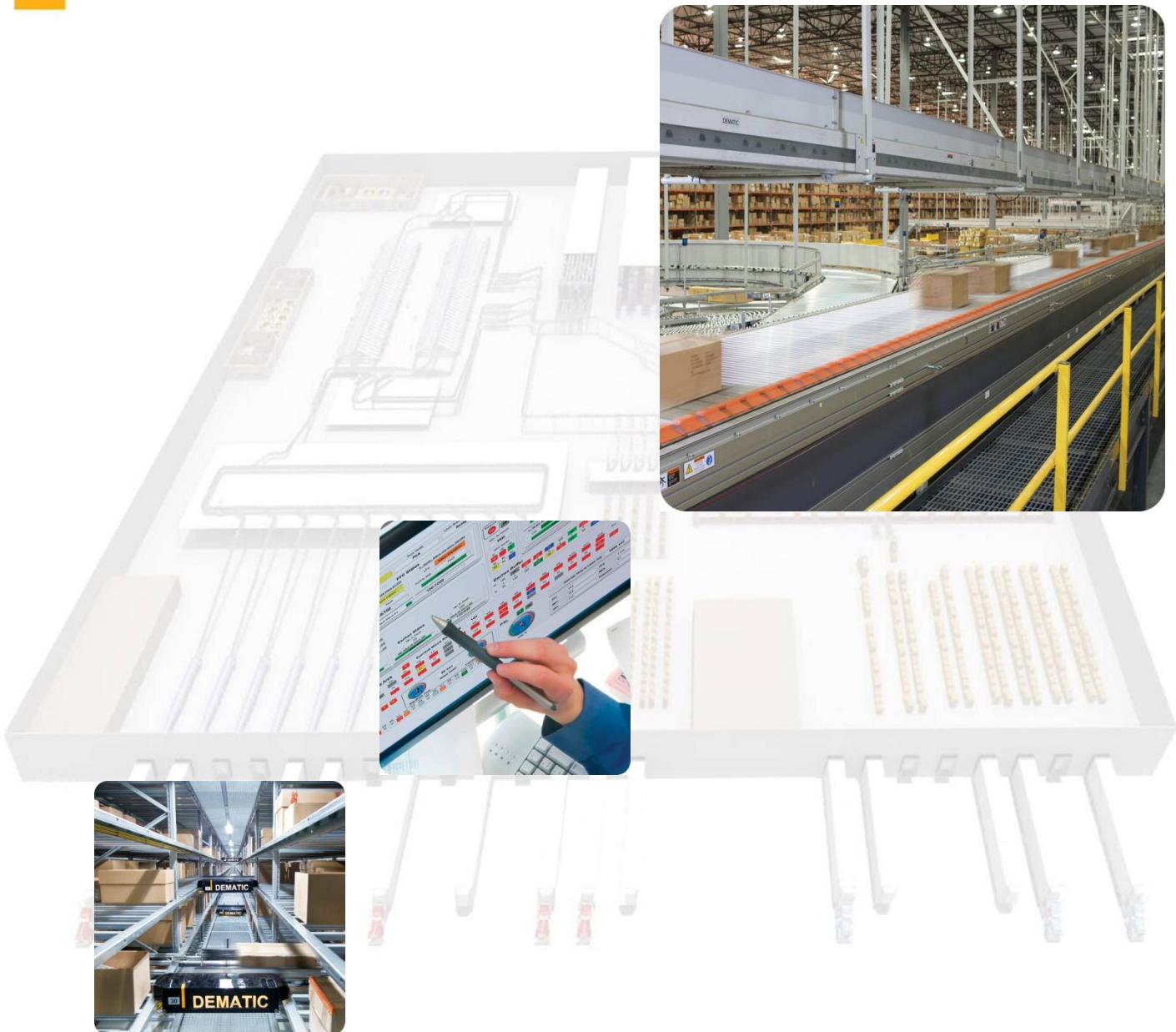


Amazon Robotics Semi Auto Workstation (ARSAW)

Operation and Maintenance Manual



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1 Safety

1.1 Danger/Warning/Caution Convention

This product is furnished with safety guards and warning labels. When this equipment is applied at your facility, additional guards and warnings may be required because specific applications might create residual hazards that could not be anticipated or eliminated when the equipment was designed. Therefore, examine your installation and provide any additional required safety measures. Danger, warning, and caution conventions are explained in the following table:

Symbol	Description
 DANGER	Danger statements indicate an imminently hazardous situation that if not avoided, WILL result in death or serious injury.
 WARNING	Warning statements indicate a potentially hazardous situation that if not avoided, COULD result in death or serious injury.
 CAUTION	Caution statements indicate a potentially hazardous situation that if not avoided, will result in minor or moderate injury. It may also be used to alert against unsafe practices.

1.2 General Safety



Never operate this equipment with missing, disabled, or inoperative safety devices. Operating equipment in this condition will result in serious injury or death. Immediately remove equipment in this condition from service.



Severe personal injury or damage to property may occur in the event of:

- Incorrect use or operation of the equipment, including allowing untrained personnel to interface with or come into contact with the equipment. Only properly trained and authorized personnel are to operate this equipment.**
- Incorrect or insufficient maintenance of the equipment. Only properly trained and authorized personnel are to service and maintain this equipment.**

⚠ WARNING

Do not perform adjustments, maintenance, clearing of jams, or any other work on this equipment unless you are competent in carrying out the energy isolation procedure as required by national or local authorities. The purpose of energy isolation procedure is to protect all persons involved against unexpected startup of the equipment. Personnel should be alerted to the hazard of stored energy which may exist after the source of energy has been isolated. Refer to national, local, or employer procedures for minimum requirements. Failure to follow these requirements may result in equipment damage, serious injury, or death.

⚠ WARNING

If any defects relating to operating safety and reliability are detected or if any damage occurs, affected parts of the system must be taken out of operation immediately. Failure to do so may result in serious injury or death

⚠ WARNING

Climbing, sitting, walking, or riding on equipment at any time may result in serious injury or death.

⚠ CAUTION

Under continuous operation, the external surface of various powered components might reach temperatures significantly above ambient temperature. Contact with unprotected skin may cause burns.

⚠ CAUTION

Exposure to elevated sound levels can damage hearing. The complete equipment operating environment should be reviewed and hearing protection provided if required.

1.2.1 Personnel

- Personnel must be informed about the location and operation of emergency stops and power disconnect points.
- Personnel must be alerted to potential hazards of entanglement in conveyors caused by such items as long hair, loose clothing, and jewelry. These hazards, if not avoided, could result in serious injury or death.
- Personnel must report to a supervisor all unsafe conditions or anything out of the ordinary that is observed prior to operating the system. Remove equipment in unsafe conditions from service immediately.

1.2.2 Equipment

- Use the equipment exclusively for appropriate conveyor loads that it is designed to handle safely.
- Do not perform any unauthorized conversion or modification of the system, equipment, or safety devices. Such modifications could degrade safety and expose personnel to risk of serious injury or death.
- Never connect or disconnect any electrical cables while power is applied to the equipment as this can result in damage to the equipment or serious injury or death resulting from electric shock. Lock-out/tag-out equipment prior to service.

1.2.3 Operation

- Prior to start up, operators are to visually confirm that all personnel are clear of the conveyor.
- During initial equipment startup, personnel must be notified prior to startup by the operator or via audible and/or visual indications followed by a delay.
- If safety devices are defective or if they do not function reliably, the equipment must not be put into operation. Notify your supervisor that equipment is not safe to operate and remove equipment from service.

1.2.4 Instructions for Safe Clearing of Product Jams

When the products being handled by the conveyor become lodged or jammed, the following instructions apply:

- Only authorized employees properly trained in the clearing of jammed products will be allowed to clear jams.
- Turn off and lock out the power to the conveyor before clearing the jam to prevent unintended motion of equipment. Take precautions to isolate all sources of energy including hydraulic, pneumatic, gravity, and other potential or stored energy.



DANGER

DO NOT climb on the conveyor at any time. Falling from the conveyor, especially from elevated heights, will cause serious injury or death.

- When unable to manually reach the jam with your hands from the walking surface, select an appropriate and safe method to access the jam. When a jam is above the walking surface or work level, a lift or ladder may be the safest method. Be sure to follow applicable manufacturer's instructions for safe use requirements and for any personal protection equipment required.
- Take precautions for stored energy of jammed packages, as releasing a jam may release potential energy.

- Realign product of good quality, and remove product of poor quality (for example, cartons that are broken, wet, or have open flaps).
- Remove any spilled materials from the conveyor and surrounding area before restarting conveyors.
- Observe the cause of the jam, and report it to the appropriate supervisor. Often, jams occur because the conveyables are of poor quality or are outside specifications, or because the equipment requires maintenance.
- By visual confirmation, be sure all personnel are clear of the conveyor before restarting.

1.2.5 Maintenance

- A routine safety inspection plan must be implemented before each shift change and startup of the equipment.
- Maintenance (other than observation) must not be performed while a conveyor is in operation or motion unless proper maintenance or service requires the conveyor to be in motion. In which case, personnel shall be made aware of all hazards and how the task may be safely accomplished.

1.3 Equipment Labels

Labels for partially-completed machinery being used in EU projects requiring CE conformity are applied after the equipment is incorporated into a conveyor system to become a complete machine.

Refer to project documentation for equipment label information.

2 Equipment Description

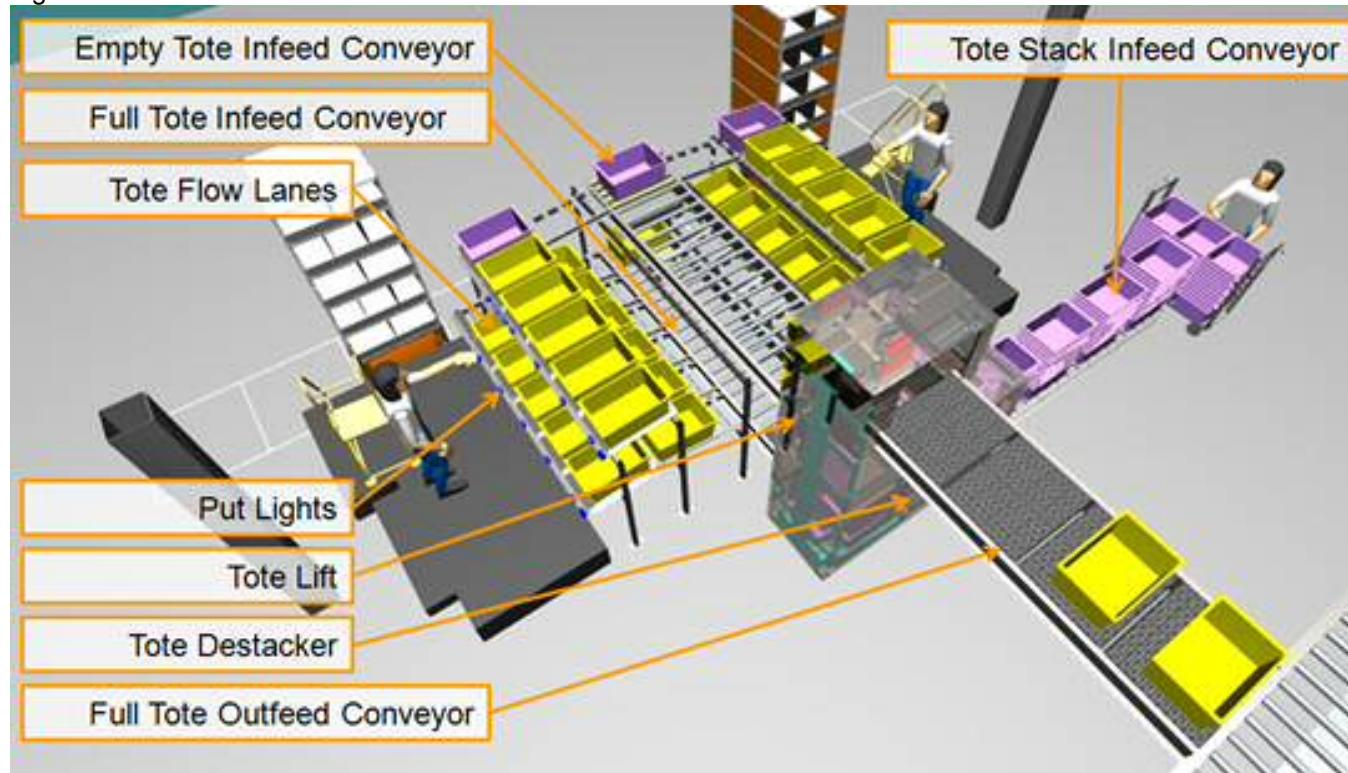
2.1 Overview

The Amazon Robotics Semi Auto Workstation (ARSAW) consists of:

- Tote Stack Infeed Conveyor (U100020)
- Tote De-stacker (U100030)
- Tote Lift (U100030)
- Empty Tote Infeed Conveyor (U100005)
- Empty Tote Velocity Transfer To Accumulation (U100010)
- Tote Flow Lanes (U100035)
- Put Lights
- Full Tote Infeed Conveyor To Lift (U100015)
- Full Tote Outfeed Conveyor From Lift (U100025)

The ARSAW receives product from Amazon Robotics Systems™ Robots at the end of two pick cells (See Figure 1). It receives empty totes (empty totes are purple in the diagrams) in stacks (maximum of 12 totes) from an operator, de-stacks, and delivers individual totes to the pick lanes. After the operator has put the appropriate material into the tote and it is considered full (full totes are yellow in the diagrams), a manual push sends it to an outfeed lane where it will be conveyed to a main trunk line.

Figure 1 ARSAW Overview

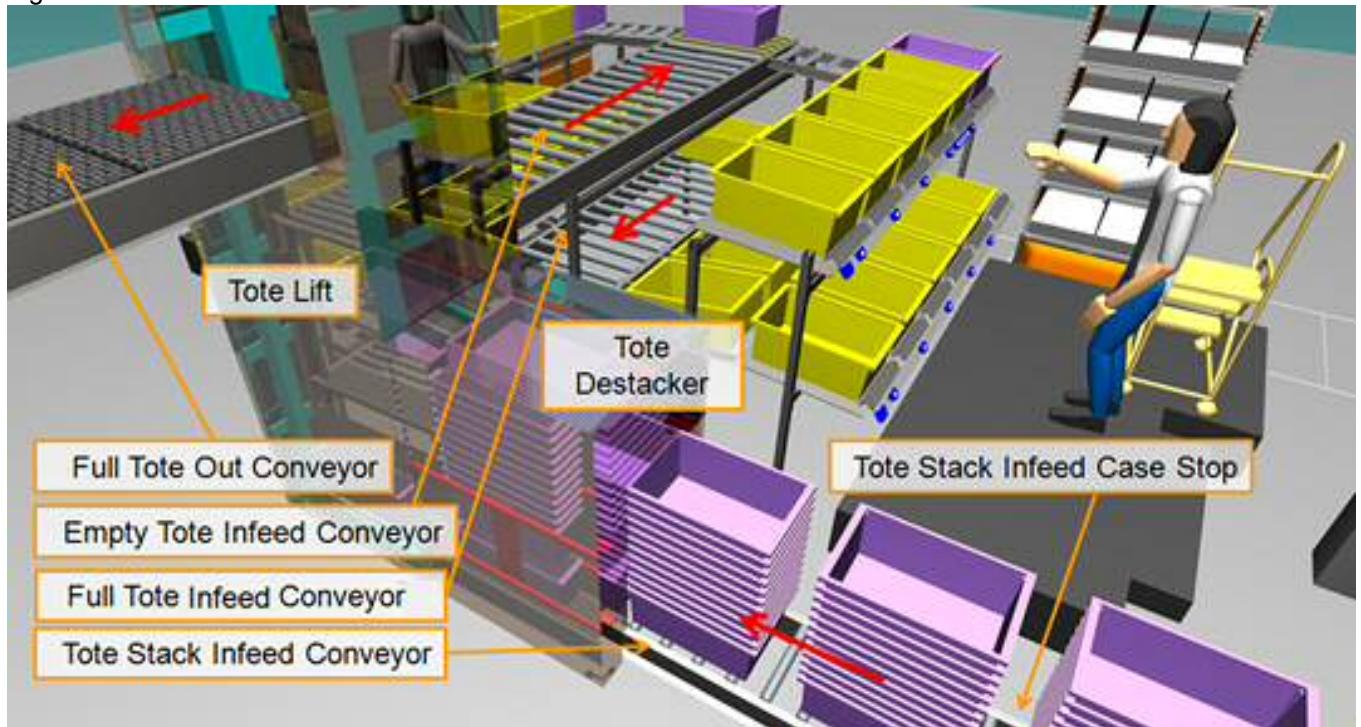


2.2 Description of Operation

2.2.1 De-stacker and Lift Details

1. Stacks of twelve (12) empty totes (purple) are conveyed into the de-stacker portion of the tote lift where the stack is lifted so that the bottom tote is singulated.
2. Each empty stack loaded will make contact with the Tote Stack Infeed Case Stop. This is to prevent the operator loading totes from pushing the stack of totes too far. Once the case stop zone photoeye has been blocked for the correct period of time the case stop will drop down and allow that single stack of empty totes through.
3. The empty tote will be held for retrieval.
4. The tote lift will retrieve the empty tote and eject it onto the empty tote infeed conveyor.
5. Full totes (yellow) will be held just before the tote lift for retrieval.
6. The tote lift will retrieve the full tote and eject it onto the full tote outfeed conveyor.

Figure 2 De-stacker and Lift Details

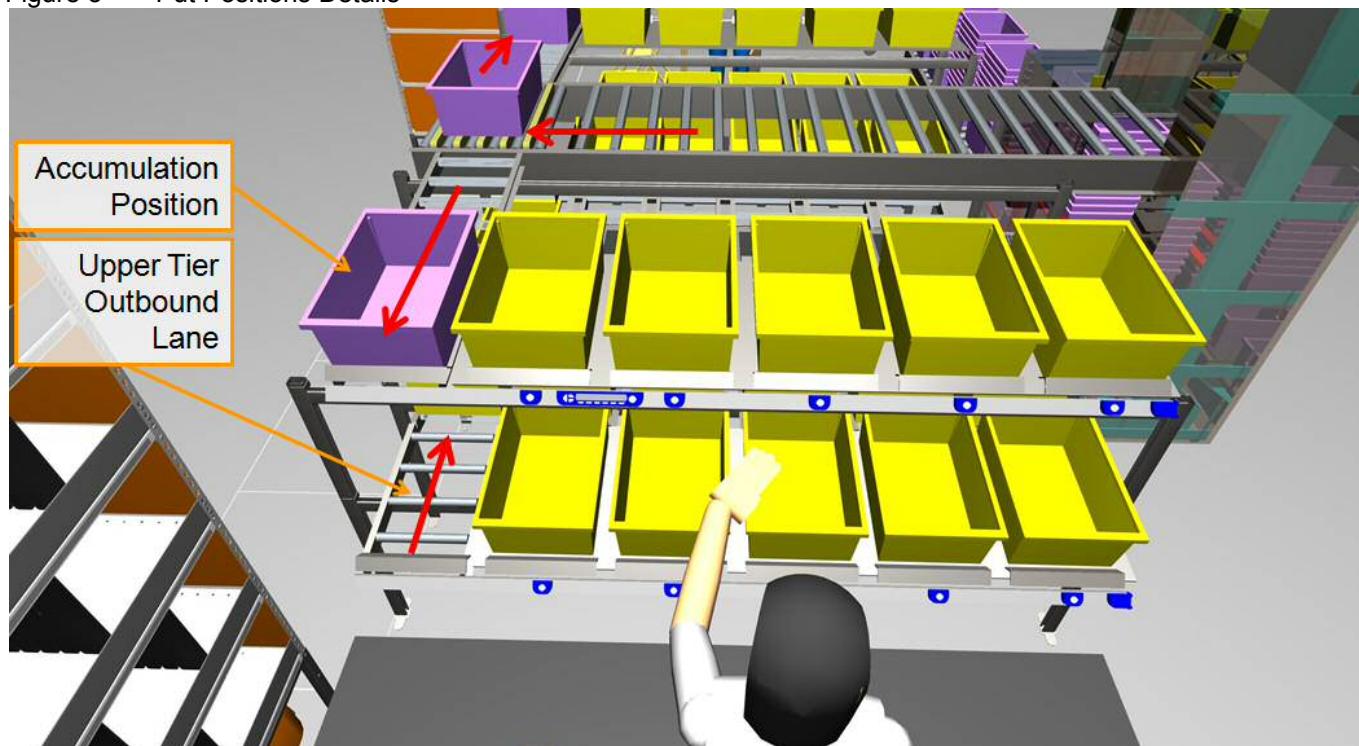


2.2.2 Put Positions Details

1. Empty totes (purple) convey to an infeed Velocity Transfer and divert in "keep full" fashion to a pair of opposing lanes.
2. Operators manually retrieve empty totes and place them into vacant put positions on either the upper or lower tier as directed by Amazon or Amazon Robotics controlled processes.

Disclaimer: The Pick/Put-to-Lights are for illustration only and may not accurately reflect placement by Amazon or Amazon Robotics.

Figure 3 Put Positions Details



2.2.3 Outbound Flow Lane Details

1. Full totes (yellow) are manually pushed away upon tote completion as described earlier.
2. Totes flow toward the full tote outfeed conveyor.
3. A case stop (see Figure 5) is used to stop the tote on the flow rack for 5 seconds to make sure that all totes on a side are present at the case stops before releasing and that there are no totes on the full tote infeed conveyor.

Figure 4 Outbound Flow Lane Details

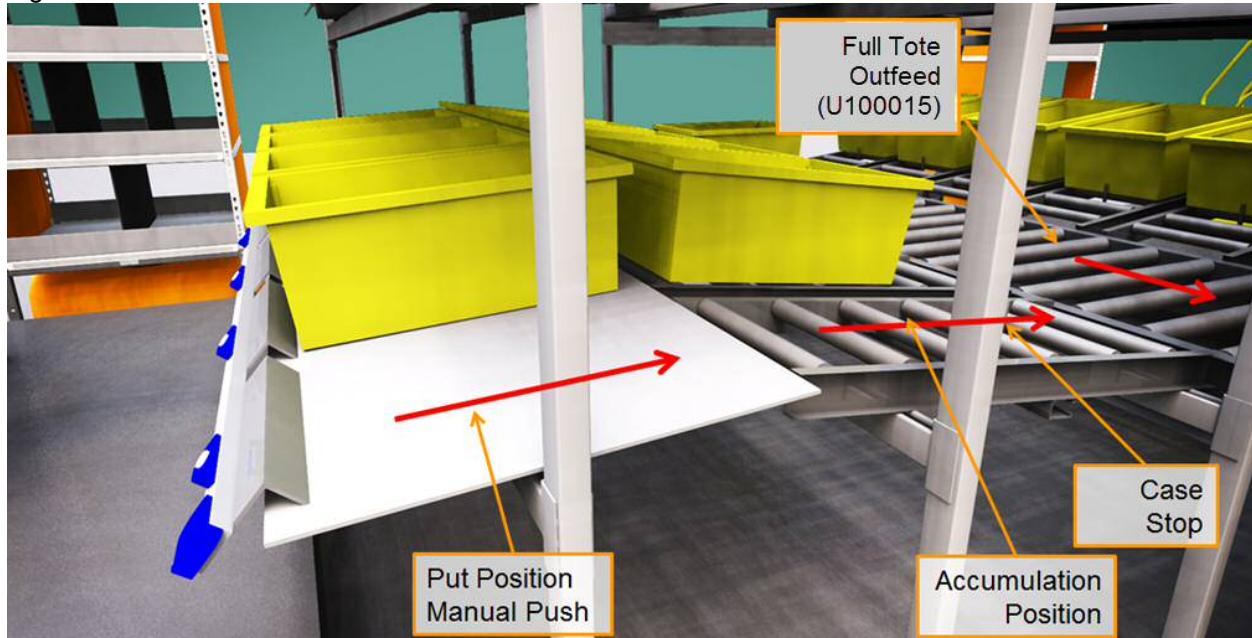
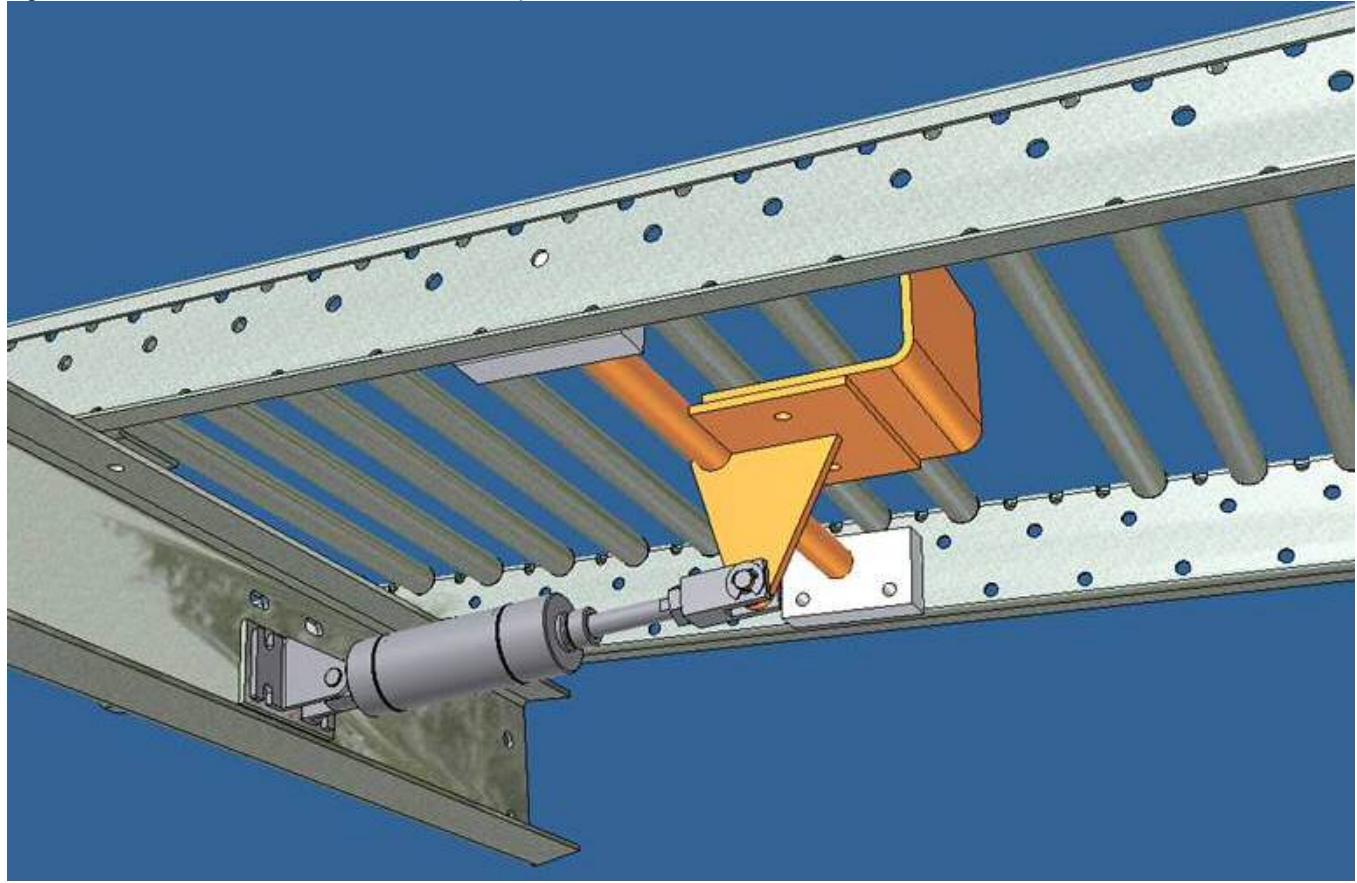


Figure 5 Outbound Flow Lane Case Stop



2.3 Safety Devices

2.3.1 Cabinet Disconnect Switch

Control Cabinet contains a fused main disconnect switch operated by a handle through the door of the cabinet. The switch should be placed in the OFF position and locked out following lockout and tag-out procedures before any maintenance is performed on the conveyors associated with the cabinet. The handle has an interlock feature to prevent the door from being opened unless the switch is in the OFF position.

Control Cabinet has an external, non-fused main disconnect switch operated by a lever on the side of the cabinet.

2.3.2 Low Air Pressure

Air pressure switches are used to monitor the main air pressure for the ARSAW. System air pressure is monitored via an air pressure switch wired to the PLC control cabinet. If the system air pressure drops below the required level, the air pressure switch will sense the low air pressure and each PLC will stop its associated conveyors. The LOW AIR PRESSURE light on the cabinet door will illuminate. When the air pressure is restored, the LOW AIR PRESSURE light flashes. Follow ARSAW start-up procedures to restart the system.

Low air pressure conditions are annunciated on Visualization.



CAUTION

The air pressure switches may not detect loss of air pressure due to operation of manual shut-off valves. Damage to equipment may occur if conveyors are run when air is turned off at local shut-off valves.

EMERGENCY STOP devices are not intended to disable equipment to provide protection for personnel in potentially hazardous contact with such equipment. For example, maintenance, jam clearing and/or other similar activities that require adherence to lockout procedures.

2.3.3 Emergency Stop

2.3.3.1 Emergency-Stop Push/Pull Buttons

Emergency Stop pushbuttons are located on the control cabinet door, in each operator area, and at the charge end of the tote stack infeed conveyor. When pushed, the START lights will extinguish and all conveyors controlled by the control cabinet will stop. See section 2.3.3.5 for definition of the E-Stop devices and zones. The button will illuminate when actuated. A red beacon associated with the E-Stop switch will flash. The E-STOP ACTUATED pilot light on the control cabinet will also illuminate.

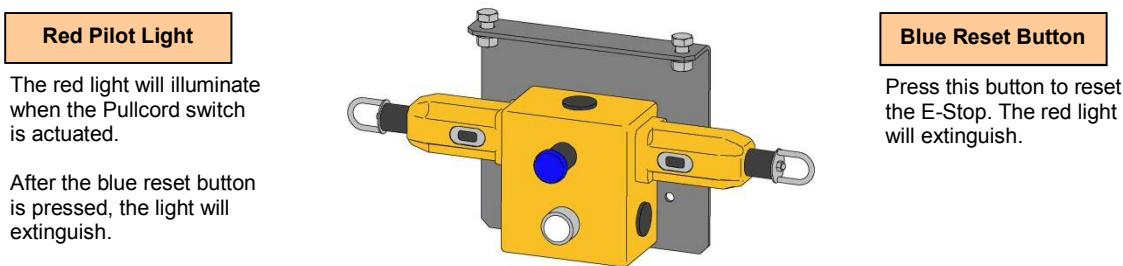
The EMERGENCY STOP button remains actuated until reset. To reset the EMERGENCY STOP button, ensure that all conditions causing the E-Stop have

been cleared and then pull the button out to its normal position. The red pilot light within the button, the red beacon, and the E-STOP ACTUATED pilot light on the control cabinet will extinguish.

2.3.3.2 Emergency Stop Pullcord Switches

Emergency Stop Pullcord switches are provided on the conveyors in each of the ARSAW. The Line Strong, or taut cord switches are failsafe devices that are actuated by pulling on the cord, or if the cord is accidentally cut or damaged. When actuated, the conveyors in the associated E-Stop zone will stop. (See section 2.3.3.5 for definition of the E-Stop zones.) A red pilot light on the actuated E-Stop switch will illuminate. A red beacon associated with the E-Stop switch will flash. The E-STOP ACTUATED pilot light on the control cabinet will also illuminate.

The Emergency Stop Pullcord switch will stay actuated until it is manually reset. To reset, press the blue reset button on the switch. The red pilot light on the E-Stop Pullcord switch, the red beacon, and the E-STOP ACTUATED pilot light on the control cabinet will extinguish. The conveyors must be restarted by ARSAW system start procedures.



2.3.3.3 Guard Panel Safety Switches

On the ARSAW there are two yellow gated guards capable of being opened. One is on the lift and the other is on the de-stacker units. On both of the guards that can be opened, there is an electrical safety switch which acts as an emergency stop and should be treated as such. The entire ARSAW will shut down upon opening one of these guards.



WARNING

Guard Panel Safety Switches are not intended to disable equipment to provide protection for personnel in potentially hazardous contact with such equipment. For example, maintenance, jam clearing and/or other similar activities that require adherence to lockout procedures.

2.3.3.4 E-Stop Fault

An E-Stop Fault is caused when a wiring problem or a device failure is detected by the PLC. The conditions that will cause an E-Stop fault are:

- The local E-Stop relay is energized, but one or more E-Stop devices in the zone have been actuated.
- The local E-Stop relay is not energized and no E-Stop devices in the zone have been actuated.

2.3.3.5 Emergency Stop Zones

E-Stop Zone	E-Stop Devices	Interlocked with Cabinets	Area Affected	Restart at
(Zone 1)	CC122_PBLT_ES CC122CS1_PBLT_ES CC122CS2_PBLT_ES CC122CS4_PBLT_ES SB+100025_PC_ES1 SB+100025_PC_ES2	No Interlocks	Entire ARSAW	CC+123



WARNING

EMERGENCY STOP devices are not intended to disable equipment to provide protection for personnel in potentially hazardous contact with such equipment. For example, maintenance, jam clearing and/or other similar activities that require adherence to lockout procedures.



CAUTION

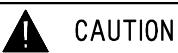
EMERGENCY STOP devices should be used only in the event of an actual emergency. Normal stopping of the conveyors should be done by using the appropriate STOP pushbutton.

2.3.4 Jam Detection

Jams are detected using the Jam Photoeyes and Package Present Photoeyes.

If the photoeye is continuously blocked for a period of time then the conveyor is considered jammed.

When a jam is detected, the conveyor on which the jam occurred and any non-accumulating conveyors upstream will stop. The associated jam beacon will flash and the JAM RESET pushbutton on the control cabinet will illuminate.



After clearing a jam/fault, remember to inspect the area in and around the lift and de-stacker to ensure there are no obstructions that would impair equipment movement upon restart.

After the jam has been physically cleared, it can be reset by pressing one of the following:

- The associated local JAM RESET pushbutton.
- The JAM RESET pushbutton on the control cabinet.

When the jam has been reset, the amber beacon will extinguish. The warning horn (SB+100025_AH) will sound for 5 seconds. When the horn silences the stopped conveyors will restart.

Jam conditions will be annunciated on Visualization.



Conveyors will start and stop without warning in flow control situations.

2.4 Control Cabinet

The following operators are located on the door of the control cabinet.

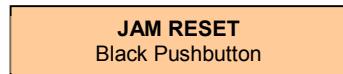
MOTOR FAULT RESET Red Illuminated Pushbutton	JAM RESET Amber Illuminated Pushbutton	LOW AIR PRESSURE Blue Pilot Light	DE-STACKER RESET Amber Illuminated Pushbutton
Illuminates when any motor controlled by this cabinet has a fault condition. The conveyor with the motor fault and all upstream conveyors will stop. After the cause of the fault has been corrected, press this pushbutton to restart the conveyors. The light will extinguish.	Illuminates when there is a jam on any conveyor controlled by this cabinet. The conveyor with the jam and all upstream conveyors will stop. After the jam is cleared press this pushbutton to reset the jam and restart the conveyors. The light will extinguish.	Illuminates when the air pressure for the system associated with this control cabinet has dropped below the minimum requirement. All associated conveyors will stop. When the air pressure has returned to an acceptable level, the light will flash. Pressing the START pushbutton will extinguish the light and restart the conveyors.	Illuminates when there is a fault in the de-stacker unit. A fault of this type will stop the de-stacker unit. After the cause of the fault has been corrected, press this pushbutton to reset the de-stacker unit. The De-stacker will need then to be homed by pressing the button again. The light will extinguish. Pressing the De-stacker reset button (when station not started) will start the homing sequence for the De-stacker.
POWER ON White Pilot Light	POWER ON ACTIVE WHEN FLASHING	MOTOR FAULT RESET	JAM RESET
Illuminates when power is supplied to this cabinet.			
E-STOP ACTUATED Red Pilot Light	E-STOP ACTUATED	START AUTOMATIC	LOW AIR PRESSURE
Illuminates when any EMERGENCY STOP device associated with the control cabinet has been actuated. Flashes at 1/2 second intervals to indicate an E-Stop/safety relay fault.			Active When Flashing Green Pilot Light
EMERGENCY-STOP Red Illuminated Push-Pull Button	EMERGENCY STOP PUSH TO STOP PULL TO RESET	STOP	START AUTOMATIC Green Illuminated Pushbutton
Pressing this pushbutton immediately shuts down all conveyors controlled by this cabinet and illuminates the pushbutton, the E-STOP ACTUATED pilot light. To reset, pull the button out to its normal position. All associated lights will extinguish.			Pressing this pushbutton will initiate the start sequence for all conveyors controlled by this cabinet.
JOG LIFT Keyed Switch	STOP Red Extended Pushbutton	LIFT RESET Amber Illuminated Pushbutton	The START pushbutton remains illuminated while the conveyors are running.
Used to manually run the lift at low speed for maintenance purposes	Pressing this pushbutton will stop all conveyors controlled by this cabinet. The START pushbutton light will extinguish. The lift and de-stacker will complete any movements that were already in progress before coming to a stop.	Illuminates when there is a fault in the lift unit. Flashes for an over-travel fault in the lift unit. The lift has to be jogged off of the over travel limit switch in order to reset an over travel fault using this button Pressing the lift reset button for 5 seconds (when station not started) will start the homing sequence for the lift.	Flashes at 1/2 second intervals when the KSAW has stopped due to energy management Flashes rapidly at 0.128 second intervals when the lift and/or de-stacker are not started. Pressing this pushbutton will also start the attached trunkline conveyor (if not already started).

2.5 Control Stations

In addition to the operators on the control cabinet door, control stations are located on the ARSAW for local operator control.

2.5.1 Jam Reset Control Station

Control Station 3CS+122 is located where the ARSAW outbound conveyor merges with the RSP trunk line and contains the following operator.



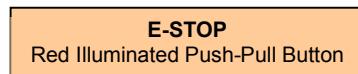
Pressing this pushbutton will reset the jam condition at the ARSAW trunk line merge once the jam photoeye (TRUNK_PE_J) has been cleared. The stopped conveyors will restart.

The Jam beacon (TRUNK_BC_J) will be extinguished.



2.5.2 E-Stop Control Stations

Control Stations 1CS+122 and 2CS+122 are located, one on either side of the ARSAW for access by the associates. Control Station 4CS+122 is located on the stacked tote infeed fencing on a vertical support. These Control Stations contain the following operator.



Pressing this pushbutton immediately shuts down all conveyors controlled by this cabinet and illuminates the pushbutton, the E-STOP ACTUATED pilot light and the E-Stop Beacon.

To reset, pull the button out to its normal position. E-STOP ACTUATED pilot light and the E-Stop Beacon (U100020_BC_ES) will extinguish.



2.5.3 Start Control Station

Control Station 5CS is located near the ARSAW access gate on the conveyor infeed line. The infeed line provides stacks of totes to the de-stacker. This control station contains the following operator.

START
Green Pushbutton

Pressing this pushbutton will initiate the start sequence for all conveyors controlled by this cabinet.

Pressing this pushbutton will restart the De-Stacker after the Gate has been closed.

The light will illuminate solid indicating the system is running normal.

The light will flash while the infeed gate is open. This condition will extinguish when the gate is closed and the gate start pushbutton has been pressed.

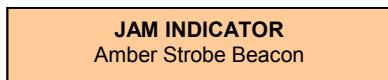


2.6 Beacons and Alarm Horn

In addition to the indicators located on the door of the control cabinet, there are beacons and an alarm horn mounted on the full tote outbound of the ARSAW (SB+100025) for indication of conveyor faults and status.

2.6.1 Jam Indicator

An amber beacon (SB+100025_BC_J) is used to indicate a jam condition within the associated ARSAW. Another amber beacon (TRUNK_BC_J) is used to indicate a jam condition at the trunk line merge.



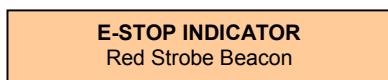
Flashes to indicate a jam in the associated ARSAW.

Press the JAM RESET pushbutton on the cabinet door to reset the jam and restart the conveyors. The beacon will stop flashing.



2.6.2 E-Stop Indicator

A flashing red beacon indicates an E-Stop condition.



Flashes when any E-Stop device in the associated ARSAW is actuated.

When the E-Stop device is reset, the beacon will stop flashing.



2.6.3 Totes Needed Status Indicator

A blue beacon (SB+100025_BCS) is used to indicate that the stacked tote infeed line is empty or near empty and requires more totes. In addition it is used to indicate when the infeed gate is open.

**Totes Needed
Blue Beacon**

Flashes when ARSAW's stacked tote infeed line is empty (not including de-stacker).

Illuminates when the ARSAW's stacked tote infeed line has only one stack of totes remaining (not including the de-stacker).



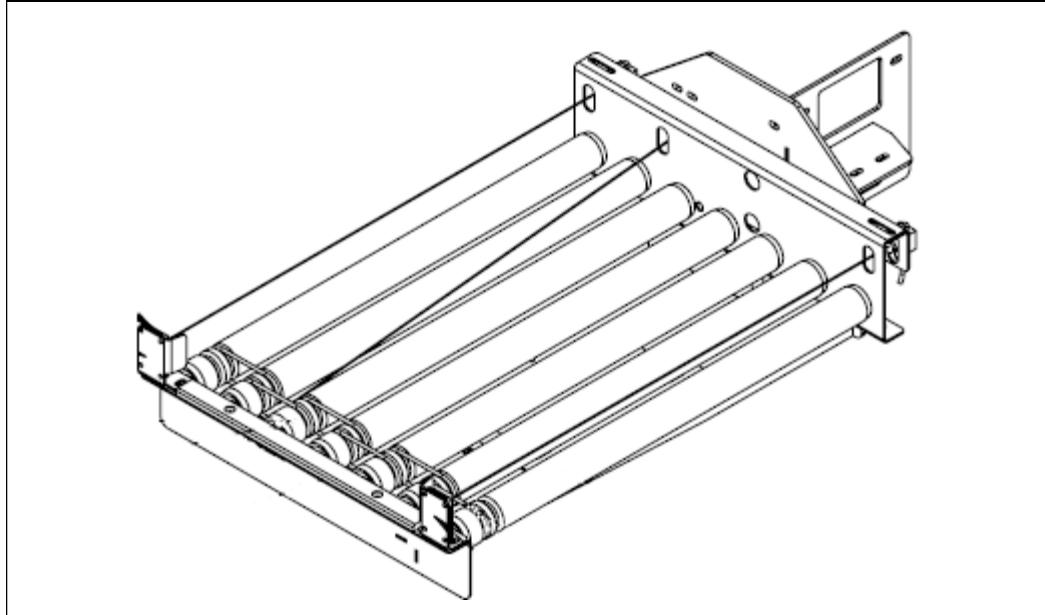
2.6.4 Alarm Horn

There is an alarm horn (SB+100025_AH) on the same stack as the beacons. The alarm horn will sound for five seconds prior to any movement within the ARSAW.

2.7 ARSAW Conveyors

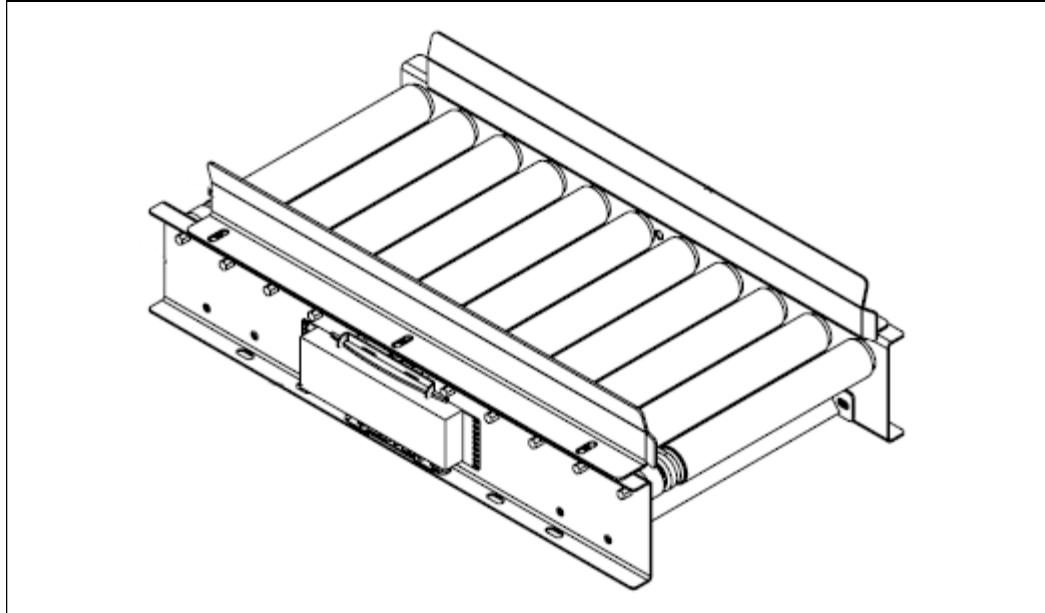
- For the **MDR Lift Conveyor**, see the *MCS 8100 Series Service Manual* and the *MCS Dual Motor Controller Service Manual*.

Figure 6 MDR Lift Conveyor



- For the **MDR Tote De-stacker Infeed Conveyor**, see the *MCS 8100 Series Service Manual* and the *MCS Dual Motor Controller Service Manual*.

Figure 7 MDR Tote De-stacker Infeed Conveyor



- For the **Tote Stack Infeed Conveyor**, see the *MCS 8100 Series Service Manual* and the *MCS Dual Motor Controller Service Manual*.
- For the **Empty Tote Infeed Conveyor**, see the *MCS 8100 Series Service Manual* and the *MCS Dual Motor Controller Service Manual*.
- For the **Velocity Transfer**, see the *MCS Model 8100 Series ODR Conveyor Service Manual*.
- For the **Empty Tote Infeed Right Angle Transfer**, see the *MCS Model 2467 RAT Service Manual* and the *MCS Dual Motor Controller Service Manual*. RAT are still used on gen 1, 2, and 2.1. For GEN3 ARSAW the RAT is replaced with a velocity transfer (perpendicular 8100 ODR bed).
- For the **Full Tote Infeed Conveyor** to the lift, see the *MCS 8100 Series Service Manual*, and the *MCS Dual Motor Controller Service Manual*.
- For the **Full Tote Outfeed Conveyor** from the lift, see the *MCS 8100 Series Service Manual*, the *MCS 8300 Series Service Manual*, and the *MCS Dual Motor Controller Service Manual*.

2.8 Recommended Spare Parts

The recommended spare parts list (RSPL) for the ARSAW is contained in the *System Operation and Maintenance (O&M) Manual*.

3 ARSAW Operation

3.1 System Start and Stop

3.1.1 Requirements for Operation

In order to start the ARSAW, both the main disconnect switch operated by a handle through the door of the cabinet and the main disconnect switch operated by a lever on the side of the cabinet must be in the ON position and all E-Stops must be reset. Once the cabinet has been powered up, the “Active When Flashing” indicator, on the cabinet door, will flash to indicate when the PLC is ready for operation.

3.1.1.1 Homing

After the initial installation and anytime the motor and/or gearbox is removed or replaced, the homing sequence will have to be performed. This will allow the lift to recalibrate its positioning system.

Pressing the LIFT RESET button for 5 seconds (when station is not started) will start the homing sequence for the lift. The horn will also sound for five seconds before the lift starts moving. The lift must be above both lower limit switches to be homed. If the lift is tripping either of the lower limit switches the jog selector switch can be used to raise the lift.

In the event of a fault in the de-stacker, the de-stacker also needs to be homed after the fault is identified and cleared. Pressing and holding the de-stacker reset button (when station not started) will start the homing sequence for the de-stacker (make sure the de-stacker is all the way down before releasing the button).

3.1.2 ARSAW Station Start Procedure

The entire ARSAW can be started by pressing the start button on the control cabinet assuming the requirements for operation have been met. When this start button is pressed, the alarm horn (SB+100025_AH) will sound for 5 seconds. After the horn silences, all conveyors will start. While the horn is sounding and while any part of the station is running, the green start pushbuttons on the cabinet will be illuminated. Pressing the start PB on the ARSAW will also start the trunk line if it is not already running.

3.1.3 ARSAW Station Stop Procedure

The entire system can be stopped by pressing the stop button on the control cabinet. When this stop button is pressed, all conveyors will stop and the illuminated start pushbutton will be extinguished only after the lift and de-stacker have completed any motion that was in progress.

3.2 Product Flow and Operation

3.2.1 De-stacker and Multi-level Lift (OR+100030)

Up to four stacks of a maximum 12 empty totes are conveyed into the de-stacking unit via the stacked tote infeed line (OR+100020). Each empty stack loaded will make contact with a case stop. This is to prevent the operator loading totes from pushing the stack of totes into the de-stacker. Once the case stop zone photoeye has been blocked for one second, the case stop will drop down and allow that single stack of empty totes through.

The de-stacker unit then lifts the top of the stack while it simultaneously holds the bottom tote to be fed to the lift. The singulated empty tote will then be transported to the tote lift. Once the lift retrieves the empty tote, it will eject it onto the empty tote infeed conveyor (OR+100005). After the singulated empty tote has been transported to the lift, the de-stacker unit will lower the stack of empty totes to the conveyor and repeat the empty tote singulating process.

Full totes will be held just before the lift for retrieval in normal accumulation fashion on the full tote outfeed lane (OR+100015 and SB+100015). The lift will retrieve a full tote and eject it onto the second part of the full tote outfeed conveyor (SB+100025) where it will wait in normal accumulation fashion for a release signal from the connected conveyor.

3.2.2 Put Lanes

Empty totes convey from the lift unit to a Velocity Transfer unit which diverts in keep full fashion to a pair of opposing lanes. Once an empty tote is fed into the keep full line, the operator can manually retrieve the empty tote and place it into a vacant put position.

Amazon software marries tote to lane moves, executes picks via terminal, puts via Amazon supplied put lights, and instructs the operator to discharge the tote when complete.

A tote considered full by Amazon software is manually pushed down gravity conveyor where it is held by a case stop before going to the full tote outfeed lane (OR+100015 and SB+100015) when the PLC sends the signal to merge.

3.2.3 Full Tote Infeed to Lift

Upon receiving notice from Amazon software to discharge a tote, a manual push is required to move the tote to the full tote infeed lane. Sensors looking for interferences on the full tote infeed to lift (OR+100015 and SB+100015) will determine if the case stop is actuated in the merge lane. An actuated case stop will not allow that merge lane's product to leave until the interferences are clear. The PLC program will release all lanes on one side of the ARSAW at a time and wait for the lift to output them to the appropriate level to be ejected to the RSP Trunk Line.

3.2.4 RSP Trunk Line Merge

After the lift ejects the full tote onto the full tote accumulation conveyor (SB+100025), the totes will release as possible based on gaps between totes upstream on the RSP Trunk Line. If the totes are unable to release immediately, they will be held in normal accumulation fashion until a gap is detected on the RSP trunk line.

3.2.5 Energy Management

Photoeyes are used to detect the presence (or absence) of totes or cartons on the conveyor system. Energy Management uses these sensors to determine whether or not there is activity on the conveyors. A lack of activity is defined as no product blocking any of the photoeyes.

If a lack of activity is detected for a pre-determined amount of time (default is 30 minutes), the area in question will shut down. The appropriate START pushbuttons will flash to indicate the Energy Management condition. The conveyor can be restarted using ARSAW startup procedures.

The Energy Management condition(s) will be displayed on System Manager.

4 Operator Procedures

4.1 Starting the ARSAW

To start the operation of an ARSAW:

1. Press the green START button on the control cabinet.

INFO Assuming the requirements of operation have been met the alarm horn will sound for 5 seconds. After the horn silences, all conveyors will start. While the horn is sounding and while any part of the station is running, the green Start pushbutton on the cabinet will be illuminated.

4.2 Loading Empty Tote Stacks

If the Blue Beacon is flashing, the ARSAW requires additional empty tote stacks to avoid running out. To load empty tote stacks into the ARSAW:

1. Retrieve an empty stack of no more than 12 totes
2. Open the access gate; the de-stacker will stop.
3. Place the stack of empty totes squarely on the charge end of the tote stack infeed conveyor.
4. After that tote stack is conveyed downstream, continue to load tote stacks at on the charge end of the tote stack infeed conveyor until the line is full. If the tote de-stacker and the line are completely empty, a total of 5 tote stacks can be loaded onto the tote stack infeed conveyor (1 in the de-stacker, 2 downstream of the case stop, and 2 upstream of the case stop).
5. When the infeed line is full, close the gate and press the start pushbutton at the gate, and the de-stacker will restart. If the start button is not pressed the Blue light will flash faster at half second intervals.



CAUTION

Empty tote stacks must be placed squarely on the tote stack infeed conveyor to avoid an empty tote jam.



CAUTION

Assuming there are totes in the tote de-stacker, DO NOT try to place more than 4 stacks of empty totes on the tote stack infeed conveyor. Doing so will likely result in a jam on the tote stack infeed conveyor.

4.3 Loading Empty Totes into Put Positions

To load an empty tote into a vacant put position:

1. Manually remove the empty tote in accumulation position 1 (see Figure 3).
2. Place the empty tote into a vacant put position on either the upper or lower tier.

4.4 Pick/Put Operations

Follow the pick instructions supplied via the terminal and place the picked product into the appropriate tote in the put positions as directed by the put lights.

When pick/put operations are complete for a given tote the system will indicate the tote is complete and maybe removed (see section 4.5).

4.5 Removing a Full Tote from a Put Position

To remove a full tote from a put position:

1. For upper tier full totes, manually remove the full tote from the put position and place it in the Upper Tier Outbound Lane (see Figure 3) and push it towards the full tote outfeed conveyor.
2. For lower tier full totes, manually push the full tote from the put position towards the full tote infeed conveyor. Note that the tote will be automatically stopped by a case stop to avoid collisions with other full totes. When the conveyor is clear, the case stop will be lowered and the full tote will convey onto the full tote infeed conveyor.



CAUTION

To avoid jams DO NOT push more than one tote at a time towards the full tote infeed conveyor. Make sure the tote has been fully conveyed onto the full tote infeed conveyor before pushing another tote towards the infeed conveyor.

4.6 Clearing a Jam

If the Amber Beacon SB+100025_BC_J is flashing, there is a jam in the ARSAW. To clear the jam and restart the ARSAW:

1. Determine the location and cause of the jam.
2. Verify that it is safe to clear the jam (see section 1.2.4).
3. Clear the jam. If necessary, contact the appropriate personnel to de-energize the de-stacker (see section 5.4.2).



CAUTION

After clearing a jam/fault, remember to inspect the area in and around the lift and de-stacker to ensure there are no obstructions that would impair equipment movement upon restart.

4. After the jam has been physically cleared, reset the ARSAW by pressing one of the following:
 - The associated local JAM RESET pushbutton.
 - The JAM RESET pushbutton on the control cabinet.

INFO When the jam has been reset, the Amber Beacon will extinguish. The warning horn will sound for 5 seconds. When the horn silences the stopped conveyors will restart.

INFO There is also an Amber Beacon TRUNK_BC_J that flashes to indicate a jam condition at the trunk line merge.

4.7 Activating an E-Stop



WARNING

EMERGENCY STOP devices are not intended to disable equipment to provide protection for personnel in potentially hazardous contact with such equipment. For example, maintenance, jam clearing and/or other similar activities that require adherence to lockout procedures.



CAUTION

EMERGENCY STOP devices should be used only in the event of an actual emergency. Normal stopping of the conveyors should be done by using the appropriate STOP pushbutton.

In the event of an actual emergency:

1. Press the nearest EMERGENCY-STOP push/pull buttons or pull on the nearest Emergency-Stop pull-cord.

INFO When an E-Stop is actuated, the green START light will extinguish and all conveyors, controlled by the control cabinet, will stop.

2. Immediately notify the appropriate personnel that an E-Stop has been actuated.

4.8 Stopping the ARSAW

To stop the operation of an ARSAW:

1. Press the red STOP button on the control cabinet.

INFO When this stop button is pressed, all conveyors will stop and the illuminated green START pushbutton will be extinguished.

5 Maintenance

5.1 General Safety and Maintenance



WARNING

Do not perform adjustments, maintenance, clearing of jams, or any other work on this equipment unless you are competent in carrying out the energy isolation procedure as required by national or local authorities. The purpose of energy isolation procedure is to protect all persons involved against unexpected startup of the equipment. Personnel should be alerted to the hazard of stored energy which may exist after the source of energy has been isolated. Refer to national, local, or employer procedures for minimum requirements. Failure to follow these requirements may result in equipment damage, serious injury, or death.

Proper maintenance of this unit will ensure proper operation and promote operating personnel safety.

INFO See individual manufacturer's product literature for more information.



WARNING

Refer to and be familiar with all of the proper safety precautions and procedures outlined in the safety section of this manual before performing maintenance. Only properly trained and authorized personnel are to perform maintenance on this equipment.



WARNING

Climbing, sitting, walking, or riding on equipment at any time may result in serious injury or death.

1. Replace broken or worn parts as soon as they are detected.
2. Safety guards must be properly attached to the unit before and while operating the equipment. Do not operate equipment with missing guards.
3. Keep all **CAUTION**, **WARNING**, and **DANGER** safety labels clean and in plain sight. Replace all missing or damaged safety labels.
4. Do not operate equipment with missing or inoperable safety devices. Immediately remove such equipment from service.

5.2 ARSAW Conveyors

INFO For maintenance information on the conveyors used in the ARSAW, refer to section 2.7.

5.3 Periodic Maintenance Schedule

See the *Conveyor Concepts Preventive Maintenance Schedule* at the end of this service manual.

5.3.1 Belt Driven Linear Actuator Scheduled Maintenance

See the *Paletti Internally Tensioned Belt Driven Linear Actuator Service Manual* at the end of this service manual.

5.4 Maintenance Procedures

5.4.1 Tote De-stacker/Lift Fault Recovery

1. Determine if a tote jam is causing the fault
 - a. If YES, see section 5.4.2.
2. Press the appropriate CC+122 fault pushbutton to reset the fault.
3. Return the ARSAW to operation.

5.4.2 De-energize and Clear the Tote De-stacker

5.4.2.1 Air Solenoid Block Details

For maintenance, repair, or clearing of tote jams it may be necessary to de-energize the tote de-stacker by removing air pressure from the cylinders.

The air solenoid block (see Figure 8) can be used to actuate the three different types of air cylinders used in the tote de-stacker (see Figure 9). To actuate the solenoids a small punch can be used to press the button (buttons are in small holes where the arrows are pointing in Figure 8), hold down until the air cylinder is at the desired position.

Figure 8 Air Solenoid Block for De-stacker

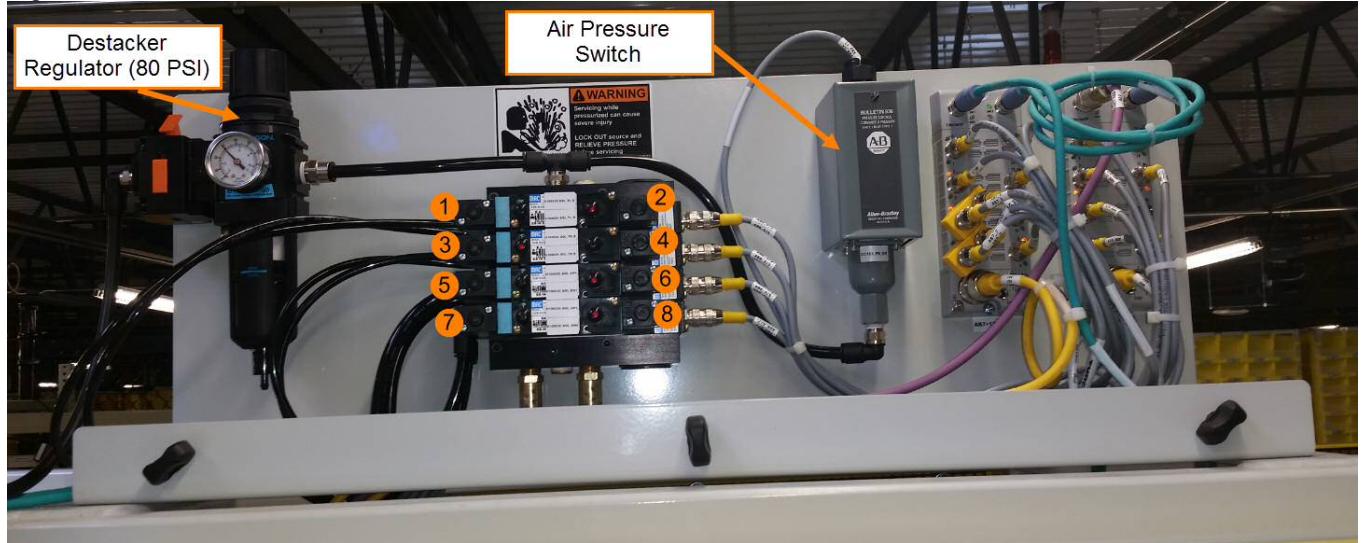


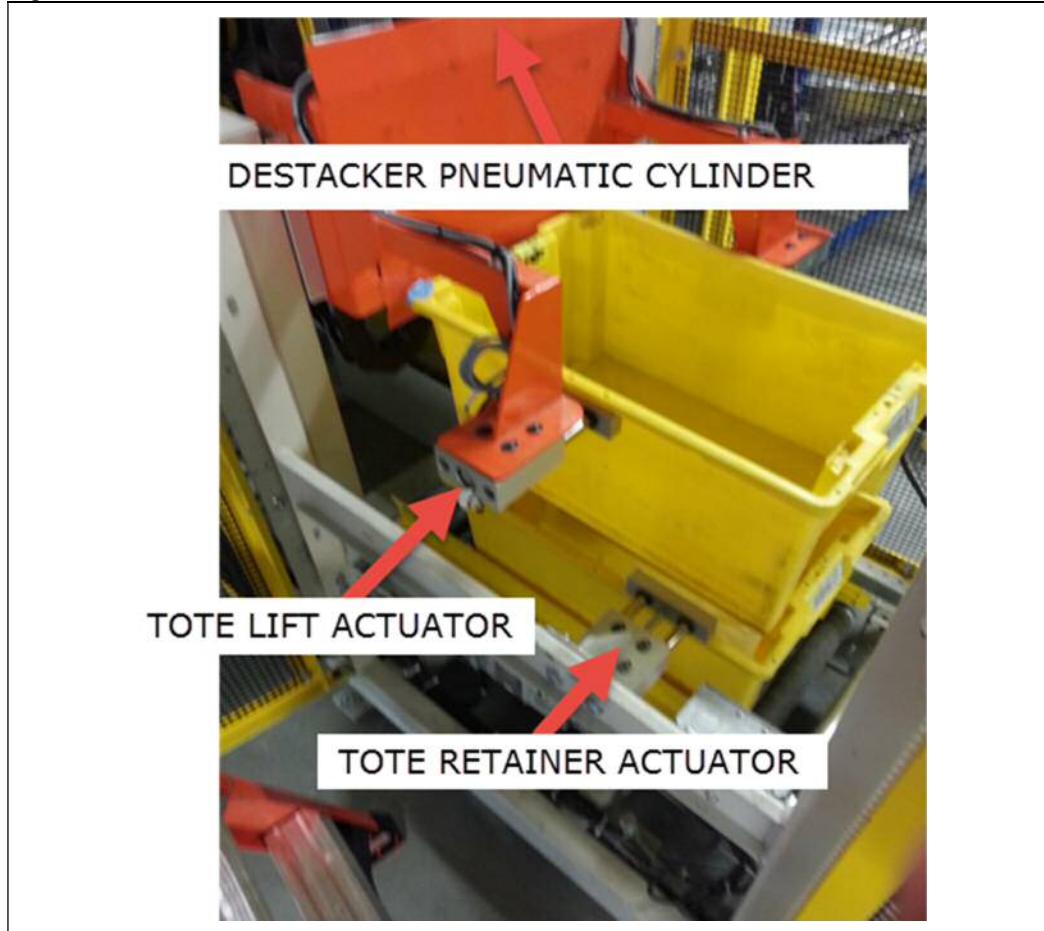
Table 1 Figure 8 Items

Item	Air Solenoid Block Button Description
1	Tote Lift In
2	Tote Lift Out
3	Tote Retainer In
4	Tote Retainer Out
5	De-stacker Pneumatic Cylinder Down (this is a two stage cylinder)
6	De-stacker Pneumatic Cylinder Up (this is a two stage cylinder)
7	De-stacker Pneumatic Cylinder Down (this is a two stage cylinder)
8	De-stacker Pneumatic Cylinder Up (this is a two stage cylinder)

5.4.2.2 De-energize and Clear Procedure

If the tote de-stacker faults out in a raised position as shown in Figure 9, use the following procedure to de-energize and clear the de-stacker.

Figure 9 De-stacker in Raised Position



To de-energize and clear the tote de-stacker:

1. Press the CC+122 cabinet STOP pushbutton.
2. De-energize and Lock Out/Tag Out the cabinet using the external disconnect switch.
3. De-energize and Lock Out/Tag Out the de-stacker air pressure regulator.

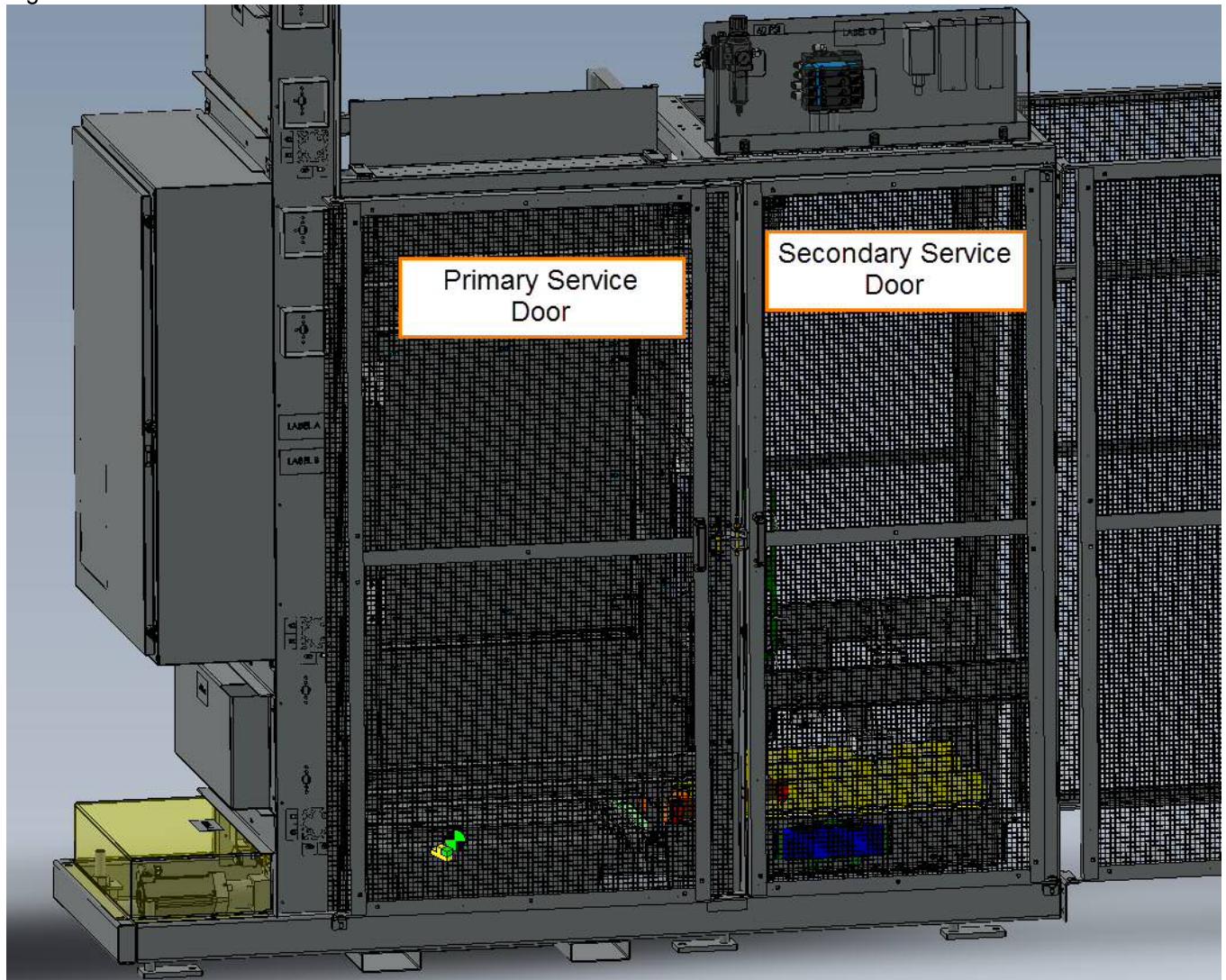


WARNING

You MUST turn off and lock out/ tag out the appropriate PDP or power disconnect point BEFORE continuing. Make sure all forms of energy are isolated.

4. Open the secondary service door.

Figure 10 Service Doors



5. Remove the yellow guard covering the air regulator, solenoid block, and pressure switch.

Figure 11 Air Components



6. Actuate the "Tote Retainer In" (Button 3) until both Tote Retainer cylinders are fully retracted
7. Remove the tote and anything under De-stacker
8. Actuate the "De-stacker Pneumatic Cylinder Down" (Buttons 5 and 7) until the remaining tote stack is resting on the conveyor below.
9. Actuate the "Tote lift In" (Button 1) until they are both fully retracted.
10. Remove remaining totes in de-stacker.
11. Install the yellow guard covering the air regulator, solenoid block, and pressure switch.
12. Close and secure the secondary service door.
13. Remove the Lock Out/Tag Out on the de-stacker air pressure regulator and energize the regulator.
14. Remove the Lock Out/Tag Out on the cabinet using and re-energize using the external disconnect switch.
15. The system will take approximately 30 seconds to come back online, afterwards clear any Jam or Fault indications.
16. Return the ARSAW to operation.

5.4.3 ARSAW De-stacker Tote Lift Cylinder Adjustment

1. Set 4 totes on the Empty Tote Infeed line (Unit 100020).
2. Let the Tote Retainer and Tote Lift cylinders extended and raise the tote stack up.
3. Stop ARSAW, by opening the Secondary Service door.
4. Then with the Tote Lifter cylinders extended, loosen the 4 mounting screws on each cylinder (Figure 12) and adjust the distance between the face plates (face plates may look different on each generation) of the extended cylinders to 14-1/4" (see Figure 13).

Figure 12 Tote Lift Cylinder Screws

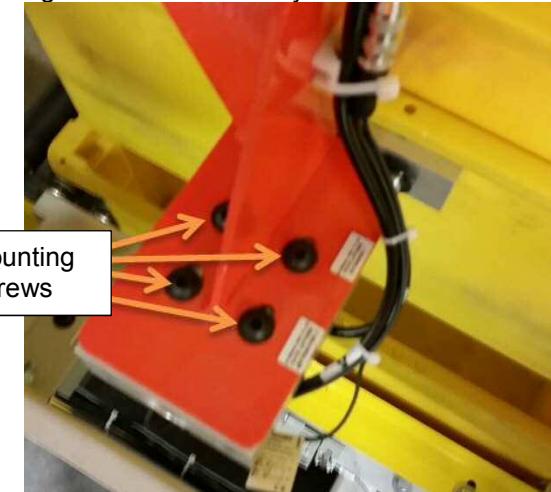
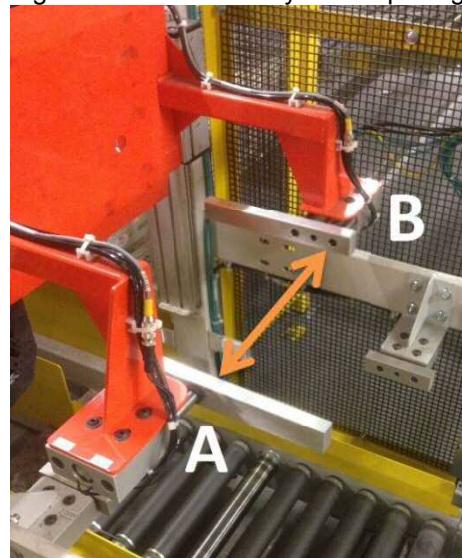


Figure 13 Tote Lift Cylinder Spacing



5. Tighten the 8 screws (4 on each cylinder) and close the door.
6. Verify 1/8" gap on each side of the tote (Figure 14).

Figure 14 Tote Lift Cylinder Gap



5.4.4 Amazon Robotics Semi-Automated Workstations (ARSAW) De-stacker Flow

Setting the De-stacker Cylinder Speed/Flow Adjustment:

The de-stacker has 4 air lines that go to the main de-stacker cylinder (see Figure 15). Where they connect to the cylinder they have 90 degree fittings. These fittings have either a knob or a screw that controls the air flow.

To adjust the speed of the de-stacker, you will need to turn these screws or knobs all the way in (clockwise). Then back them out. Start with 8 full turns out (counterclockwise). At this point I would test the detached with running some totes in it. The cylinder needs to complete the stroke from position 2 (picks up totes) to position 3 (tote stack all the way up, cylinder all the way retracted). If it seems too slow or it faults out you will need to back the screws or knobs out more. If it is too fast turn the screw or knobs in.

Remember there are 4 flow control valves and they all need to be adjusted the exact same.

Figure 15 De-stacker Cylinder



6 Troubleshooting

The following troubleshooting tables are provided to assist you in diagnosing and resolving symptoms that might occur during the normal operation of this conveyor system.

INFO See individual manufacturer's product literature for more information.

To use a troubleshooting table:

1. Identify the symptom in the left most column in the table.
2. Identify the most likely possible cause in the center column.
3. Apply the solution outlined in the far right column.

6.1 ARSAW Conveyors

INFO For troubleshooting information on the conveyors used in the ARSAW, refer to section 2.7.

6.2 Lift Fault Troubleshooting

INFO The following faults are listed on the ARSAW STATUS visualization screen.

Table 2 Lift Fault Troubleshooting

Symptom	Description
Physical Axis Fault	If the Physical Axis Fault bit is set, it indicates that one or more fault conditions have been reported by the physical axis. The specific fault conditions can then be determined through access to the axis data type specific fault attributes of the associated physical axis. For Servo axis data types, Physical Axis Faults map to the Servo Faults attribute. For Servo Drive axis data types Physical Axis Faults map to the Drive Faults attribute. For CIP Drive axis data types Physical Axis Faults map to the standard CIP Axis Faults attribute or manufacturer specific CIP Axis Faults – Rockwell Automation, and CIP Axis Fault – Mfg attributes.
Module Fault	The Module Fault bit attribute is set when one or more faults have occurred related to the 1756-EnxT module associated with the selected axis. The specific fault conditions can then be determined through access to the Module Fault Attribute of the associated axis. Usually a module fault affects all axes associated with the 1756-EnxT module. A module fault generally results in the shutdown of all associated axes. Reconfiguration of the 1756-Enxt module is required to recover from a module fault condition.

Table 2 Lift Fault Troubleshooting

Symptom	Description	
Group Fault	The Group Fault bit attribute is set when one or more faults have occurred related to the motion group associated with the selected axis. The specific fault conditions can then be determined through access to the Group Fault attribute of the associated motion group. Usually a group fault affects all axes associated with the motion group. A group fault generally results in the shutdown of all associated axes. Reconfiguration of the entire motion subsystem is required to recover from a group fault condition	
Guard Fault	If the Guard Fault bit is set, it indicates that one or more fault conditions have occurred related to the Guard Motion Safety function. The specific Fault conditions can then be determined through access to the Guard Motion attribute of the associated axis. Guard Faults are only applicable if the drive device is equipped with Guard Safety functionality.	
Initialization Fault	The Initialization Fault bit is set when initialization of the CIP Motion drive fails for any reason. Specific information concerning the Initialization Fault may be found in the standard CIP Initialization attribute or manufacturer specific CIP Initialization Fault – Rockwell Automation, and CIP Initialization Fault – Mfg attributes associated with the CIP Drive axis data types.	
Symptom	Possible Cause	Solution
APR Fault	This fault means the Absolute Position Reference (APR) has been lost.	<ol style="list-style-type: none"> “Home” the servo drive.
Empty Tote Not Clear Fault	The lift was discharging an empty tote onto the upper empty tote conveyor (U100005). The tote did not pass the Lift Package Present Photo #3 (U100030_PE_P3) in less than the expected amount of time.	<ol style="list-style-type: none"> Clear the photoeye by either removing the tote or moving it on to U100005. (Do not push the tote back onto the lift.). Press the Jam Reset pushbutton on the control cabinet to reset the jam.
Empty Tote Entry Jam	The tote did not pass from the de-stacker all the way onto the lift, or something blocked the U100030_PE_C photoeye when it was not expected (not transferring a tote at the time).	<ol style="list-style-type: none"> Clear the photoeye by removing the tote. Press the Jam Reset pushbutton on the control cabinet to reset the jam.
Full Tote OH Jam	A tote exceeding the maximum allowable height (approx. 16") was detected at the discharge end of zone 3 of U100015.	<ol style="list-style-type: none"> Remove the tote from U100015. Do not push it into the lift and do not put it back onto the system without correcting the over-height condition. Then press the Jam Reset pushbutton on the control cabinet to reset the jam.
Full Tote Entry Jam	A full tote was entering the lift. The tote did not pass the Lift Package Present Photo #3 (U100030_PE_P3) in less than the expected amount of time.	<ol style="list-style-type: none"> Clear the photoeye by either removing the tote. (Do not push the tote onto the lift.). Press the Jam Reset pushbutton on the control cabinet to reset the jam.
Full Tote Not Clear Jam	The lift was discharging a full tote onto the upper full tote conveyor (U100025). The tote did not pass the U100030_PE_P4 photoeye in less than the expected amount of time.	<ol style="list-style-type: none"> Clear the photoeye by either removing the tote or moving it on to U100025. (Do not push the tote back onto the lift.) Press the Jam Reset pushbutton on the cabinet to reset the jam.

Table 2 Lift Fault Troubleshooting

Symptom	Description	
Lift Not Clear Jam	Caused when one of the following photoeyes has jammed: <ul style="list-style-type: none">• Lift Clear Photo (U100030_PE_C)• Lift Package Present Photo #3 (U100030_PE_P3)• Lift Package Present Photo #4 (U100030_PE_P4)• SB+100015 Over Height Photo (U100015_PE_OH)• SB+100015 Clear Photo U100015_PE_C	<ol style="list-style-type: none">1. Clear blocked photoeye.2. Reset jam condition using the Jam Reset pushbutton on the control cabinet door.3. Reset lift fault condition using the Lift Fault reset pushbutton on the control cabinet door.4. Start cabinet using the START pushbutton on the control cabinet door.

6.3 De-stacker Fault Troubleshooting

INFO The following faults are listed on the ARSAW STATUS visualization screen.

Table 3 De-stacker Fault Troubleshooting

Symptom	Possible Cause	Solution
Extend Lifters Fault	• Lift/Retainer Actuator Failure	1. Verify that the lift/retainer actuators are in the intended position. If they are, check the sensors. Adjust/replace sensors as necessary (see section 7.6).
Extend Retainers Fault	• Solenoid Failure	2. If the lift/retainer actuators are not in the intended position, manually fire the appropriate solenoid by pressing the test button on the solenoid (see section 5.4.2.1). If that does not work, check airlines and lift/retainer actuators. Adjust/replace as necessary (see section 7.3).
Move to Drop (Home) Position Fault	• Armorblock Failure	3. If manually firing the solenoids works, use the I/O Test Routine in the PLC to turn on the outputs to the solenoid(s) in question. Check the corresponding output light on the Armorblock and the indicator light on the solenoid. Replace the Armorblock, I/O Cable, or solenoid as necessary.
Move to Pick Position Fault	• Sensor Failure	
Move to Clear Position Fault		
Retract Lifters Fault		
Retract Retainers Fault		
Retainers Cylinder and/or Sensors Fault		
Lifters Cylinder and/or Sensors Fault		
Position Cylinder and/or Sensors Fault		

6.4 Status Indicators

INFO The following status indicators are listed on the ARSAW STATUS visualization screen.

6.4.1 De-stacker Position Status

Table 4 De-stacker Position Status

Status	Description
De-stacker at Drop (Home) Position	Indicates that the de-stacker is at the Drop (Home) Position.
De-stacker at Pick Position	Indicates that the de-stacker is at the Pick Position.
De-stacker at Clear Position	Indicates that the de-stacker is at the Clear Position.
De-stacker at Charge Enable	Indicates that the de-stacker is at the Charge Enable Position.

6.4.2 De-stacker I/O Status

Table 5 De-stacker I/O Status

Status	Description
De-stacker Pos 1 Prox	De-stacker is at position 1.
De-stacker Pos 2 Prox	De-stacker is at position 2.
De-stacker Pos 3 Prox	De-stacker is at position 3.
Tote Lifters Ret Prox 1	De-stacker tote lifter cylinder 1 is fully retracted.
Tote Lifters Ret Prox 2	De-stacker tote lifter cylinder 2 is fully retracted.
Tote Retainers Ret Prox 1	De-stacker tote retainer cylinder 1 is fully retracted.
Tote Retainers Ret Prox 2	De-stacker tote retainer cylinder 2 is fully retracted.
Tote Lifter Ext. Prox 1	De-stacker tote lifter cylinder 1 is fully extended.
Tote Lifter Ext. Prox 2	De-stacker tote lifter cylinder 2 is fully extended.
Tote Retainers Ext. Prox 1	De-stacker tote retainer cylinder 1 is fully extended.
Tote Retainers Ext. Prox 2	De-stacker tote retainer cylinder 2 is fully extended.
Lower De-stacker Sol 1	De-stacker lower solenoid 1 has been actuated.
Lower De-stacker Sol 2	De-stacker lower solenoid 2 has been actuated.
Raise De-stacker Sol 1	De-stacker raise solenoid 1 has been actuated.
Raise De-stacker Sol 2	De-stacker raise solenoid 2 has been actuated.
Extend Retainers Sol	De-stacker tote retainer extend solenoid has been actuated.
Extend Lifters Sol	De-stacker tote lifter extend solenoid has been actuated.
Retractor Retainers Sol	De-stacker tote retainer retract solenoid has been actuated.
Retractor Lifters Sol	De-stacker tote lifter retract solenoid has been actuated.

6.4.3 Lift Package Present Status

Table 6 Lift Package Present Status

Status	Description
Empty	No tote present on lift.
Occupied Empty Tote	Empty tote is present on the lift.
Occupied Full Tote	Full tote is present on the lift.
Occupied Unknown	An unknown tote is present on the lift

6.4.4 Lift Status

Table 7 Lift Status

Status	Description
Idle	Lift is at an idle state (no command given to move).
Load Empty Tote	Loading an empty tote.
Unload Empty Tote	Unloading an empty tote.
Load Full Tote	Loading a full tote.
Unload Full Tote	Unloading a full tote.
Move to Empty Tote Load	Move lift to load an empty tote.
Move to Full Tote Load	Move lift to unload an empty tote.
Move to Empty Tote Unload	Move lift to load a full tote.
Move to Full Tote Unload	Move lift to unload a full tote.
Initialize	Initialize lift.
Faulted	Lift faulted.
Inactive (Disabled)	Lift disabled.

6.4.5 Lift Position Status

Table 8 Lift Position Status

Status	Description
Unknown	Lift at unknown position.
At Empty Tote Load	Lift at empty tote load position.
At Full Tote Load	Lift at full tote load position.
At Empty Tote Unload	Lift at empty tote unload position.
At Full Tote Unload	Lift at full tote unload position.

6.4.6 Trunk Line Status

Table 9 Trunk Line Status

Status	Description
Trunk Line Running	Trunk line conveyor is running.
ARSAW OK to REL DWNSTRM	ARSAW is OK to release totes onto the trunk line.

6.4.7 De-stacker/Lift Photos Status

Table 10 De-stacker/Lift Photos Status

Status	Description
De-stacker to Lift Clear	Conveyance from de-stacker to lift is clear.
De-stacker to 1 st Tote Present	Tote present in the de-stacker.
De-stacker to 2 nd Tote Present	More than one tote present in de-stacker.
De-stacker Overheight	Tote stack too tall to enter de-stacker.
Lift Pack, Present #3	Tote is not centered on lift (overhanging towards trunk line).
Lift Pack, Present #4	Tote is present on lift.
Lift Pack, Present #5	Tote is not centered on lift (overhanging towards flow racks).
Full Tote Overheight	Full tote contents too tall to enter lift.
Full Tote Overhang	Full tote contents hanging out of tote.

6.4.8 Lift Overtravel Status

Table 11 Lift Overtravel Status

Status	Description
Upper Overtravel Limit	Lift has actuated the upper over travel limit switch.
Lower Overtravel Limit	Lift has actuated the lower over travel limit switch.

6.4.9 I/O Communication Status

Table 12 I/O Communication Status

Status	Description
Armor Block #1	Armor Block #1 is communicating with ARSAW PLC.
Armor Block #2	Armor Block #2 is communicating with ARSAW PLC
Armor Block #3	Armor Block #3 is communicating with ARSAW PLC.
Armor Block #4	Armor Block #4 is communicating with ARSAW PLC.
Armor Block #5	Armor Block #5 is communicating with ARSAW PLC.
Armor Block #6	Armor Block #6 is communicating with ARSAW PLC.
Armor Block #7	Armor Block #7 is communicating with ARSAW PLC.
Armor Block #8	Armor Block #8 is communicating with ARSAW PLC.
Armor Block #9	Armor Block #9 is communicating with ARSAW PLC.
Servo	ARSAW servo drive is communicating with ARSAW PLC.
Trunk Line PLC	Trunk line PLC is communicating with ARSAW PLC.

6.5 ARSAW Alarm Descriptions

See Table 13 for ARSAW System Manager Alarm Descriptions.

Table 13 ARSAW System Manager Alarms

Alarm Text	Description
CC122 ARSAWxyz LOW AIR PRESSURE	This alarm is caused when the air pressure drops below the minimum requirement.
CC122 ARSAWxyz AREA E-STOP FAULT	This alarm is caused when the E-Stop circuit and the E-Stop devices are not corresponding properly. For example, there is an E-Stop pushbutton input active but the E-Stop circuit did not trip. Used to help detect incorrect wiring of the E-Stop circuit
CC122 ARSAWxyz OVER VOLTAGE FAULT	This alarm is caused when 0180PDM senses 10% or more voltage than expected.
CC122 ARSAWxyz E-STOP PUSHBUTTON	This alarm is caused when the E-Stop pushbutton on the front of the control cabinet is activated.
CC122 ARSAWxyz UNDER VOLTAGE FAULT	This alarm is caused when 0180PDM senses 5% or less voltage than expected.
OR+ 100005 ARSAWxyz EMPTY TOTE OUTBOUND PACKAGE PRESENT PHOTO BLOCKED	This alarm is caused when photoeye U100005_DMC2_PE2 is blocked for too long.
OR+ 100005 ARSAWxyz EMPTY TOTE OUTBOUND MOTOR FAULT	This alarm is caused when there is a motor fault detected on one of the DMC's that control the MDR on unit OR+100005
RX+ 100010 ARSAWxyz RAT PACKAGE PRESENT PHOTO BLOCKED	This alarm is caused when photoeye U100010_PE_P is blocked for too long.
RX+ 100010 ARSAWxyz RAT TRANSFER MOTOR FAULT	This alarm is caused by a fault condition on the U100010_DMC1.
RX+ 100010 ARSAWxyz RAT TRANSPORT MOTOR FAULT	This alarm is caused by a fault condition on the U100010_DMC1.
OR+ 100015 ARSAWxyz FULL TOTE OVERHEIGHT JAM PHOTO BLOCKED	This alarm is caused when U100015_PE_OH is blocked.
OR+100015 ARSAWxyz FULL TOTE CLEAR PHOTO BLOCKED	This alarm is caused when U100015_PE_C is blocked for too long or at the wrong time.
OR+ 100015 ARSAWxyz ZONE1 FULL TOTE INBOUND JAM PHOTO BLOCKED	This alarm is caused when U100015_DMC1_PE1 is blocked for too long.
OR+ 100015 ARSAWxyz ZONE1 FULL TOTE INBOUND MOTOR FAULT	This alarm is caused by a fault condition on the U100015_DMC1.
OR+ 100015 ARSAWxyz ZONE2 FULL TOTE INBOUND JAM PHOTO BLOCKED	This alarm is caused when U100015_DMC2_PE1 is blocked for too long.
OR+ 100015 ARSAWxyz ZONE2 FULL TOTE INBOUND MOTOR FAULT	This alarm is caused by a fault condition on the U100015_DMC2.
OR+ 100015 ARSAWxyz ZONE3 FULL TOTE INBOUND JAM PHOTO BLOCKED	This alarm is caused when U100015_DMC2_PE2 is blocked for too long.

Table 13 ARSAW System Manager Alarms

Alarm Text	Description
OR+ 100015 ARSAWxyz ZONE3 FULL TOTE INBOUND MOTOR FAULT	This alarm is caused by a fault condition on the U100015_DMC2.
OR+ 100015 ARSAWxyz ZONE4 FULL TOTE INBOUND JAM PHOTO BLOCKED	This alarm is caused when U100015_DMC3_PE1 is blocked for too long.
OR+ 100015 ARSAWxyz ZONE4 FULL TOTE INBOUND MOTOR FAULT	This alarm is caused by a fault condition on the U100015_DMC3.
OR+ 100020 ARSAWxyz ZONE1 EMPTY TOTE INBOUND JAM PHOTO BLOCKED	This alarm is caused when U100020_PE_P1 is blocked for too long.
OR+ 100020 ARSAWxyz ZONE1 EMPTY TOTE INBOUND MOTOR FAULT	This alarm is caused by a fault condition on the U100020_DMC1.
OR+ 100020 ARSAWxyz ZONE2 EMPTY TOTE INBOUND JAM PHOTO BLOCKED	This alarm is caused when U100020_PE_P2 is blocked for too long.
OR+ 100020 ARSAWxyz ZONE2 EMPTY TOTE INBOUND MOTOR FAULT	This alarm is caused by a fault condition on the U100020_DMC1.
OR+ 100020 ARSAWxyz ZONE3 EMPTY TOTE INBOUND JAM PHOTO BLOCKED	This alarm is caused when U100020_PE_P3 is blocked for too long.
OR+ 100020 ARSAWxyz ZONE3 EMPTY TOTE INBOUND MOTOR FAULT	This alarm is caused by a fault condition on the U100020_DMC2.
OR+ 100020 ARSAWxyz ZONE4 EMPTY TOTE INBOUND JAM PHOTO BLOCKED	This alarm is caused when U100020_PE_P4 is blocked for too long.
OR+ 100020 ARSAWxyz ZONE4 EMPTY TOTE INBOUND MOTOR FAULT	This alarm is caused by a fault condition on the U100020_DMC2.
SB+ 100025 ARSAWxyz ACCUMULATION ZONE MOTOR FAULT	This alarm is caused by a fault condition on the U100025_DMC1 or any of the DMCN's.
SB+ 100025 ESTOP PULLCORD #1 ACTUATED	This alarm is caused when U100025_PC_ES1 is actuated.
SB+ 100025 ESTOP PULLCORD #2 ACTUATED	This alarm is caused when U100025_PC_ES2 is actuated.
SB+ 100025 ARSAWxyz CONSTANT SPEED BELT MOTOR FAULT	This alarm is caused by a fault condition on the U100025_DMCY.
SB+ 100025 ARSAWxyz CONSTANT SPEED JAM PHOTO BLOCKED	This alarm is caused when U100025_PE_J is blocked for too long.
DE-STACKER+ 100030 ARSAWxyz DE-STACKER TOTE BOUNCE BACK JAM PHOTO BLOCKED	This alarm is caused when U100030_PE_C is blocked for too long or at the wrong time.
DE-STACKER+ 100030 ARSAWxyz DE-STACKER OVERHEIGHT JAM PHOTO BLOCKED	This alarm is caused when U100030_PE_OH is blocked.
DE-STACKER+ 100030 ARSAWxyz DE-STACKER PACKAGE PRESENT PHOTO BLOCKED	This alarm is caused when U100030_PE_P1 is blocked for too long.

Table 13 ARSAW System Manager Alarms

Alarm Text	Description
DE-STACKER+ 100030 ARSAWxyz DE-STACKER MOTOR FAULT	This alarm is caused by a fault condition on U100030_DMC1.
LIFT+ 100030 ARSAWxyz LIFT JAM PHOTO BLOCKED	This alarm is caused when U100030_PE_P5 is blocked for too long.
LIFT+ 100030 ARSAWxyz LIFT P3 PHOTO BLOCKED	This alarm is caused when U100030_PE_P3 is blocked for too long.
LIFT+ 100030 ARSAWxyz LIFT P4 PHOTO BLOCKED	This alarm is caused when U100030_PE_P4 is blocked for too long.
LIFT+ 100030 ARSAWxyz LIFT MOTOR FAULT	This alarm is caused by a fault condition on U100030_DMC2.
RG+100035 ESTOP PUSHBUTTON #1 ACTUATED	This alarm is caused when 1CS+122 E-Stop Pushbutton is actuated.
RG+100035 ESTOP PUSHBUTTON #2 ACTUATED	This alarm is caused when 2CS+122 E-Stop Pushbutton is actuated.
RG+100035 ARSAWxyz CASE STOP1 PACKAGE PRESENT PHOTO BLOCKED	This alarm is caused when U100035_PE_P1 is blocked for too long.
RG+100035 ARSAWxyz CASE STOP10 PACKAGE PRESENT PHOTO BLOCKED	This alarm is caused when U100035_PE_P10 is blocked for too long.
RG+100035 ARSAWxyz CASE STOP11 PACKAGE PRESENT PHOTO BLOCKED	This alarm is caused when U100035_PE_P11 is blocked for too long.
RG+100035 ARSAWxyz CASE STOP12 PACKAGE PRESENT PHOTO BLOCKED	This alarm is caused when U100035_PE_P12 is blocked for too long.
RG+100035 ARSAWxyz CASE STOP2 PACKAGE PRESENT PHOTO BLOCKED	This alarm is caused when U100035_PE_P2 is blocked for too long.
RG+100035 ARSAWxyz CASE STOP3 PACKAGE PRESENT PHOTO BLOCKED	This alarm is caused when U100035_PE_P3 is blocked for too long.
RG+100035 ARSAWxyz CASE STOP4 PACKAGE PRESENT PHOTO BLOCKED	This alarm is caused when U100035_PE_P4 is blocked for too long.
RG+100035 ARSAWxyz CASE STOP5 PACKAGE PRESENT PHOTO BLOCKED	This alarm is caused when U100035_PE_P5 is blocked for too long.
RG+100035 ARSAWxyz CASE STOP6 PACKAGE PRESENT PHOTO BLOCKED	This alarm is caused when U100035_PE_P6 is blocked for too long.
RG+100035 ARSAWxyz CASE STOP7 PACKAGE PRESENT PHOTO BLOCKED	This alarm is caused when U100035_PE_P7 is blocked for too long.
RG+100035 ARSAWxyz CASE STOP8 PACKAGE PRESENT PHOTO BLOCKED	This alarm is caused when U100035_PE_P8 is blocked for too long.
RG+100035 ARSAWxyz CASE STOP9 PACKAGE PRESENT PHOTO BLOCKED	This alarm is caused when U100035_PE_P9 is blocked for too long.
RG+100035 ARSAWxyz SIDE-A LONG RANGE JAM PHOTO BLOCKED	This alarm is caused when U100035_PE_JLR1 is blocked for too long.
RG+100035 ARSAWxyz SIDE-B LONG RANGE JAM PHOTO BLOCKED	This alarm is caused when U100035_PE_JLR2 is blocked for too long.

Table 13 ARSAW System Manager Alarms

Alarm Text	Description
ARSAWxyz ARMOR BLOCK #1 ETHERNET OFFLINE	This alarm is caused when Armor Block 1 is not communicating with the PLC.
ARSAWxyz ARMOR BLOCK #2 ETHERNET OFFLINE	This alarm is caused when Armor Block 2 is not communicating with the PLC.
ARSAWxyz ARMOR BLOCK #3 ETHERNET OFFLINE	This alarm is caused when Armor Block 3 is not communicating with the PLC.
ARSAWxyz ARMOR BLOCK #4 ETHERNET OFFLINE	This alarm is caused when Armor Block 4 is not communicating with the PLC.
ARSAWxyz ARMOR BLOCK #5 ETHERNET OFFLINE	This alarm is caused when Armor Block 5 is not communicating with the PLC.
ARSAWxyz ARMOR BLOCK #6 ETHERNET OFFLINE	This alarm is caused when Armor Block 6 is not communicating with the PLC.
ARSAWxyz ARMOR BLOCK #7 ETHERNET OFFLINE	This alarm is caused when Armor Block 7 is not communicating with the PLC.
ARSAWxyz ARMOR BLOCK #8 ETHERNET OFFLINE	This alarm is caused when Armor Block 8 is not communicating with the PLC.
ARSAWxyz ARMOR BLOCK #9 ETHERNET OFFLINE	This alarm is caused when Armor Block 9 is not communicating with the PLC.
OR+ 100020 ESTOP PUSHBUTTON ACTUATED	This alarm is caused when 4CS+122 E-Stop pushbutton is actuated.
ARSAWxyz DE-STACKER+ 100030 LIFTERS FAULT (CYLINDER AND/OR SENSOR)	This alarm is caused when the U100030_PRX_TL_E1, U100030_PRX_TL_E2, U100030_PRX_TL_R1, and U100030_PRX_TL_R2 are not sensing the lifter cylinder positions to where they are expected to be.
ARSAWxyz DE-STACKER+ 100030 POSITION FAULT (CYLINDER AND/OR SENSOR)	This alarm is caused when the U100030_PRX_P1, U100030_PRX_P2, and U100030_PRX_P3 are not sensing the expected cylinder position.
ARSAWxyz DE-STACKER+ 100030 RETAINERS FAULT (CYLINDER AND/OR SENSOR)	This alarm is caused when the U100030_PRX_TR_E1, U100030_PRX_TR_E2, U100030_PRX_TR_R1, and U100030_PRX_TR_R2 are not sensing the retainer cylinder positions to where they are expected to be.
ARSAWxyz DE-STACKER+ 100030 EXTEND LIFTERS FAULT	This alarm is caused when the lifters cylinders are extended and do not reach their intended destination.
ARSAWxyz DE-STACKER+ 100030 EXTEND RETAINERS FAULT	This alarm is caused when the retainers cylinders are extended and do not reach their intended destination.
ACCESS GATE SWITCH #1 OPEN	This alarm is caused when the U100030_DI_ES1 Door Interlock is open.
ACCESS GATE SWITCH #2 OPEN	This alarm is caused when the U100030_DI_ES2 Door Interlock is open.
ARSAWxyz LIFT APR FAULT (SEE ROCKWELL MANUAL)	This alarm is caused when the servo has lost its absolute position reference. Needs to be re-homed.

Table 13 ARSAW System Manager Alarms

Alarm Text	Description
ARSAWxyz LIFT LOWER OVERTRAVEL SWITCH FAULT	This alarm is caused when the lower overtravel limit switch U100030_LS_OT_L is actuated.
ARSAWxyz LIFT MODULE FAULT (SEE ROCKWELL MANUAL)	This alarm is caused when a serious fault has occurred with the motion module associated with the selected axis.
ARSAWxyz LIFT NOT CLEAR (OVERHANG PHOTOS)	This alarm is caused when the lift is commanded to move and one of the following sensors is blocked. U100030_PE_C, U100030_PE_P3, U100030_PE_P4, U100015_PE_C.
ARSAWxyz LIFT FAULTED STATE	This alarm is caused when the lift is a faulted state.
ARSAWxyz LIFT UPPER OVERTRAVEL SWITCH FAULT	This alarm is caused when the upper overtravel limit switch U100030_LS_OT_U is actuated.
ARSAWxyz DE-STACKER+ 100030 LOWER TO DROP(HOME) POSITION FAULT	This alarm is caused when the de-stacker does not reach the home position (down).
ARSAWxyz DE-STACKER+ 100030 MOVE TO PICK POSITION FAULT	This alarm is caused when the de-stacker does not reach the pick position (middle).
ARSAWxyz DE-STACKER+ 100030 RAISE TO CLEAR POSITION FAULT	This alarm is caused when the de-stacker does not reach the clear position (top).
ARSAWxyz DE-STACKER+ 100030 RETRACT LIFTERS FAULT	This alarm is caused when the lifters cylinders are retracted and do not reach their intended destination.
ARSAWxyz DE-STACKER+ 100030 RETRACT RETAINERS FAULT	This alarm is caused when the retainers cylinders are retracted and do not reach their intended destination.
ARSAWxyz SERVO ETHERNET OFFLINE	This alarm is caused when 0120SERVO is not communicating with the PLC.
ARSAWxyz TRUNKLINE JAM PHOTO BLOCKED	This alarm is caused when TRUNK_PE_J is blocked for too long.
ARSAWxyz PLC TO PLC COMM FAULT	This alarm is caused when the ARSAW PLC is not communicating to the associated RSP Trunkline PLC.

7 Repair

This section provides removal and replacement procedures for replaceable parts and assemblies. As you follow the removal steps to reach the part that is to be replaced, you might have to remove other parts. Inspect these parts for wear or other problems and replace them at this time if necessary.

INFO Use care not to damage good parts when trying to reach a particular part.

The heading for each procedure references the part or parts to replace. The reference following the part name [Figure X - Item (XX)] directs you to the illustration containing that part for a visual reference.

In the procedure, when applicable, the number adjacent to the part referenced in that step refers to a Figure and Item number, as in Figure 5-(9). If the figure number is not listed, the item number refers to the last figure that was referenced.



WARNING

Do not perform adjustments, maintenance, clearing of jams, or any other work on this equipment unless you are competent in carrying out the energy isolation procedure as required by national or local authorities. The purpose of energy isolation procedure is to protect all persons involved against unexpected startup of the equipment. Personnel should be alerted to the hazard of stored energy which may exist after the source of energy has been isolated. Refer to national, local, or employer procedures for minimum requirements. Failure to follow these requirements may result in equipment damage, serious injury, or death.

Follow standard shop practices and safety procedures whenever you remove or replace parts.

1. Make certain the system is locked out and all sources of energy are isolated before performing any maintenance activities.
2. Secure all hardware during installation.
3. Clean parts and assemblies after installation.
4. Before starting the conveyor, install all guards and covers removed during maintenance or repair activities.

7.1 ARSAW Conveyors

INFO For repair information on the conveyors used in the ARSAW, refer to section 2.7.

7.2 Belt Driven Linear Actuator, Servo Motor, Gear Reducer, MDR Lift Conveyor

Removal

Belt Driven Linear Actuator [Figure 16 – Item (1)]

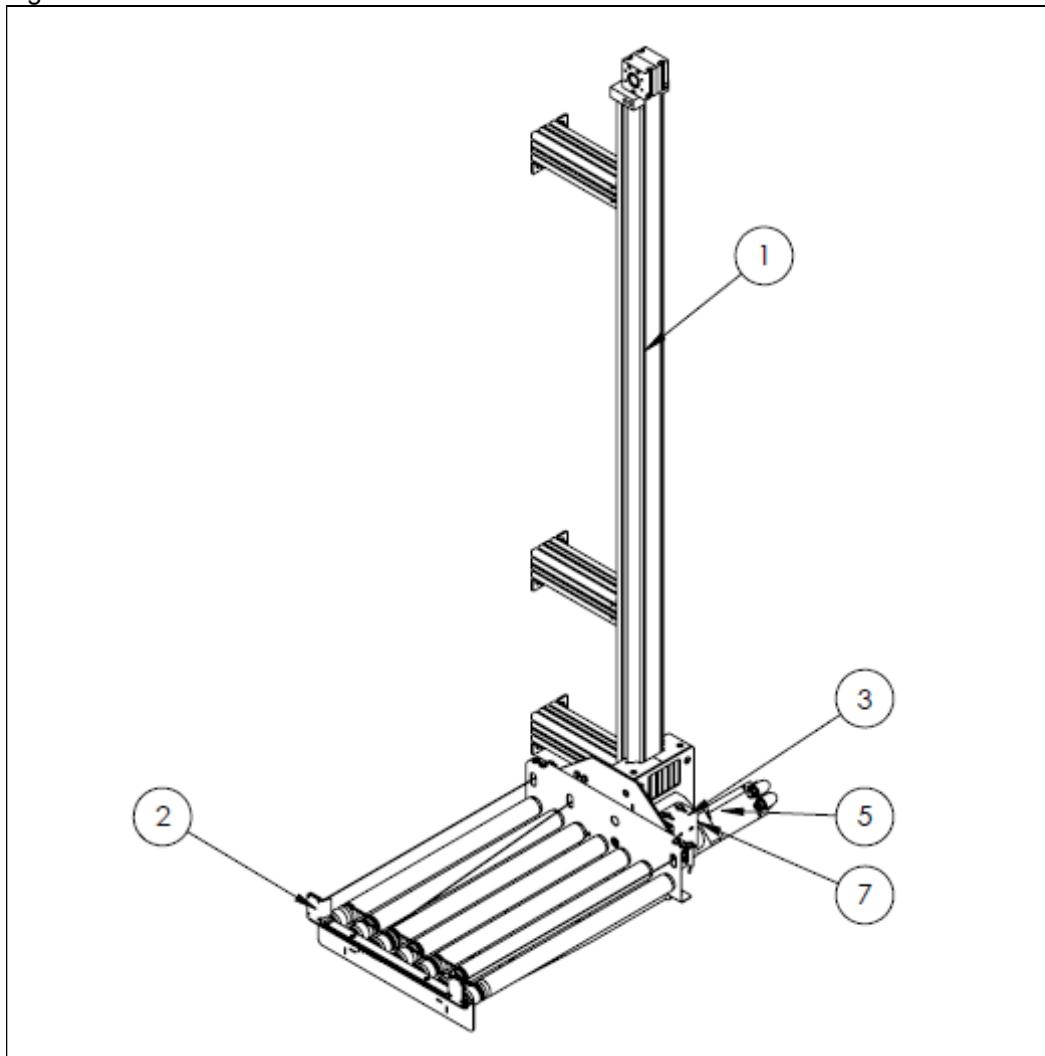
Servo Motor [Figure 16 – Item (5)]

Gear Reducer [Figure 16 – Item (7)]

MDR Lift Conveyor [Figure 16 – Item (2)]

If any component on the Belt Driven Linear Actuator (Figure 16 – (1)) needs repair, it is recommended that the entire Belt Driven Linear Actuator including the MDR Lift Conveyor carrier be removed from the ARSAW and replaced with spare Belt Driven Linear Actuator. The Belt Driven Linear Actuator may then be bench repaired. See the *Paletti Internally Tensioned Belt Driven Linear Actuator Service Manual* at the end of this service manual for detailed information.

Figure 16 Belt Driven Linear Actuator



1. Verify that the MDR Lift Conveyor is in the low position.
2. Press the CC+122 cabinet STOP pushbutton.
3. De-energize and Lock Out/Tag Out the cabinet using the external disconnect switch.
4. De-energize and Lock Out/Tag Out the de-stacker air pressure regulator.

⚠️ WARNING

You MUST turn off and lock out/ tag out the appropriate PDP or power disconnect point BEFORE continuing. Make sure all forms of energy are isolated.

5. Open the service door (see Figure 10).
6. Remove the 8 bolts from the 2 cross members to remove the entire backstop.



7. Remove the servo motor guard.

Figure 17 Servo Motor Guard



8. Noting their locations, disconnect all wiring to the servo motor and MDR Lift Conveyor.
9. Unbolt and remove the MDR Lift Conveyor assembly (2) from the Belt Driven Linear Actuator (1) and remove it from the structural frame.
10. Remove the servo motor (5) and gear reducer (7) from the bottom pulley on the Belt Driven Linear Actuator (1).
11. Unbolt and remove the Belt Driven Linear Actuator from the structural frame.

Replacement

Belt Driven Linear Actuator [Figure 16 – Item (1)]

Servo Motor [Figure 16 – Item (5)]

Gear Reducer [Figure 16 – Item (7)]

Lift MDR Conveyor [Figure 16 – Item (2)]

1. Position the Belt Driven Linear Actuator inside the structural frame and bolt in place.
2. Install the servo motor and gear reducer onto the Belt Driven Linear Actuator. Refer to the *Conveyor Concepts Servo-Gear Head-Lift Actuator Assembly Manual* at the end of this manual for detailed information.
3. Install the MDR Lift Conveyor onto the Belt Driven Linear Actuator carrier.
4. Install the servo motor guard.
5. Install the structural supports in the service door opening.
6. Close and secure the service door.

7. Remove the Lock Out/Tag Out on the de-stacker air pressure regulator and energize the regulator.
8. Remove the Lock Out/Tag Out on the cabinet using and re-energize using the external disconnect switch.
9. Return the ARSAW to operation and ensure that the lift is properly homed.

7.3 Tote Lift/Retainer Pneumatic Actuator

Removal

1. Press the CC+122 cabinet STOP pushbutton.
2. De-energize and Lock Out/Tag Out the cabinet using the external disconnect switch.
3. De-energize and Lock Out/Tag Out the de-stacker air pressure regulator.

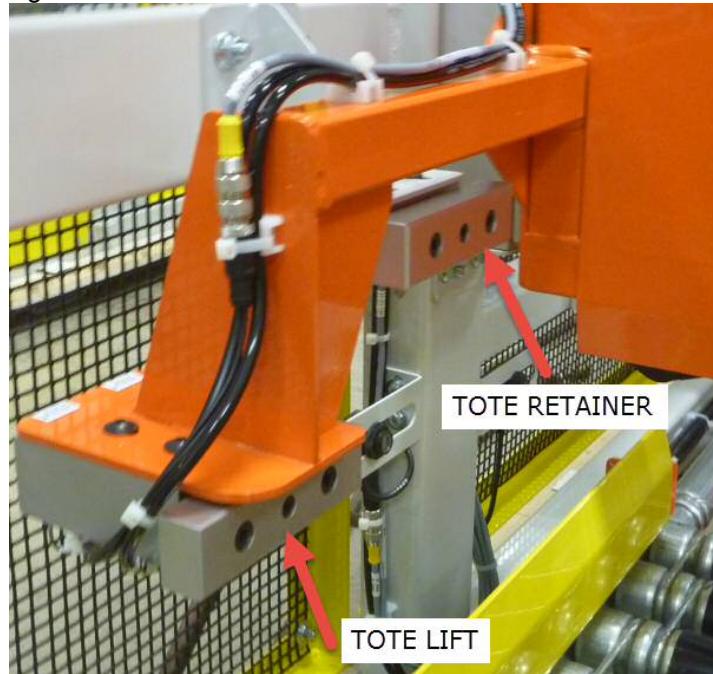


WARNING

You **MUST** turn off and lock out/ tag out the appropriate PDP or power disconnect point **BEFORE** continuing. Make sure all forms of energy are isolated.

4. Open the secondary service door (see Figure 10).
5. Noting their locations, disconnect the wiring and air tubing to the failed lift or retainer pneumatic cylinder (see Figure 18).
6. Unbolt the actuator from its mounting bracket.

Figure 18 Tote Lift/Retainer Pneumatic Actuators



Replacement

1. Install the lift or retainer actuator on its mounting bracket.
2. Reconnect air tubing and wiring and dress the wiring harness as necessary.
3. Close and secure the secondary service door.
4. Remove the Lock Out/Tag Out on the de-stacker air pressure regulator and energize the regulator.
5. Remove the Lock Out/Tag Out on the cabinet using and re-energize using the external disconnect switch.
6. Return the ARSAW to service.

7.4 De-stacker Proximity Sensors

Removal

1. Verify that the de-stacker lift weldment is in the low position.
2. Press the CC+122 cabinet STOP pushbutton.
3. De-energize and Lock Out/Tag Out the cabinet using the external disconnect switch.
4. De-energize and Lock Out/Tag Out the de-stacker air pressure regulator.



You MUST turn off and lock out/ tag out the appropriate PDP or power disconnect point BEFORE continuing. Make sure all forms of energy are isolated.

5. Open the secondary service door (see Figure 10).
6. Mark the location of the proximity sensor on the mounting bracket.
7. Disconnect the proximity sensor cable and remove the sensor from the mounting bracket.

Figure 19 De-stacker Proximity Sensors (Top Sensor Shown for Reference)



Replacement

1. Install the proximity sensor in the same location using the removal marks.
2. Reconnect the sensor's cable.
3. Close and pin the service door.
4. Return the ARSAW to operation and ensure that empty tote de-stacker is working properly.

7.5 De-stacker Pneumatic Cylinder

Removal

1. Verify that the de-stacker lift weldment is in the low position.
2. Press the CC+122 cabinet STOP pushbutton.
3. De-energize and Lock Out/Tag Out the cabinet using the external disconnect switch.
4. De-energize and Lock Out/Tag Out the de-stacker air pressure regulator.



WARNING

You **MUST** turn off and lock out/ tag out the appropriate PDP or power disconnect point BEFORE continuing. Make sure all forms of energy are isolated.

5. Open the service door (see Figure 10).
6. Disconnect the air tubing from the de-stacker pneumatic cylinder (see Figure 20).

Figure 20 De-stacker Pneumatic Cylinder



7. Disconnect the cylinder shaft from the de-stacker lift weldment. Use caution as the weldment will travel downward slightly till it reaches the end of the guide tracks and bottoms out.



8. Remove the cotter pin and mounting pin from the top of the cylinder and remove the cylinder.



Replacement

1. Install the pneumatic cylinder
2. Reconnect the air tubing.
3. Close and pin the service door.
4. Remove the Lock Out/Tag Out on the de-stacker air pressure regulator and energize the regulator.
5. Remove the Lock Out/Tag Out on the cabinet using and re-energize using the external disconnect switch.
6. Return the ARSAW to operation and ensure that empty tote de-stacker is working properly.

7.6 Photo Sensors/Reflectors

Removal

If a photo sensor or reflector (see Figure 21) has been damaged or has failed:

1. Press the CC+122 cabinet STOP pushbutton.
2. De-energize and Lock Out/Tag Out the cabinet using the external disconnect switch.
3. De-energize and Lock Out/Tag Out the de-stacker air pressure regulator.
4. Open the service or secondary service door as necessary (see Figure 10).
5. Disconnect the photo sensor from the wiring harness.
6. Mark the location of the photo sensor/reflector if installed on an adjustable mounting bracket.
7. Remove the photo sensor/reflector.



You MUST turn off and lock out/ tag out the appropriate PDP or power disconnect point BEFORE continuing. Make sure all forms of energy are isolated.

Replacement

1. Install the photo sensor/reflector using any marks made during removal.
2. Align the photo sensor.
3. Close and secure the service or secondary service door as necessary.
4. Remove the Lock Out/Tag Out on the de-stacker air pressure regulator and energize the regulator.
5. Remove the Lock Out/Tag Out on the cabinet using and re-energize using the external disconnect switch.
6. Return the ARSAW to operation.

Figure 21 Photo Sensor and Reflector Example



7.7 Upper, Lower, and Home Limit Switches

Removal

If an upper, lower or home limit switch (see Figure 22) has been damaged or has failed:

1. Press the CC+122 cabinet STOP pushbutton.
2. De-energize and Lock Out/Tag Out the cabinet using the external disconnect switch.
3. De-energize and Lock Out/Tag Out the de-stacker air pressure regulator.



WARNING

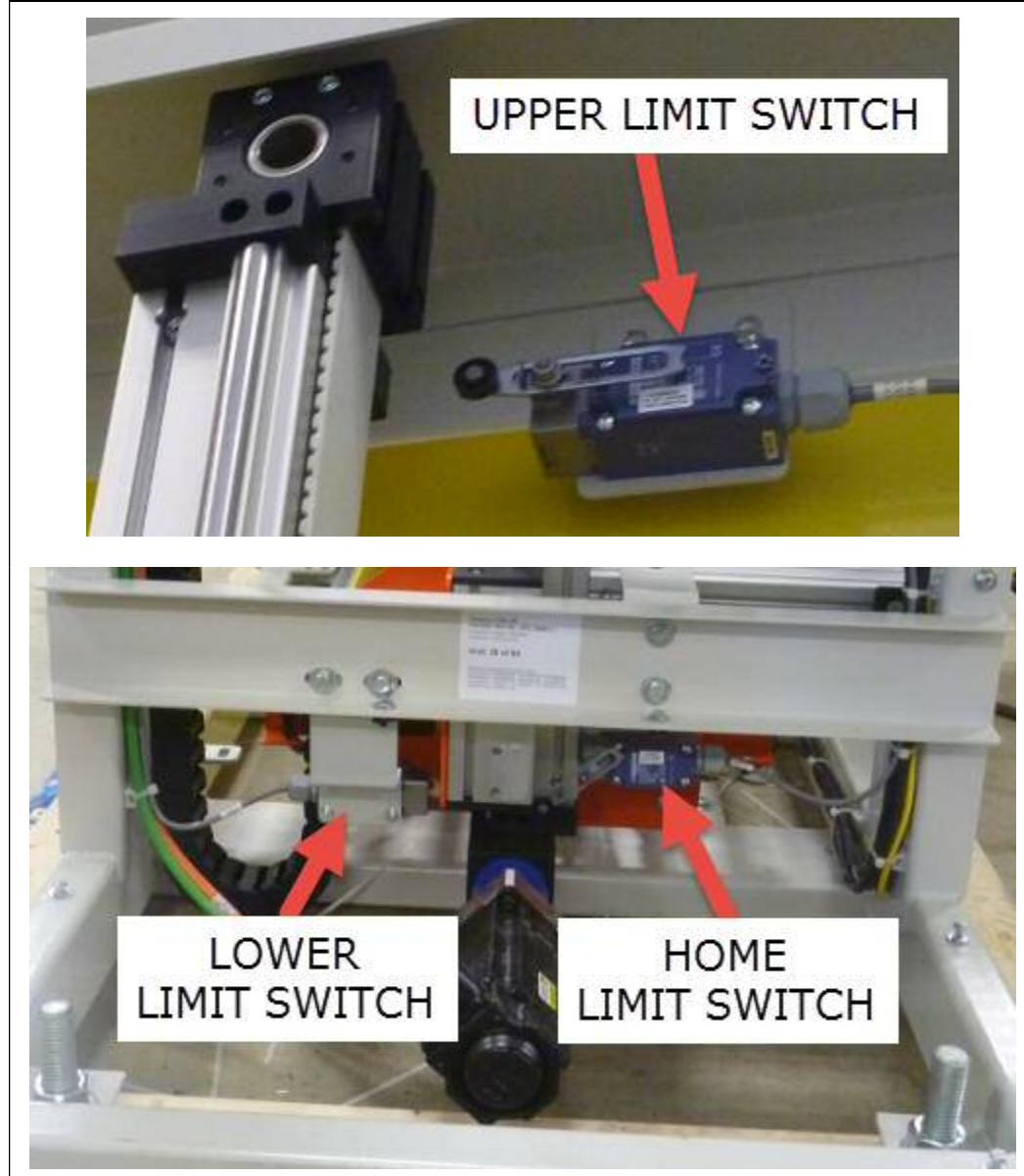
You MUST turn off and lock out/ tag out the appropriate PDP or power disconnect point BEFORE continuing. Make sure all forms of energy are isolated.

4. Open the service door (see Figure 10).
5. Remove the servo motor guard (see Figure 17).
6. Disconnect the limit switch from the wiring harness.
7. Remove the limit switch from its mounting bracket.

Replacement

1. Adjust the limit switch so that it is the same as the one removed.
2. Install the limit switch to its mounting bracket.
3. Install the servo motor guard.
4. Close and secure the service door.
5. Remove the Lock Out/Tag Out on the de-stacker air pressure regulator and energize the regulator.
6. Remove the Lock Out/Tag Out on the cabinet using and re-energize using the external disconnect switch.
7. Return the ARSAW to operation and verify the lift is operating correctly.

Figure 22 Limit Switches



**AMAZON TOTE DESTACKER AND
LIFT UNIT
14DC1687P01**

- Standard Kiva GENII -

**PREVENTIVE MAINTENANCE
SCHEDULE**

Preventive Maintenance Schedule - Rev 01

Component	Suggested Action	Weekly	Monthly	Quarterly	6 Months
All	Clean				
	Check for loose fasteners				
	Check for physical damage, replace worn or damaged components as required				
Motor & Gear Reducer	Check for noise				
	Check mounting bolt torque *See note #3				
	Re-Torque and Check - Servo motor clamp hub torque (124 In Lbs) *See note #3				
	Re-Torque and Check - Gear box to Paletti Clamping Hub (71 In Lbs, Aluminum) *See note #3				
	Note: If connection is damaged replace hub and clean gear head output shaft				
	Re-Torque and Check - Gear box to Paletti expansion coupling (106 In Lbs) *See note #3				
	Notes:	1) De-Oil all shafts, clamp hubs, and expansion couplings prior to assembly 2) Refer to Wittenstein/Alphamanual manual pages for additional details 3) Check minimum every 500 hrs run time			
Paletti - Lift	Check for noise				
	Inspect guide rails for rust or un-even wear				
	Felt Pads in Wiper-Lube Unit - Verify pads are moist with #2 Way Oil or synthetic food grade lubricant for SS applications				
	Replace Wiper-Lube Unit *See note #2				
	Notes:	1) Refer to Paletti manual pages for additional information 2) Replace minimum every 2,000 hrs run time			
Paletti - Empty Tote	Check for noise				
	Inspect carriages, guides, and rails for wear or damage, replace as required				
Alignment Coupler On Empty Tote Carriage	Check Jam nut to Alignment Coupler connection - Confirm jam nut is locked/tight				
Air Actuators & Pneumatic System	Check for noise				
	Check mounting bolts				
	Check airlines and connections for leaks or damaged components				
	Empty moisture from sediment bowl				
Structural	Check for loose fasteners				
	Check for physical damage				
Rollers	Check for noise				
	Check for wear, replace as required				
Guide Rollers	Check for noise				
	Check mounting bolts				
	Check for wear, replace as required				
UHMW Guides	Check for wear, replace as required				
	Check for loose fasteners				
Belts	Check for physical damage, replace as required				



Project: 14DC1241P01

Date: 10/08/2014 Revision: 04

Subject: Servo/Gear Head/Paletti Clamping Hub/Paletti Coupling Connection

This document identifies key components and outlines proper assembly for the servo, gear head, and Paletti lift actuator.

General Notes:

- 1) If a jam is incurred, unit has been over traveled, or if slippage has been experienced. Maintenance must disassemble/remove the motor and gear head from the unit and inspect the motor to gear head and gear head to Paletti connections. Replace any worn or scored items, and clean the shafts. Gear head output shaft must be cleaned up and all aluminum removed from shaft prior to re-assembly. All connections must be torqued to factory specifications listed in manual and this document.
 - Unit is designed to have the Aluminum Paletti Clamping Hub which couples the gear head to Paletti unit slip in the event of a jam, crash, over travel condition instead of damaging or destroying a more expensive gear head, servo motor, or Paletti unit.
 - Secure a strap to conveyor carriage and tied back to unit frame. This will keep carriage from dropping/free falling when motor/gear head is removed from Paletti unit. May have to raise or lower strap to line up set screws with access holes.
- 2) Anytime the motor/gear head unit has been taken apart or components replaced remove oil, grease, ... from all metallic parts and shafts prior to assembling components. Use a clean rag and a degreaser (brake cleaner). Spray cleaner on rag and wipe components, do not spray components directly. Re-torque all connections to factory specifications listed in manual and this document.
- 3) Conveyor Lift Carriage – In the event of a jam or crash inspect the conveyor lift carriage for damage. If carriage has been bent or damaged carriage must be replaced.
 - Do not sit, stand, or ride on the carriage, unit was not designed to support weight other than the tote and its load.
- 4) Reference picture #14 for important installation notes
- 5) Refer to manufacturers manual for additional instructions and or contact Paletti USA at (267) 289-0020

Picture #1





Drive train Dis-Assembly and Re-Assembly instructions

If possible move carriage up 25% from lower position to make access to bolt removal easier.

****Lock-Out/Tag-Out Power to unit**

Steps to remove Servo/Gear box assembly from Paletti unit

- Remove yellow guard (ref picture #1)
- **Attach ratchet strap from frame to carriage to keep carriage from dropping when Servo/Gear box removed**
- Dis-connect the cables from the Servo motor
- Remove (3) bolts from back side of Paletti (carriage side) using a 5MM hex wrench (ref back side of picture #13)
- Remove Servo/Gear box by pulling out back of unit

Steps to Re-Install Servo/Gear box assembly to Paletti unit

(After Expansion Coupling installed into Paletti unit properly)

- Hold Servo/Gear box assembly up to Paletti unit, slowly ratchet carriage up as required until the Couplings align/mate with each other and Servo/Gear box assembly engages and mates with Paletti unit (ref picture #13)
- Install (3) bolts from the back side of Paletti unit, stagger torque/tighten them. **Do not over tighten bolts**
- Re-Connect the cables to Servo motor
- Re-Install yellow guard (ref picture #1)
- Remove ratchet strap from frame and carriage

Steps to remove Servo Motor from Gear box

- Remove Servo motor from Gear box by using a 5MM hex wrench to remove (4) bolts that mount Servo motor to Gear box (ref picture #4,5)
- Remove rubber cap from Gear box and rotate Servo motor until set screw aligns with hole (ref picture #4)
- Loosen set screw by using a 4MM hex wrench, pull Servo motor from Gear box (ref picture #4)
- Remove Alpha Clamp Hub (ref picture #4,5)

Steps to Re-Install Servo Motor to Gear box

- Clean Servo Motor shaft with brake cleaner and rag (ref picture #5)
Note: Spray brake cleaner onto rag then wipe
- Clean inside of Gear box hub with brake cleaner and rag (ref picture #6)
Note: Spray brake cleaner onto rag then wipe



- Clean Alpha Clamp Hub inside and outside with brake cleaner and rag (ref picture #4,5)
- Insert Alpha Clamp Hub into Gear box, align slot in Alpha Clamp Hub with #7 on Gear box (ref picture #6)
- Rotate Gear box shaft to align the set screw with hole in Gear box (ref picture #6)
- Insert Servo Motor into Alpha Clamp Hub/Gear box, align the keyway on Servo Motor with the slot in Alpha Clamp Hub and #7 on Gear box (ref picture #6)
- Hold Servo Motor tight to Gear box and torque the Alpha Clamp Hub set screw by using 4MM hex wrench to 124 in Lbs
Note: May need to cut a 4MM hex key to 1-3/4" lg and insert and tape into a 4MM socket to reach thru Gear box hole to torque the Alpha Clamp Hub set screw
- Rotate Servo Motor to align mounting bolts with Gear box, tighten with 5MM hex wrench

Steps to remove Aluminum Clamp Hub

- Remove Servo motor from Gear box by using a 5MM hex wrench to remove (4) bolts that mount Servo motor to Gear box. Remove rubber cap from Gear box and rotate Servo motor until set screw aligns with hole, loosen set screw by using a 4MM hex wrench, pull Servo motor from Gear box. (ref picture #4,5)
- Rotate Gear box shaft to align hex bolt in Aluminum Clamp Hub with hole in Gear box (ref picture #3)
- Remove the socket head bolt completely by using a 4MM hex wrench (ref picture #3)
- Take a straight blade screw driver and tap into the Aluminum Clamp Hub slot just enough to expand Hub to slip off Gear box shaft (ref picture #3)
**Do not over expand Hub

Note: If the screw driver method does not work remove (4) bolts holding the black spacer block to the Gear box by using a 4MM hex wrench then remove the Aluminum Clamp Hub. Re-Install the bolts and torque using stagger torque, torque to 46 in Lbs (ref picture #7)

Steps to Re-Install Aluminum Clamp Hub

- Confirm there is not aluminum on the Gear box shaft. If aluminum present remove using fine emery cloth
- Confirm Aluminum Clamp Hub bore is not scored, if scored replace the Hub with a new one
- Clean the Gear box shaft with brake cleaner and rag
Note: Spray brake cleaner onto rag then wipe
- Clean the Aluminum Clamp Hub bore with brake cleaner and rag
- Install Aluminum Clamp Hub into the Gear box shaft (may have to use a straight blade screw driver inserted into slot to expand Hub slightly. **Do not over expand Hub. Align slot in Hub with keyway in Gear box shaft (ref picture #8)
- Insert Hub into shaft until aligned as shown in picture #8. Counter bore in Aluminum Clamp Hub to be flush with Gear box shaft (ref picture #8)



- Rotate Gear box shaft from Servo motor end until Aluminum Clamp Hub bolt lines up with hole in Gear box and insert bolt (ref picture #3)
- Torque bolt by using a 4MM hex wrench to 71 in Lbs.

Note: May need to cut a 4MM hex key to 1-3/4" lg and insert and tape into a 4MM socket to reach thru Gear box hole to torque the Aluminum Clamp Hub bolt (ref picture #3)

Steps to remove Paletti Expansion Coupling

- Reference picture #13, loosen bolt about 4 turns with 5MM hex wrench
- Take 3/4" dia brass punch and strike head of bolt to dis-engage the wedge
- Remove bolt and push wedge out back of Paletti unit
- Take 3/4" dia brass punch and gently tap the back of Expansion Coupling to push it out the front of Paletti unit

Steps to Re-Install Paletti Expansion Coupling

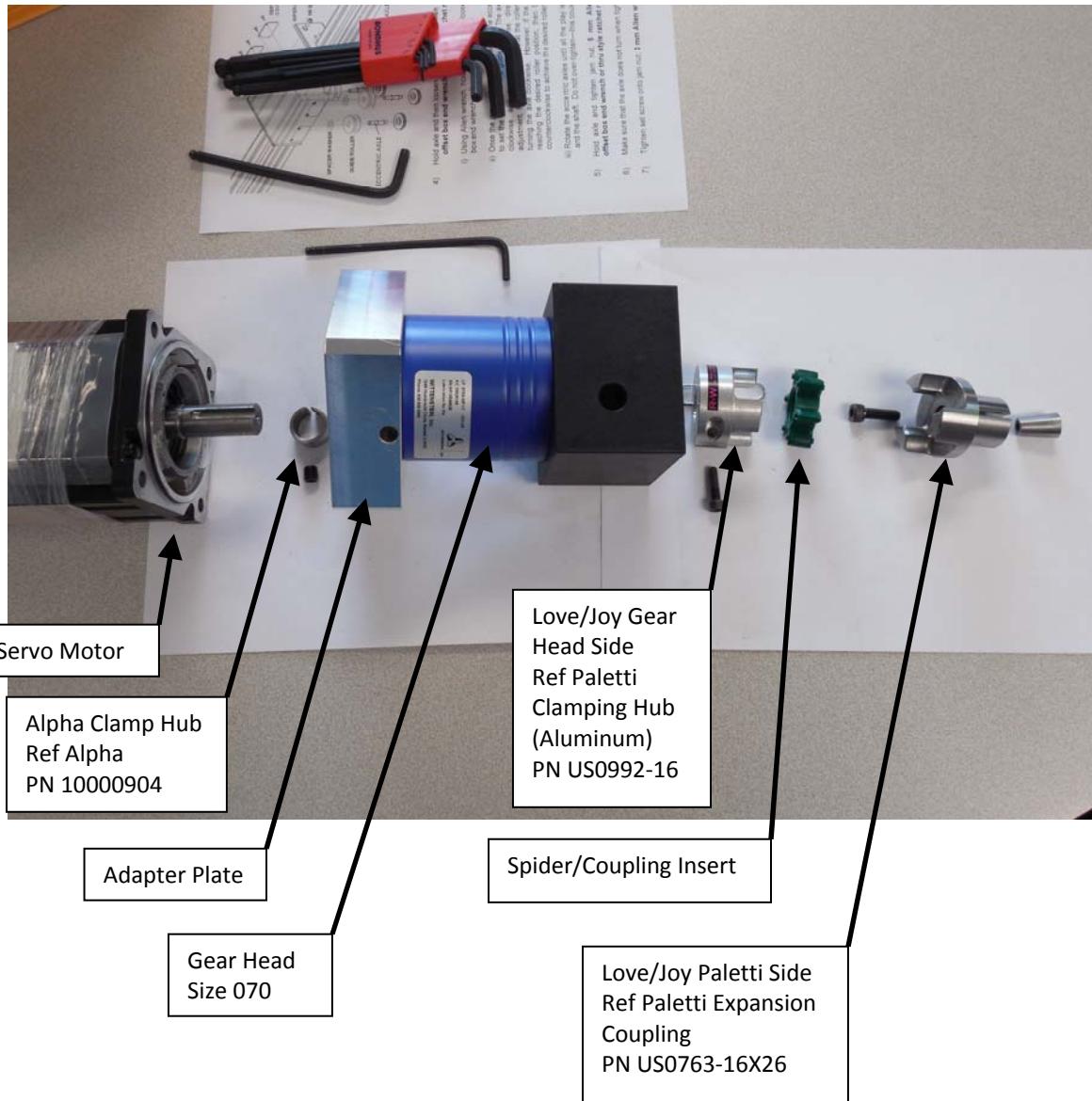
- Inspect Expansion Coupling for damage, replace if damaged
- Remove all oil from all surfaces using brake cleaner and rag
- Insert wedge into the Expansion Coupling and start bolt, don't draw wedge tight leave loose
- Insert Expansion Coupling into Paletti unit, place 1MM shims between Expansion Coupling and Paletti unit
Note: 1MM gap very critical
- Tighten wedge bolt, torque wedge bolt to 106 in Lbs
- Remove 1MM shims from behind Expansion Coupling
- Re-Install Spider/Coupling Insert (green plastic piece)

Remove Lock-Out/Tag-Out and restore power to unit

Re-Home and test unit

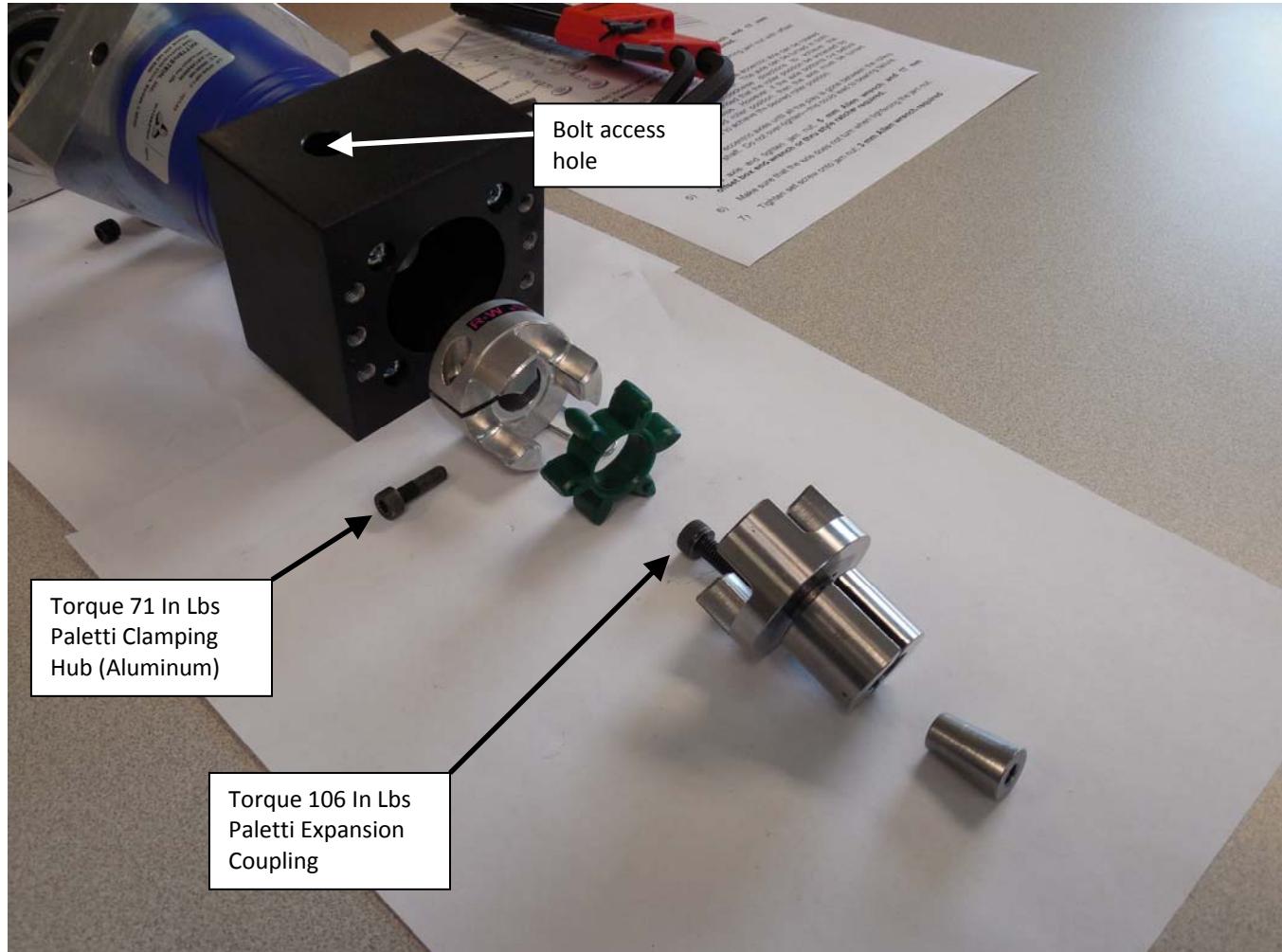
Servo/Gear Head/Coupling Assembly – Part Identification

Picture #2



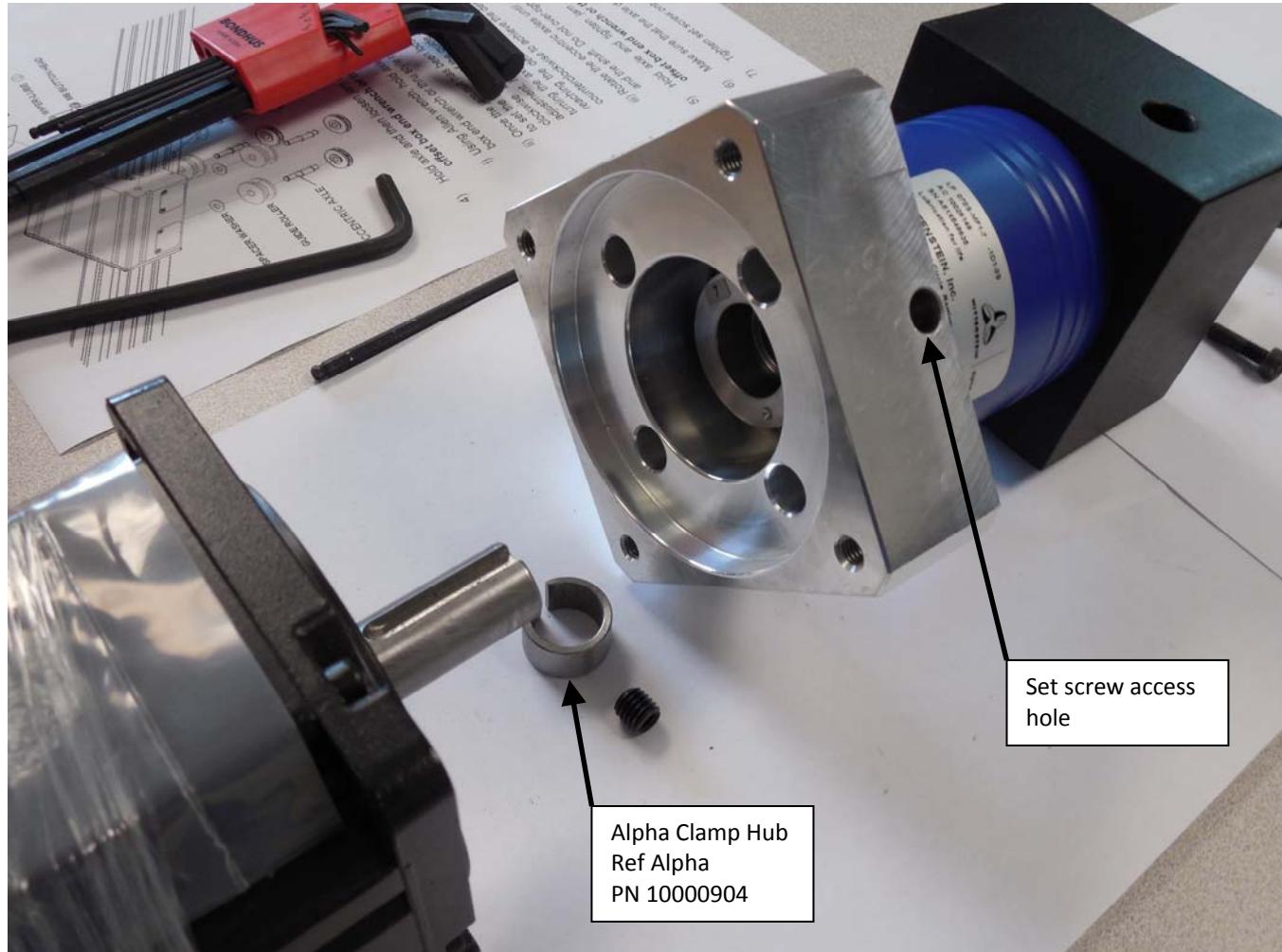
Paletti Clamp Coupling, Expansion Coupling at Gear Head – Part Identification

Picture #3



Servo/Gear Head, Alpha Clamp Hub

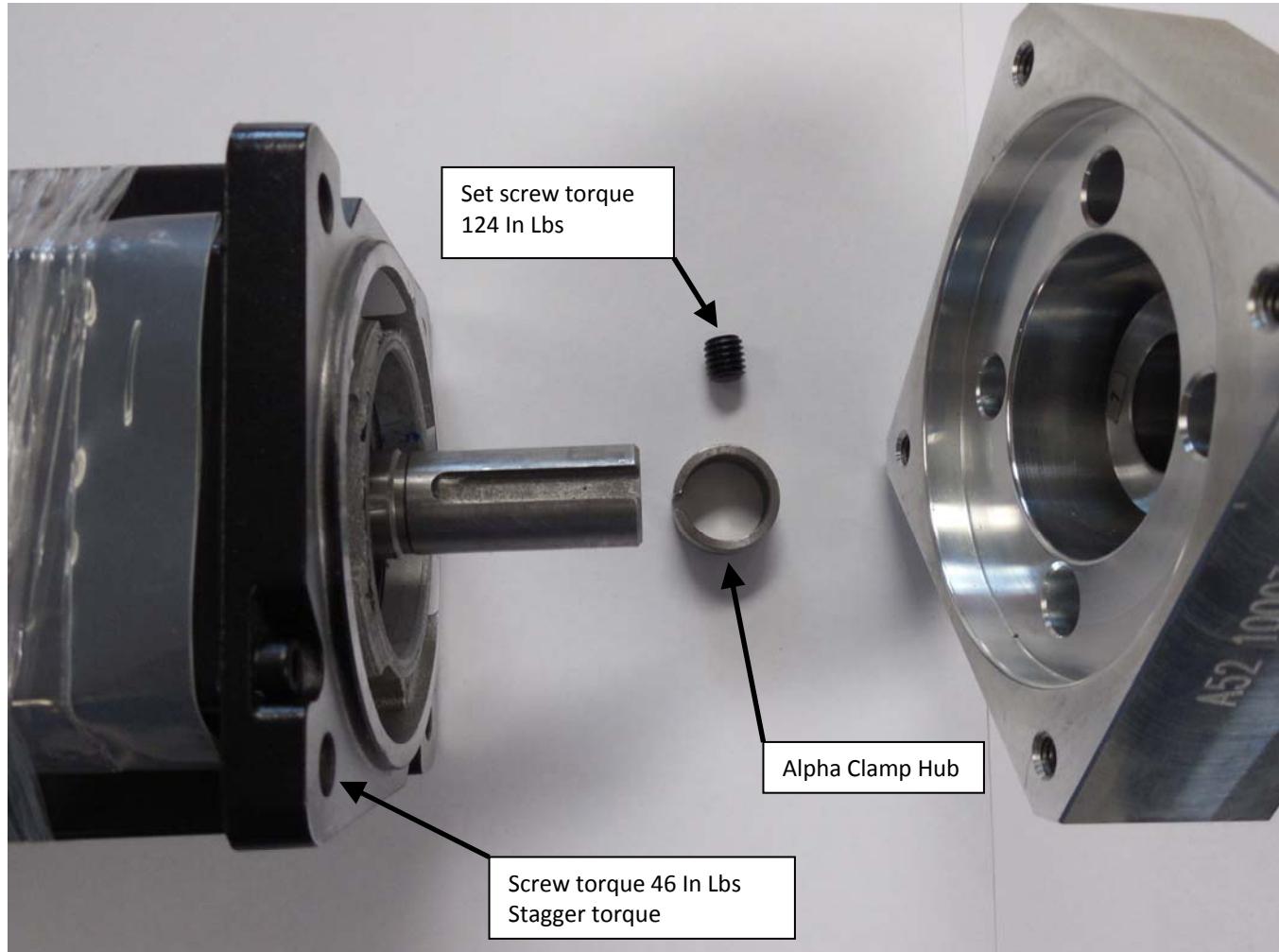
Picture #4



Carefully remove the rubber cap to access the set screw. Re-install cap after torqueing set screw.

Servo/Gear Head Connection

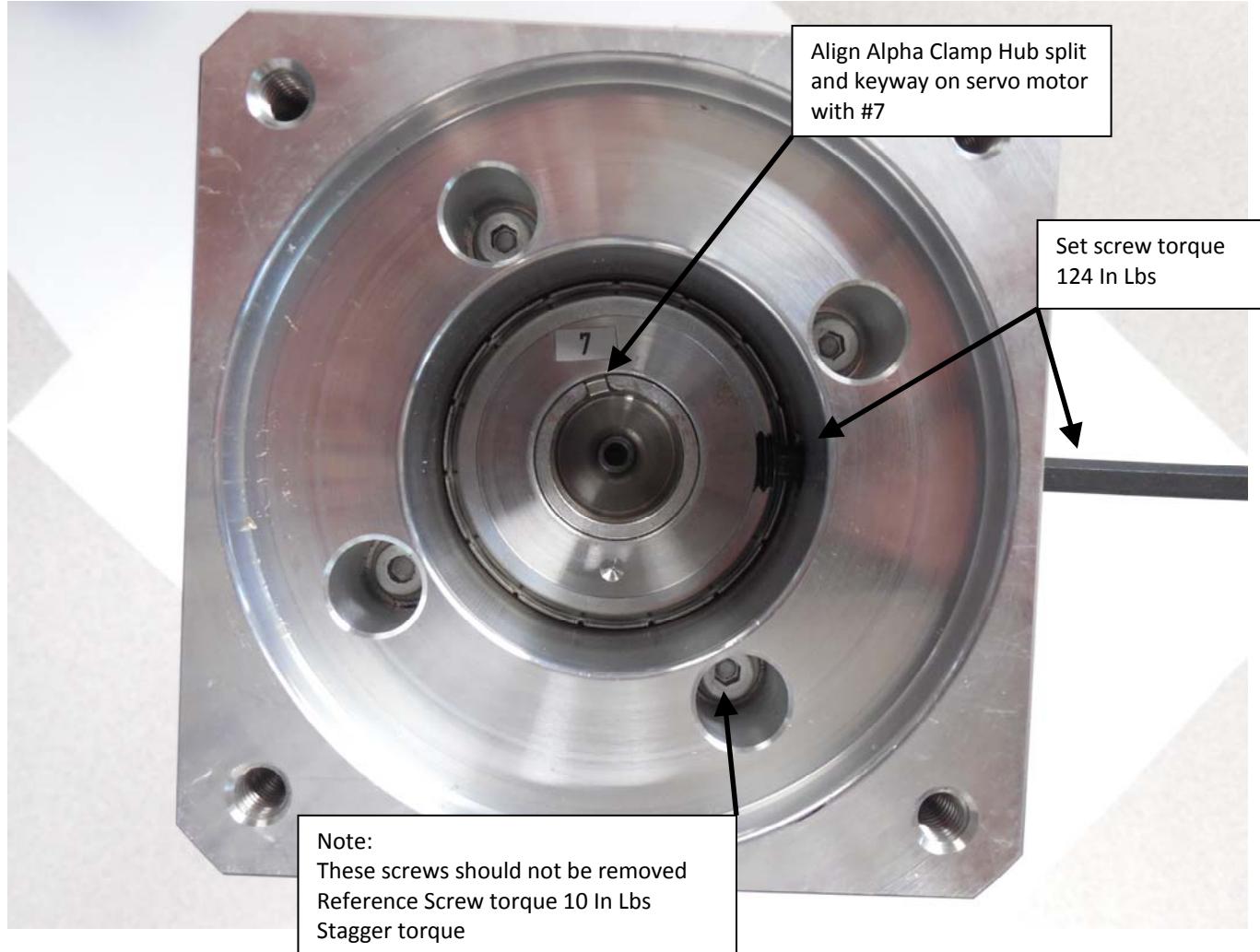
Picture #5



- Remove oil, grease, ... from all metal components prior to assembly
- Insert Alpha Clamp Hub with slit in ring pointed at the #7 (reference picture #6)
- Insert/install servo with keyway in shaft pointed at the #7 (reference picture #6)
- Holding the Servo Motor tight to Gear Head torque the Alpha Clamp Hub set screw
- Rotate Servo Motor to line up with Gear Head bolts, insert and torque bolts
- Remove plastic and documents from servo motor

Gear Head

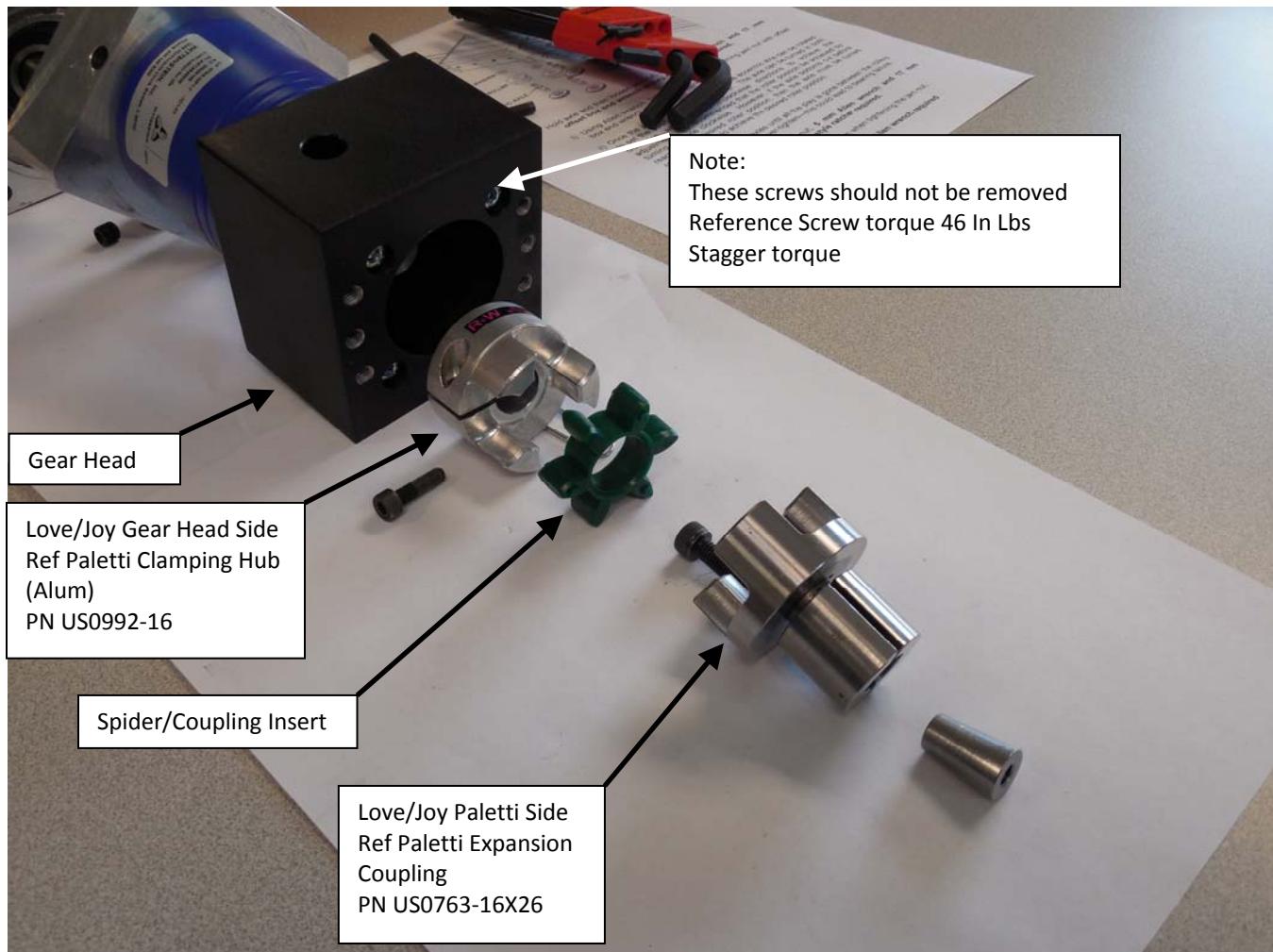
Picture #6



Refer to manual and drawing US-A-1109 for complete and addition details/instructions.

Paletti Coupling Assembly

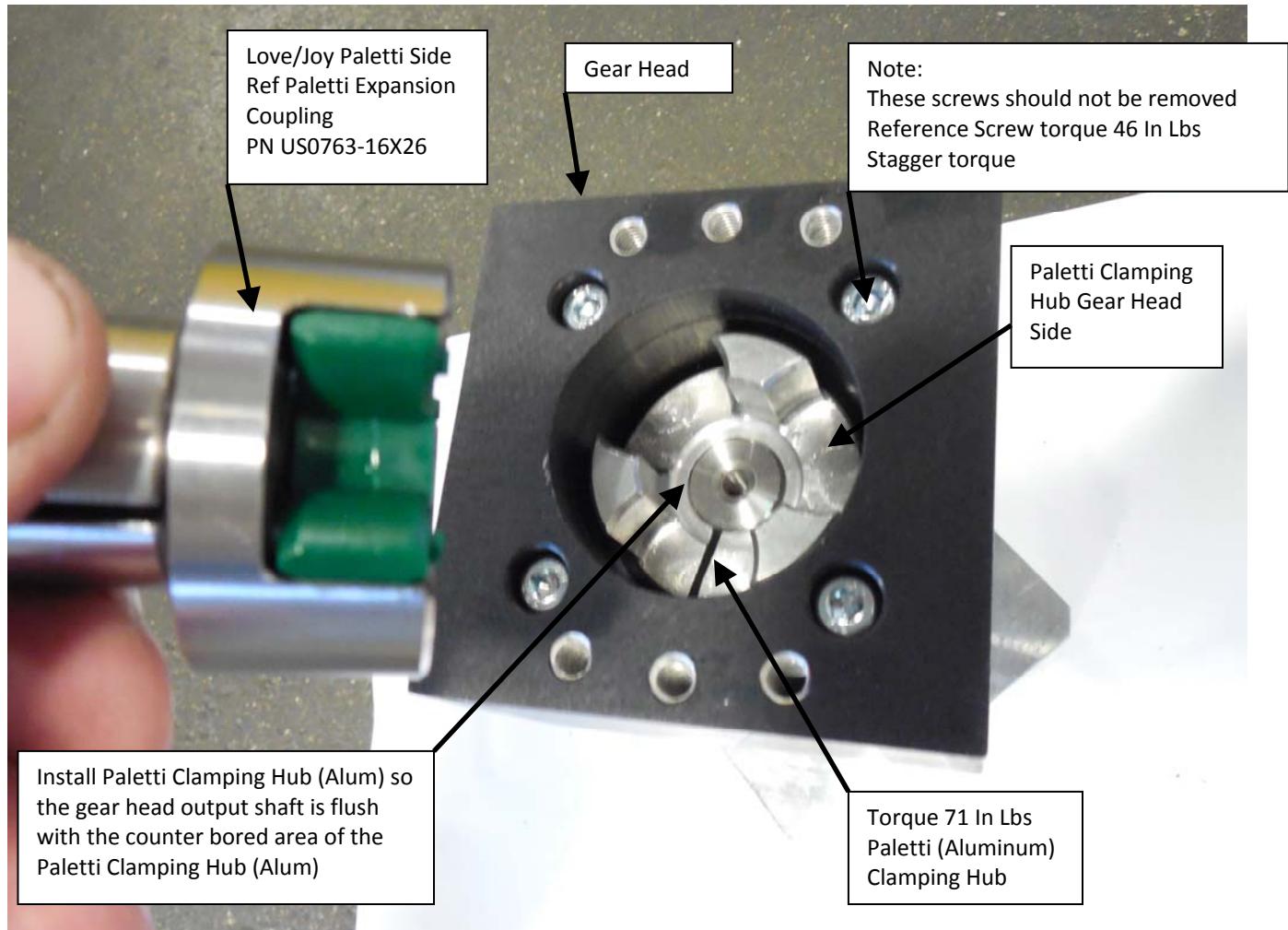
Picture #7



- Remove oil, grease, ... from all metal components prior to assembly
- Torque Paletti Clamping Hub connection (Alum), refer to picture #8 for proper placement on output shaft
- Torque Paletti Expansion Coupling connection, refer to picture #12 for proper placement/gap to Paletti unit
- Insert Spider/Coupling Insert between Paletti Clamping Hub (Alum) and Paletti Expansion Coupling
- Assemble and torque Gear Head to Paletti unit

Gear Head/Paletti Clamping Hub/Paletti Expansion Coupling Connection

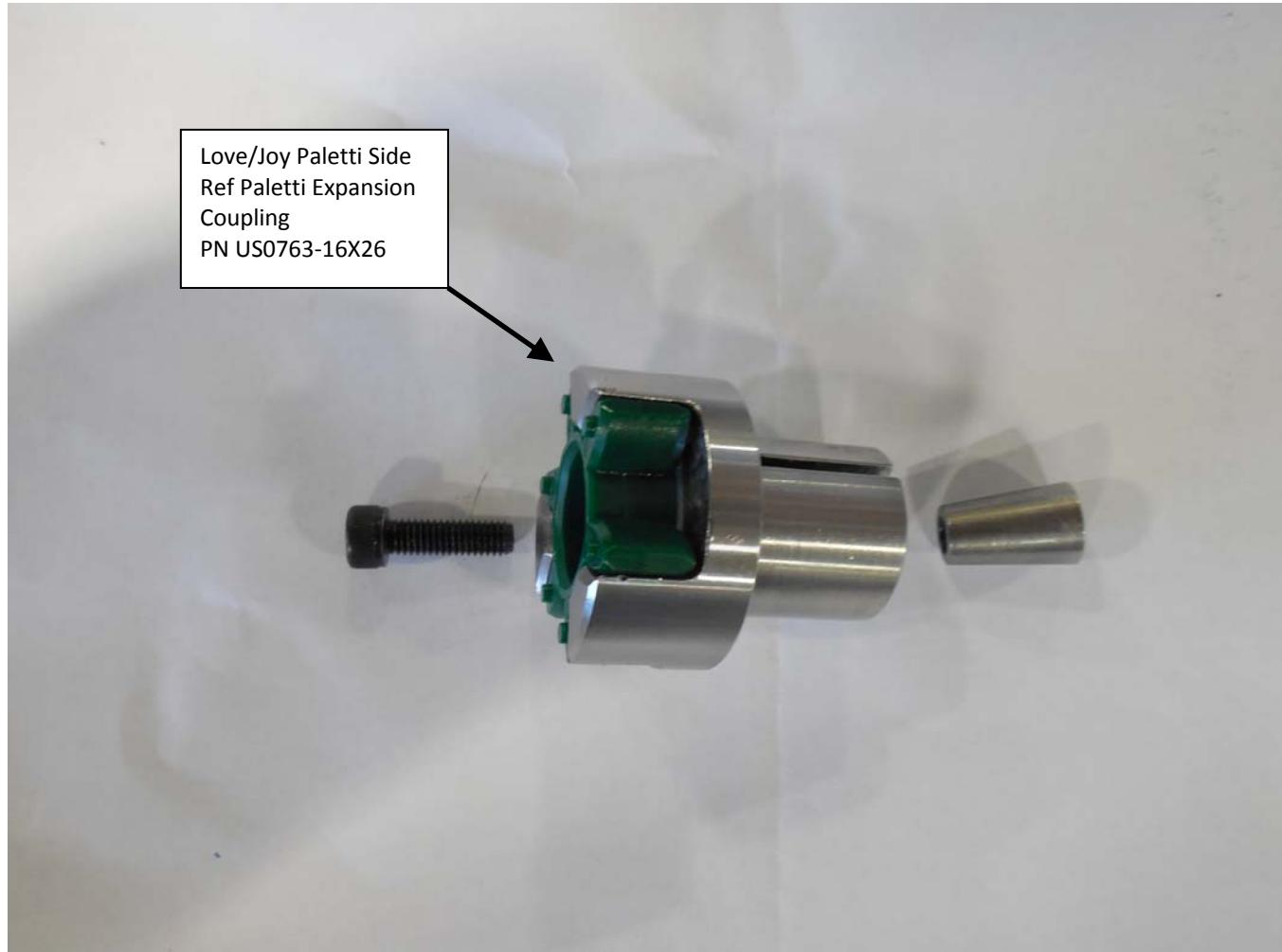
Picture #8



Install Paletti Clamping Hub (Alum) as shown in picture #8.

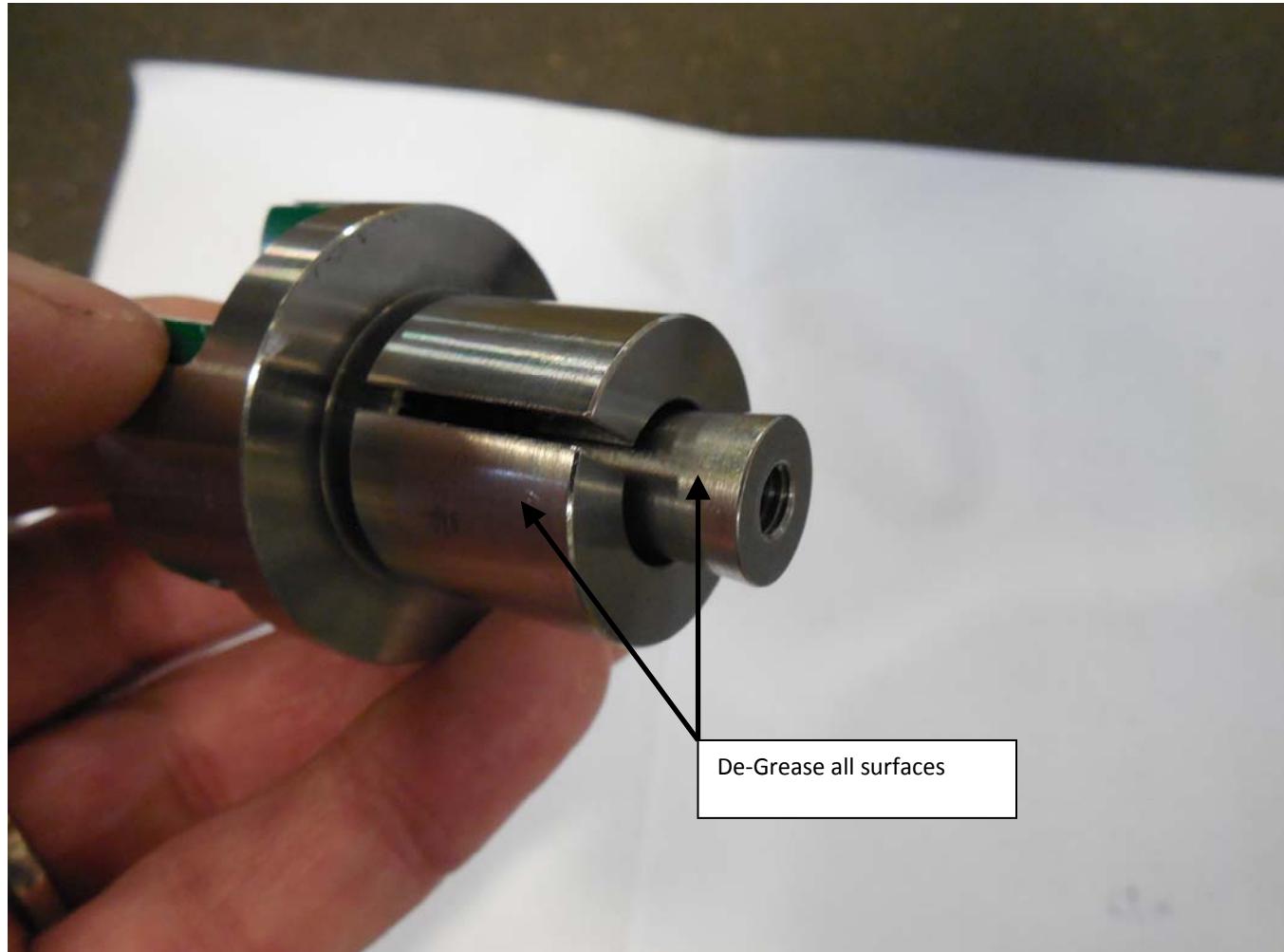
Expansion Coupling Assembly (Paletti/Gear Head)

Picture #9



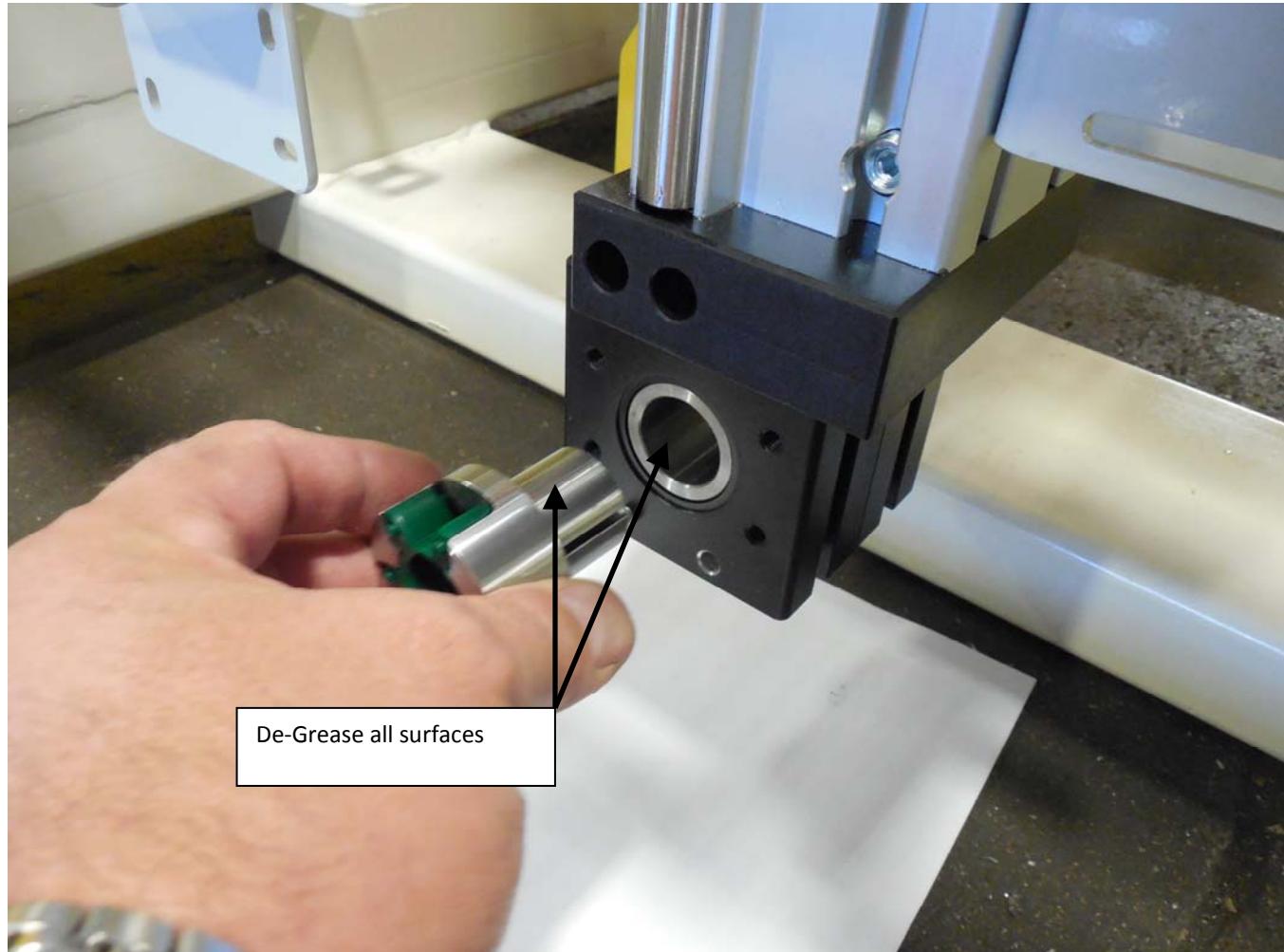
Expansion Coupling Assembly (Paletti to Gear Head)

Picture #10



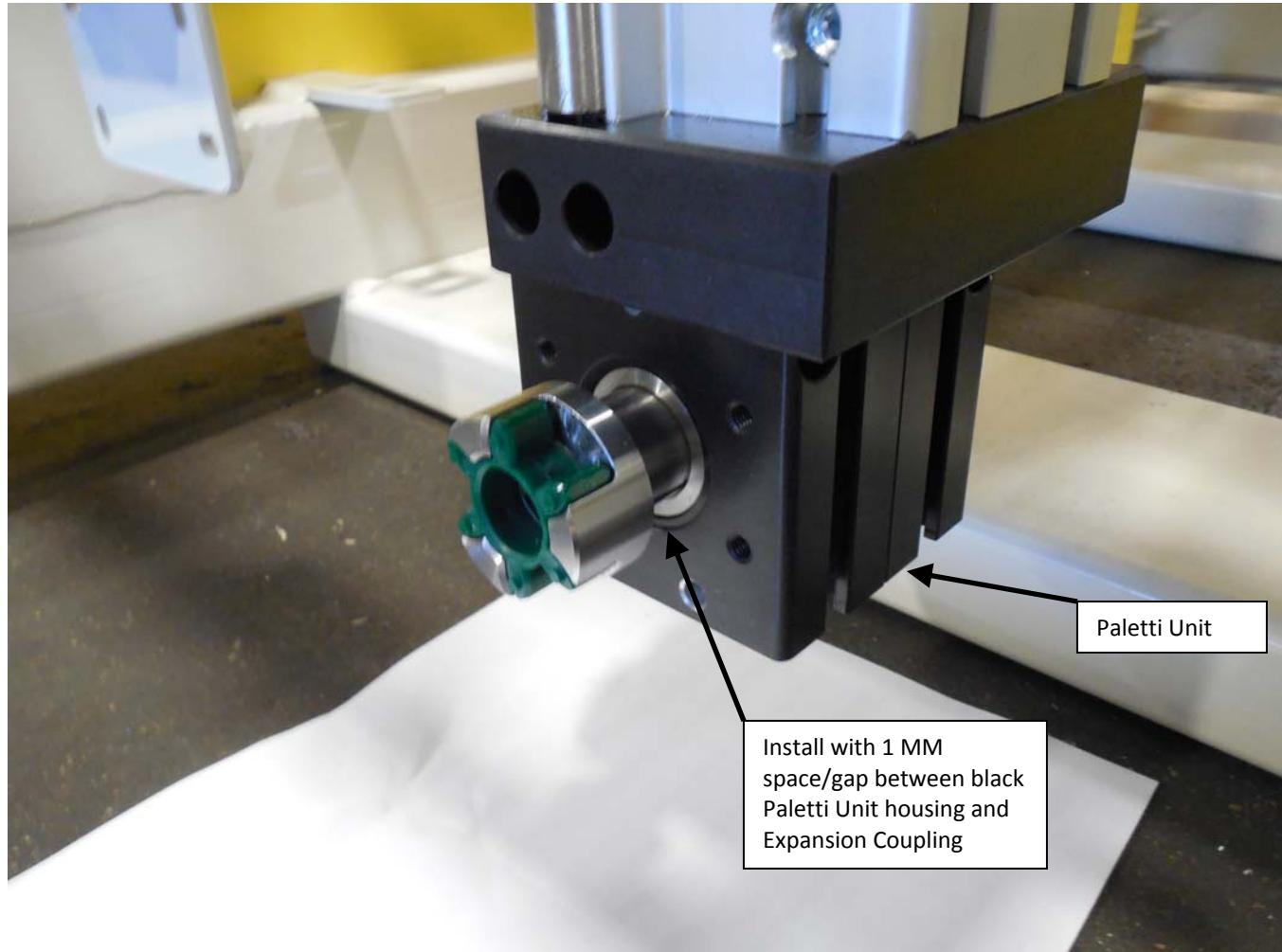
Expansion Coupling to Paletti Gear Head

Picture #11



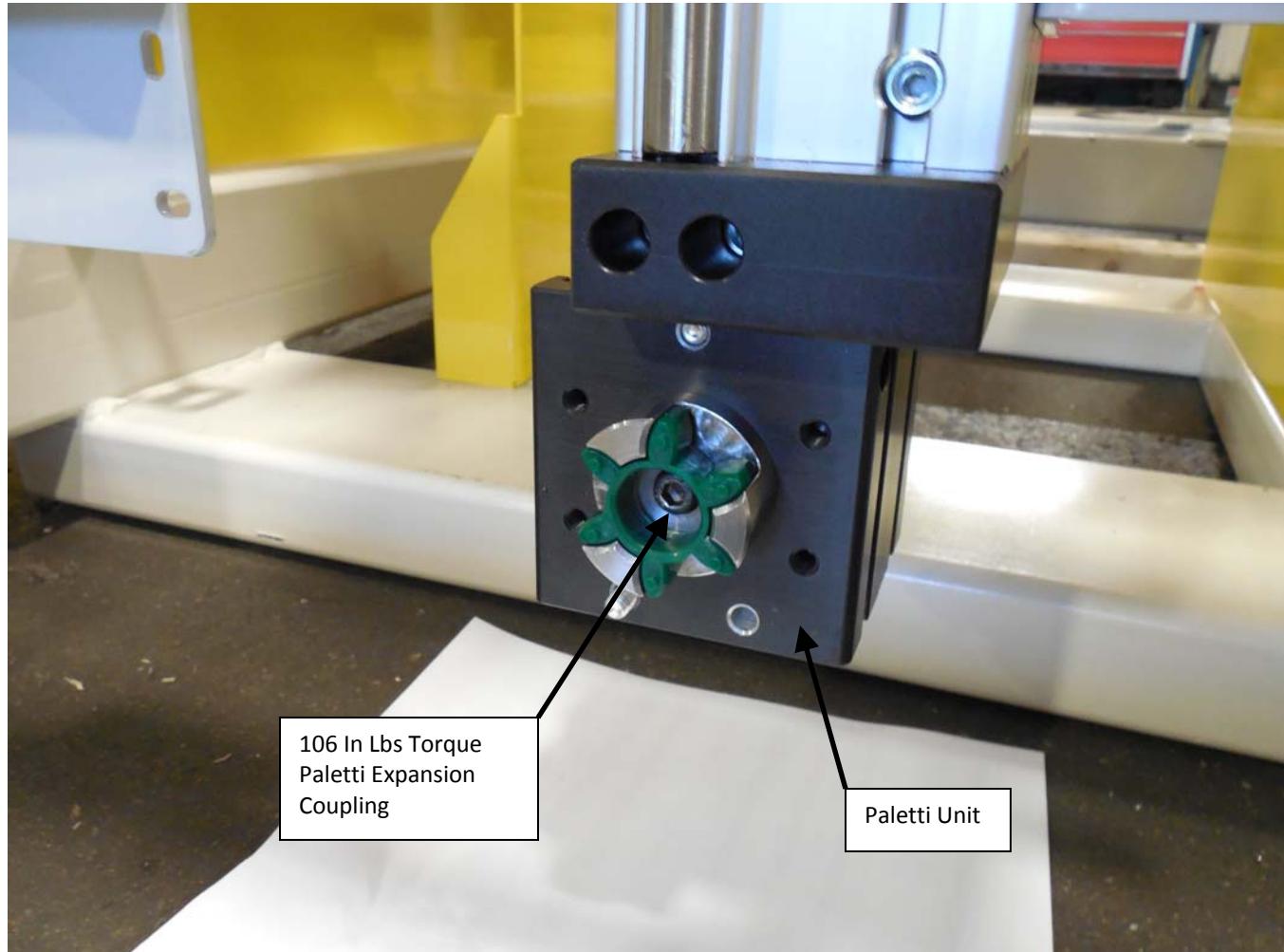
Expansion Coupling to Paletti Gear Head

Picture #12



Improper gap may cause damage to coupling connection, Paletti Gear Head, and or gear box. Use 1 MM shim stock or 1 MM feeler gauge to set proper gap.

Expansion Coupling to Paletti Gear Head
Picture #13





Project: 14DC1241P01

Date: 10/13/2014 Revision: 01

Subject: Servo/Gear Head/Paletti Clamping Hub/Paletti Coupling Connection – Tools Required

This document identifies key tools required to repair servo connection.

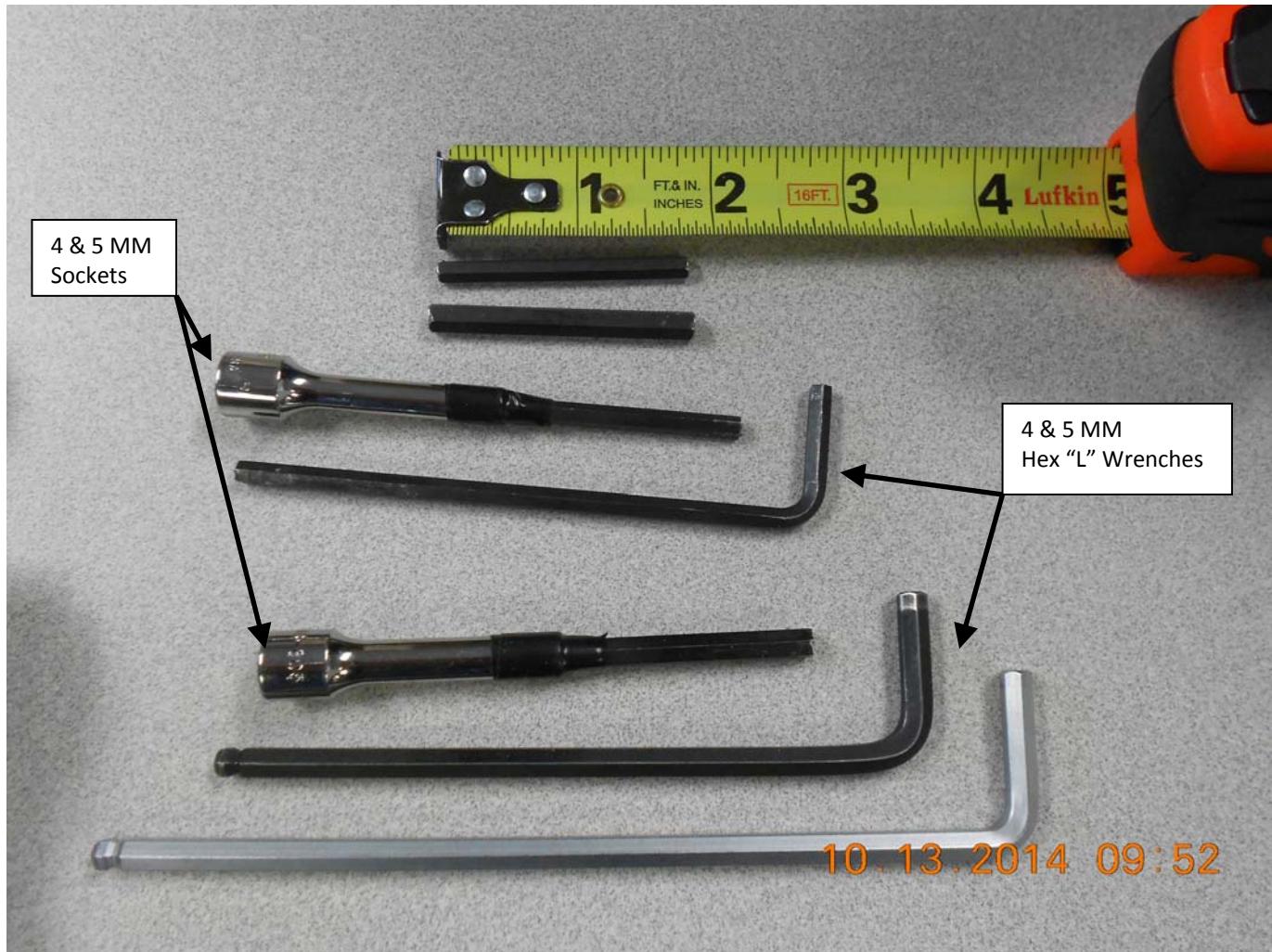
Each site will want to have in stock the following minimum tools to perform drive repairs:

- Ratchet strap – To secure carriage from free falling and to make minor elevation adjustments to align couplings
- Hammer
- Torque wrench with minimum torque range of 10 in Lbs to 124 in Lbs
- 3/4" Dia brass punch
- Flat bladed screw driver
- 7/16" Wrench – Req'd to remove guard
- Adjustable wrench
- 4MM Hex key "L" wrench
- 5MM Hex key "L" wrench
- 4MM Straight hex key socket used to re-torque components (may have to fabricate)
- 5MM Straight hex key socket used to re-torque components (may have to fabricate)
- 1MM shims (2 req'd)
- Pick to remove plug

See pictures below

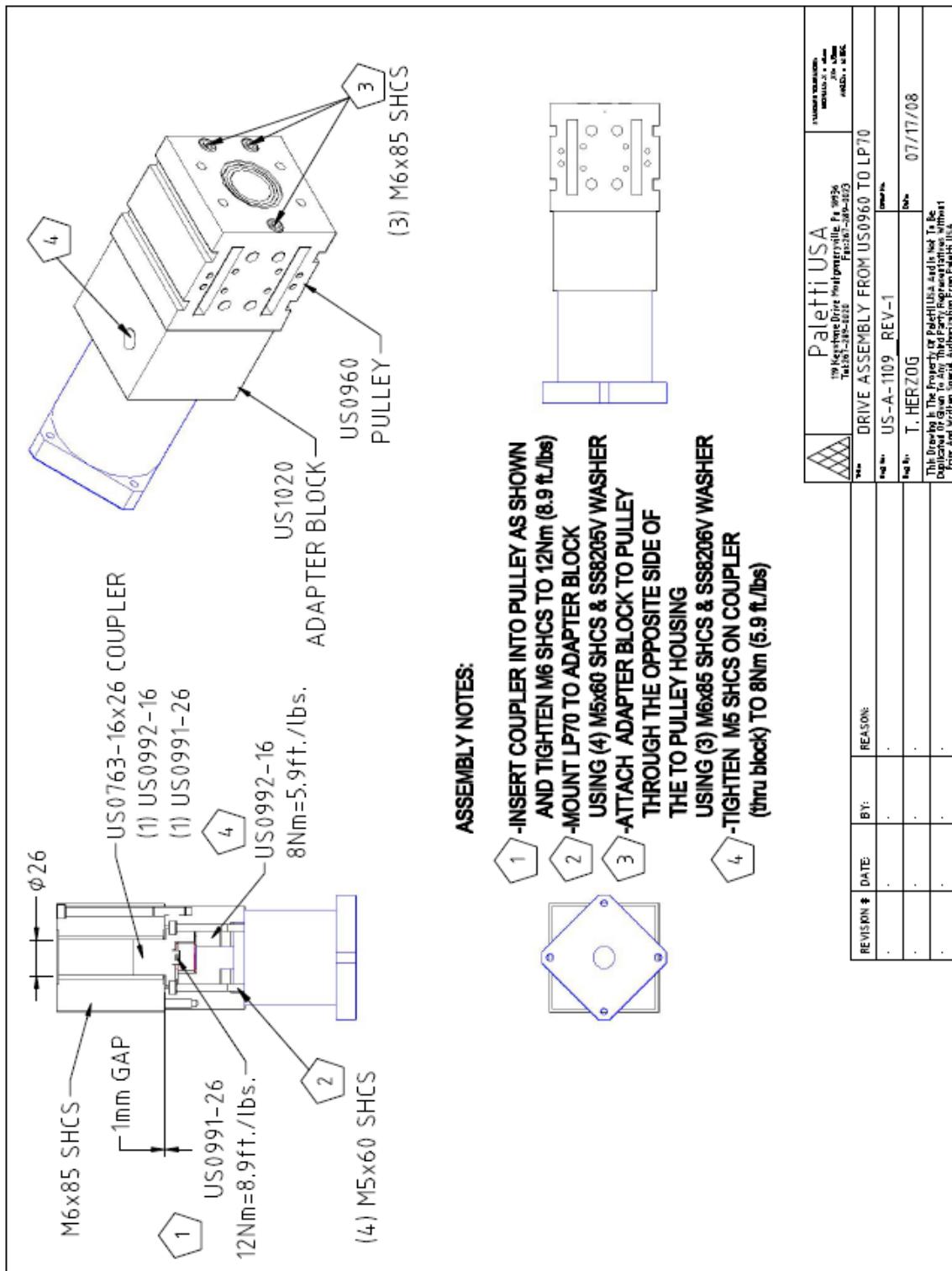
Important note: Cleaning, installing, shimming, component alignment and placement, and torqueing to proper torques very critical. Reference manual and detailed instructions outlining how to remove and re-assemble drive components.





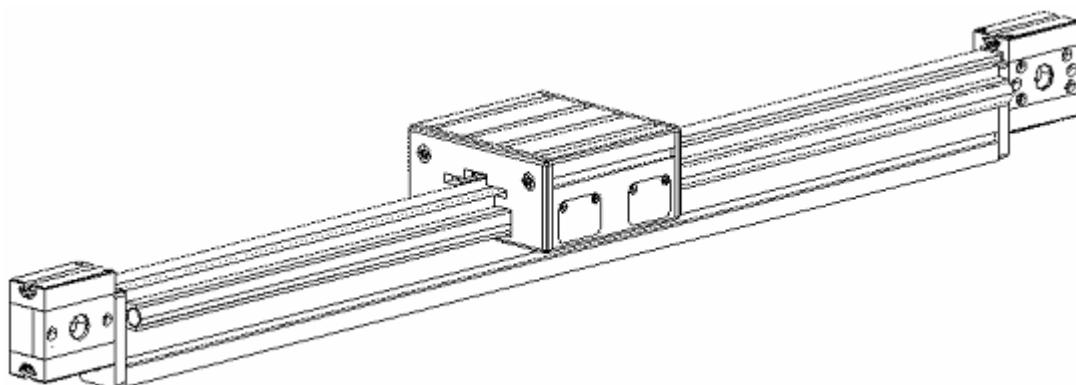
May have to fabricate your own 4MM & 5MM sockets by using 4MM & 5MM sockets and cutting 4MM & 5MM Hex stock to reach thru access holes in reducer.

Picture #14





Internally Tensioned Belt Driven Linear Actuator Service Manual



Scheduled Maintenance

1) Periodic Inspection – Monthly or as required by frequency of actuator cycle time.
(See figure 1)

- a) Inspect Guide Rails for rust or uneven wear.
- b) Felt pads in Wiper-Lube Unit are moist with
#2 Way Oil, or synthetic food grade lubricant for stainless applications.
- c) Inspect belt for uneven wear.

2) Replacement of Wiper-Lube units is *recommended* every 6 months, or after 2000 hours of operation– As required by frequency of actuator cycle time.

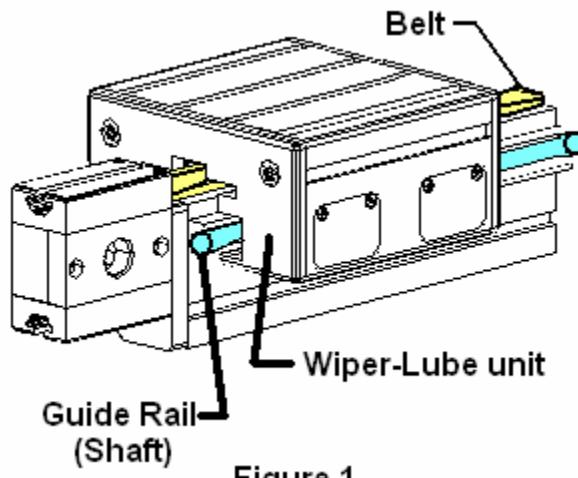


Figure 1

Repair and Replacement of Worn Items

Disassembly of Belt from Carriage:

- 1) Remove Wiper/Lube cover.
- 2) Clamp belt to track profile, in order to prevent belt from moving. (See figure 2)
- 3) Remove set screws for belt tensioner.
- 4) Use rubber mallet on face of carriage to extract tensioner from carriage body.
- 5) In extracting tensioner, be careful not to mar carriage face.

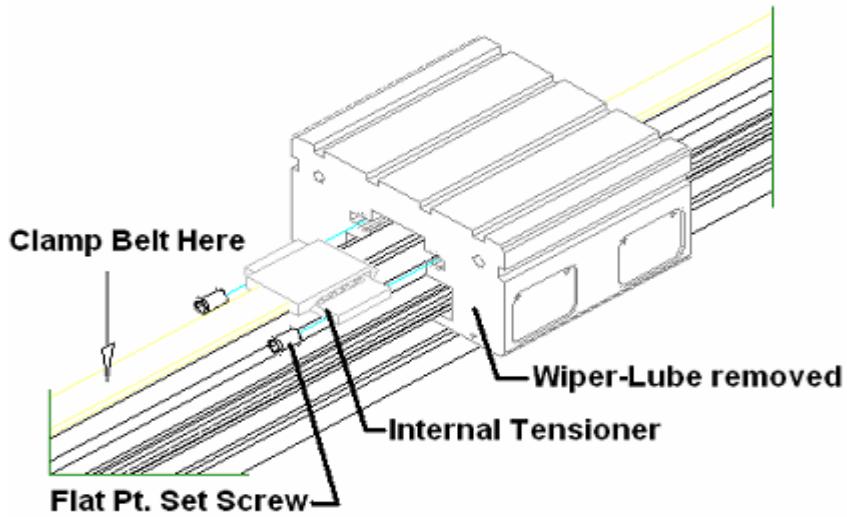


Figure 2

- 6) Remove belt from tensioner by pushing through the side.
DO NOT PRY TENSIONER TO SPREAD APART!

***NOTE:** Most actuators are shipped with the pulleys and belts centered on the profile. These units will always have the belts centered in the tensioner. There are some units that require the pulley and belt to be mounted to one side of the profile. For these units when the belt is not centered on the tensioner, a mark should be made on the tensioner to note where the belt should sit before disassembly.

Removal of Pulleys:

- 1) Prior to the removal of the pulleys, the motor/gearbox unit that is coupled to the pulley must first be removed.
- 2) Pulley housing can now be removed from the track profile by releasing the central fastener (**4 mm Allen wrench required**) or cap screws. (See figure 3)

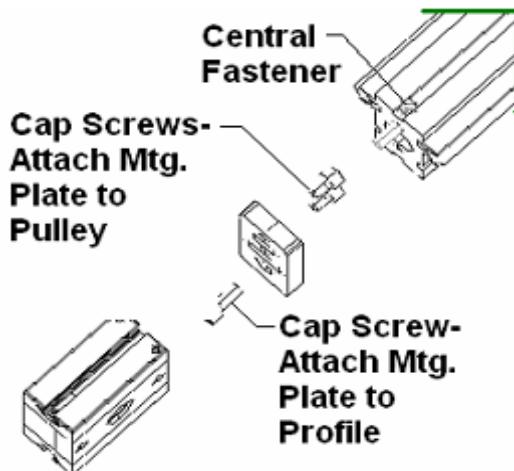


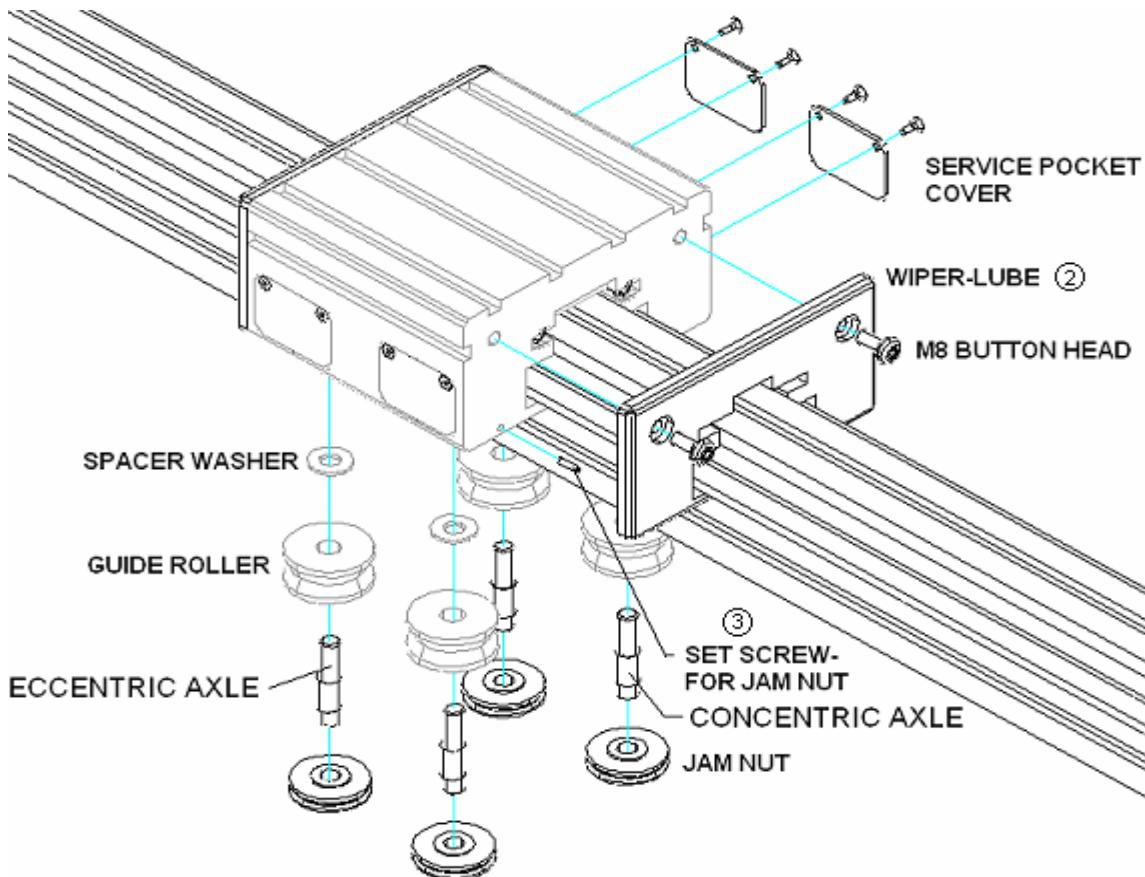
Figure 3

- 3) After re-assembly of the pulleys, the motor/gearbox must be coupled to the pulley.

***NOTE:** Verify that the coupling screws are tightened to the correct torque settings of the coupling. If unsure of the screws torque setting, contact your local Paletti USA representative, or contact engineering at Paletti USA: (267) 289-0020.

Eccentric axle / Roller adjustment Instructions

- 1) Identify Eccentric axle
 - i) The eccentric axles will be stamped on the underside of the carriage with a capital 'E.' The concentric side will be stamped with a capital 'Z,' from the German for 'Zentric.'
- 2) Remove Wiper and Lubricator (WL); **5 mm Allen wrench required**
 - i) Remove WL, if present. WL's are the black plastic plates that hold the spring loaded felt pad. Part numbers are typically: SL0162S and SL0164S. A pair of M8 Button Head Cap Screws (BHCS) holds the wiper and lubricator to the carriage. Typically, these wiper and lubricators are pinned together.
 - (1) Note: If the halves of the WL are not pinned together, it is only required to remove the WL halves that are on the eccentric side of the carriage.
- 3) Loosen Set screw in the end of the carriage. This set screw holds the jam nut that holds the Axle; **3 mm Allen wrench required**
 - i) CAUTION: If this set screw is not loosened, further adjustment may damage carriage and void warranty.



- 4) Hold axle and then loosen jam nut; **5 mm Allen wrench and 17 mm offset box end wrench or thru style ratchet required.**
 - i) Using Allen wrench, hold axle fixed while loosening jam nut with offset box end wrench or thru style ratchet.
 - ii) Once the jam nut has been loosened, the eccentric axle can be rotated to set the position of the guide roller. The axle can be turned in both clockwise and the counterclockwise directions to achieve the adjustment. It is recommended that the roller position be achieved by turning the axle clockwise. However, if the axle bottoms out before reaching the desired roller position, then the axle must be turned counterclockwise to achieve the desired roller position.
 - iii) Rotate the eccentric axles until all the play is gone between the rollers and the shaft. Do not over-tighten—this could lead to bearing failure.
- 5) Hold axle and tighten jam nut; **5 mm Allen wrench and 17 mm offset box end wrench or thru style ratchet required.**
- 6) Make sure that the axle does not turn when tightening the jam nut.
- 7) Tighten set screw onto jam nut; **3 mm Allen wrench required**

- i) Tighten set screw just to the point that the aluminum bulges slightly. This deformation ensures that the set screw has some preload on it. Do not over tighten.
- 8) Attach wiper and lubricator; **5 mm Allen wrench required**
- 9) Cycle unit twice by hand to ensure proper operation.

At any point, if there are questions, contact your local Paletti USA representative, or contact engineering of Paletti USA at: (267) 289-0020.

Belt Tensioning Assembly Instructions with Internal Belt Tensioners

Disassembly:

- 1) Remove Wiper/Lube cover.
- 2) Clamp belt to track profile.
- 3) Remove set screws for belt tensioner.
- 4) Use rubber mallet on face of carriage to extract tensioner from carriage body.
- 5) In extracting tensioner, be careful not to mar carriage face.
- 6) Remove belt from tensioner by pushing through the side. DO NOT PRY TENSIONER TO SPREAD APART!
If the belt is not centered on tensioner when removed from the carriage, make note on tensioner to show where to place the belt.

Pulley housing can now be removed from the track profile by releasing the central fastener or cap screws.

Re-Assembly:

- 1) CENTER belt in tensioner, or align with old position.
- 2) Carefully use a rubber mallet to push the tensioner back into the carriage so that the end is flush with the carriage face.
- 3) Insert set screws so that they are flush with the face of the carriage.

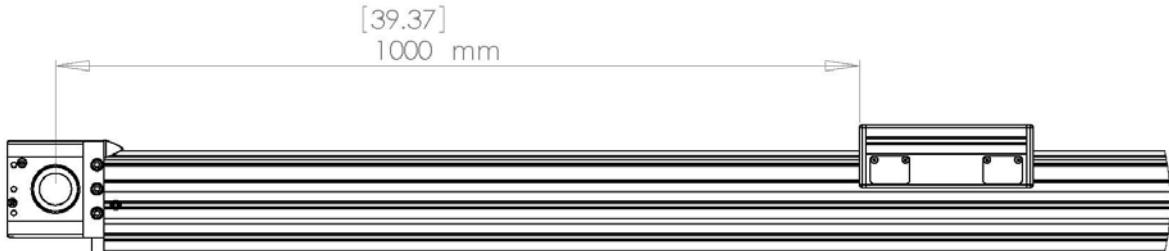
The belt should no longer be loose, but is not tensioned!

- 4a) If unit is less than 1 meter long, move the carriage to one end.
- 4b) If unit is greater than 1 meter, move the carriage so that there is 1 meter from the carriage to the pulley housing.
- 5) Continue to push tensioner in with set screws to achieve required tension.
22mm Belt) When tensioned, the belt should be able to make $\frac{1}{2}$ rotation (180 deg.)
50mm Belt) When tensioned, the belt should not be able to make $\frac{1}{4}$ rotation (90 deg.) About 75 deg. is enough.

Saturate felt wipers with #2 Way Oil and apply to rails
Fully cycle actuator twice and the actuator is complete.

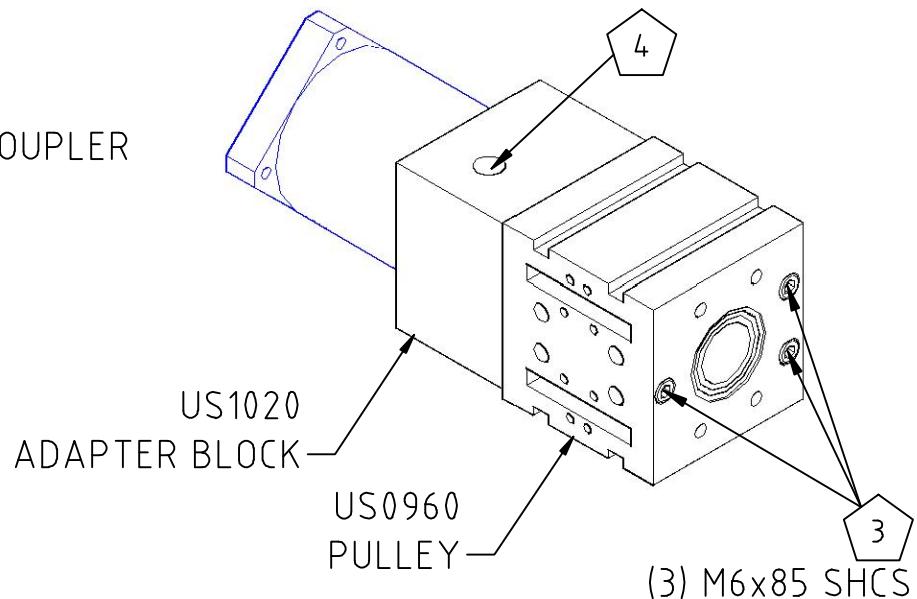
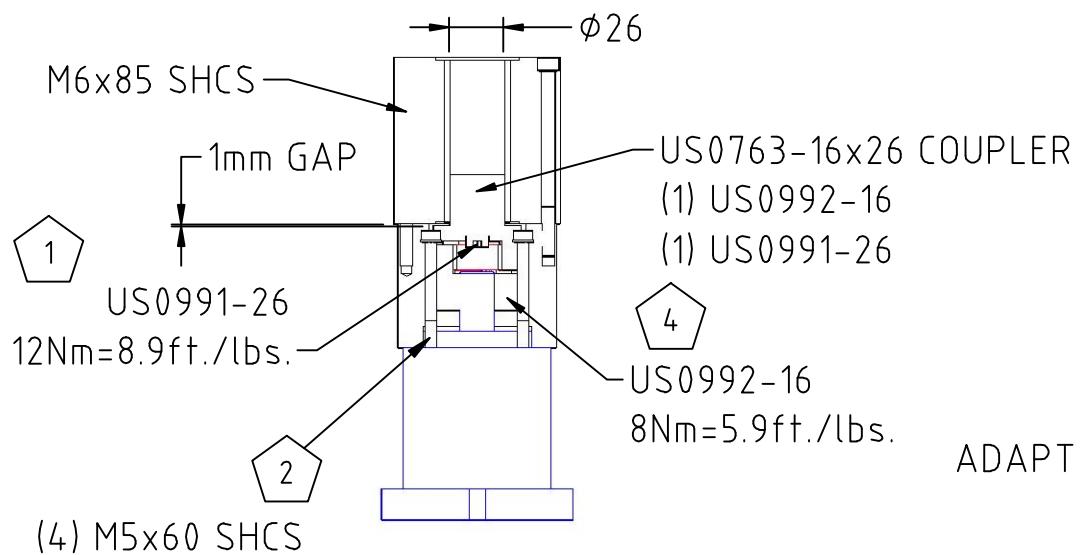
Belt Tensioning with frequency meter

- Position the carriage on the rail so that the face of the wiper lubricator is **1000 millimeters (39.37")** from the center of the reversing unit.

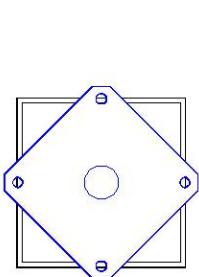


- While holding the tension meter about 10mm from the belt (at the center of the span) lightly tap the belt making sure the belt doesn't contact the aluminum profile or the tension meter in the process.
- Repeat this process multiple times until you obtain a consistent reading.
- Adjust the tensioning screws in the carriage accordingly until the belt reaches the desired frequency. (Tightening the screw to raise the frequency & loosening to lower)

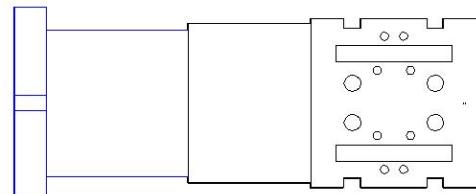
The factory set frequency value for this unit is: **29Hz @ 1000mm**



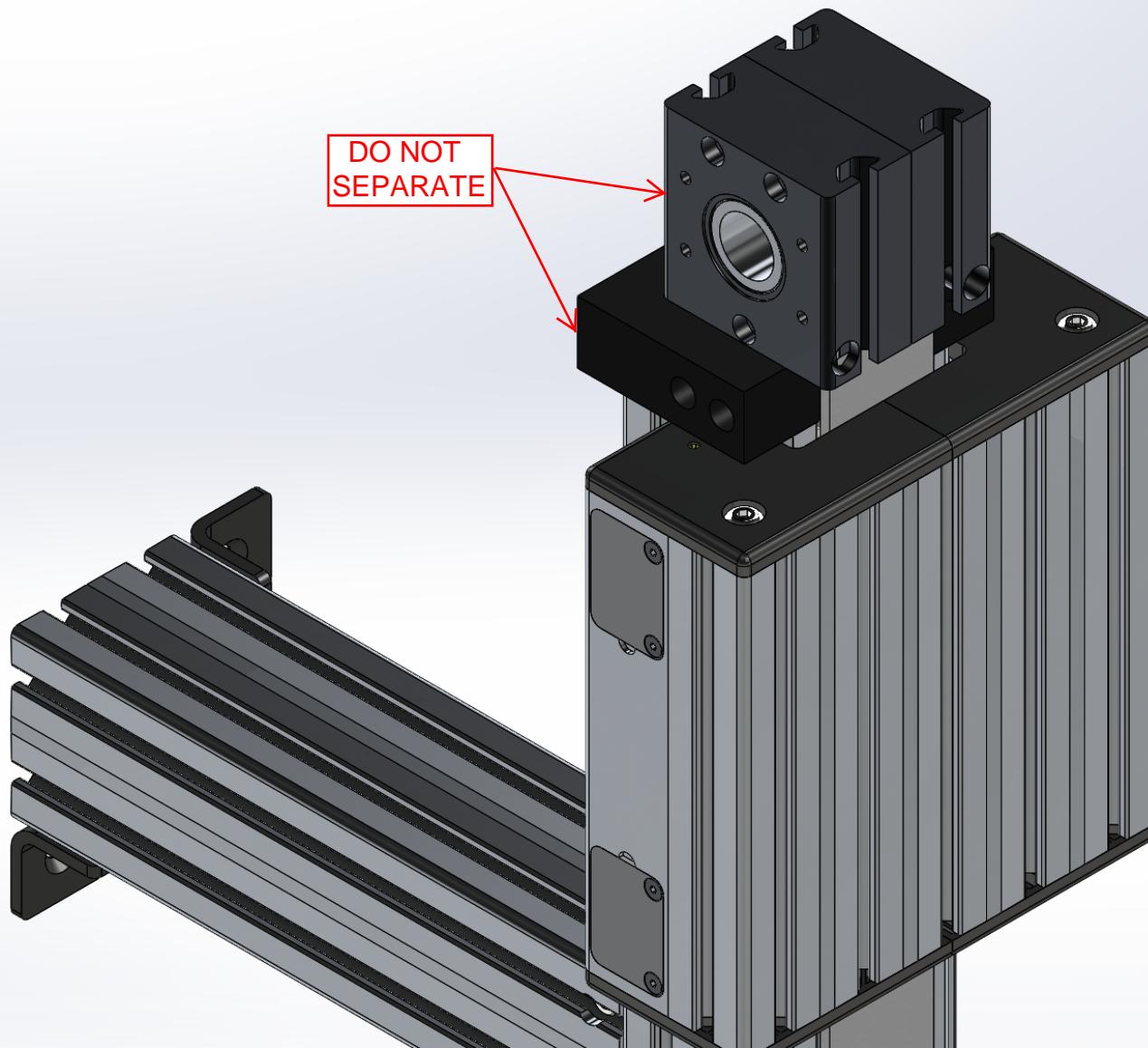
ASSEMBLY NOTES:



- 1** -INSERT COUPLER INTO PULLEY AS SHOWN AND TIGHTEN M6 SHCS TO 12Nm (8.9 ft./lbs)
- 2** -MOUNT LP70 TO ADAPTER BLOCK USING (4) M5x60 SHCS & SS8205V WASHER
- 3** -ATTACH ADAPTER BLOCK TO PULLEY THROUGH THE OPPOSITE SIDE OF THE PULLEY HOUSING USING (3) M6x85 SHCS & SS8206V WASHER
- 4** -TIGHTEN M5 SHCS ON COUPLER (thru block) TO 8Nm (5.9 ft./lbs)

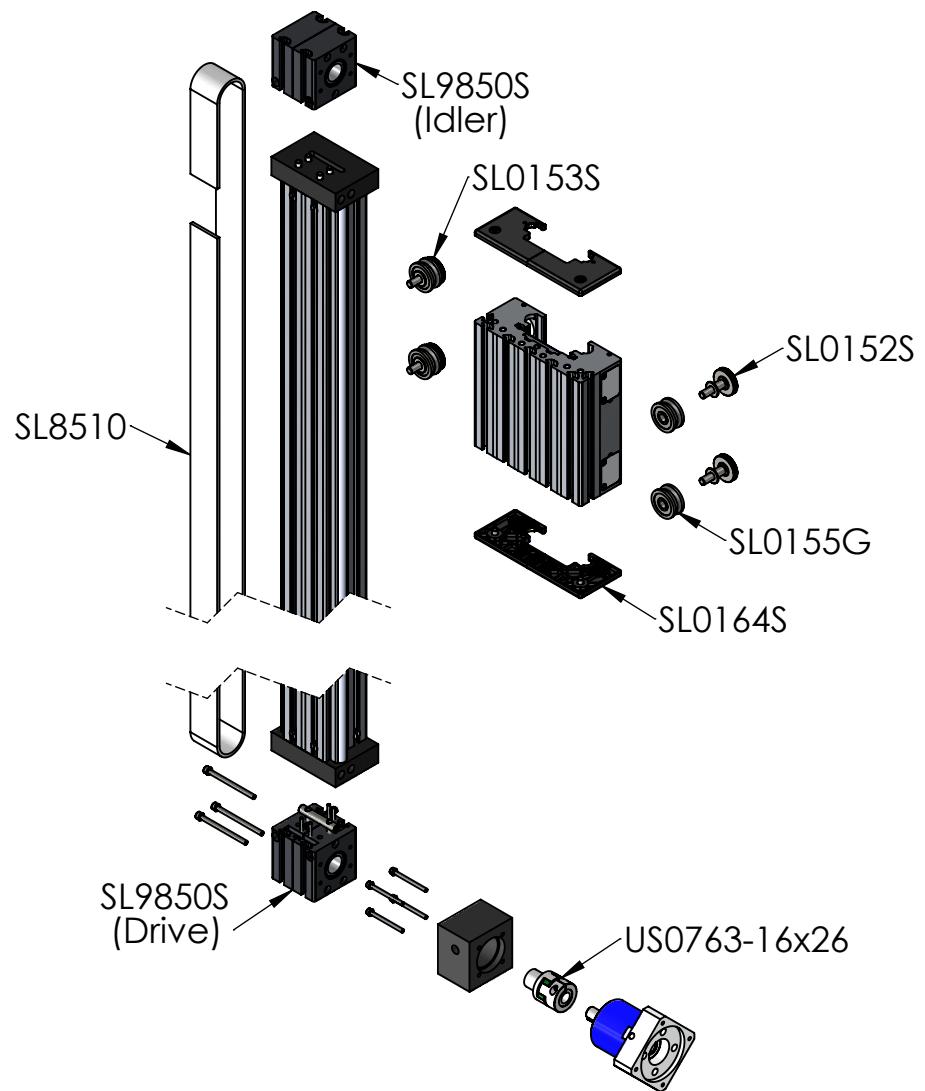


	Paletti USA 119 Keystone Drive Montgomeryville, Pa 18936 Tel:267-289-0020 Fax:267-289-0023	<small>STANDARD TOLERANCES: DECIMALS: X ± .5mm XX ± .13mm ANGLES: ± 2 DEG.</small>
REVISION #	DATE:	BY:
.	.	.
REASON:		
Title:	DRIVE ASSEMBLY FROM US0960 TO LP70	
Dwg. No.:	US-A-1109_REV-1	Order No.
Dwg. By:	T. HERZOG	Date: 07/17/08
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DO NOT
SEPARATE

Spare Component	Description
SL9850S (Drive)	Tooth Belt Guide 80/90 (Machined for Drive Mount Package)
SL9850S (Idler)	Tooth Belt Guide 80/90
SL0155G	Roller 16
SL0152S	Roller Axle, Concentric
SL0153S	Roller Axle, Eccentric
SL0164S	Wiper & Lube System
SL8510	Timing Belt AT10/50 @ 4900mm length
US0763-16x26	Expansion Shaft/Bore Coupler, 16mm bore x 26mm shaft



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DIMENSIONS ARE IN MILLIMETERS
STANDARD TOLERANCES:
ANGULAR: ± 0.5 DEG
ONE PLACE DECIMAL: ± 0.1
TWO PLACE DECIMAL: ± 0.05

FINISH:
Saw Edge -A- // 0.1 A
Side -B- \perp 0.1 B ✓ 3.2

MATERIAL:

Revision # Reason: DRAWN CHECKED

Description: Linear Actuator
16 - 80 x 80 Spare Parts

NAME DATE

T Ambrose 4/23/2014



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145 Keystone Drive
Montgomeryville, PA 18936
Phone: 267-289-0020
Fax: 267-289-0023
<http://www.paletti-usa.com>

SIZE

DWG. NO.

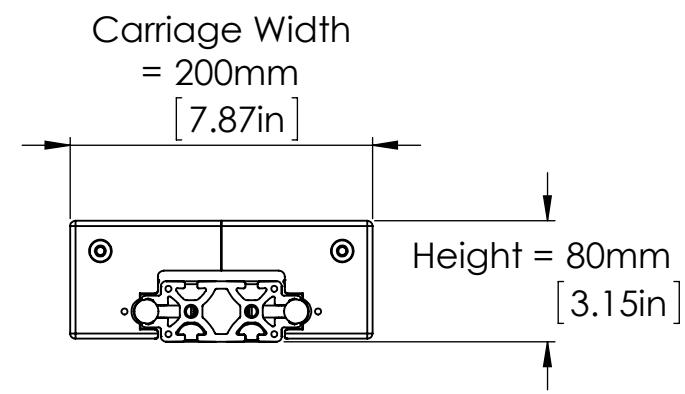
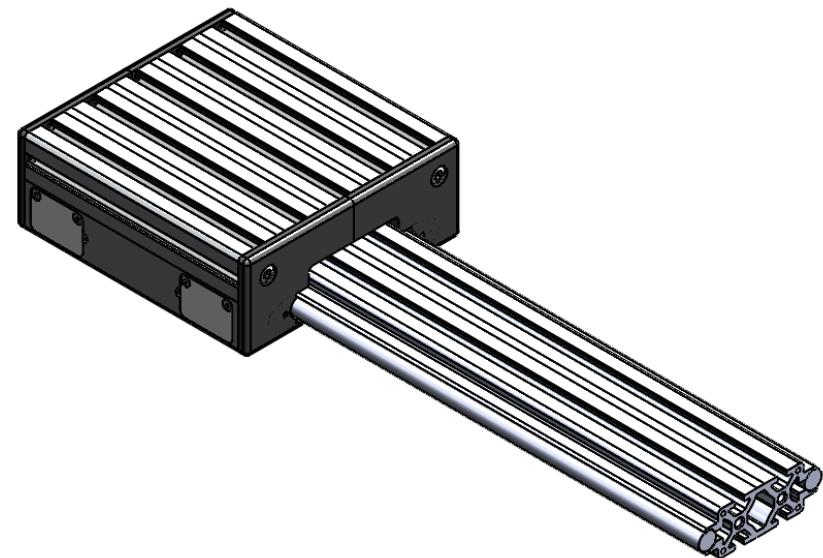
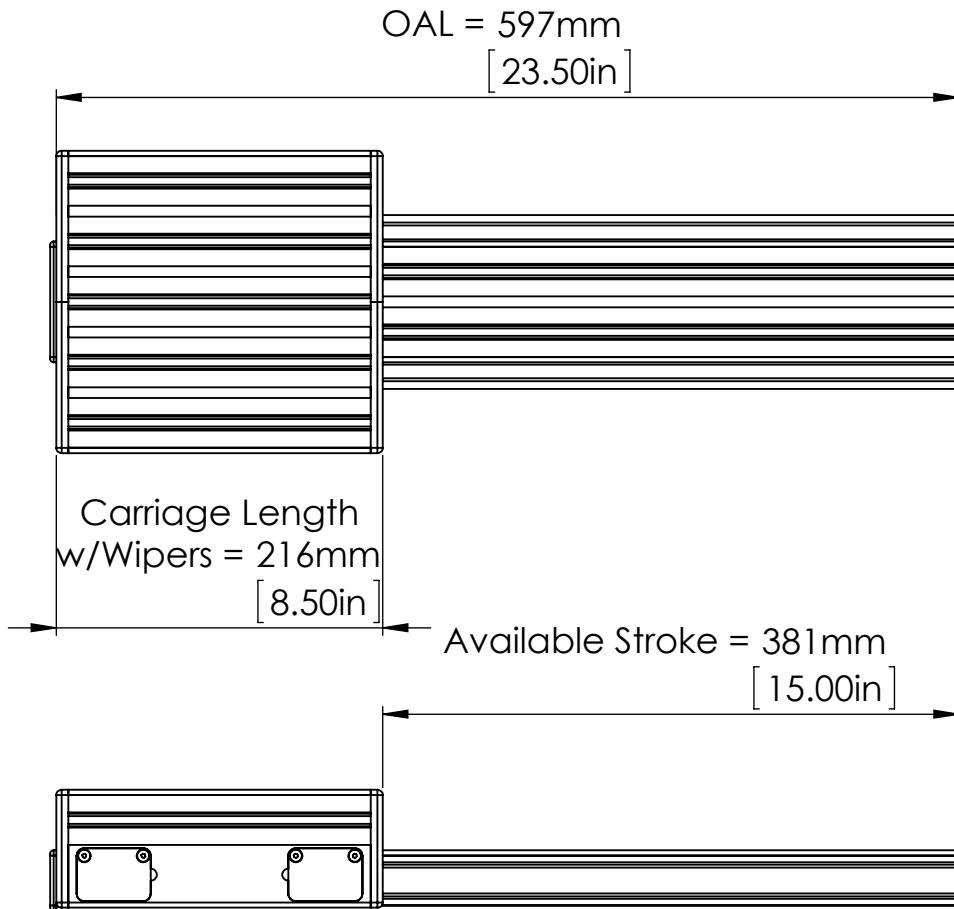
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SCALE 1:10

Sheet1 of 1

Location: \\SBS2008\SharedFolder\Sales\Quotes\2014 Quotes\01-Jan 2014\2014-01-8049_Kendall-Conveyor Concepts actuator\2014-01-8049-10\SL5076N2210\



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ANGULAR: ± 0.5 DEG
ONE PLACE DECIMAL: ± 0.1
TWO PLACE DECIMAL: ± 0.05

FINISH:
Saw Edge -A- // 0.1 A
Side -B- ⊥ 0.1 B ✓
3.2

MATERIAL:

Revision # Reason: CHECKED

Description: Linear Guide
16-40x80/80

NAME DATE

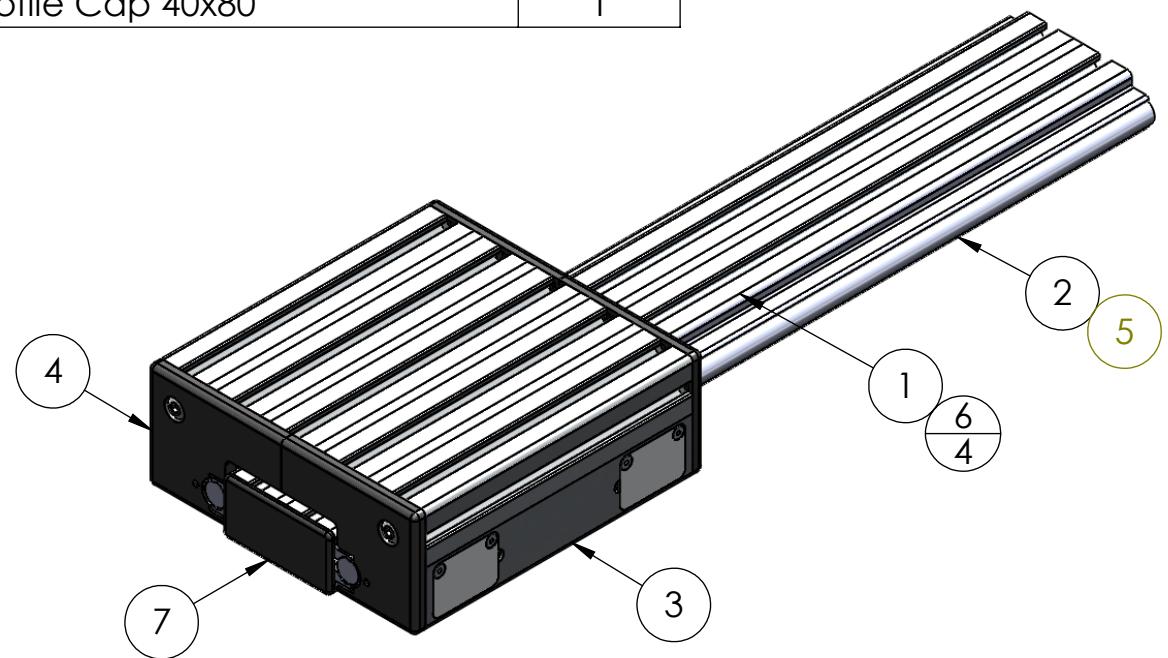
DRAWN tambrose 1/21/2015



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SIZE	DWG. NO.
A	2014-02-8076-301_REV-1
SCALE	1:5
Sheet 1 of 2	

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	SP4901N597	Track Profile 40x80/80 (Countersink Both Ends, Machined for Dowel Pins)	1
2	SL0184G596	Guide Shaft d16, 596 mm (Pinned)	2
3	SL0087N	Carriage 16/200/200/4/S	1
4	SL0164S	Wiper And Lubrication System 200	2
5	DK6325080354	Dowel Pin DIN 6325 - d8 x 35	2
6	SV2800V	T-Nut 5/16" ball-type, slide in	4
7	SZ0011S	Profile Cap 40x80	1



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STANDARD TOLERANCES:
ANGULAR: ± 0.5 DEG
ONE PLACE DECIMAL: ± 0.1
TWO PLACE DECIMAL: ± 0.05

FINISH:
Saw Edge -A- // 0.1 A
Side -B- \perp 0.1 B ✓
 32

MATERIAL:

Revision # Reason: DRAWN

Description: Linear Guide 16-40x80/80

NAME DATE

tambrose 1/21/2015

CHECKED



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2014-02-8076-301_REV-1

SCALE 1:4

Sheet 2 of 2

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