

High end estimate

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	375.71	112.71	488.42	48.84	537.26	537.26	537.26	537.26
6 Days	425.98	127.79	553.77	55.38	609.15	609.15	609.15	609.15
7 Days	476.25	142.88	619.13	61.91	681.04	681.04	681.04	681.04

* **Repair maintenance estimates based on 30% of preventive maintenance.**

** **Based on 10% of total PM and repair.**

THRESHOLDS and PM TIME SUMMARY Hrs PER Year

Daily	351.87
Weekly	8.67
Monthly	83.00
Quarterly	16.67
Semi-Annual	15.83
Annual	0.00
Bi-Annual	0.21

OPERATIONAL MAINTENANCE

0 MIN. PER DAY PER MACHINE

	One Tour	Two Tours	Three Tours
5 Day	0.00	0.00	0.00
6 Day	0.00	0.00	0.00
7 Day	0.00	0.00	0.00

NOTES:

∗ Repair estimates based on 30% of servicing.

∗∗ Based on 10% of total servicing and repair.

THIS PAGE BLANK

ATTACHMENT 2

ADUS MASTER CHECKLIST

03-ADUS-AA-001-M

Time Total: See Attachment 1

U.S. Postal Service Maintenance Checklist	IDENTIFICATION															
	WORK CODE		EQUIPMENT ACRONYM								CLASS CODE		NUMBER			TYPE
	0	3	A	D	U	S					A	A	0	0	1	M
Equipment Nomenclature ADUS	Equipment Model								Bulletin Filename mm20008				Occurrence Calendar Based			

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.	**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. **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. **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. **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.	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.
ADUS: ADUS	2.	**Power Down And Lock Out Power. (Power Off)** Soft-reboot of the computers in the MAVIS RACK is not needed when complying with the current Maintenance Management Order (MMO) providing lockout/restore procedures. Power down the machine and lock out its power as prescribed by the current local lockout instructions providing lockout/restore procedures.	5	09			D
ADUS: ADUS	3.	**Mail Search (Power Off)** Perform a loose mail search throughout the entire system paying special attention to transitions between conveyors and beneath conveyor line. Return mail to proper path.	10	07			D
ADUS: ADUS	4.	**Clean Sensors (Power Off)** 1. Clean all sensors, height and width array. a. Vacuum if required. b. Spray lint-free towel with locally-approved cleaner, and wipe height and width emitters and receivers until clean. 3. Use a spray bottle containing tap water to moisten cloth for wiping away stubborn smudges. 4. Note any deficiencies and generate a work order/report them to supervisor.	5	07			W
ADUS: MCP-1	5.	**Inspect and Clean MCP-1 (Power Off)** 1. Inspect for loose hardware and loose wire connections inside MCP-1. 2. Use a HEPA vacuum cleaner to clean the air filters in the Main Control Panel fan housings. 3. Use a HEPA vacuum cleaner to clean surfaces of components installed in the MCP-1 cabinet. 4. Note any deficiencies and generate a work order/report them to supervisor.	10	09			Q
ADUS: ADUS-SS	6.	**Inspect and Clean ADUS-SS (Power Off)** 1. Inspect for loose hardware and loose wire connections. 2. Use a HEPA vacuum cleaner to clean accumulated dirt, dust, or debris from the Sort Server cart and sort server computer vents. 3. Note any deficiencies and generate a work order/report them to supervisor.	5	09			S
ADUS: MAVIS RACK	7.	**Inspect and Clean MAVIS Rack (Power off)** 1. Inspect for loose hardware and loose wire connections inside MAVIS Rack. 2. Use a HEPA vacuum cleaner to clean the air filters in the in the MAVIS rack. 3. Use a HEPA vacuum cleaner to clean surfaces of components installed in the MAVIS cabinet. 4. Note any deficiencies and generate a work order/report them to supervisor.	5	09			S

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.
ADUS: PSOC	8.	**Clean Overhead Camera Clear Cover (Power Off)** **The glass used in this system is fragile enough to break if pressure is applied.** Do not spray the equipment. Only a misting of the cloth is required. Optionally, use a streak-free glass cleaner. 1. Using a lint-free cloth, gently wipe the underside of the clear cover over the camera lens and LED array. 2. Use a spray bottle containing tap water to moisten cloth for wiping away stubborn smudges.	15	07			M
ADUS: IND-1/INDUCT	9.	**Verify Belt Tension (Power Off)** 1. Measure across four flights covering 3 pockets. 2. Use measuring tape to measure across 4 flights or 3 belt pocket assemblies. a. Verify the measured length is less than 100.25 inches. If the measured length is more than 100.25 inches, order new belt and schedule belt replacement task. If the measure length is greater than 101.25 inches, replace the IND-1 belt. 3. Remove IND-1-side panels and ensure both tensioning assemblies are in good working order and free of debris. 4. Ensure all hardware is tight. 5. Replace panels. 6. Note any deficiencies and generate a work order/report them to supervisor.	20	09			S
	10.						
ADUS: IND-1/INDUCT	11.	**Check Gear Motor (Power Off)** 1. Check the motor gear case for leaking seals. 2. Use a HEPA vacuum cleaner to clean accumulated dirt, dust, or debris from the breather on the gear case. 3. Ensure all hardware is tight. 4. Note any deficiencies and generate a work order/report them to supervisor.	10	07			S
ADUS: IND-1/INDUCT	12.	**CLEAN SENSORS** 1. Clean sensors. a. Vacuum if required. b. Spray lint-free towel with locally approved cleaner, and wipe until clean.	2	07			D
ADUS: DWS-1/BUFFER	13.	**Clean Belt (Power off)** 1. Use a HEPA vacuum cleaner to clean accumulated dirt, dust, or debris from interior of IND-1 remove any dust and debris from space around belt rollers and all belt features (flights, rollers, etc.). 2. Use a cloth to clean the top surface of the belt. 3. Note any deficiencies and generate a work order/report them to supervisor.	30	07			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.
ADUS: DWS-1/BUFFER	14.	**CHECK GEARMOTOR (Power Off)** 1. Check the motor gear case for leaking seals. 2. Ensure all hardware is tight. 3. Use a HEPA vacuum cleaner to clean accumulated dirt, dust, or debris from the breather on the gear case. 4. Note any deficiencies and generate a work order/report them to supervisor.	10	07			S
ADUS: DWS-1/BUFFER	15.	**Clean Dimensioner and Height Tower Arrays** 1. Clean/Clear DWS.DIM and Height Tower arrays of any dust or debris, paying special attention to the width array mounted below the transition of DWS-1 DWS-2. a. Vacuum sensors with non-abrasive attachment if required. b. Wipe all sensors and reflectors with lint-free towel to remove dust or debris. c. Use a spray bottle containing tap water or non-abrasive, non-corrosive locally approved cleaner to moisten cloth for wiping away stubborn smudges. 2. Note any deficiencies and generate a work order/report them to supervisor.	5	07			W
ADUS: DWS-2/SCALE	16.	**Clean Scale Conveyor (Power off)** 1. Clean belt of all debris. Remove product debris between load cell and weighing belt if necessary. 2. Observe conveyor belt for conditions requiring replacement: a. Slick belt surface. b. Belt splice separation. c. Nicks, tears, abrasions, and fraying. 3. Note any deficiencies and generate a work order/report them to supervisor.	30	07			M
ADUS: IFS-1/INCLINE	17.	**Inspect Rollers and Bearings (Power off)** 1. Ensure the drive and idler pulleys are secure. 2. Check belt idle rollers are secure, free of debris and spin freely. 3. Note any deficiencies and generate a work order/report them to supervisor.	10	09			M
ADUS: IFS-1/INCLINE	18.	**Clean Belts, Rollers and Bearings (Power off)** 1. Clean belt, rollers, and bearings of all debris. 2. Observe conveyor belt for conditions requiring replacement: a. Slick belt surface. b. Belt splice separation. c. Nicks, tears, abrasions, and fraying. 3. Note any deficiencies and generate a work order/report them to supervisor.	20	07			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.
ADUS: IFS-1/INCLINE	19.	**Inspect Motor (Power off)** 1. Check the motor gear case for leaking seals. 2. Use a HEPA vacuum cleaner to clean accumulated dirt, dust, or debris from the breather on the gear case and the outside of all the drive motor cooling fan covers. 3. Ensure all hardware is tight. 4. Note any deficiencies and generate a work order/report them to supervisor.	5	09			M
ADUS: IFS-1/INCLINE	20.	**Inspect Chains and Sprockets (Power Off)** 1. Lubricate with 30 weight, non-detergent, synthetic oil or equivalent as needed. 2. Inspect sprocket for signs of excessive wear such as cracks, worn or missing teeth, or signs of excessive side loading due to improper sprocket alignment. 3. Note any deficiencies and generate a work order/report to the supervisor	30	09			Q
ADUS: IFS-1/INCLINE	21.	**CHECK CHAIN TENSION AND ALIGNMENT** 1. Verify that chain does not contact chain cover or frame 2. Remove covers or panels as required 3. Apply pressure from the bottom side of the chain. Ideal deflection is between 3/16 - 1/4 inch. 4. Reinstall any removed covers or panels. 5. Note any deficiencies and generate a work order/report them to supervisor.	5	09			Q
ADUS: IFS-2-FLOTURN	22.	**Grease Chain Guides and Shaft Bearings (Power off)** 1. Using a grease gun with grease, lubricate sprocket shaft bearings on both sides as needed. Use Mobilgrease FM102 or Mobilgrease FM222, as needed. 2. Lubricate upper chain guides with Lubriplate #3000 grease or equivalent as needed. 3. Note any deficiencies and generate a work order/report them to supervisor.	15	09			S
ADUS: IFS-2-FLOTURN	23.	**Check Flow Turn Chain, Chain Slack and Motor Assembly (Power off)** 1. Inspect sprocket for signs of excessive wear such as cracks, worn or missing teeth, or signs of excessive side loading due to improper sprocket alignment. 2. Check chain slack on the bottom of the sprocket on the discharge end of the curve. Ideal Chain slack should be within 1/8-3/8 inch. 3. Using a HEPA filtered vacuum cleaner, clean the outside of all the drive motor cooling fan covers. 4. Note any deficiencies and generate a work order/report them to supervisor.	20	09			Q

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.
ADUS: IFS-2-FLOTURN	24.	**CLEAN BELT, ROLLERS AND BEARINGS (Power Off)** 1. Clean belt, rollers, and bearings of all debris. 2. Observe conveyor belt for conditions requiring replacement: a. Slick belt surface. b. Belt splice separation. c. Nicks, tears, abrasions, and fraying. 3. Check that all rollers and pulleys turn free. 4. Note any deficiencies and generate a work order/report them to supervisor.	10	07			M
ADUS: SRT-1/SORTOUTPUT	25.	**Clean Belt (Power Off)** 1. Use a HEPA vacuum cleaner to clean accumulated dirt, dust, or debris from exterior of SRT-1. Remove any dust and debris from space around belt and traverse rollers and other belt features. Ensure all belt-connecting pins are fully installed. 2. Using a HEPA filtered vacuum cleaner, clean the outside of all the drive motor cooling fan covers. Use a cloth to clean the top surface of the belt.	30	07			M
ADUS: SRT-1/SORTOUTPUT	26.	**Check Catenary Sag (Power off)** 1. Check for Catenary sag at first SRT-1 output module. 2. Ideal sag should be between 1.5 and 3.5 inches from the top of the Catenary sag slot. Belt should be visible in monitoring slot. 3. Note any deficiencies and generate a work order/report them to supervisor. **Note:** An even number of belt links must be removed in order to maintain lateral stability (Brick pattern).	15	09			S
ADUS: SRT-1/SORTOUTPUT	27.	**CHECK GEARMOTOR** 1. Check the motor gear case for leaking seals. 2. Use a HEPA vacuum cleaner to clean accumulated dirt, dust, or debris from the breather on the gear case. 3. Note any deficiencies and generate a work order/report them to supervisor.	5	07			Q
ADUS: SRT-1/SORTOUTPUT	28.	**Inspect Sorter Drive Motor Hardware (Power off)** 1. Remove the screws to remove the main drive belt safety cover. 2. Check power cable conduit for signs of damage and cracks, and conduit connections are secured and tight. 3. Check pulleys and associated hardware for damage and/or cracks. Tighten any loose hardware. 4. Check drive belt for fraying, cracks, or signs of damage. 4. Using a straight edge, ensure pulleys are aligned	35	09			Q

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.
		with each other. 5. Belt is properly tensioned when it tracks without contacting either pulley flange. 6. Replace the main drive belt safety cover. 7. Note any deficiencies and generate a work order/report them to supervisor.					
ADUS: SRT-1/SORTOUTPUT	29.	**Check All Rack-N-Roll (RnR) Assemblies (Power off)** 1. At SRT-1 tail end, run hand over roller belt, make sure roller belts contact carryway rollers. Outer rollers should resist turning at the recentering module. 2. At sort modules, run hand over roller belt, make sure roller belt does not contact carryway rollers and spins freely. 3. Check to ensure all carrier rollers are in place and are undamaged. 4. Note any deficiencies and generate a work order/report them to supervisor.	120	09			S
ADUS: SRT-1/SORTOUTPUT	30.	**This task requires two people. Time is doubled for staffing purposes.** **INSPECT SPROCKETS FOR TOOTH WEAR** 1. Split the belt on the head end of the sorter. 2. Insert an appropriately sized screwdriver through sprocket engagement hole near both Drive end and Idle end sprockets. This secures carryway belt after being opened and does not allow gravity to pull belt into returnway. 3. Inspect sprocket for signs of excessive wear such as cracks, worn or missing teeth. 4. Sprockets should be aligned with slot on underside of belt. 5. Inspect sprocket slots on underside of the belt for damage from improper sprocket alignments. 6. Note any deficiencies and generate a work order/report them to supervisor if any sprocket requires replacement or plastic belting shows damage from improper alignment. 7. Repeat steps 1-6 for the tail end of the sorter. **INSPECT ALL RACK-N-ROLL (RnR) ROLLERS** 1. While the belt is split, inspect all RnR roller assemblies for wear and damage. 2. Use a pick tool and a HEPA vacuum to clean around all rollers and roller assemblies. The belt will need to be split at the center point of each sort module to access all of the RnR assemblies. 3. Note any deficiencies and generate a work order/report them to supervisor. **Clean and Inspect Surfaces and Interior of SRT-**	120	09			S

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.
		1 (Power Off). Clean and inspect under side of SRT-1. 1. Remove conveyor underguarding as required to allow inspection of returnways. 2. Gather loose mail and return to proper mail path. 3. Ensure all pins are fully installed in the belts. 4. Use a HEPA vacuum cleaner to clean accumulated dirt, dust, or debris from interior of ADUS. 5. Verify return rollers turn freely and are evenly spaced. 6. Reinstall any removed conveyor guarding. **Clean and inspect top side of SRT-1**. The belt will need to be split at the center point of each sort module to access all of the RnR assemblies. 1. Insert an appropriately sized screwdriver through sprocket engagement hole near both Drive end and Idle end sprockets. This secures carryway belt after being opened and does not allow gravity to pull belt into returnway. 2. Open belt and vacuum dust that has collected inside of the conveyor. 3. Remove debris that has accumulated in conveyor frame. 4. Use a HEPA vacuum cleaner to clean accumulated dirt, dust, or debris from surfaces and remove any dust and debris from space around belt rollers. 5. Use a cloth to clean the top surface of ADUS belting. 6. Use a pick tool and a HEPA vacuum to clean around all rollers and roller assemblies. 7. Ensure the Carryway Rollers spin freely. 8. Reconnect the belt before moving on to the next output module. 9. Remove all screwdrivers used to secure carryway belt.					
ADUS: MCP-2	31.	**Clean surfaces and Interior (Power off)** Use a HEPA vacuum cleaner to clean accumulated dirt, dust, or debris from interior of MCP-2 cabinet.	10	07			M
ADUS: MCP-2	32.	**INSPECT MCP-2** 1. Inspect for loose hardware and loose-wired connections inside MCP-2. 2. Note any deficiencies and generate a work order/report them to supervisor.	10	09			Q
ADUS: SRT-	33.	**CHECK GEARMOTOR** 1. Check the motor gear case for leaking seals.	5	07			Q

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.
1/DRIVEEND		2. Use a HEPA vacuum cleaner to clean accumulated dirt, dust, or debris from the breather on the gear case. 3. Note any deficiencies and generate a work order/report them to supervisor.					
ADUS: SRT-1/DRIVEEND	34.	**This task requires two people. Time is doubled for staffing purposes.** **Inspect Drive Belt Tension (Power off)** 1. Using a straight edge, ensure pulleys are aligned with each other. 2. Belt is properly tensioned when it tracks without contacting either pulley flange and deflects between 1/4” and 1/2” using finger pressure. 3. Note any deficiencies and generate a work order/report them to supervisor.	30	09			Q
ADUS: COMPRESSOR	35.	**Drain air receiver of condensate. (Power Off)**	5	07			D
ADUS: COMPRESSOR	36.	**Clean or change the package pre–filter if necessary. (Power Off)**	10	09			M
ADUS: COMPRESSOR	37.	**Remove any dust from the condenser fins. (Power Off)**	10	07			Q
ADUS: COMPRESSOR	38.	**Check Drive Belt Tension (Power Off)** 1. Belt should be centered and tight on the pulleys with no noticeable sag. 2. Check belts for fraying and signs of damage. 3. Note any deficiencies and generate a work order/report them to supervisor.	20	09			A
ADUS: COMPRESSOR	39.	**Change the Air Filter element. (Power Off)**	10	09			A
ADUS: COMPRESSOR	40.	**Change drive belt. (Power Off)** **Replace the coolant and filters (Power Off)**	40	09			K
ADUS: ADUS	41.	**Restore Equipment To Service** Soft-reboot of the computers in the MAVIS RACK is not needed when complying with the current Maintenance Management Order (MMO) providing lockout/restore procedures. **Be cautious when working around or on equipment when power has been applied. Some of the following tasks require that the machine be running. Take precautions to prevent hair, clothing, tools, and test equipment from being caught in moving parts.** Power up the machine and remove lock out as prescribed by the current local lockout instructions providing lockout/restore procedures.	5	09			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.
ADUS: ADUS	42.	**CHECK ALL E-STOPS** **Be cautious when working around or on equipment when power has been applied.** **When performing this step, check only one emergency stop switch with machine running. Check all other E-STOP switches while machine is stopped.** **This task requires two people. Time is doubled for staffing purposes. Verify light conditions for each E-STOP.** **CHECK E-STOP LOOPS.** 1. Load Maintenance Sort Plan at ADUS Sort Server (SS). 2. Start ADUS. Verify that when SYSTEM START switch is pressed, the stack light assemblies flash green (Ready to Start) 3. Pull E-stop pull cord assembly on right/left side. Ensure that the stack lights are solid red and ADUS-SS display an E-stop fault. 4. Reset lamp light switch on the side that the pull assembly was engaged. The lamp light should be red. 5. Attempt to start system by pushing and holding the System Start button at the Operator Interface Panel. System should not start. 6. Push the blue push button to reset. Lamp light should be green. 7. Refresh ADUS-SS and fault should clear. Stacklights will reset to a ready state. 5. Repeat steps 3 thru 7 on opposite side. 6. Note any deficiencies and generate a work order/report them to supervisor. **CHECK E-STOPS ON SRT-1** 1. Push each individual E-stop button at the SRT and ensure red light at the E-stop indicator. (For production ADUS systems). Check the Link Tap directly under the E-stop pushbutton (under the runout). Link Tap lights should display solid red and ADUS-SS display an E-stop fault. 2. Verify that the link taps along the rest of the line show a flashing green light on top with a solid red light on bottom. 3. Pull the push button at the E-stop out. This should restore the Link Taps to solid green lights on top and bottom all around the SRT. 4. Refresh ADUS-SS and fault should clear. Stacklights will reset to a ready state. 5. Repeat steps 1 thru 4 for each E-stop on SRT. 6. Note any deficiencies and generate a work order/report them to supervisor.	30	09			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.
ADUS: ADUS	43.	**ADJUST EMERGENCY PULL CORD (ECP) TENSION IF NEEDED. (Power On)** 1. Ensure green adjustment arrow is aligned with reference mark in adjustment window. 2. If out of alignment, loosen jam nut. 3. Turn hex coupler until green adjustment arrow is aligned with reference mark on adjustment window. 4. Tighten jam nut securely. 5. Test EPC by pulling cord. 6. Note any deficiencies and generate a work order/report them to supervisor.	15	09			M
ADUS: ADUS	44.	**Check Sensors for Proper Action (Power On) Check IND-1.OHS Sensor on the tunnel of IND-1 Conveyor for proper operation.** 1. With the sorter running, use a piece of paper or cardboard to block the sensor, creating a jam. 2. The Conveyor will stops immediately and the blinking amber LED will turn off, the Stacklights remain a steady green. no error displayed on HMI. NOTE; If the sensors is block for 30 seconds, ADUS will stop with error code 44 (IND1.OHS IND. Belt Over-Height Sensor Fault) on the HMI and the Stacklights will remain blinking green, in a ready state. 3. Control power light indicator is illuminated white, push the green, system start button on IND-1 to start ADUS again. 4. Note any deficiencies and generate a work order/report them to supervisor.	5	09			M
ADUS: ADUS	45.	**Check Sensors for Proper Action (Power On) Check DWS-1.PCS.E Sensors on DWS-2 for proper operation.** 1. With the sorter running, use a piece of paper or cardboard to block the sensor, creating a jam. 2. Check that IND-1 belt slows when it is unblocked. The belt will come back up to speed when unblocked If the sensors is block for 3+ seconds, the amber LED on the sensor will be on steady. ADUS will stop and an error code 41 (IND1.PCS IND. Belt Pre-Cognition Sensor Fault) will be displayed on the HMI. DWS.STK will be blinking red, yellow, and green. The SRT.EC.STK will blink red. 3. Control power light indicator is illuminated white, push the green system start button on IND-1 to start ADUS again. 4. Note any deficiencies and generate a work order/report them to supervisor.	5	09			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.
ADUS: ADUS	46.	**Check Sensors for Proper Action (Power On) Check DWS.DIM.W emitter and receiver and DWS.DIM.H emitter and receiver Sensor.** 1. With the sorter running, use a piece of paper or cardboard to block the sensor, creating a jam. 2. ADUS stops immediately. An error code 64 (DWS.DIM.W Width Array Jam) or Error Code 65 (DWS.DIM.H Height Array Jam) is displayed on the HMI. TDWS.STK will be blinking red yellow, and green. The SRT.EC.STK will blink red. 3. Control power light indicator is illuminated white, push the green system start button on IND-1 to start ADUS again. 4. Note any deficiencies and generate a work order/report them to supervisor.	5	09			M
ADUS: ADUS	47.	**Check Sensors for Proper Action (Power On) Check DWS height tower.** 1. It is not necessary to run the system to check for proper action on the Height tower array for PSOC, use a piece of paper or cardboard to block the sensor. a. The green LED represents that power is applied to the array. b. The amber LED will be lit representing a package present. c. The red LED will only illuminate if there is an array fault. 2. Note any deficiencies and generate a work order/report them to supervisor.	5	09			M
ADUS: ADUS	48.	**Check Sensors for Proper Action (Power On) Check SRT1.STS Sensor at the head end of SRT1** 1. With the sorter running, use a piece of paper or cardboard to block the sensor, creating a jam. 2. The Conveyor will stop after 5 seconds and the blinking amber light will turn off, the Stacklights remain a steady green. An error code 37 (SRT1.STS Sorter 1 Sack Trap Sensor Fault) is displayed on the HMI. TDWS.STK (Stacklights) will be blinking red. The SRT.EC.STK (Stacklights) will blink red, amber and green 3. Control power light indicator is illuminated white, push the green system start button on IND-1 to start ADUS again. 4. Note any deficiencies and generate a work order/report them to supervisor.	10	09			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.
		Check Sensors for Proper Action (Power On). **Check SRT1.FLS Sensor at the end cage of SRT1** 1. Tape a piece of paper over the sensor to creating a jam. 2. Ensure a container is installed at the end cage. Start the ADUS system. 3. The Conveyor will stop after 10 seconds and the blinking amber light will turn off. Error Code 39 (SRT1.FLS Sorter 1 Full Line Sensor Fault at reject bin) is displayed on the HMI. DWS.STK will be blinking red. The SRT.EC.STK will blink red, amber and green. 4. Remove the piece of paper 5. Control power light indicator is illuminated white, push the green system start button on IND-1 to start ADUS again. 6 Note any deficiencies and generate a work order/report them to supervisor.					
ADUS: ADUS	49.	**Check Sensors for Proper Action (Power On)** **Check SRT1.BDS Sensor at the tail end of SRT1** 1. With the sorter running, use a piece of paper or cardboard to block the sensor, creating a jam. 2. ADUS stops immediately. An error code 36 (SRT1.BDS Sorter 1 Belt Disengagement Sensor Fault) is displayed on the HMI. TDWS.STK will be blinking red yellow, and green. The SRT.EC.STK will blink red. 3. Control power light indicator is illuminated white, push the green system start button on IND-1 to start ADUS again. 4. Note any deficiencies and generate a work order/report them to supervisor. **Check SRT1.TRS Sensor at the tail end of SRT1**. 1. With the sorter running, use a piece of paper or cardboard to block the sensor, creating a jam. 2. The Conveyor will stop after 3 seconds and the blinking amber light will turn off, the Stacklights remain a steady green. An error code 35 (SRT1.TRS Sorter 1 Trash Sensor Fault) is displayed on the HMI. DWS.STK will be blinking red, yellow, and green. The SRT.EC.STK will blink red. 3. Control power light indicator is illuminated white, push the green system start button on IND-1 to start ADUS again. 4. Note any deficiencies and generate a work order/report them to supervisor.	15	09			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.
		Check SRT1.TES Sensor at the tail end of SRT1 1. With the sorter running, use a piece of paper or cardboard to block the sensor, creating a jam. 2. The Conveyor will stop after 3 seconds and the blinking amber light will turn off, the Stacklights reset to a blinking green, ready state. An error code 33 (SRT1.TES Sorter 1 Tail End Sensor Fault) is displayed on the HMI. DWS.STK will be blinking red, yellow, and green with a sensor fault. The SRT.EC.STK will blink red. All faults will clear when sensor is unblocked and Stacklights will return to blinking green, a ready state. 3. Control power light indicator is illuminated white, push the green system start button on IND-1 to start ADUS again. 4. Note any deficiencies and generate a work order/report them to supervisor.					
ADUS: ADUS	50.	**Check Sensors for Proper Action (Power On)** **Check SRT1.CPS Sensor at the end cage of SRT1** 1. With the ADUS running, remove container to check the container present sensor. 2. The Conveyor will stop after 3 seconds and the blinking amber light will turn off, the Stacklights remain a steady green. Error Code 40 (SRT1.CPS Sorter 1 Cart Presence Sensor Fault) is displayed on the HMI. DWS.STK will be blinking red. The SRT.EC.STK will blink red, amber and green. 3. Control power light indicator is illuminated white, push the green system start button on IND-1 to start ADUS again. 4. Note any deficiencies and generate a work order/report them to supervisor.	5	09			M
ADUS: ADUS-SS	51.	**VERIFY UPS IS OPERATIONAL (Power On)** 1. Verify MAVIS UPS battery is good. 2. Press the enter button (above the power button) to enter the menu. 3. Scroll down using the down button to select control, press enter. 4. Select start battery test using the down button, press enter. Test will take approximately 15 seconds. Press ESC button to return to the main screen. 5. Note any deficiencies and generate a work order/report them to supervisor.	5	09			M
	52.						
ADUS: MAVIS RACK	53.	**VERIFY UPS IS OPERATIONAL (Power On)** 1. Verify MAVIS UPS has power by looking for a green wave (~) indicator in the top right area of the UPS front panel.	5	09			S

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.
		2. When facility power is removed the battery icon is illuminated yellow and an audible beep occurs immediately and then every 30 seconds until power is restored. NOTE the audible alarm will activate every 30 seconds, time will decrease, between alarms until the UPS loses all stored energy. 3. Note any deficiencies and generate a work order/report them to supervisor.					
ADUS: IND-1/INDUCT	54.	**inspect belts for proper tracking (Power On)** 1. Ensure system is running. 2. Ensure belts are aligned with sprockets and sprockets are evenly distributed across idle/drive shafts. 3. Check sidewalls for wear or excessive buildup of plastic dust which would indicate signs of improper tracking. Finding plastic dust in any location is an indication of belt wearing against a surface. 4. Note any deficiencies and generate a work order/report them to supervisor.	5	09			M
ADUS: DWS-1/BUFFER	55.	**Verify Belt Tracking And Tensioning (Power on)** 1. Belt should be centered on the conveyor bed and the idler roller. The belt should not make contact with conveyor guarding. 2. Check belts for fraying and signs of damage. 3. Note any deficiencies and generate a work order/report them to supervisor.	10	09			M
ADUS: DWS-2/SCALE	56.	**Check Weighing Accuracy. (Power on)** **Check the Weigh Scale system for accuracy using current ADUS Scale Validation Bulletin.**	10	09			D
ADUS: DWS-2/SCALE	57.	**Verify Belt Tracking and Tension. (Power on)** 1. Belt should be centered on the conveyor bed and the idler roller. The belt should not make contact with conveyor guarding. 2. Note any deficiencies and generate a work order/report them to supervisor.	15	09			M
ADUS: IFS-1/INCLINE	58.	**Verify Belt Tracking and Tension. (Power on)** 1. Belt should be centered on the conveyor bed and the idler roller. The belt should not make contact with conveyor guarding. 2. Note any deficiencies and generate a work order/report them to supervisor.	5	09			Q
ADUS: IFS-2-FLOTURN	59.	**Verify Belt Tracking and Tensioning. (Power on)** 1. Belt should be centered on the conveyor bed and the idler roller. The belt should not make contact with conveyor guarding. 2. Note any deficiencies and generate a work order/report them to supervisor.	10	09			Q

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.
ADUS: SRT-1/SORTOUTPUT	60.	**Perform Leak Check and Inspect Activated Roller Belt (ARB) Activation Zones. (Power on)** 1.Ensure system is pressurized. 2. Do a walk around and listen for hissing or leaking air. 3. Check air pressure on the air manifold assembly below the SRT-1 Idle End. a. Ensure pressure is set to 50 ± 3 psi on pressure regulator gauge. b. Turn cutout valve and ensure it reduces gauge on pressure regulator to 0 psi. c. Turn cutout valve back on. Gauge should read 50 ± 3 psi. d. Ensure there is no drop in air pressure. Monitor for a minimum of 2 minutes. 4. Inspect separator filter to ensure automatic drain is not clogged. With a small container underneath filter, turn nozzle on bottom of filter counter clockwise a quarter-turn to release water. Test RnR for proper action at Solenoid Valve Bank (SVB). Note: Quarter turn of the blue button will lock rack in active position. Ensure that rack is not locked. Press blue button on the SVB and verify proper operation of each pneumatic component (cylinders, pop-up diverts, etc.).	60	09			Q
ADUS: SRT-1/SORTOUTPUT	61.	**Inspect Belt Tracking and Sprocket Alignment (Power on)** Finding excessive accumulations of plastic dust or shavings in any location is an indication of belt wearing against a surface. 1. Ensure belts are aligned with sprockets and sprockets are evenly distributed across idle/drive shafts. 2. If belt tracking is suspect, power down and lockout ADUS system and perform the below. a. Measure distance between edge of belt and conveyor sideguard or UHMW strip. Belt should be relatively centered. b. If belting is found to be wearing on one side, or is too close to sideguarding or UHMW, the head end sprocket requires adjustment.	5	09			M
ADUS: COMPRESSOR	62.	**Visual check of Compressor for any leaks, dust build up or unusual noise or vibration. (Power On)**	5	07			A
ADUS: COMPRESSOR	63.	**Verify that the condensate drains are operating correctly. (Power On)**	5	09			W
ADUS: COMPRESSOR	64.	**Check the coolant level and replenish if necessary (Power Off)**	FF	09			W

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.
		Coolant level is correct when a unit is showing coolant in the bottom half of sight glass when up to operating temperature (ten minutes running loaded) with compressor running. To add fluid if needed: **WARNING: Before performing the following task, power down and lock out the compressor as prescribed by the local energy control procedures developed in accordance with the current Maintenance Management Order (MMO) providing lockout/restore procedures. Failure to comply may result in personal injury or death, and/or damage to equipment.** **WARNING: Compressor must be at a zero energy state before attempting to top up or add fluid.** 1. Stop compressor with red air compressor stop button on air compressor control panel. 2. Slowly remove fill cap. 3. Pour coolant into spout until spout almost overflows. 4. Replace and tighten fill cap. 5. **Remove lock out and power on compressor as prescribed by the local energy control procedures developed in accordance with the current Maintenance Management Order (MMO) providing lockout/restore procedures.** 6. Pull out red air compressor stop button on air compressor control panel. 7. Start unit for about 10 minutes (until coolant drains out the bottom of the sight glass). Allow 10 minutes for level to stabilize. **WARNING: Before performing the following task, power down and lock out the compressor as prescribed by the local energy control procedures developed in accordance with the current Maintenance Management Order (MMO) providing lockout/restore procedures. Failure to comply may result in personal injury or death, and/or damage to equipment.** **WARNING: Compressor must be at a zero energy state before attempting to top up or add fluid.** 8. Shut down the unit. Check level. 9. Slowly remove fill cap. 10. Refill into spout until spout almost overflows.					

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.
		11. Replace and tighten oil fill cap. Repeat as needed until level is correct. Coolant level is correct when a unit is showing coolant in the bottom half of sight glass when up to operating temperature (ten minutes running loaded) with compressor running.					
ADUS: ADUS	65.	**Observe System Running. (Power on)** 1. Restore Machine to Ready State. 2. Note any unusual noises, vibrations, sounds and odors. 3. Verify that all parts and hardware are secure. 4. Ensure all guarding and panels are in place. 5. Ensure all cables/wiring are secure and covers are in place. 6. Note any deficiencies and generate a work order/report them to supervisor.	10	09			D
ADUS: DWS-2/SCALE	66.	**Replace Battery in OCS Cabinet. (Power on)** Replace Battery in OCS cabinet with CR2450N Cabinet must be powered on when replacing battery. If battery is replaced with power down, configuration settings must be reloaded.	25	09			WI[51]
FINAL-CLEANUP	67.	**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.	15	All			