

# Parallel Process Line (PPL)



# Line overview

INFEEED EDGE DELETE  
EDGE DELETE  
INFEEED WASHER  
WASHER  
INSPECTION STATION  
DOUBLE SHUTTLE  
INFEEED SPACER APPLICATOR  
SPACER APPLICATOR  
OUTFEEED SPACER APPLICATOR  
GRID STATION  
FIRST SHUTTLE  
DUAL GAS PRESS  
SECOND SHUTTLE  
IG SECONDARY SEALER  
OUTFEEED INSPECTION STATION

# Automation

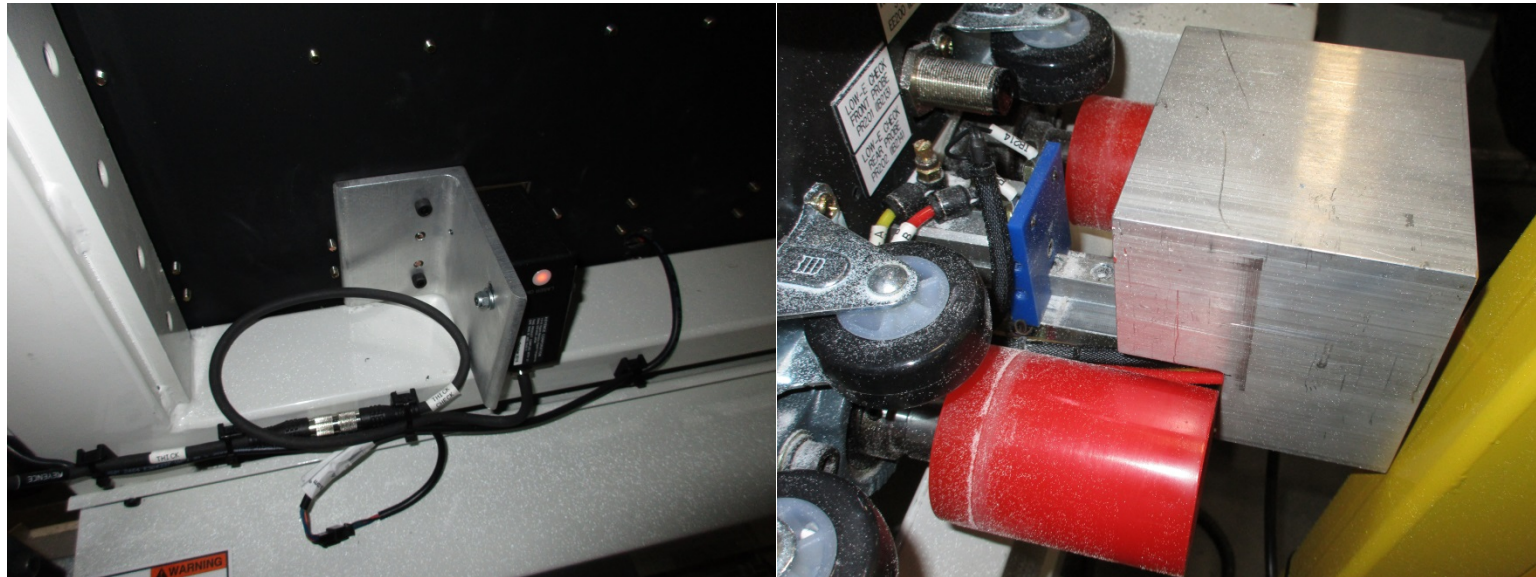
Automation has been achieved by various means including mechanical, pneumatic, electrical, electronic devices and computers, usually in combination. This document will help point out such devices to help you understand what makes your line perform.

# Infeed Edge delete

Keyence sensor for thickness detect

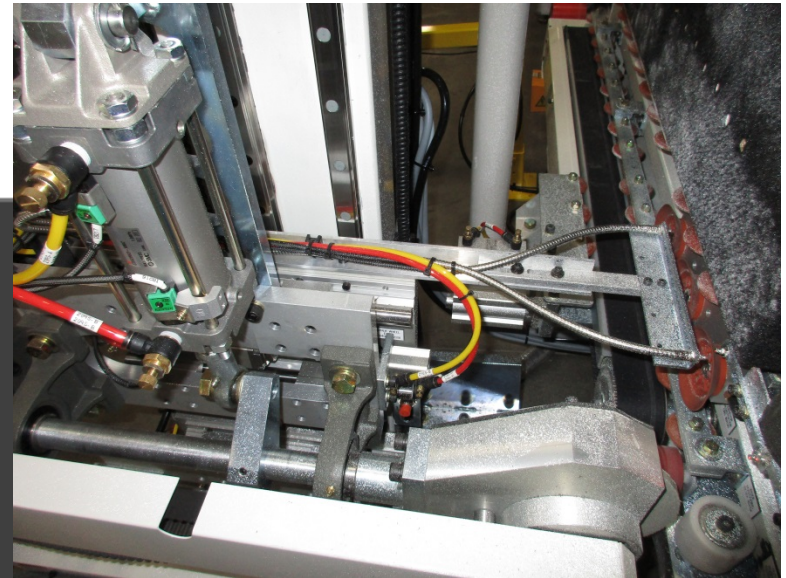
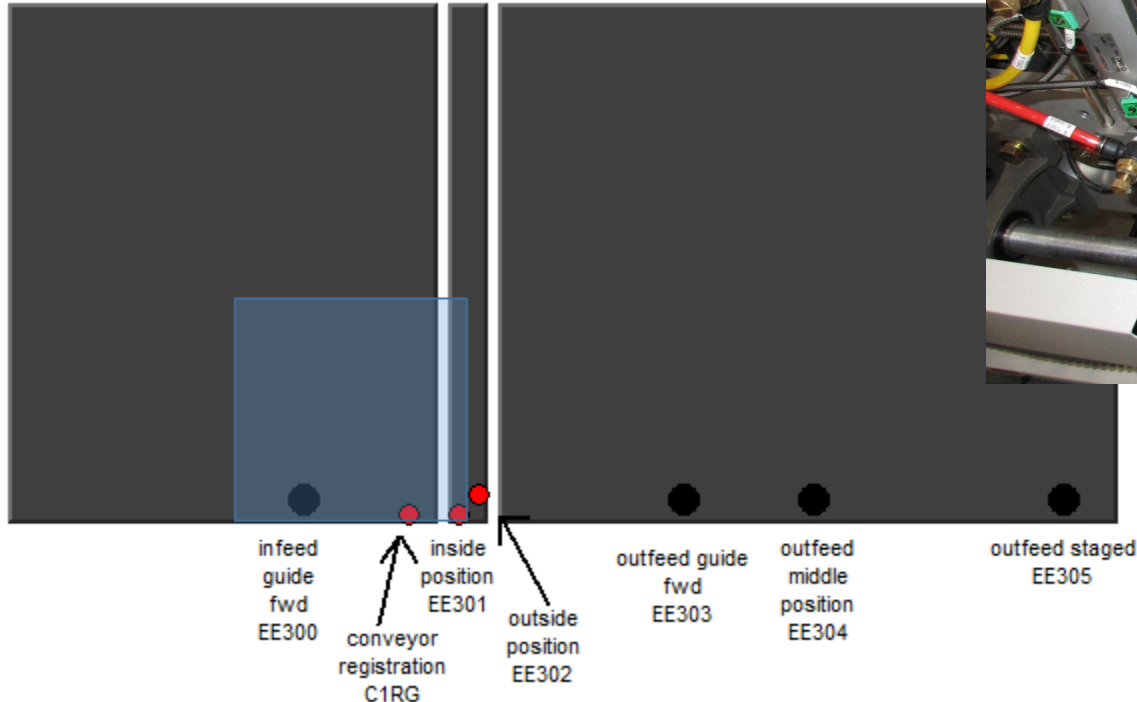
Low e check

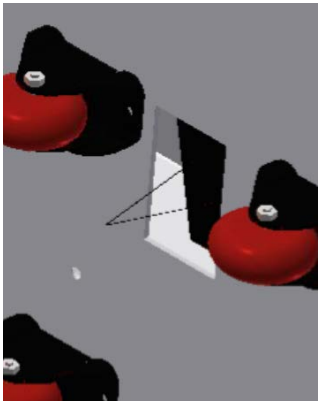
Product detect eye



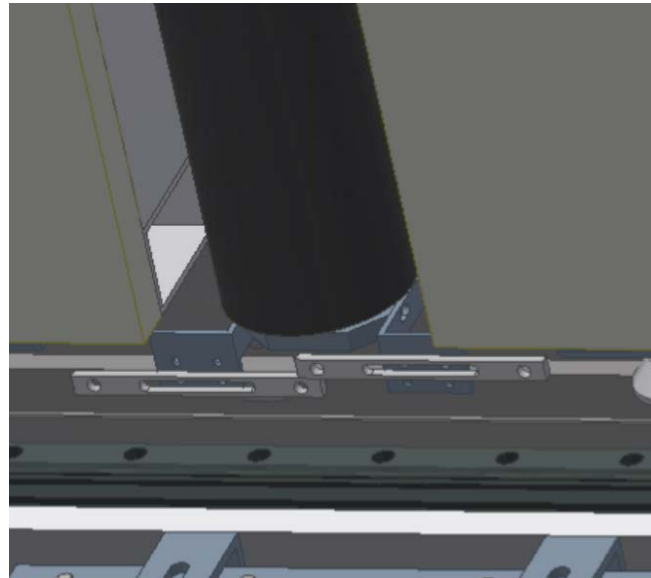
# Edge delete

Sensors for positioning the glass and verifying size of glass

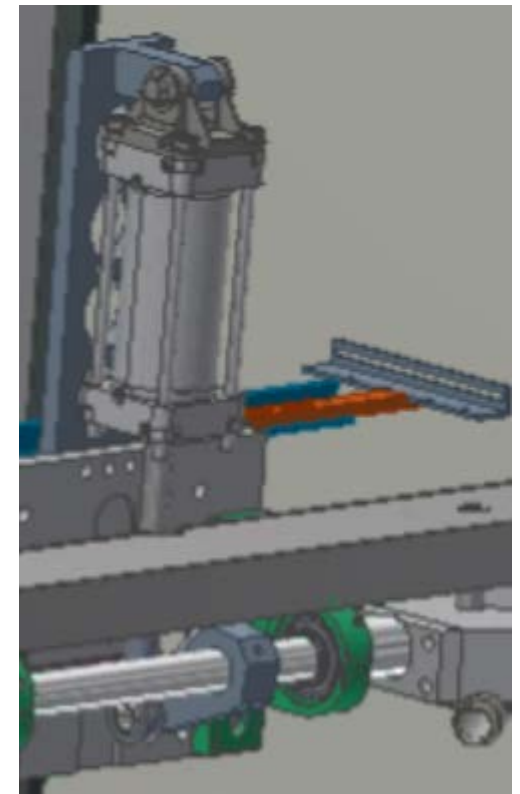




Thickness  
Detect

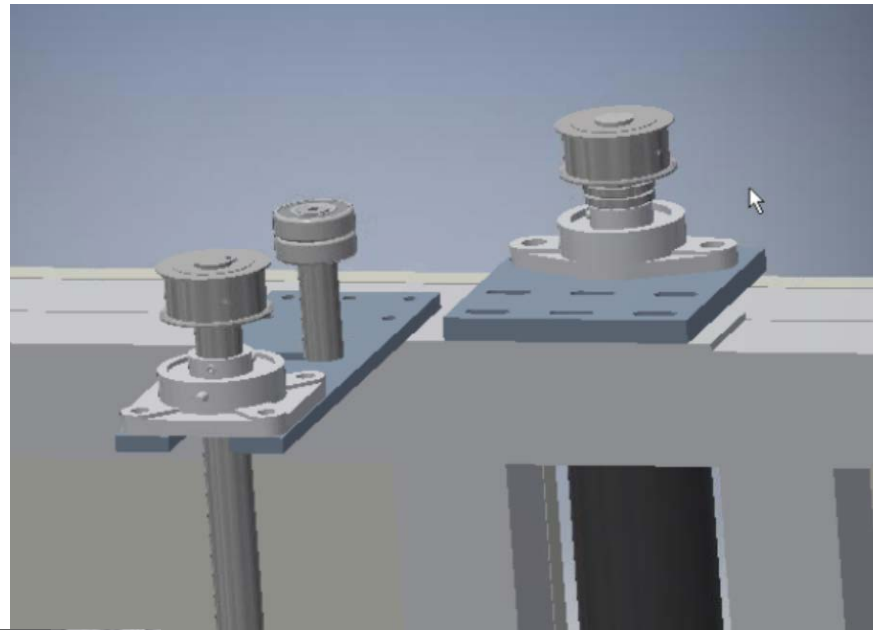


X Registration  
Eye Bracket

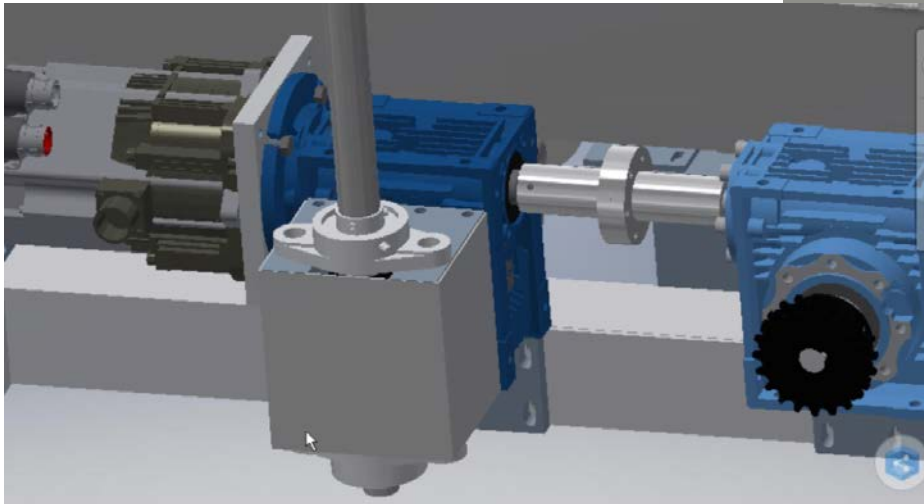


Y Registration  
Eye Bracket

Servo Drive

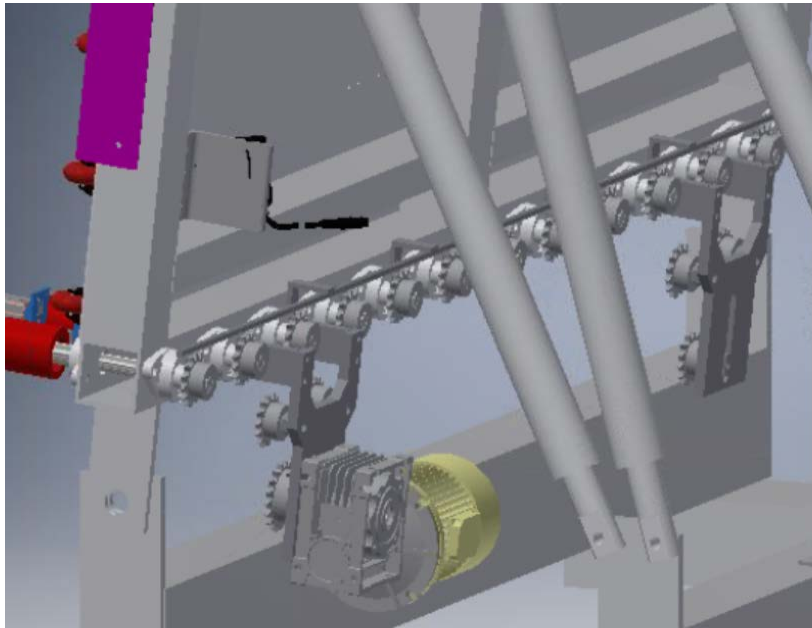


Upper Vertical  
Support Roller  
Drive /  
Tensioner

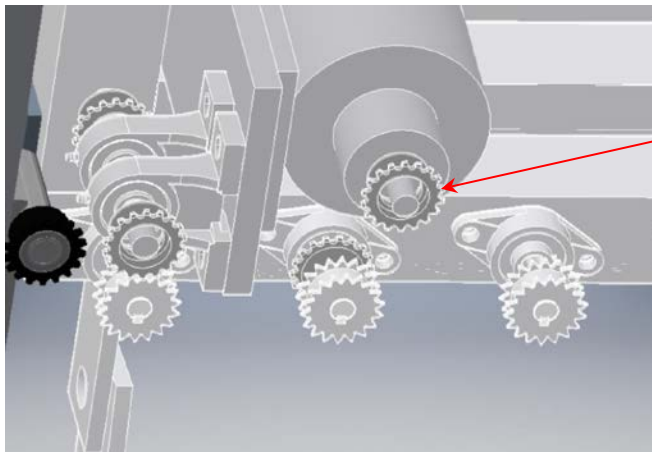


Lower Vertical  
Support Roller  
Drive  
(Gearbox)

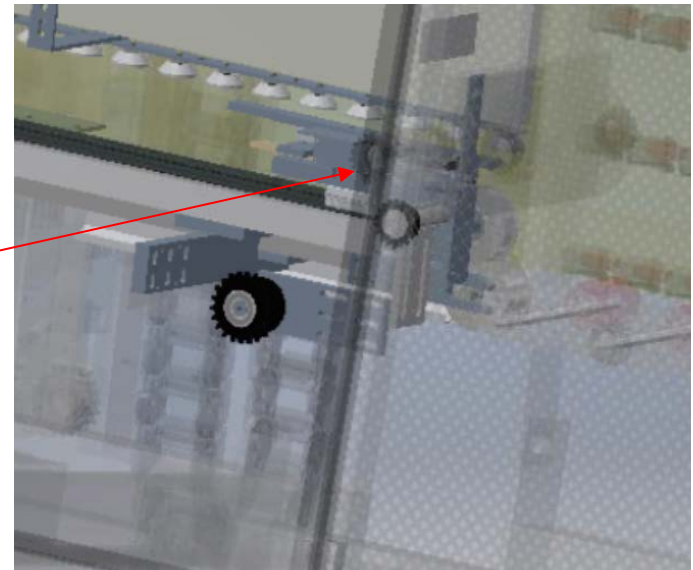
Drive to Gear  
To Conveyor



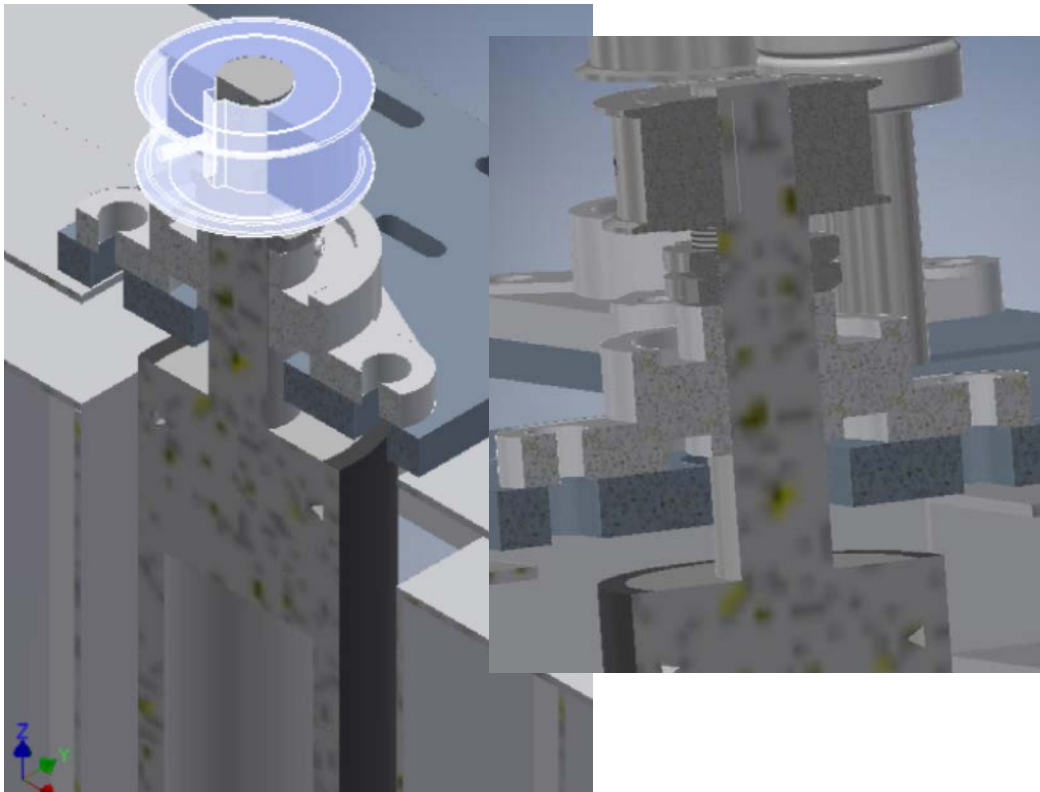
Denver / Tacoma  
Infeed Conveyor  
Drive System



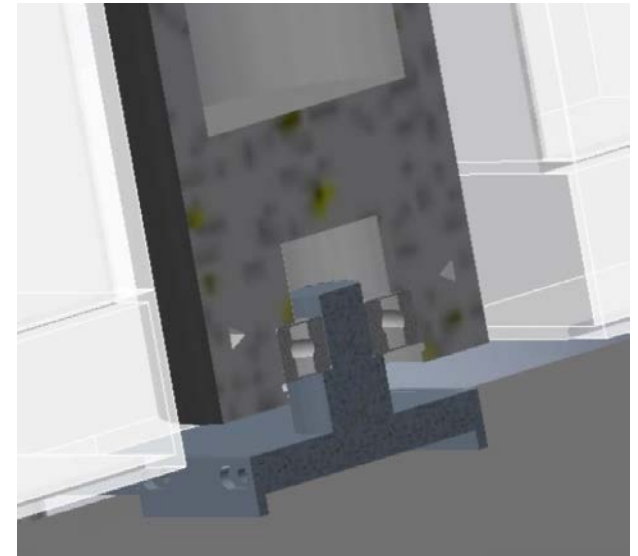
Sacramento Line Infeed  
Conveyor Drive System



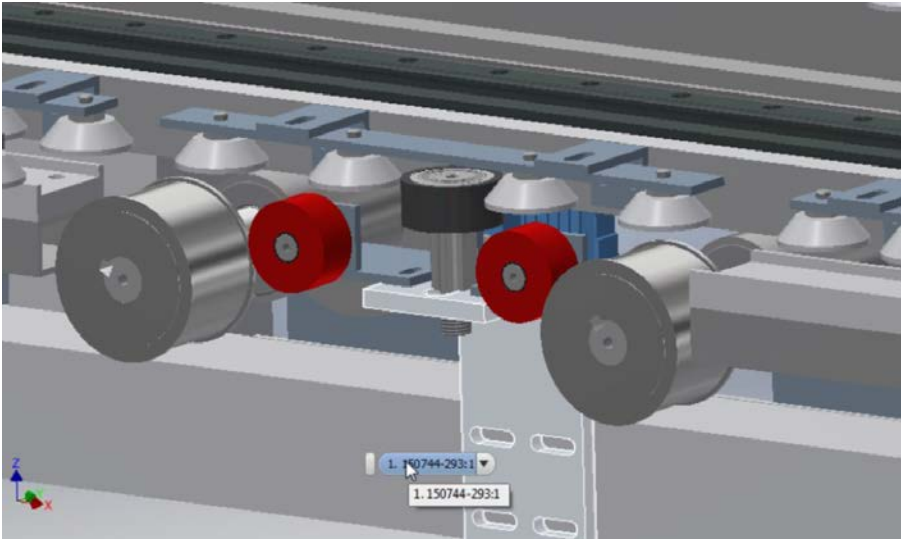
(Edge Delete Station 1  
to Infeed Conveyor)



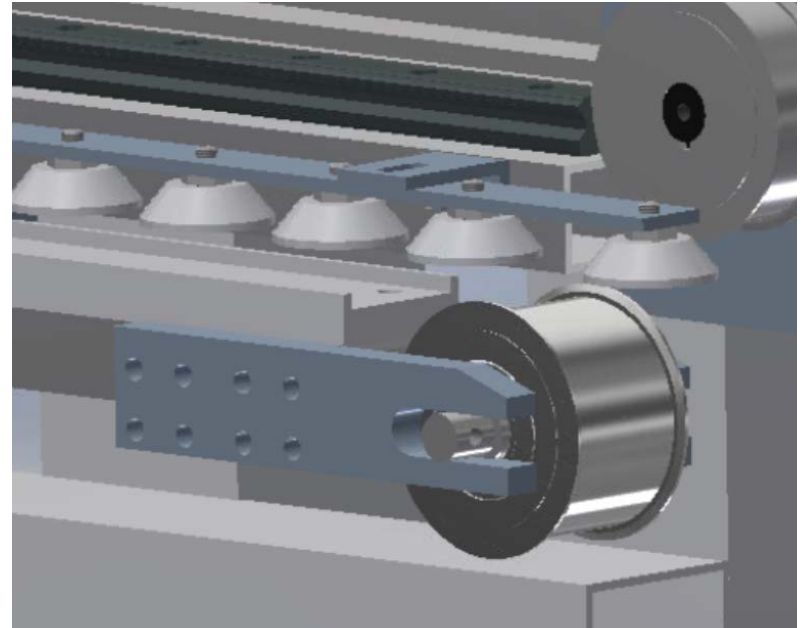
Cross Section of upper  
bearing / Vertical  
Support Roller



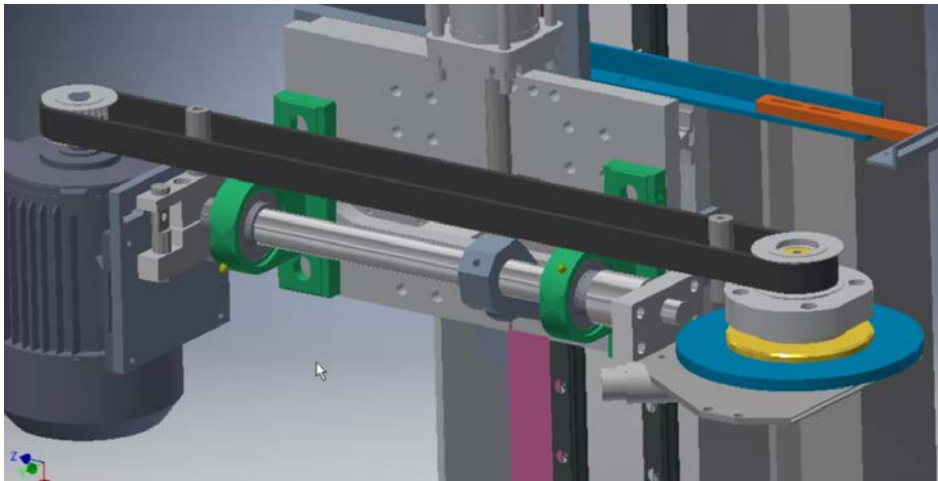
Cross Section of lower  
bearing / Vertical  
Support Roller



Version 1 Support  
roller

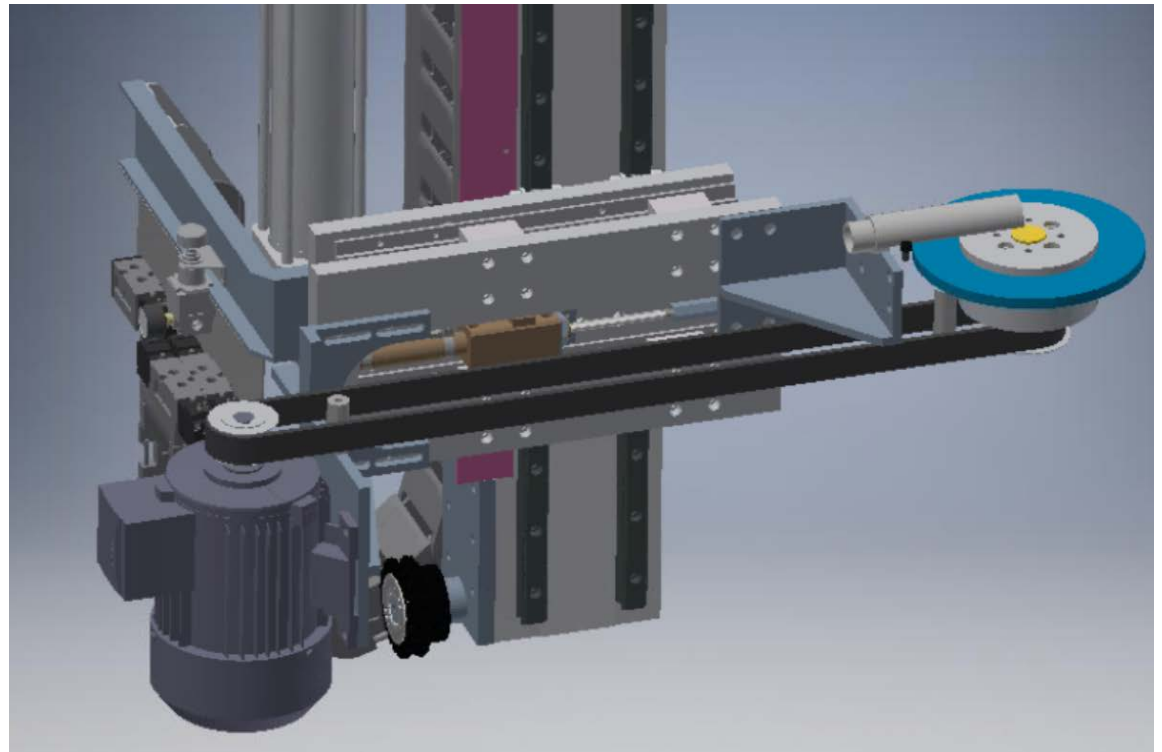


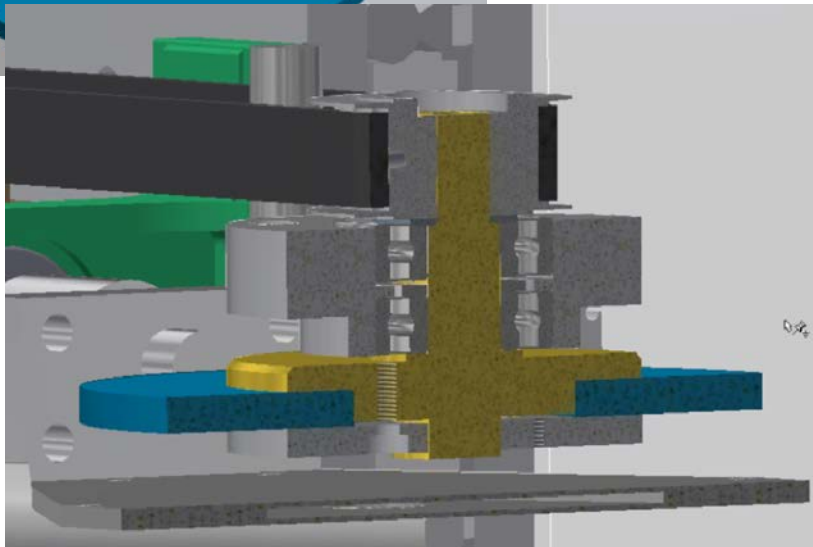
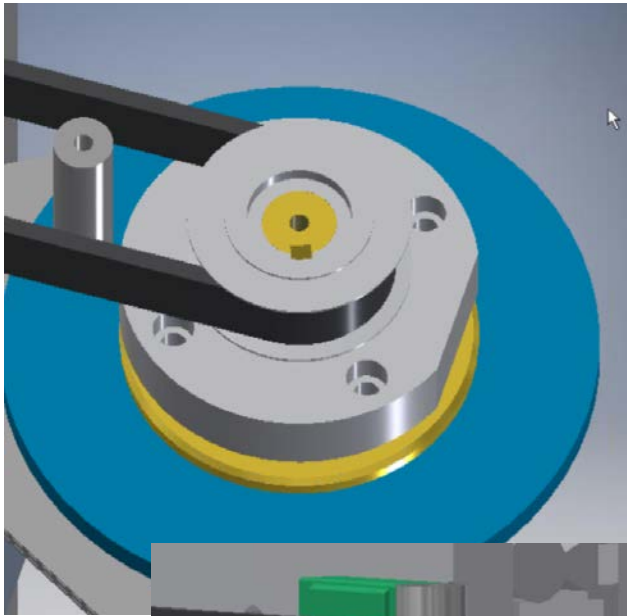
Edge Delete Conveyor  
Belt Tensioner



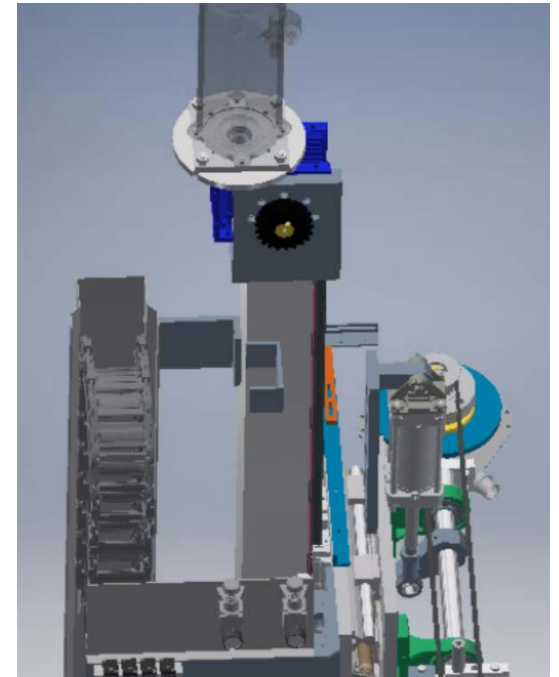
Exposed View Upper  
Edge Delete

Exposed View Lower  
Edge Delete

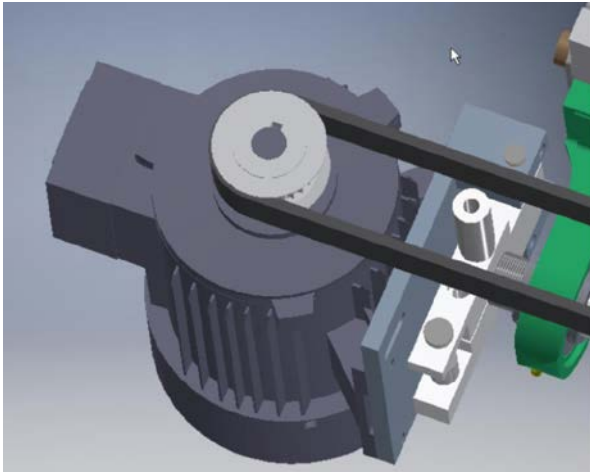




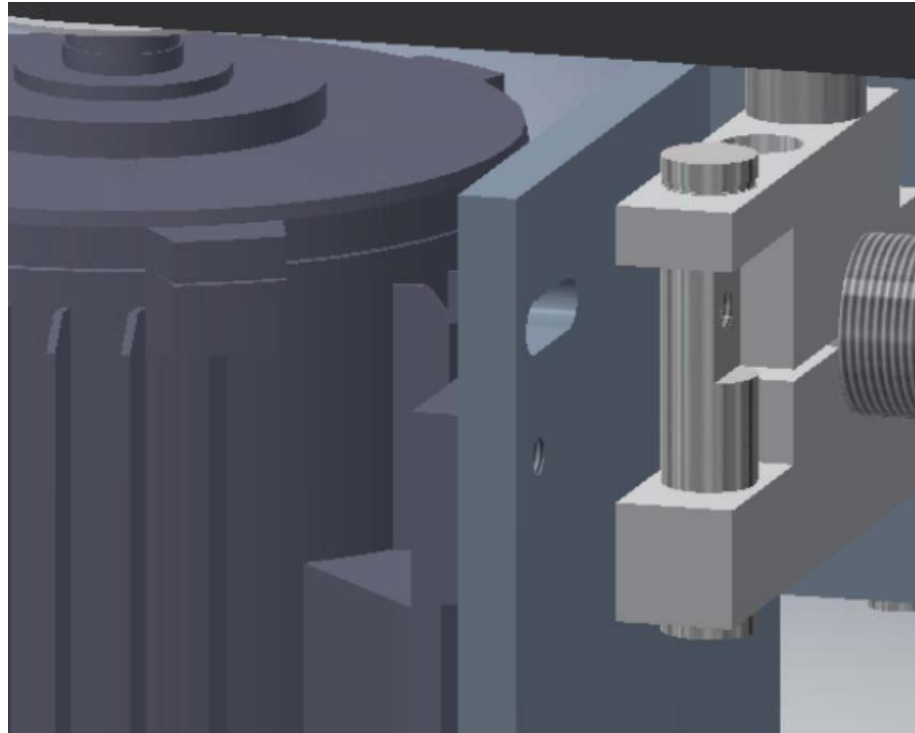
Cross Section  
Of Edge Delete Wheel  
Spindle



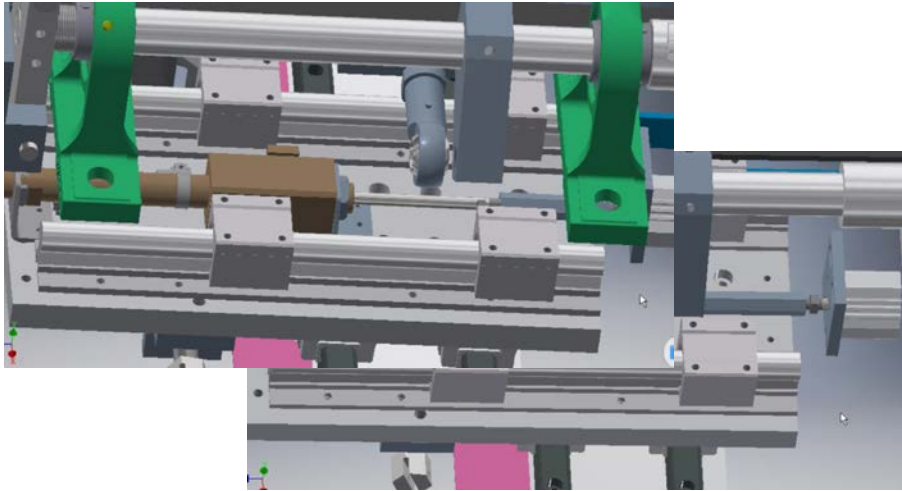
Upper Head Drive  
Assembly



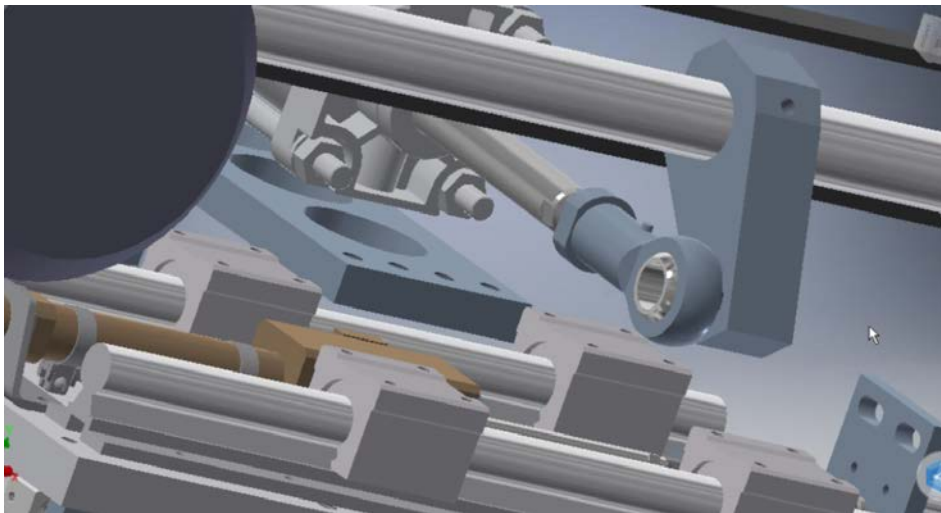
Edge Delete Drive Belt  
Tensioner



Exposed View Upper &  
Lower Z Axis Motion



Lower Head  
Positioning Cylinder

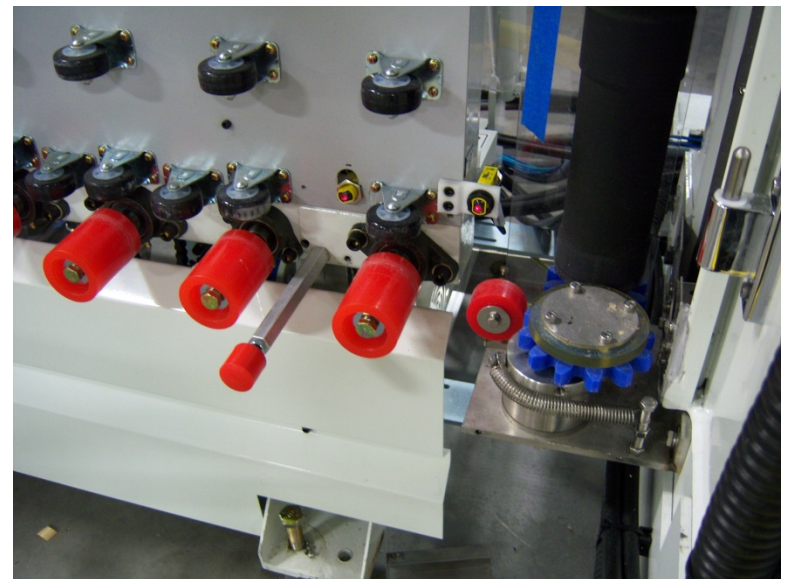


Upper Head Rotate  
Assembly

# Infeed washer

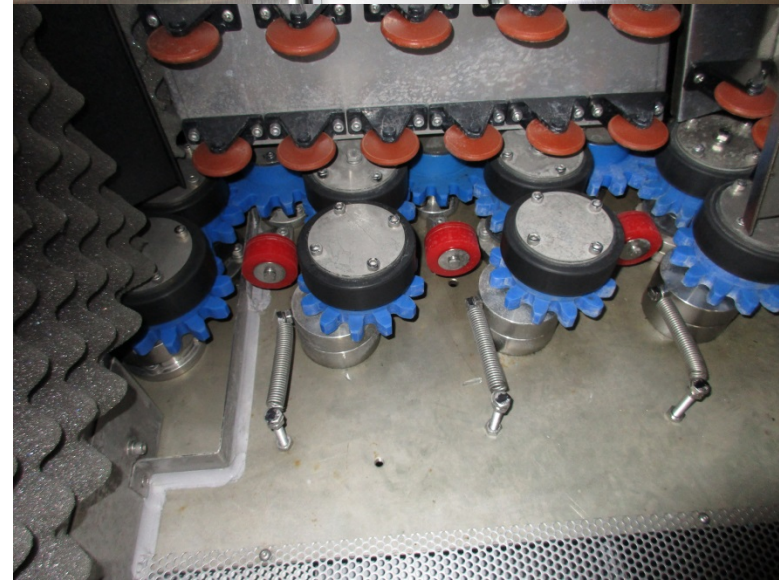
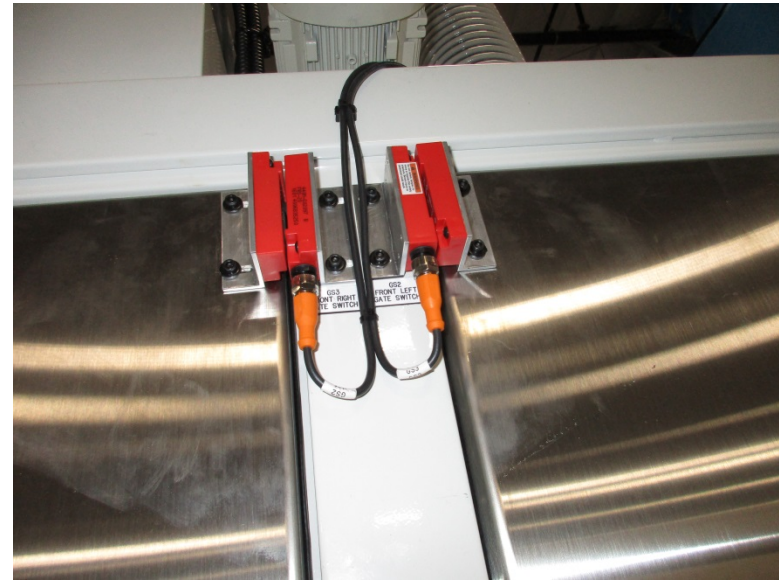
Product detect eyes

Sensors for monitoring water temp, level and quality

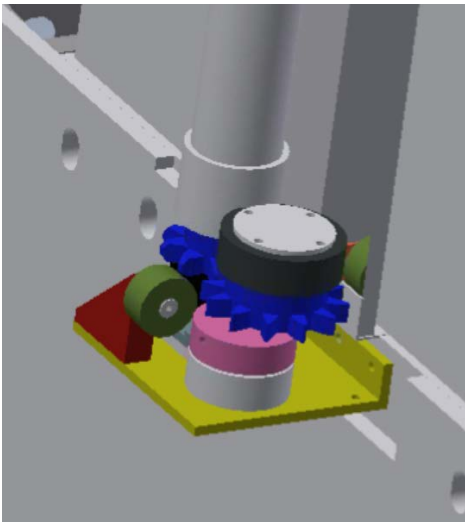


# Washer

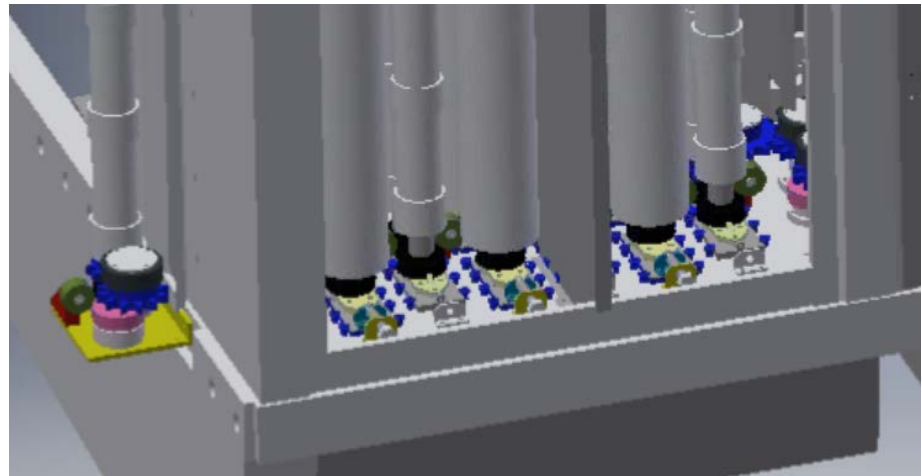
Safety door interlock  
Drive components



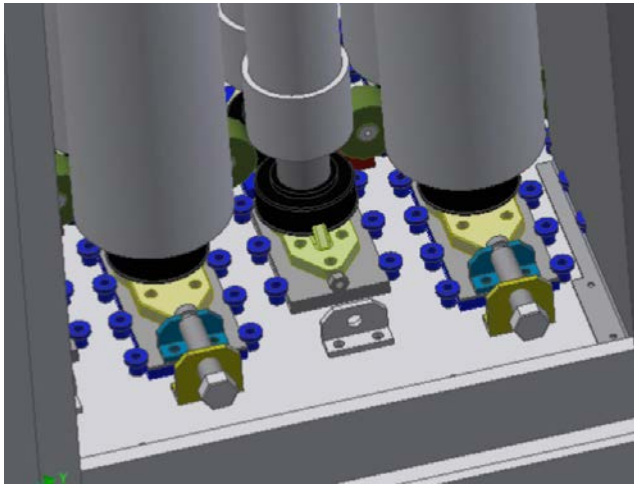
## Exposed View of Washer Top / Belt Drive System



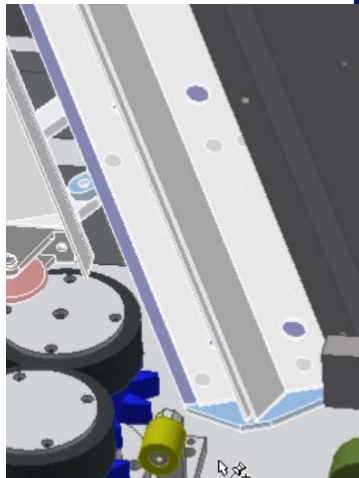
Washer Infeed Pinch  
Roller



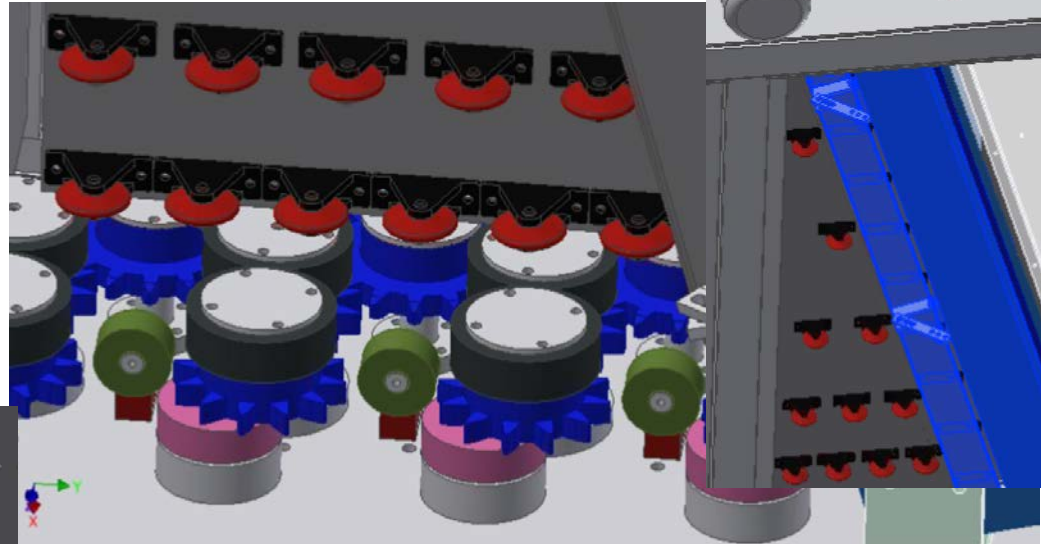
Exposed View Washer  
Brush Adjust and Spring  
Tension Pinch Roller



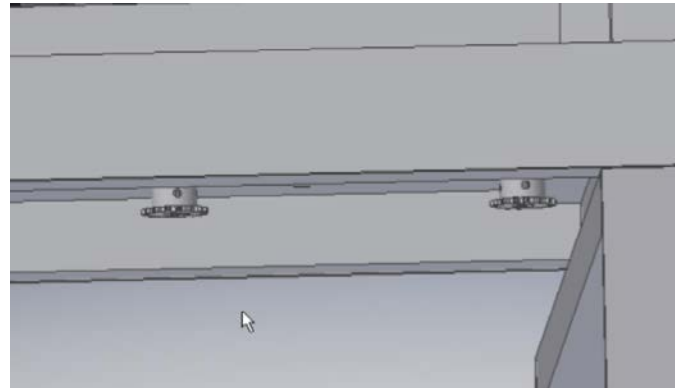
Wash Side / Brush  
Adjust



Exposed View of  
Air Knife

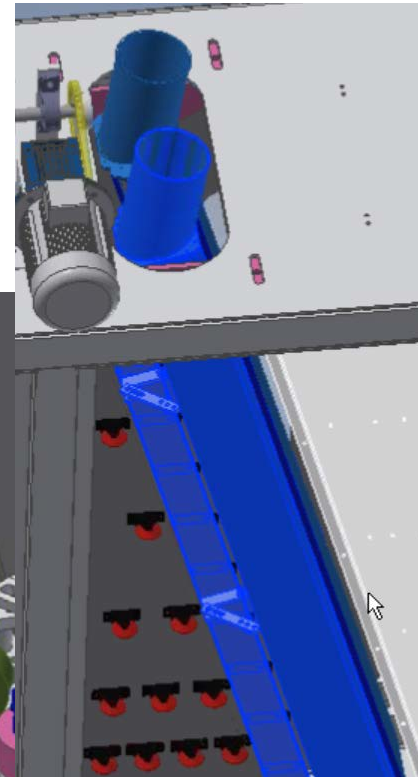


Dryer Side Pinch  
Rollers



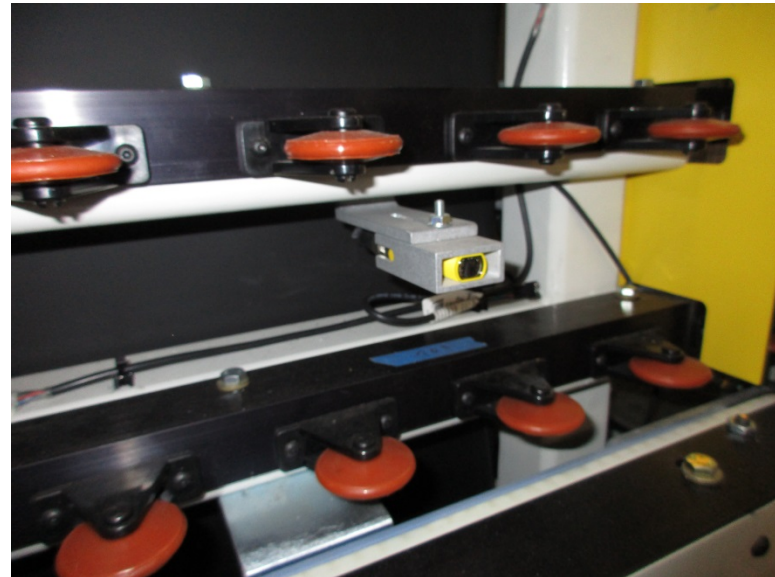
Drive Sprockets  
for Final Pinch  
Rollers / Dryer  
Side

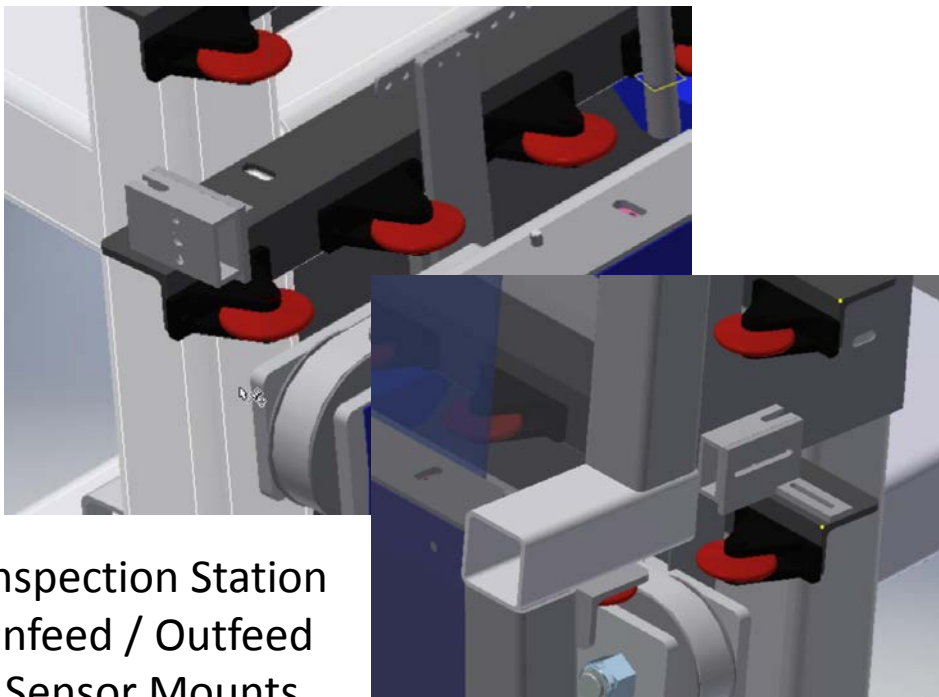
Air Knife /  
Blower Inlet



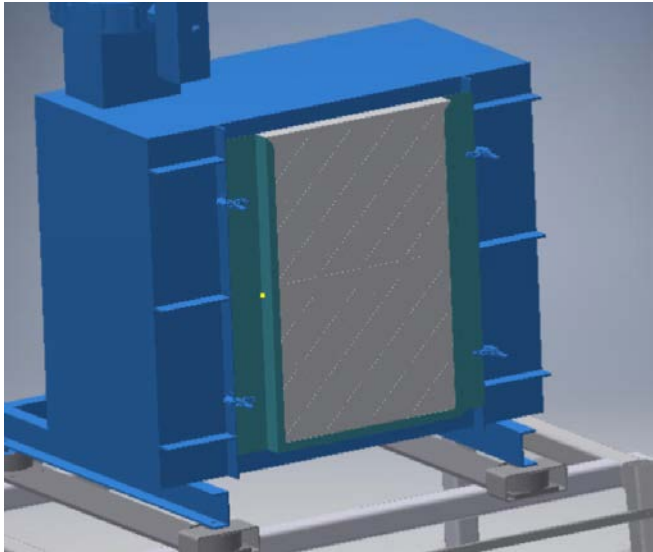
# Inspection station

Infeed and outfeed product detect eyes  
Conveyor drive

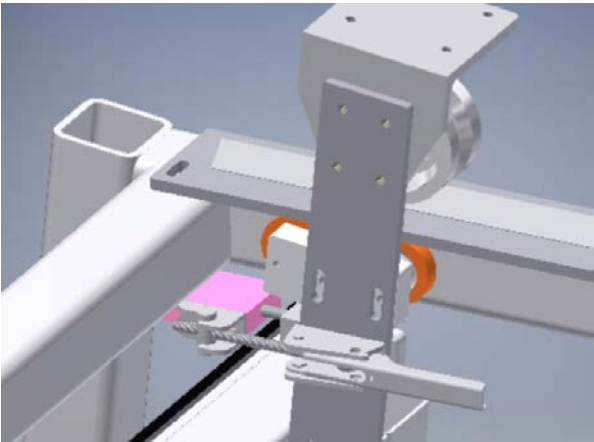




Inspection Station  
Infeed / Outfeed  
Sensor Mounts



Air Knife Blower / Filters

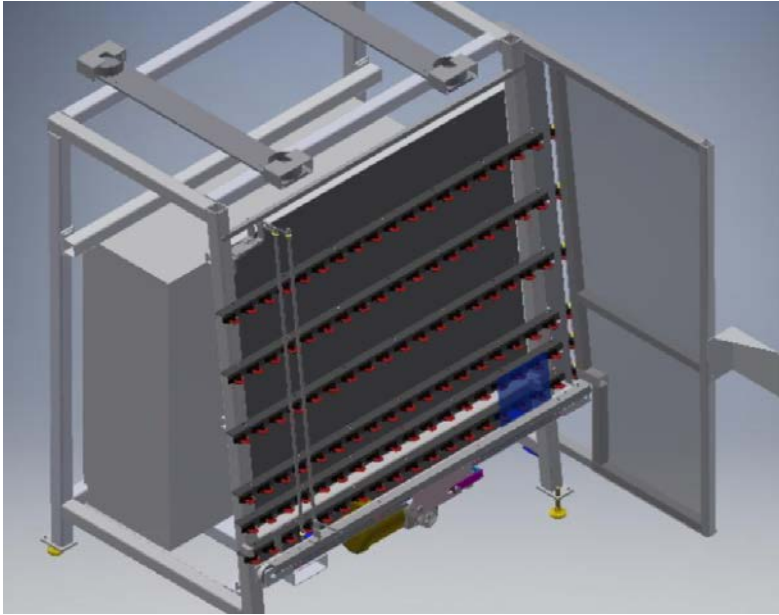


Back Lane Access Turn-  
buckles



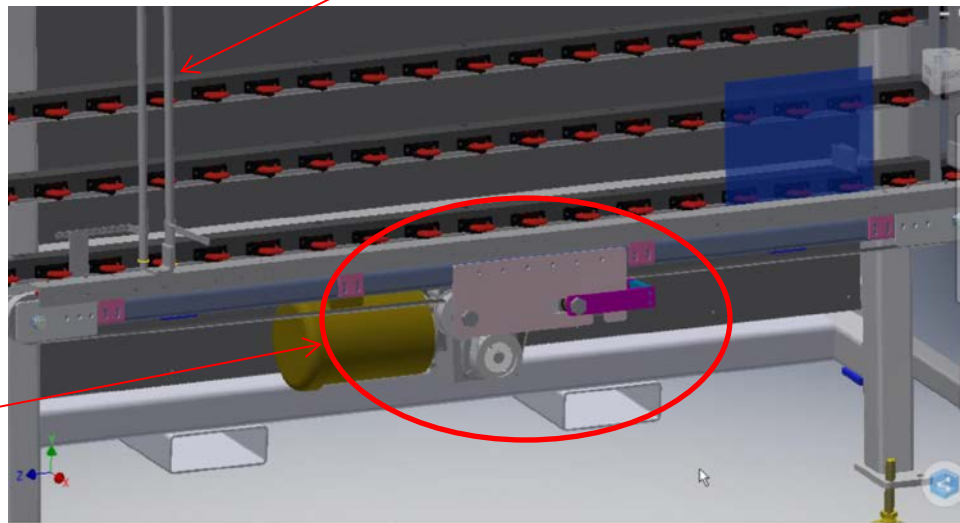
SAM Infeed Drive  
System

Back Lane Caster  
(For Manual Access)



Inspection station

Static bars on infeed  
of inspection station



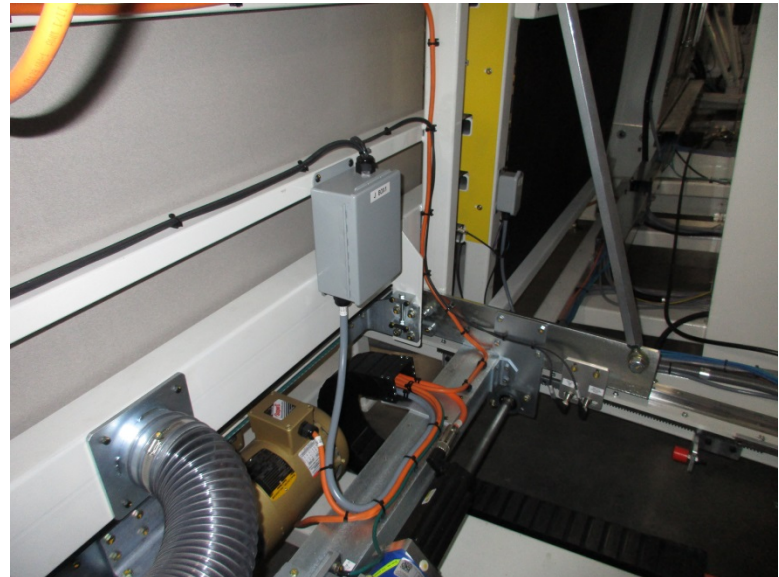
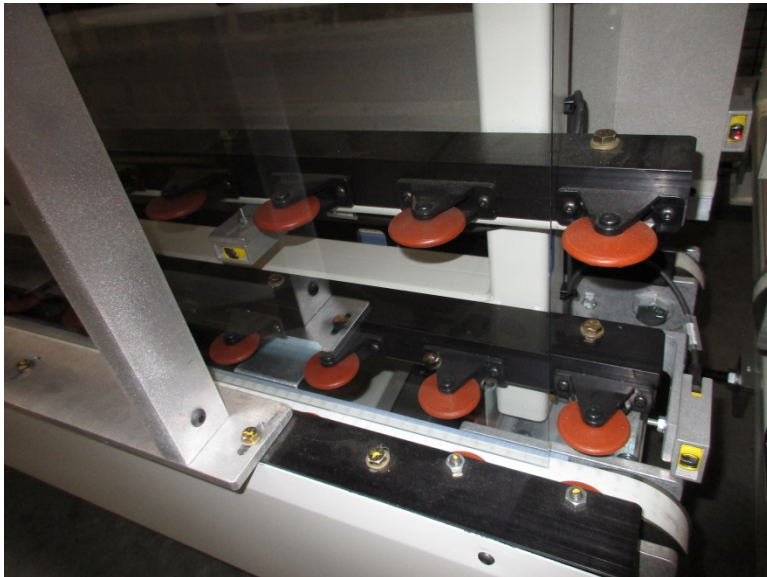
Conveyor belt  
tensioning on  
inspection station

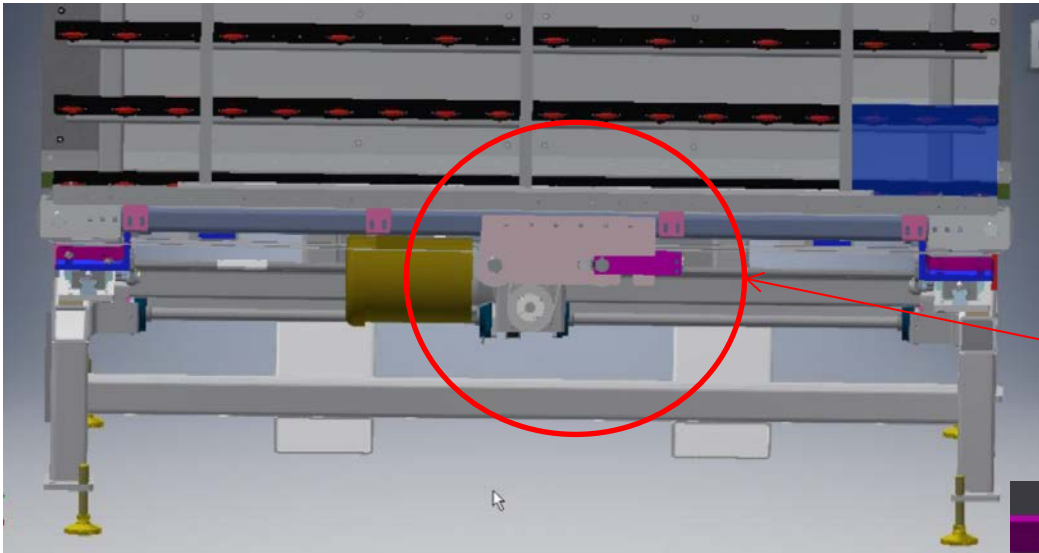
# Double shuttle

Home and over travel prox

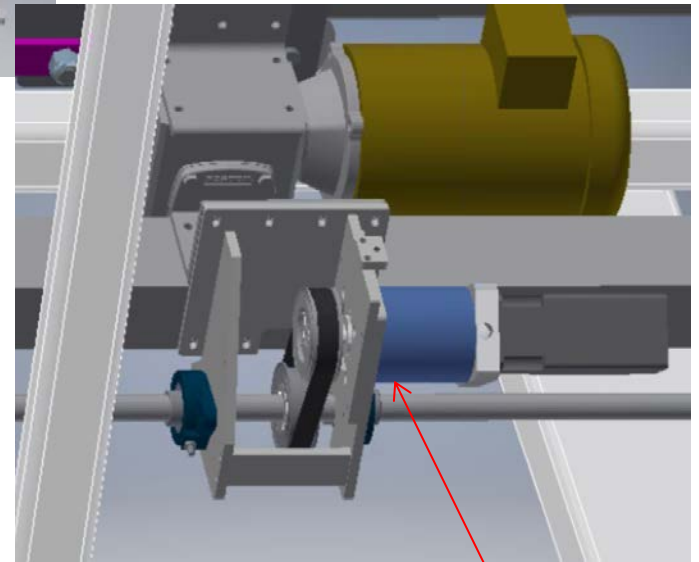
Conveyor drive

Product detect eyes



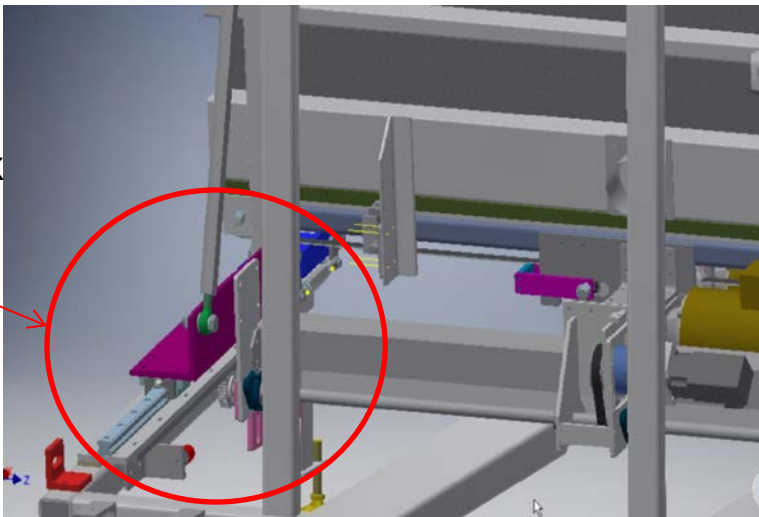


Conveyor belt  
tensioning on  
shuttle



Shuttle servo drive

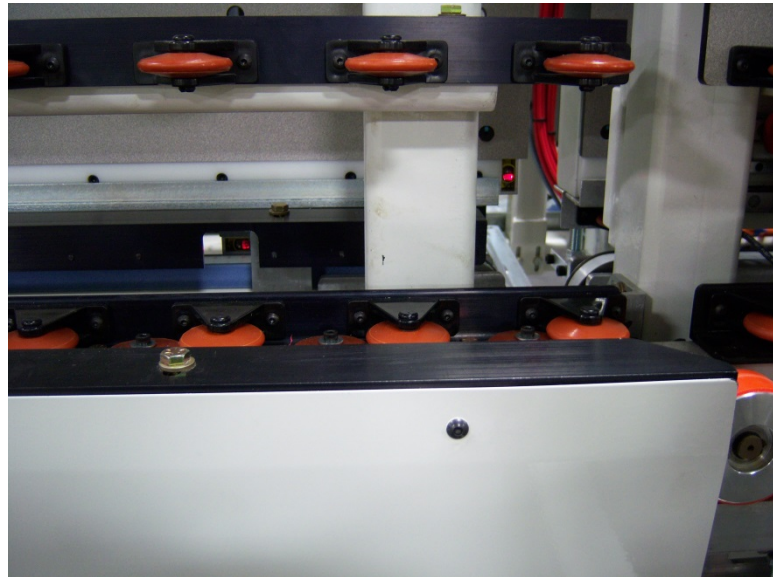
Shuttle guide  
bearings / rack  
and pinion



# Infeed spacer applicator

Back lane closed prox

Product detect eyes



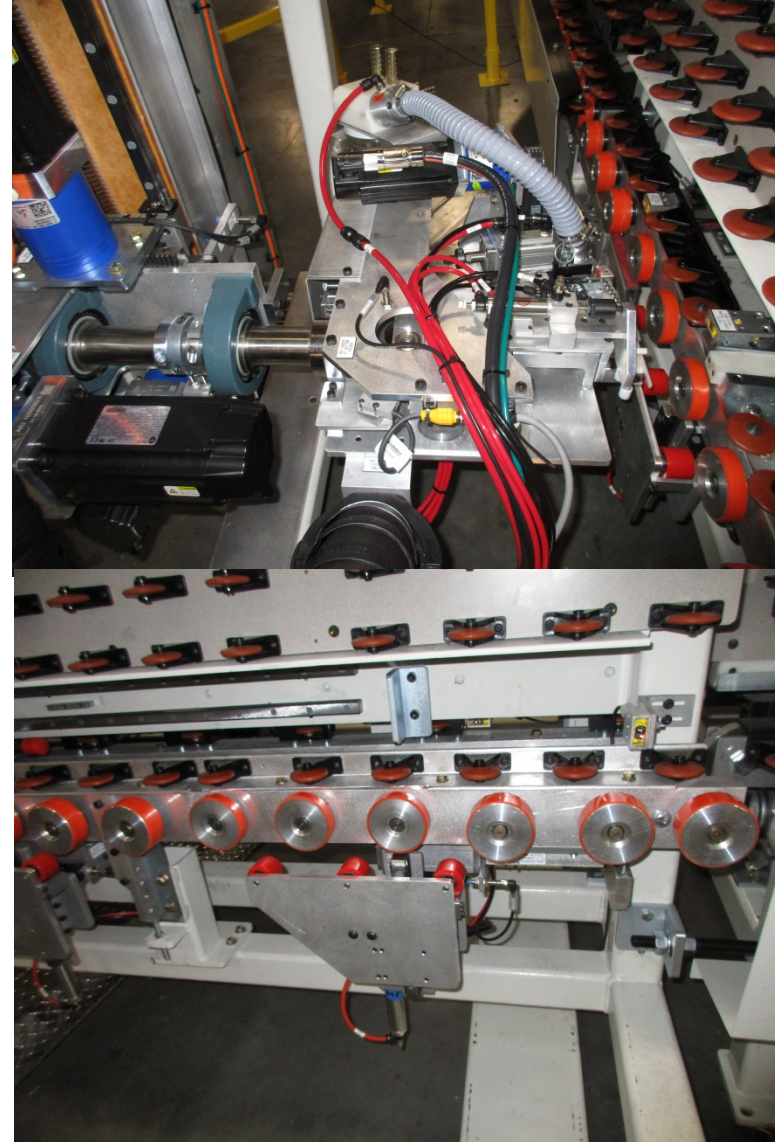
# Spacer applicator

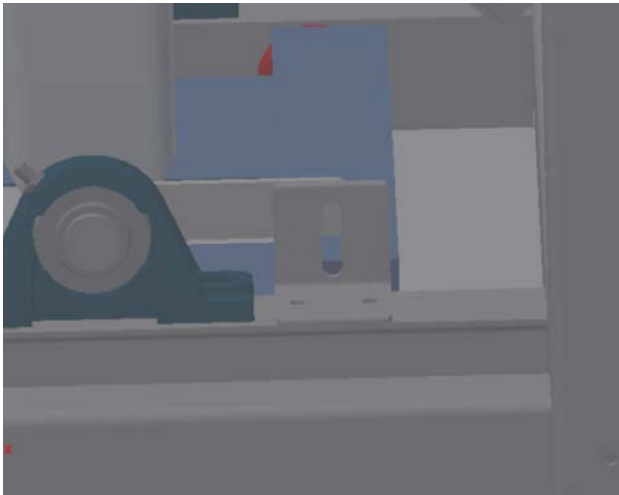
Backer removal station

Conveyor components

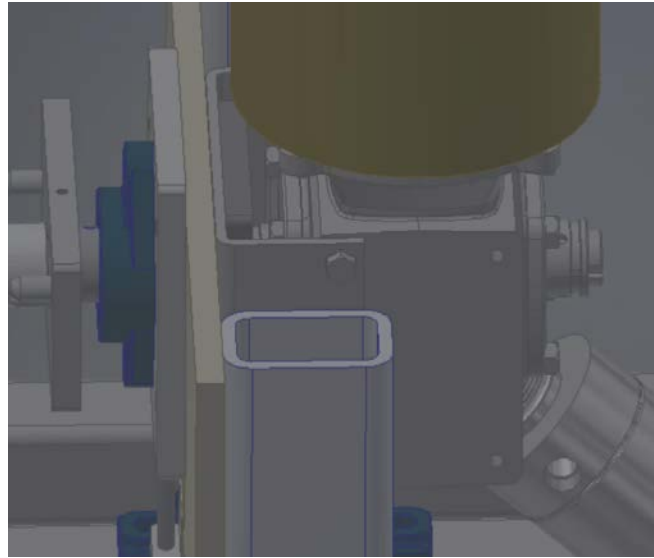
Application head

Eyes and sensors



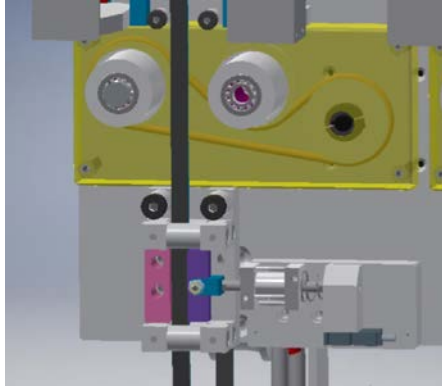
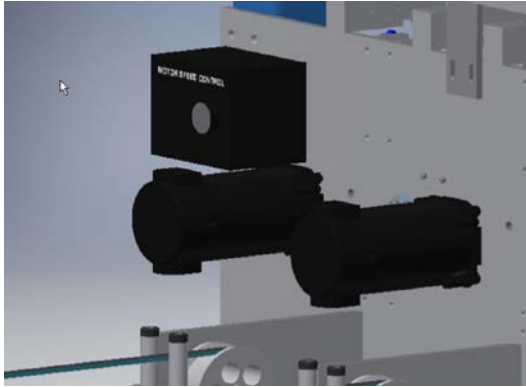


Spacer Drive Box Prox  
Mount Bracket  
(Reel Tip Angle)



Reel Drive Box

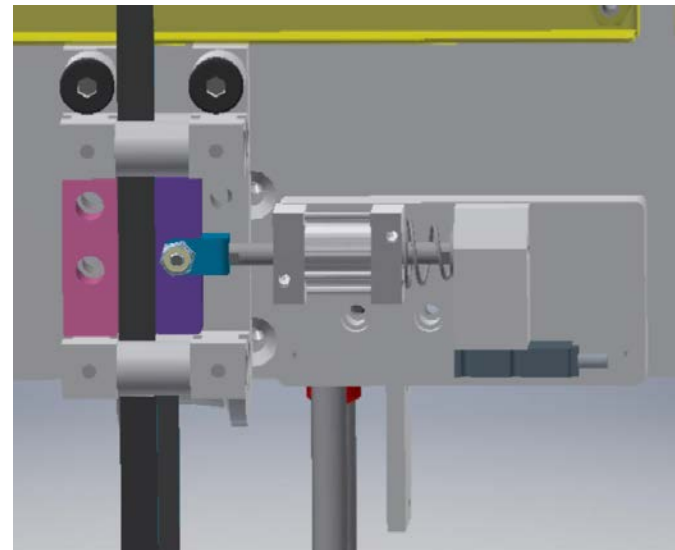
## Blue Backer Friction Wheel Drive & Motors



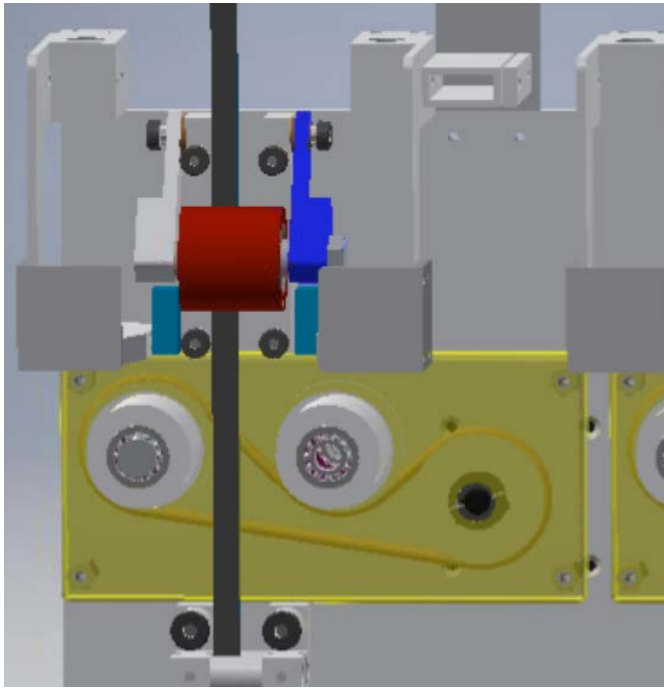
View of Blue Backer  
Friction Roller Drive  
Belt



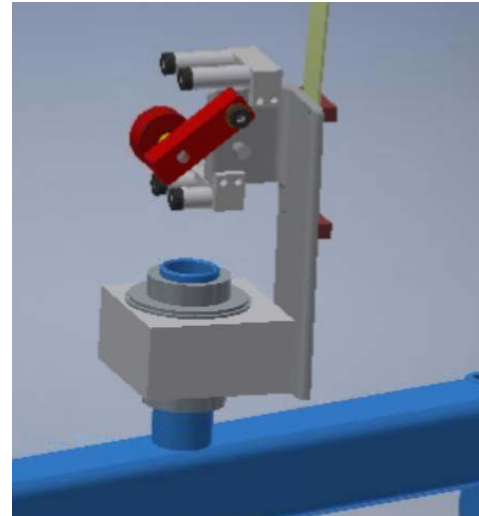
Big Dancer Laser  
Mount



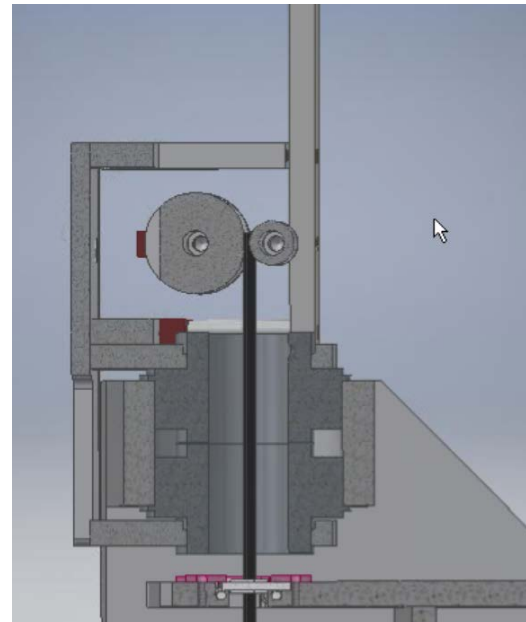
Spacer Thickness (Size)  
Detector



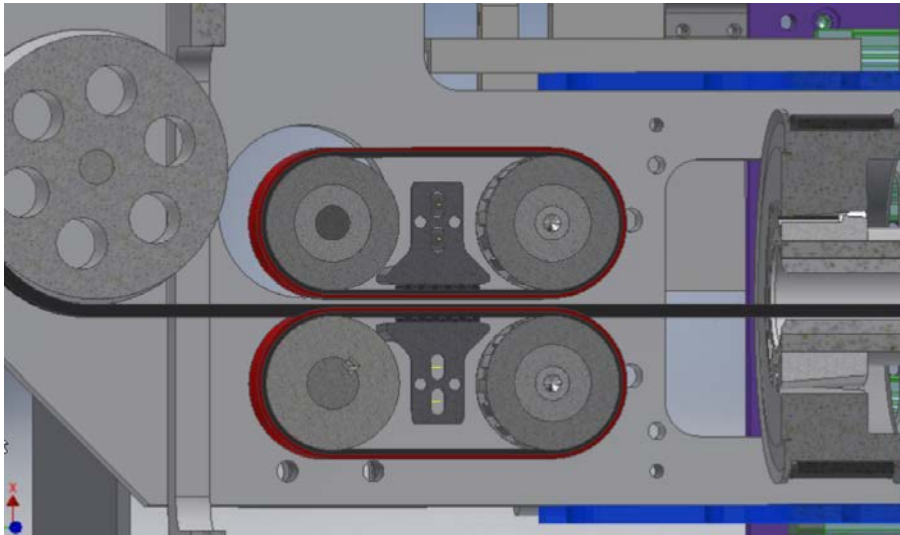
Spacer Hold Down  
Roller (In conjunction  
with Blue Backer  
Removal Sensors)



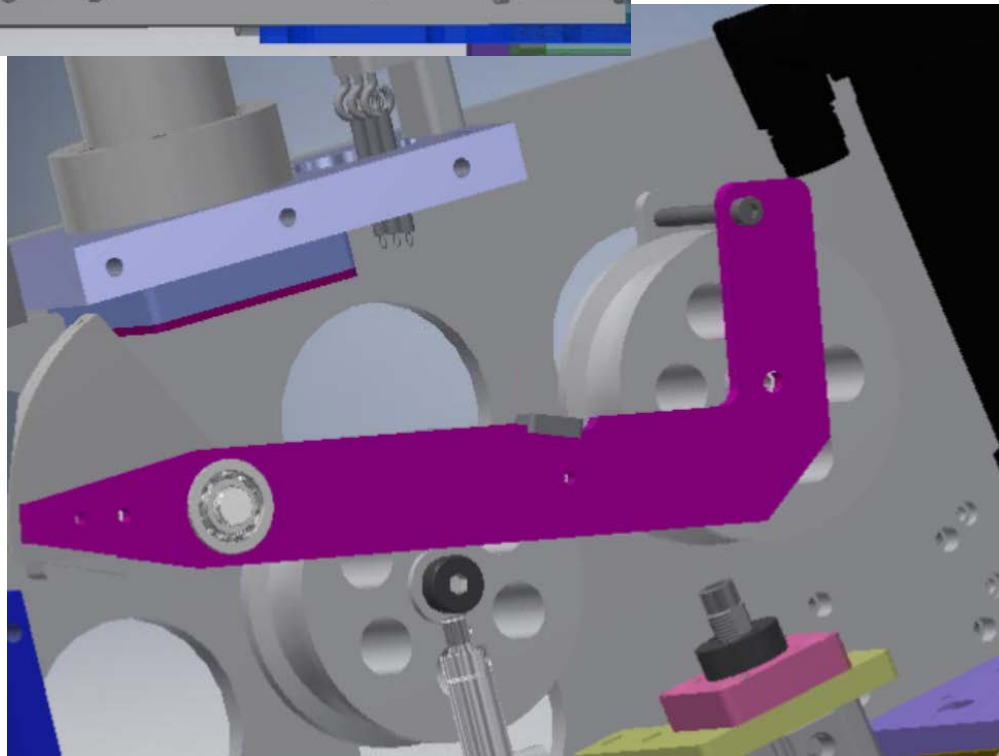
Spacer Hoop  
Support Pivot  
and Hold Down  
Roller



Section View of  
Spacer Support  
Pivot

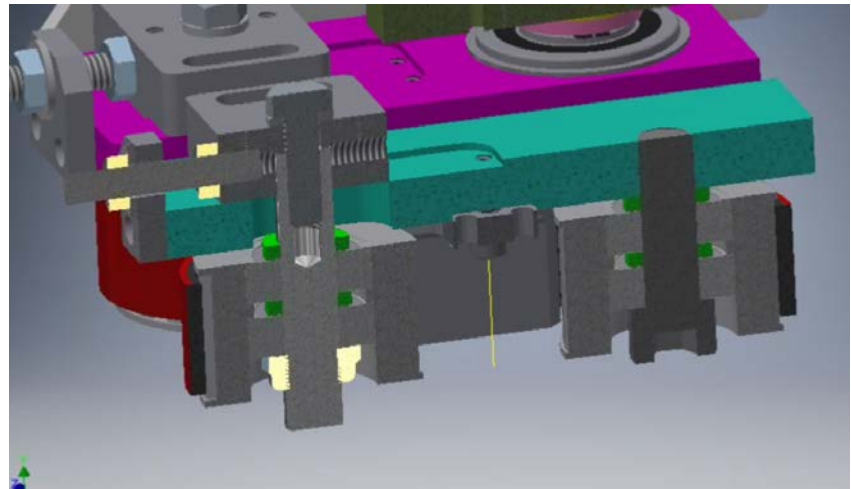
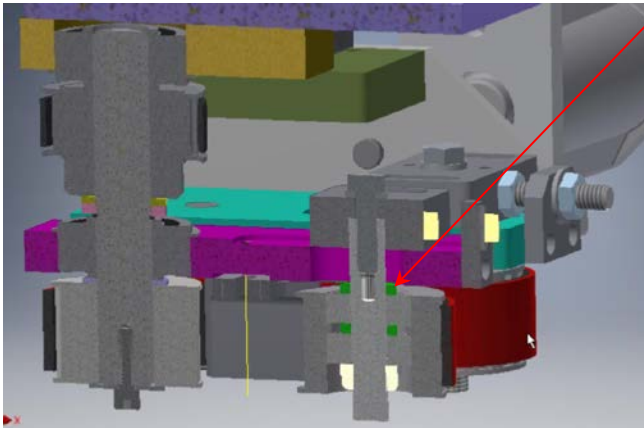
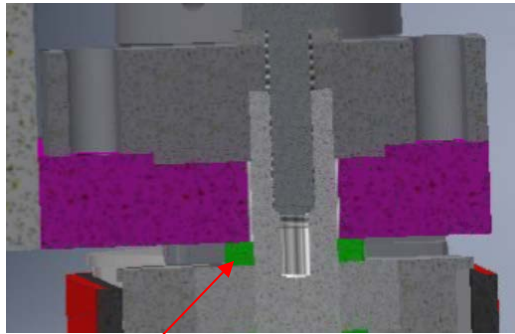


Section View of  
Infeed Tractor  
Drive



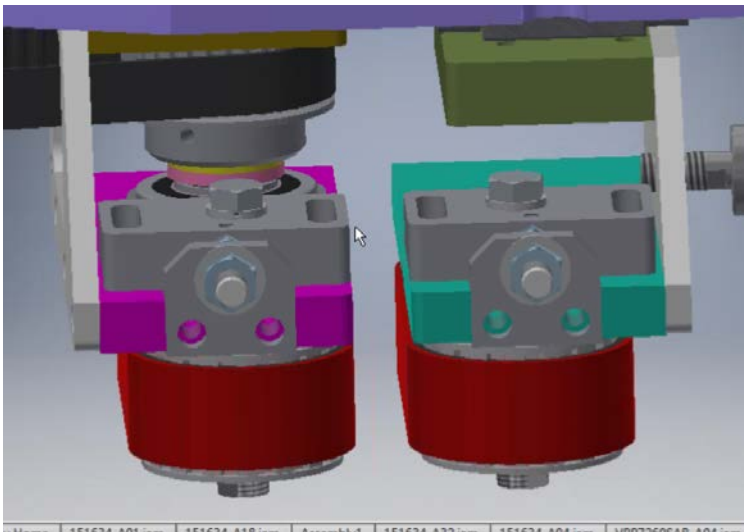
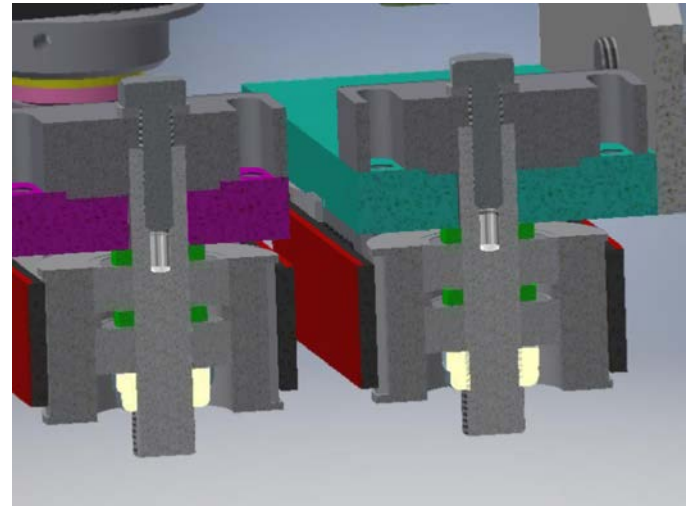
Exposed View  
of Tiny Dancer

Drive Side  
Side Section  
View of Tractor  
Drive

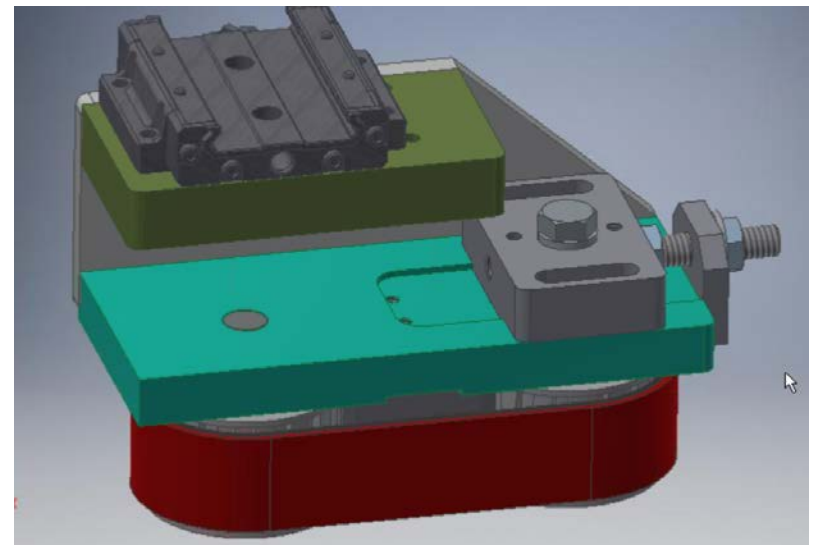


Floating Side  
Side Section View of  
Tractor Drive

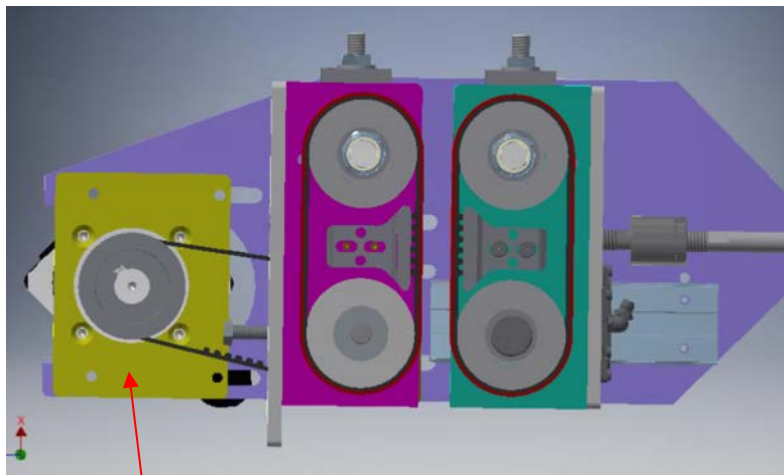
Tensioning End  
Section View of  
Tractor Drive



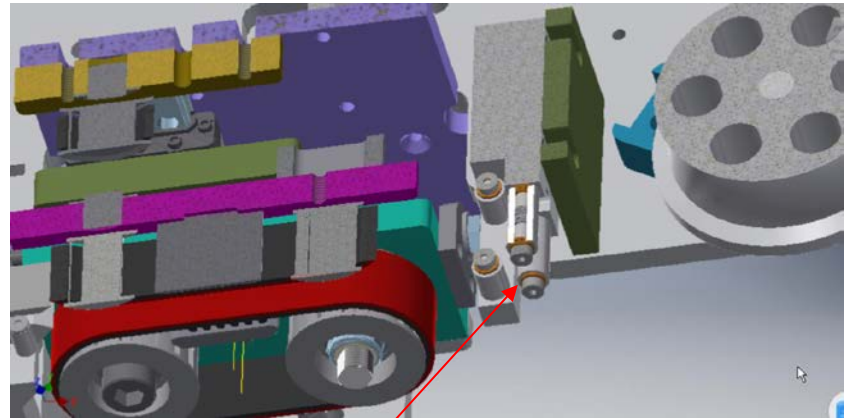
Tensioning End  
View of Tractor  
Drive



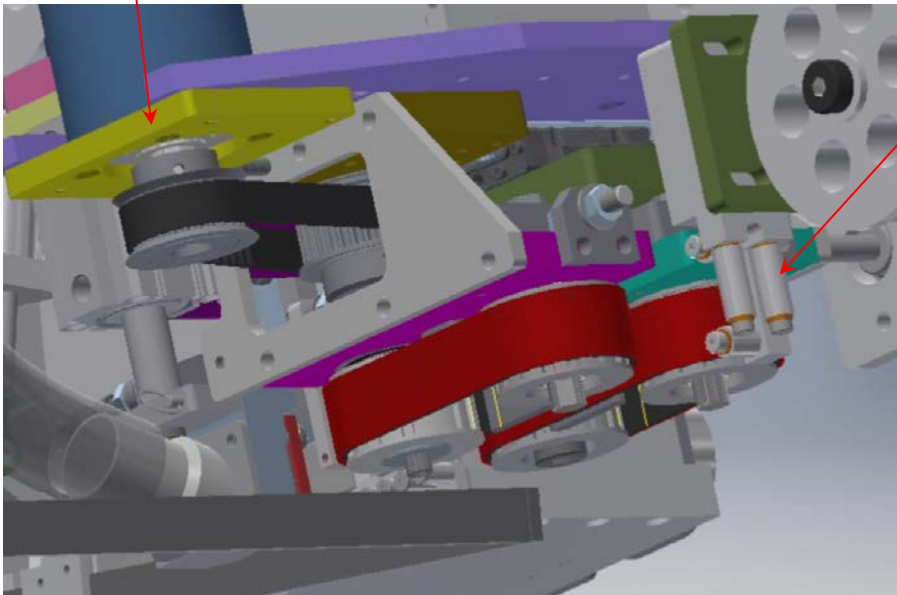
Tensioning Side View of  
Tractor Drive

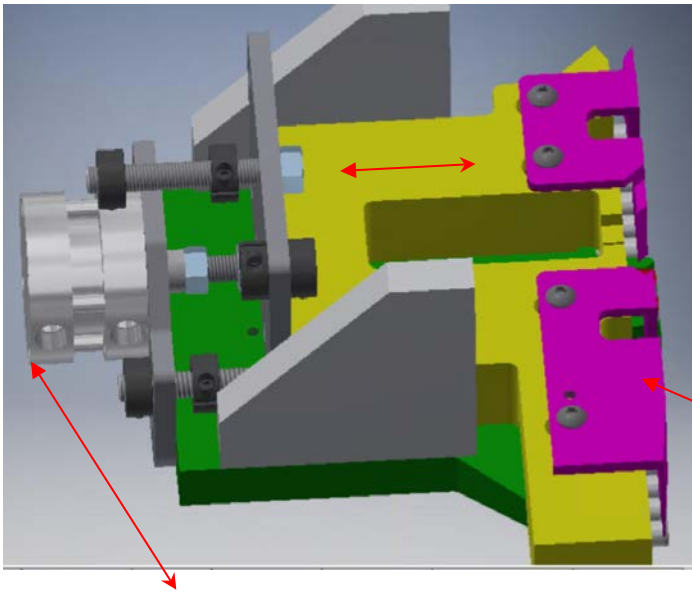


Section View of  
Outfeed Tractor Drive



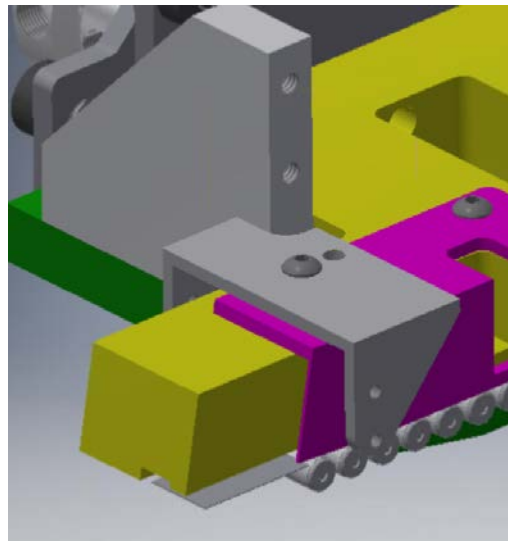
Section View of  
Outfeed Tractor Drive  
Floating Side



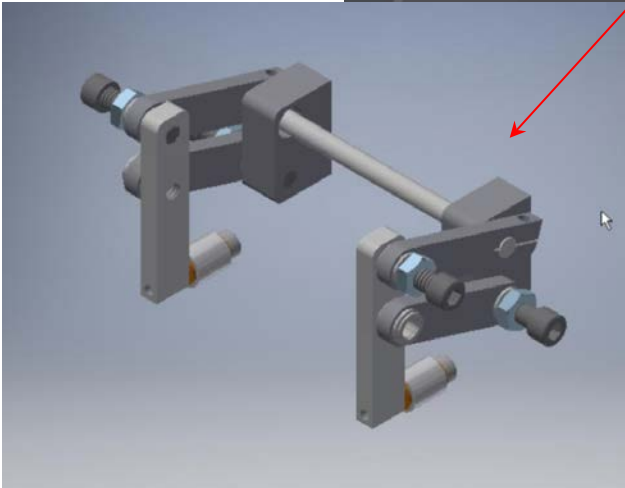
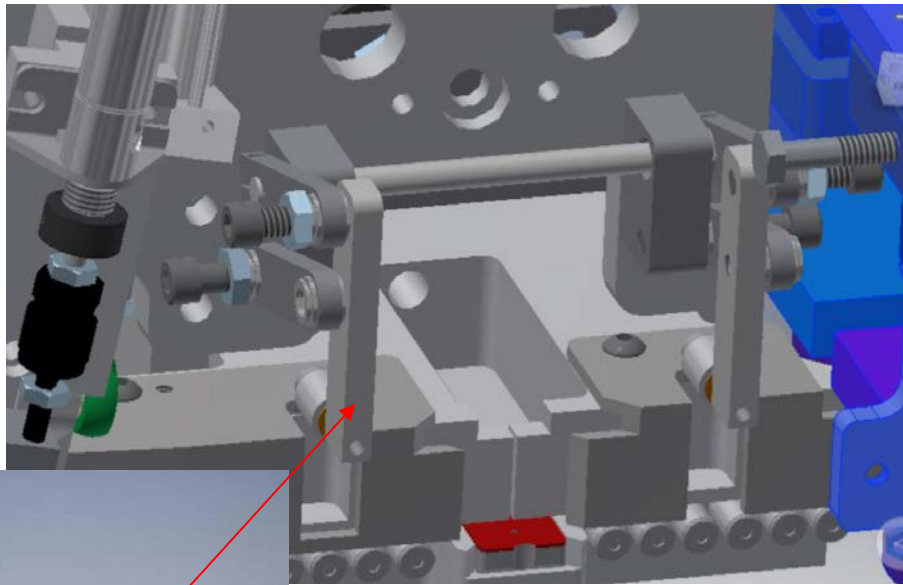


Spacer Guide  
Work Assembly

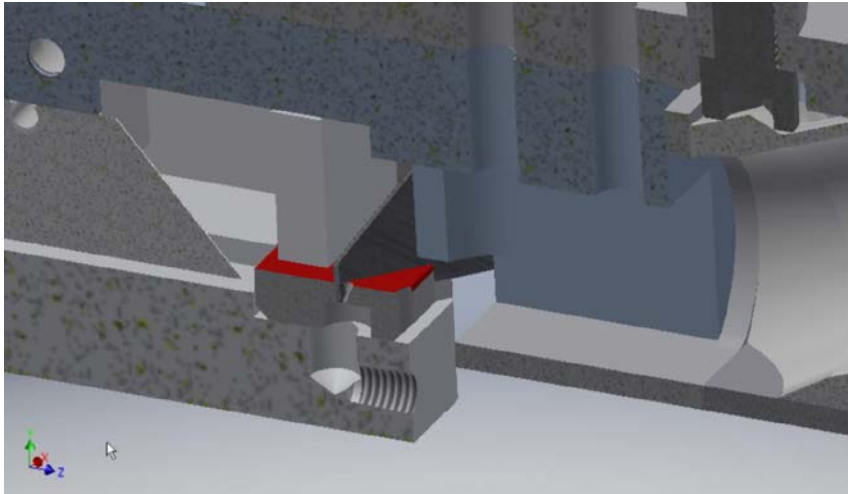
Spacer Clamping  
Assembly for  
Knife Cutting



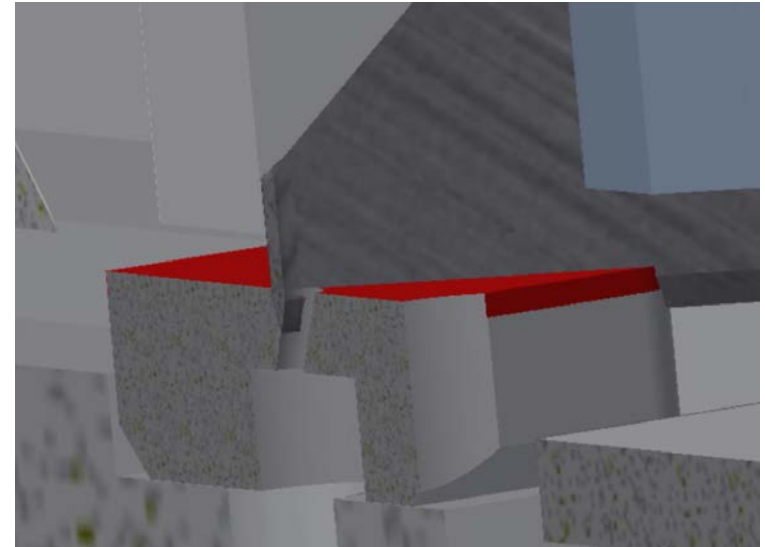
Spacer Prestart  
Measuring  
Fiber Optics  
Mount



Down Roller  
Assembly at  
Knife Cutting  
Area

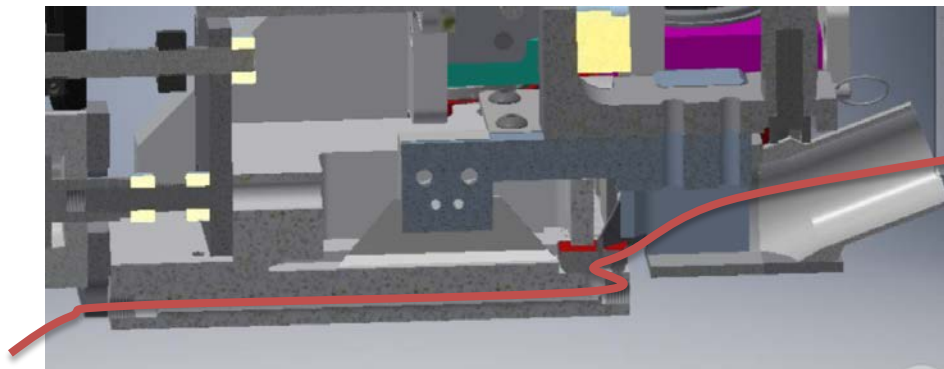


Section View  
showing Knife  
Backer

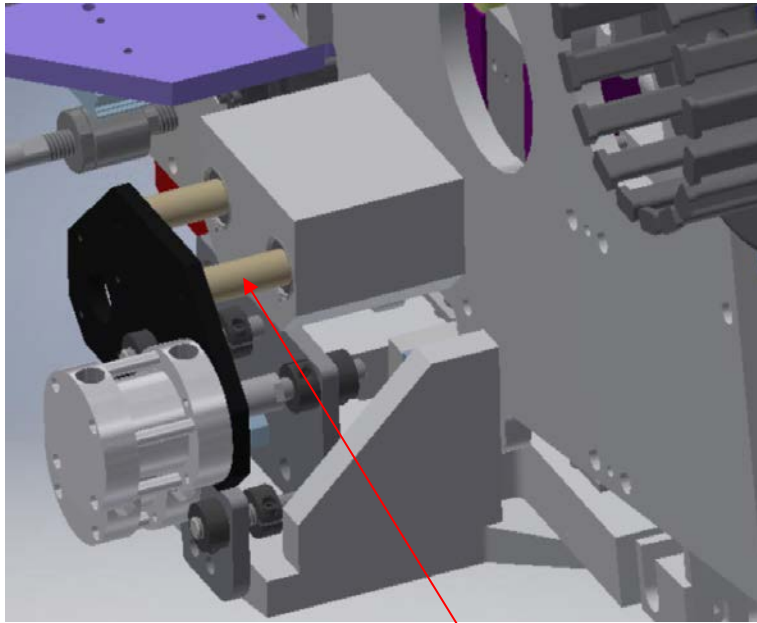


Section View  
showing Knife  
Cut Depth

Air Blast Inlet  
for Chad  
Removal

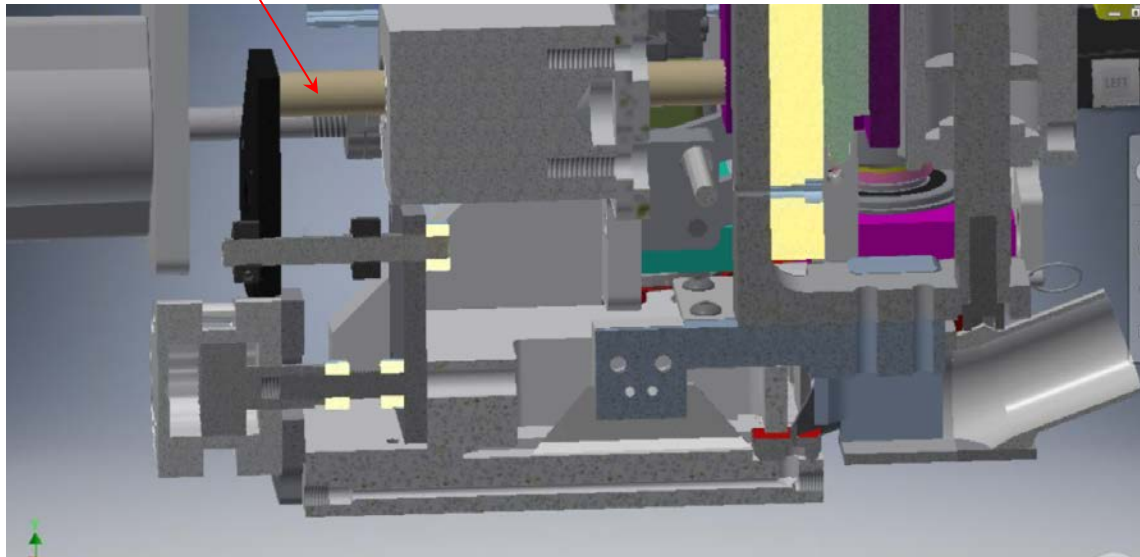


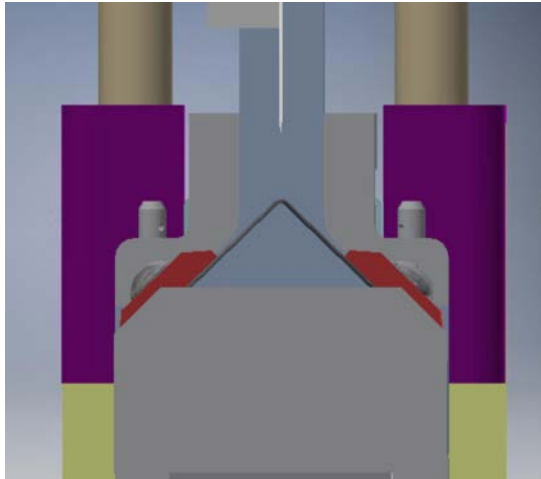
Hose Fitting for  
Chad Collector



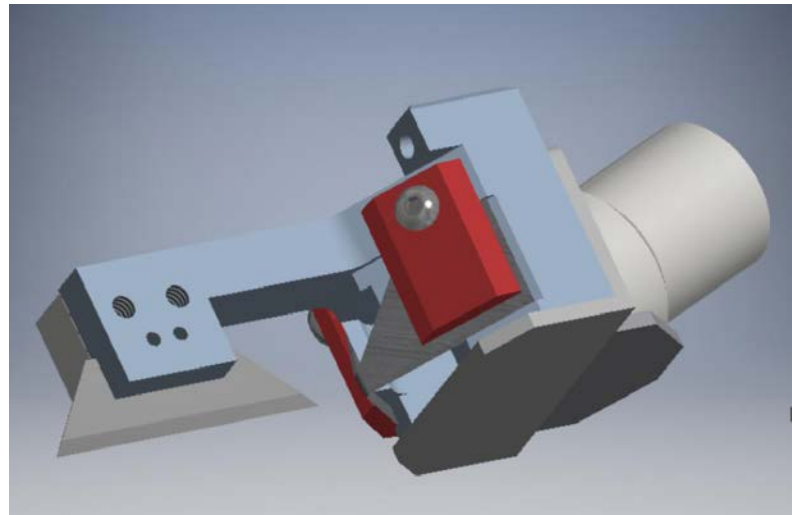
Side Clamping and  
Knife shift  
(Straight vs  
V-Notch Cut)

Section View of Side  
Clamping and Knife shift

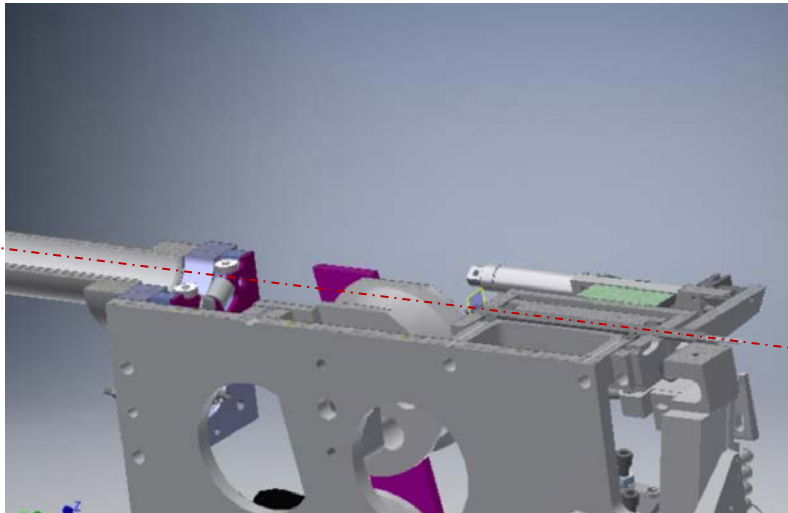




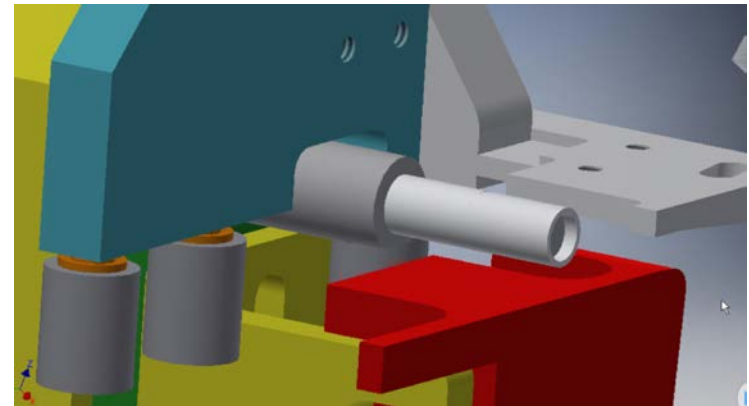
Alignment View of Bottom  
Side of Knife Assembly



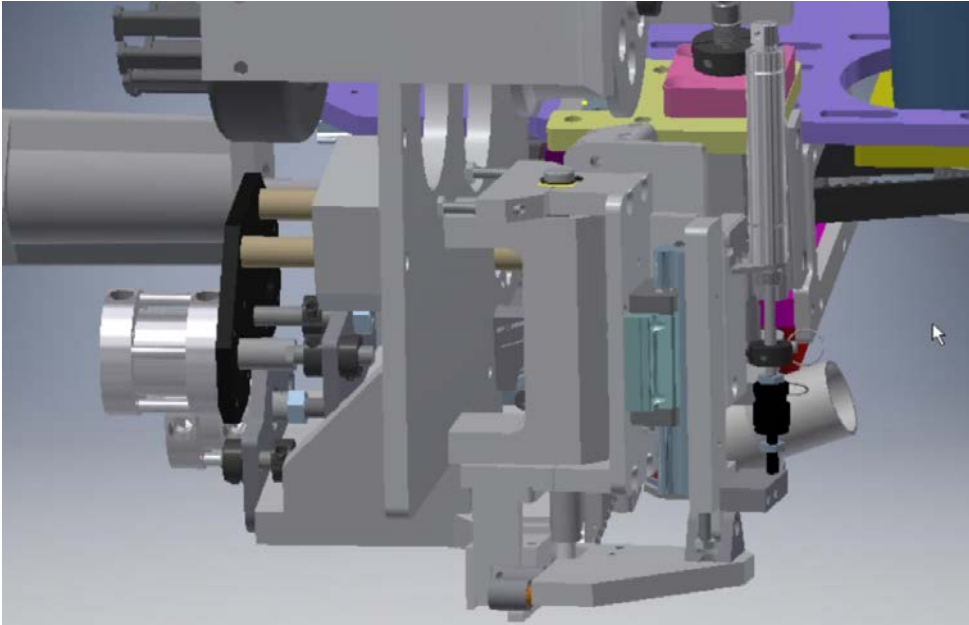
Model of Knife Holder  
Assembly



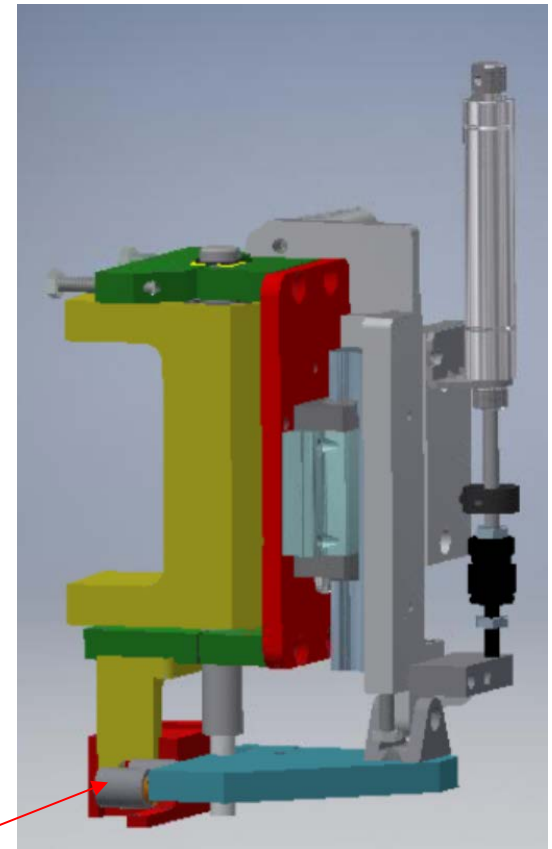
Section View of Center Line  
(Index Shaft to Corner Pin)



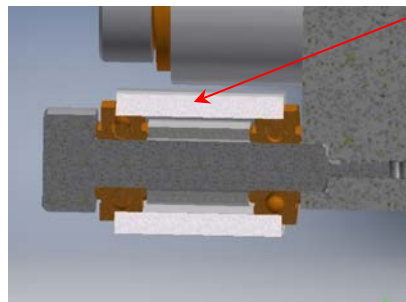
View of Corner Pin Through  
Hold Down Roller Assembly



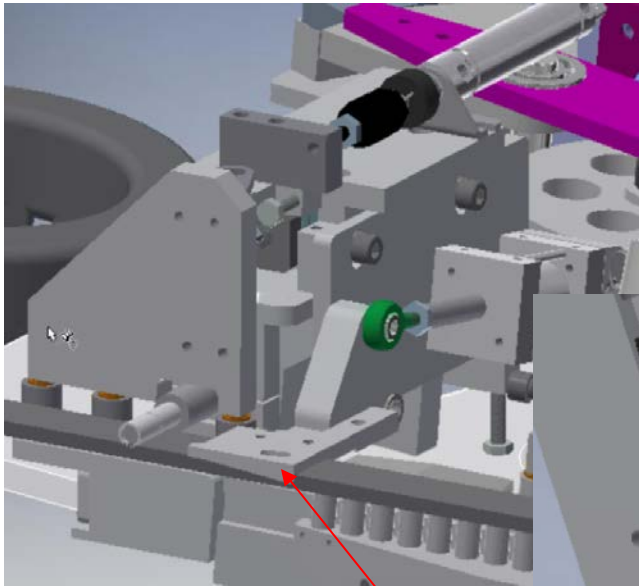
Assembly View of Hold  
Down Roller Assembly on  
SAM Head



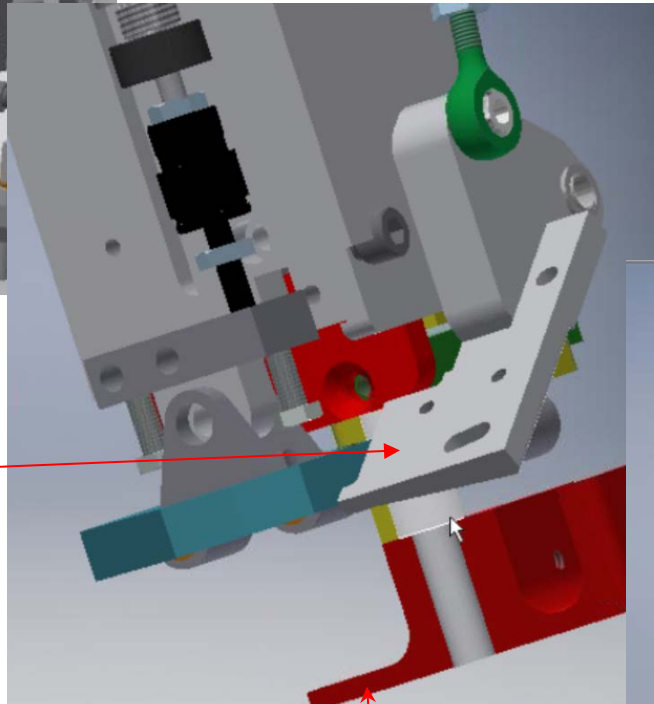
Hold Down Roller  
Assembly



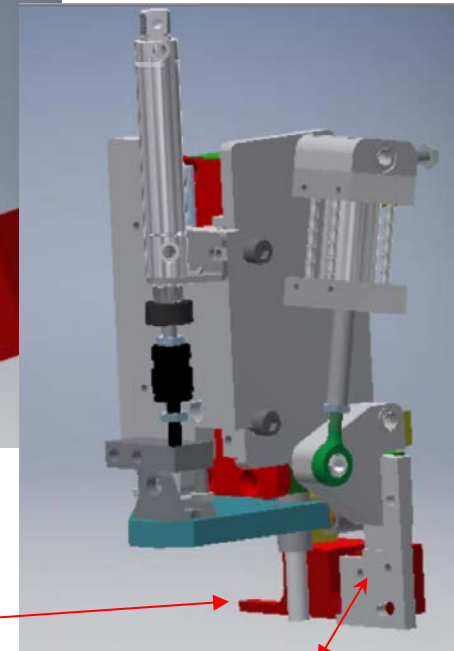
Section View  
of Application  
Down Rollers



(Retractable Guide Work  
(During Start / Stop  
Corners))



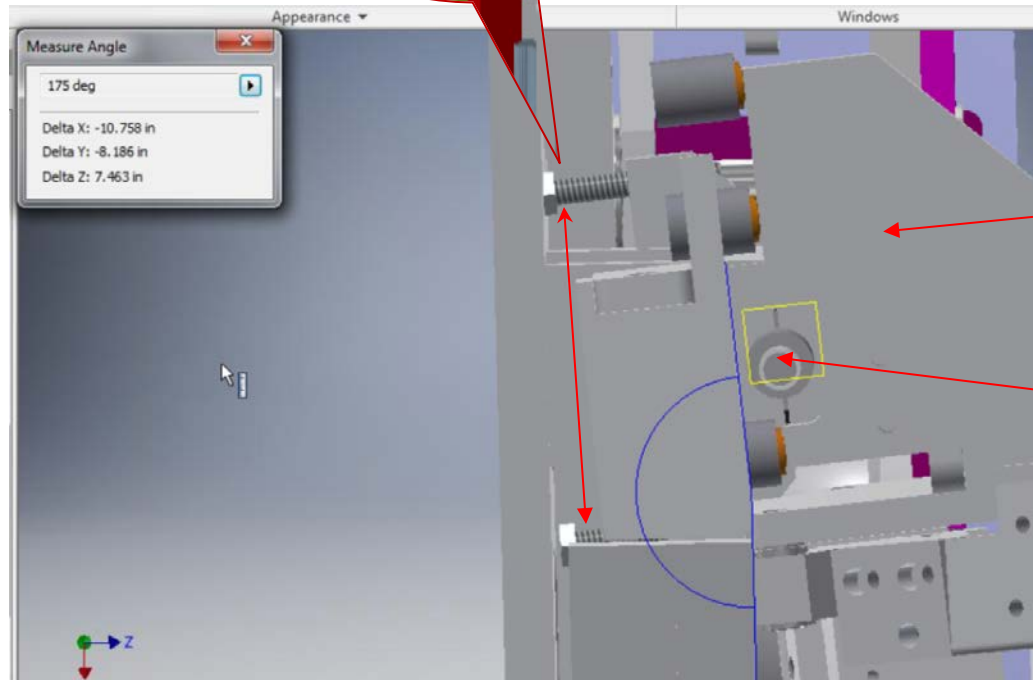
(Delrin Stationary  
Guide Block)



(Retractable Guide  
Work....Extended View  
(During Application))

Views of Motion of  
Retractable Guide Work

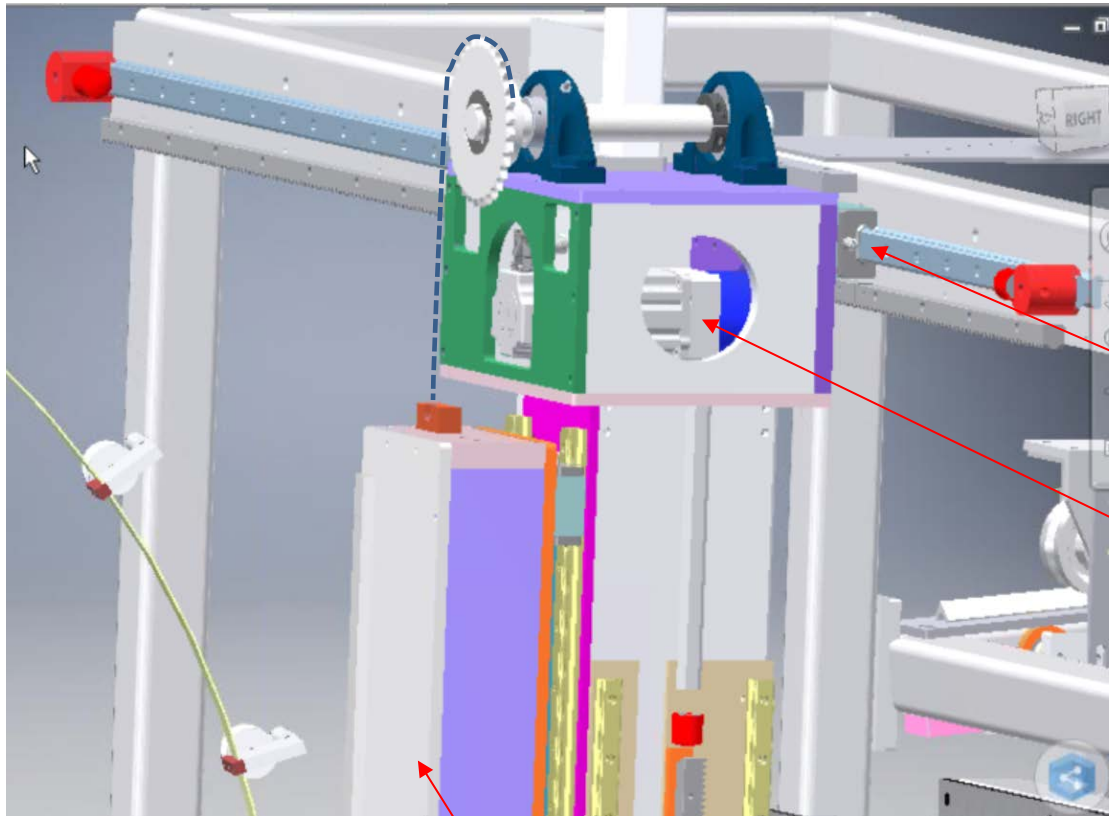
(Down Rollers & Stationary  
Guide Block  
Assembly Adjustment Bolts)



(Down Rollers  
Assembly)

(Corner Pin)

Bottom View of Stationary  
Guide Block  
Showing Application Angle  
(5 degrees (Parameter  
Controlled))



Exposed View of SAM  
Gantry at the TOP  
Showing Drive &  
Counterweight

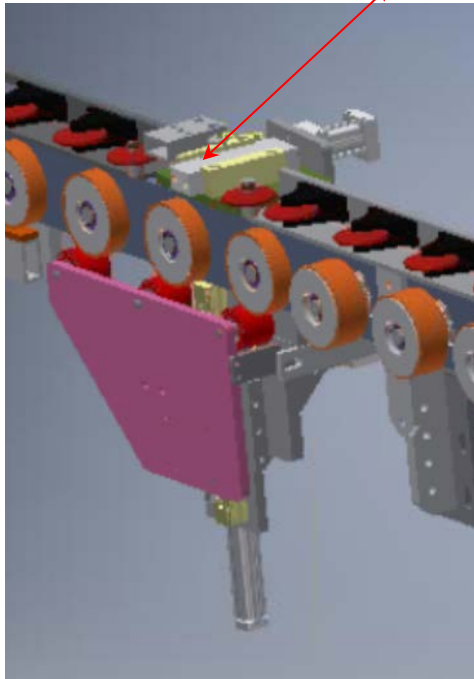
(X Axis Linear  
Bearings & Rail)

(Upper X Axis  
Servo Drive)

(Counterweight Assy)

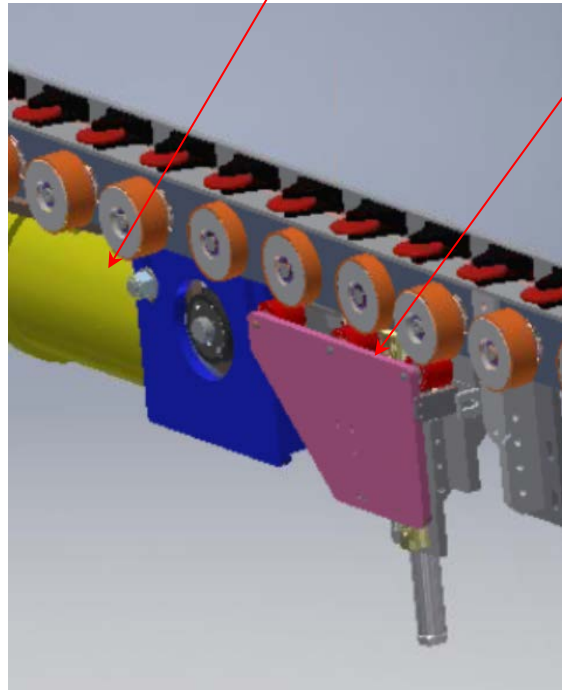
Exposed Rear View of SAM IG  
Transfer Roller Drive System

(Infeed Stop)

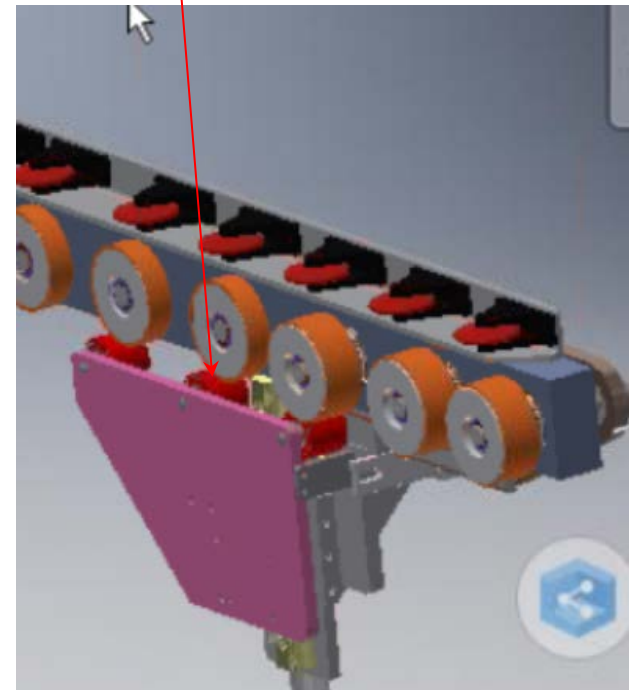


Front View of SAM  
IG Transfer Roller Drive  
At Infeed Stop

(Drive Motor)



(Retractable Support  
Rollers – Used During  
Transfer Only)



Front Views of SAM IG  
Transfer Roller Drive System

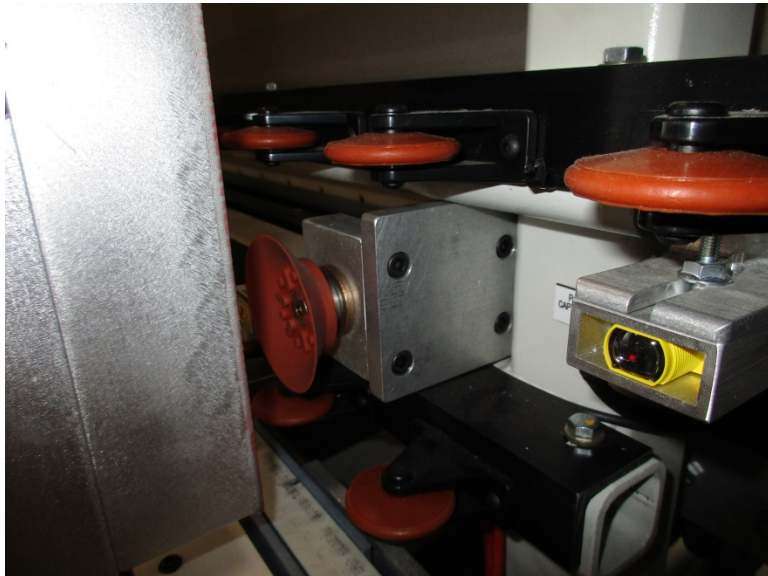
# Outfeed spacer applicator

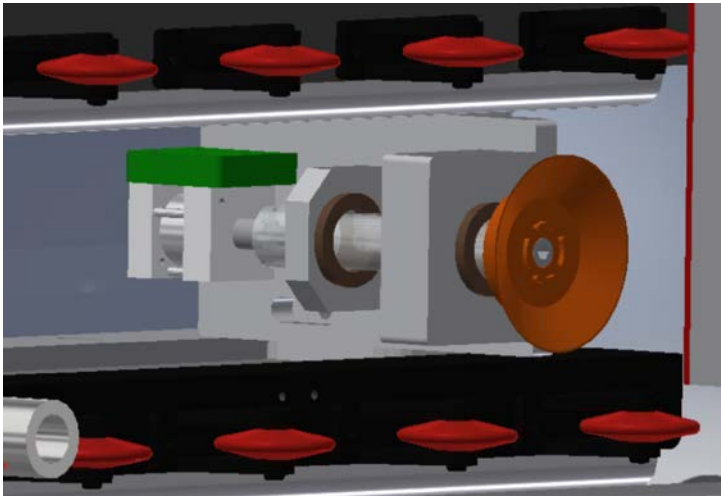
Print station

Cap tube station prox

Front and back lane product

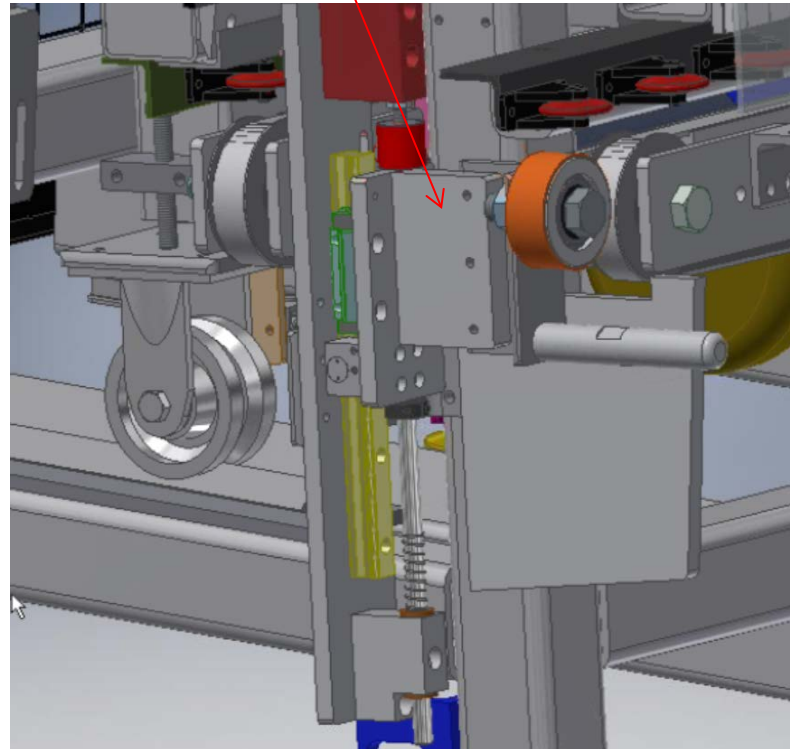
Detect eyes

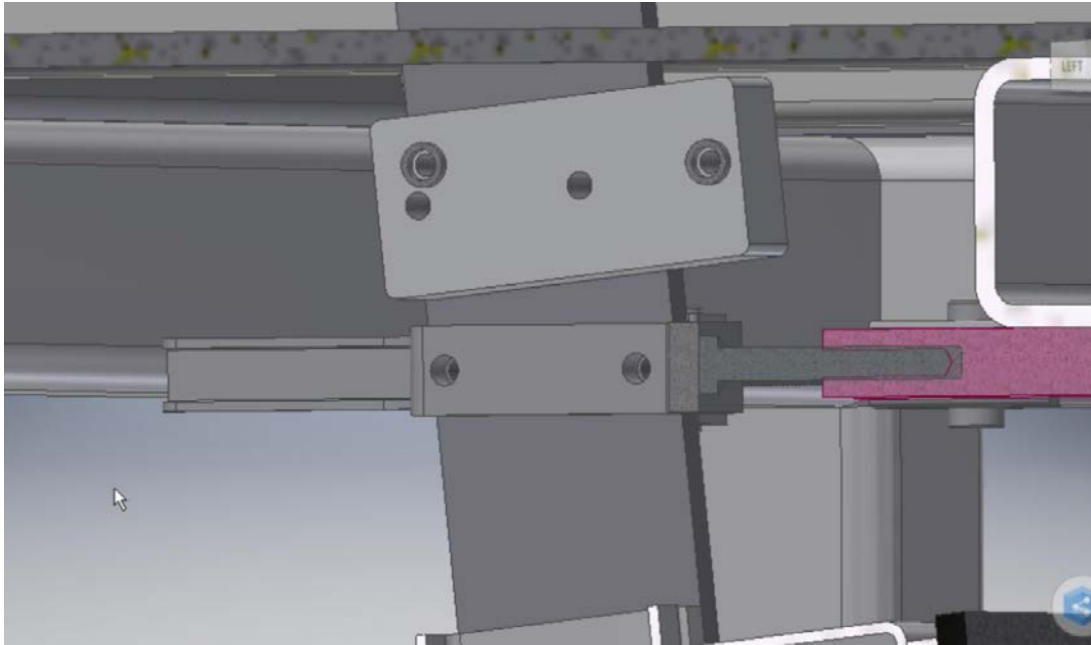




Cap tube station support cup assy

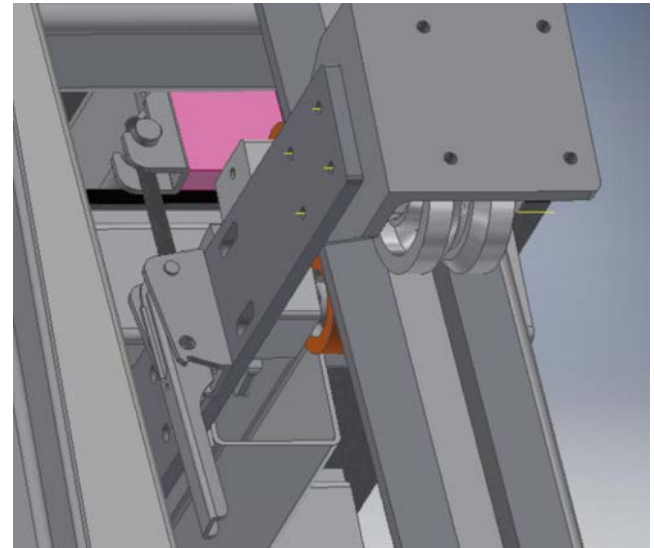
Cap tube station drop roller  
assy.

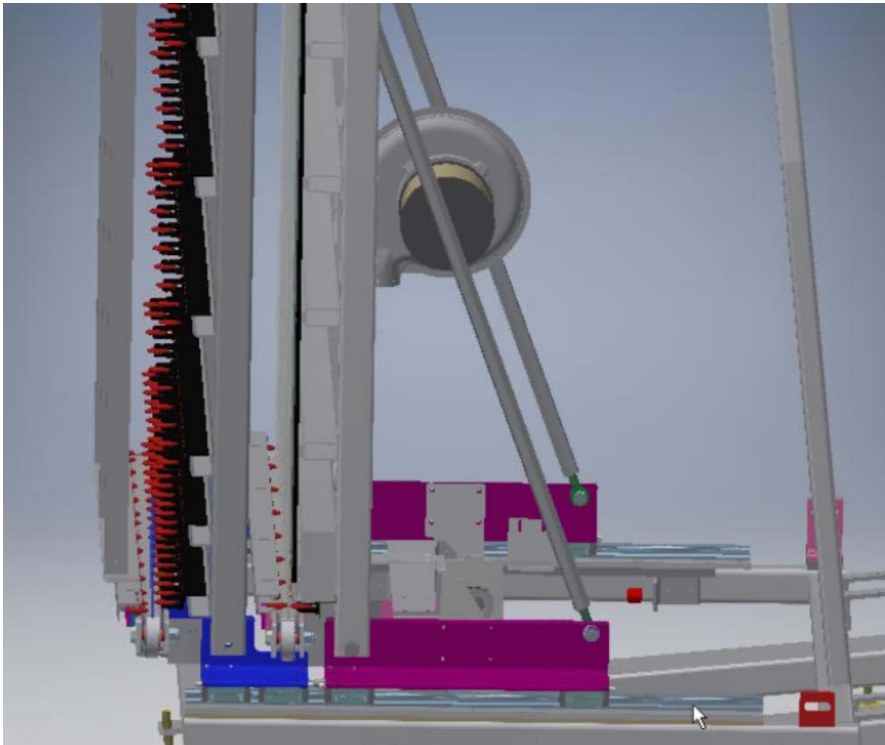




Section view of back lane clamp

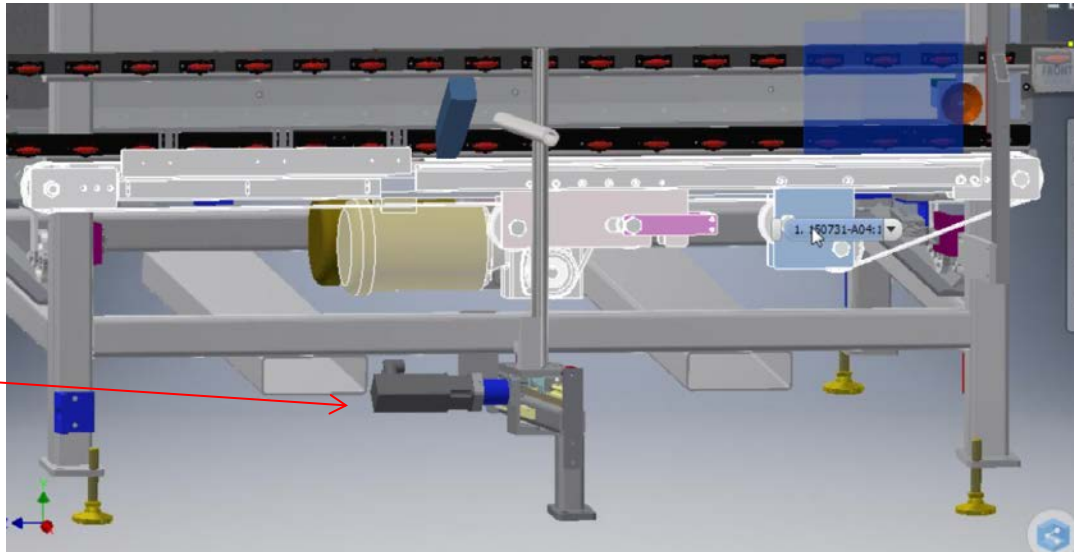
Top view showing  
back lane clamp  
and v-wheel

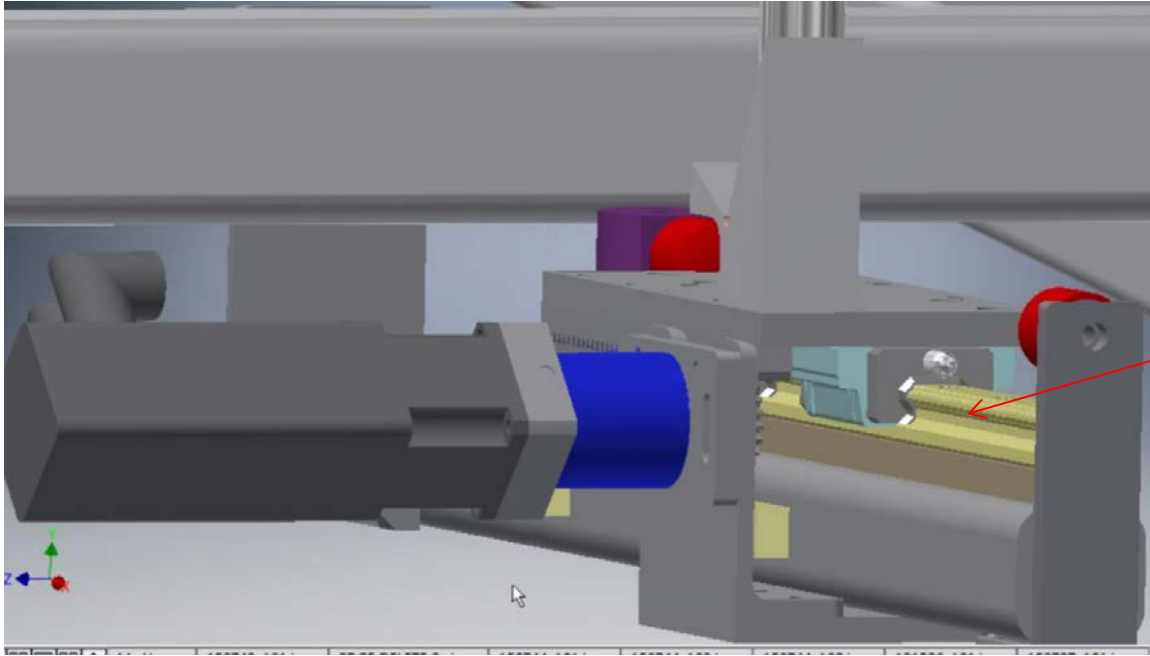




Shuttle station

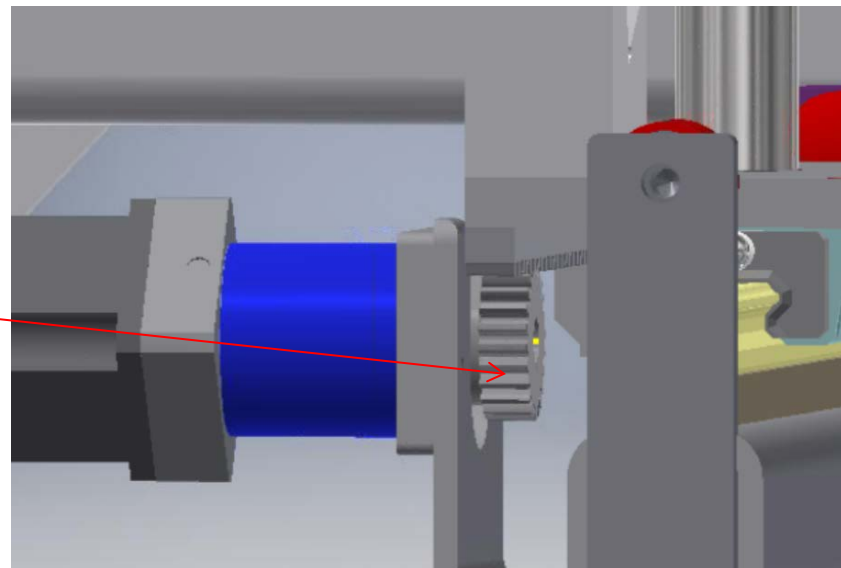
Optional Printer assembly  
mounted to queue  
station





Optional printer station  
servo drive guide rail

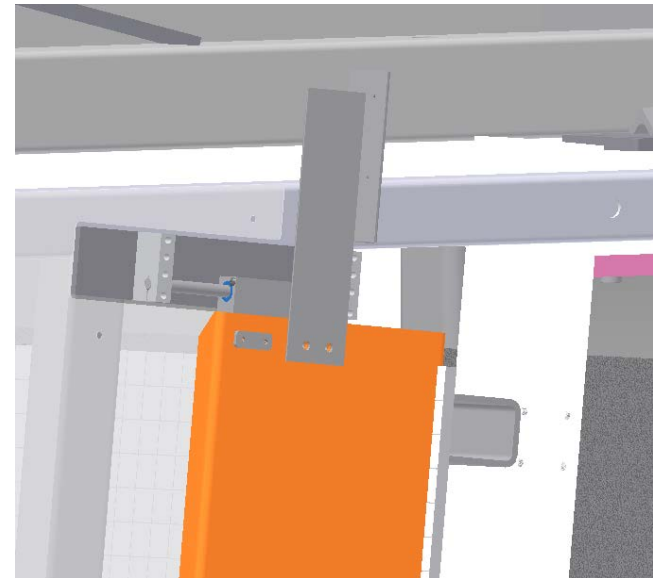
Optional printer station  
servo rack and pinion  
drive

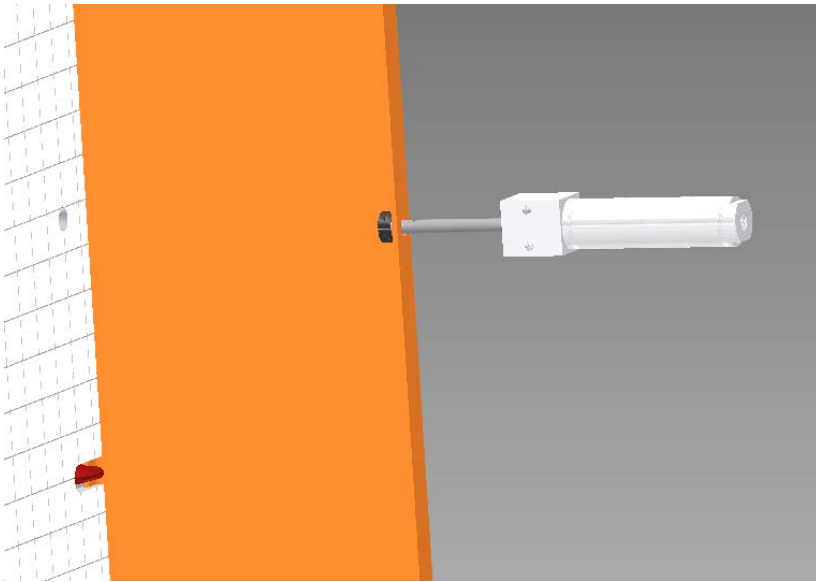


# Grid apply

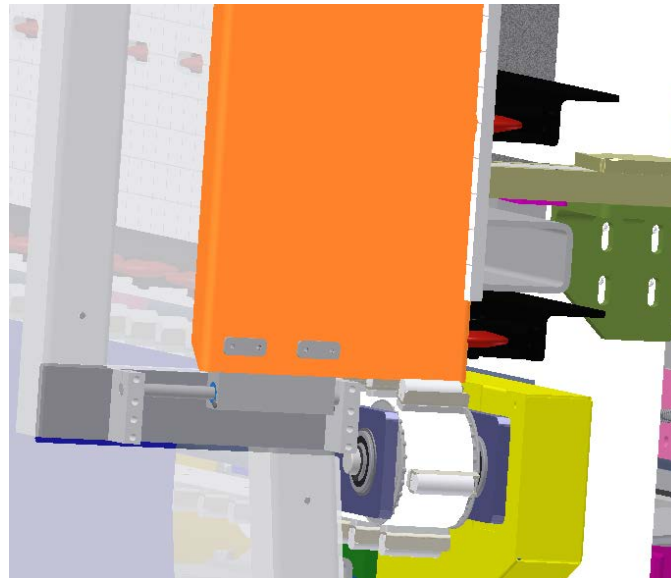
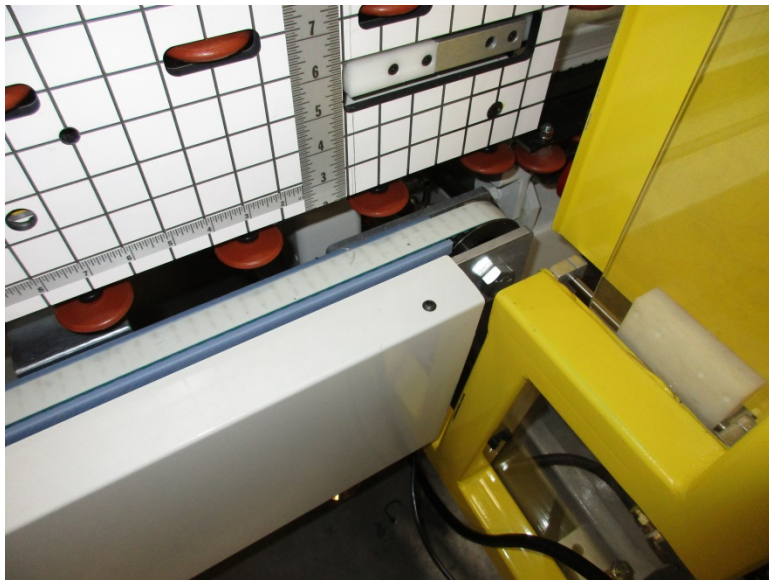
Safety gate magnetic safety switch

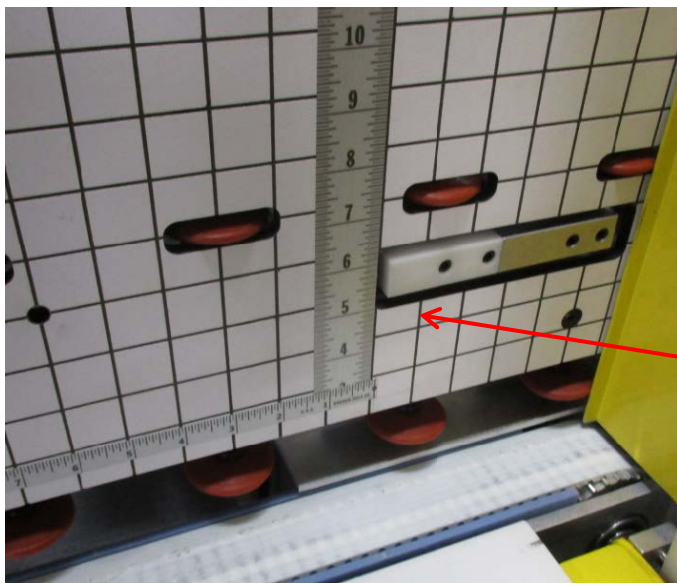
Front and back lane product detect eyes





Safety gate operation powered open  
spring assist close





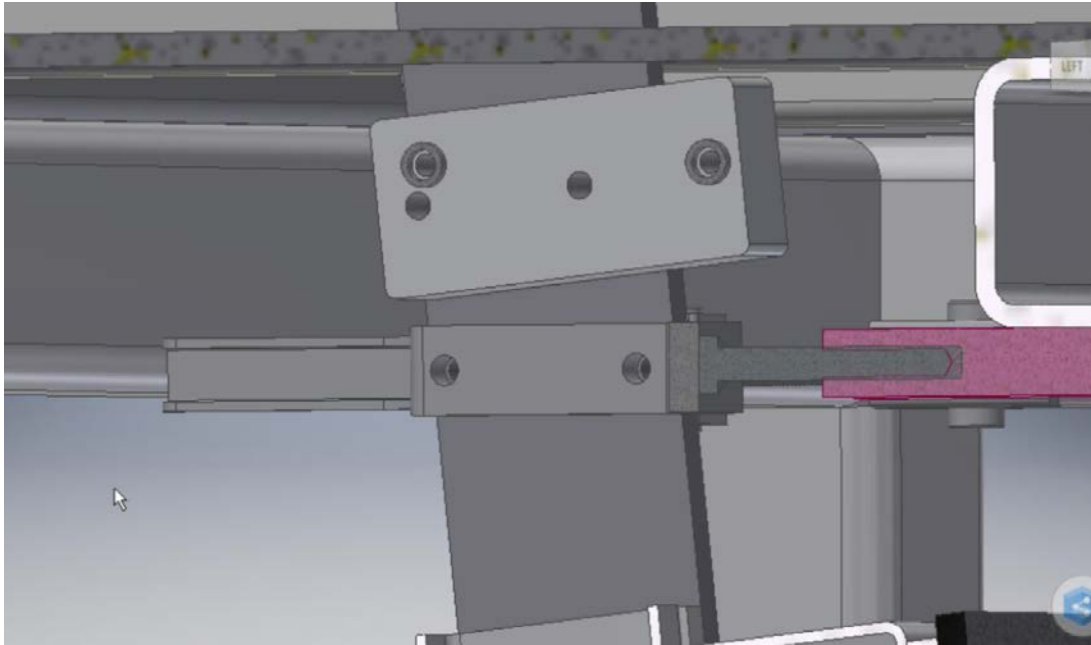
Grid station  
reference stop



Grid laser display unit

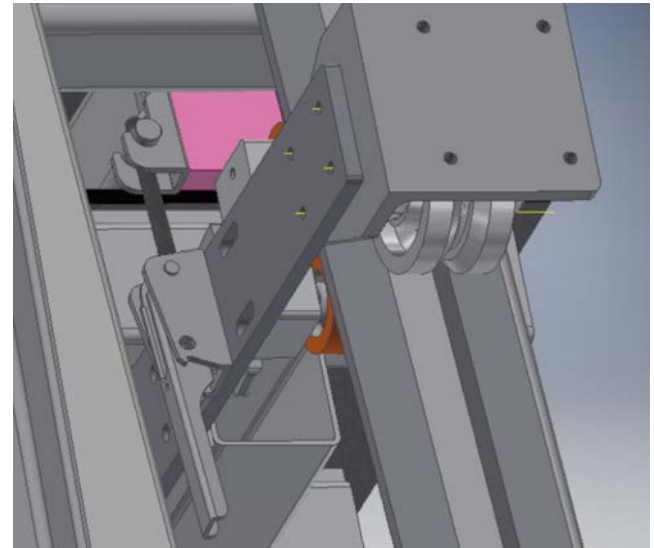


Grid apply station



Section view of back lane clamp

Top view showing  
back lane clamp  
and v-wheel



# First shuttle

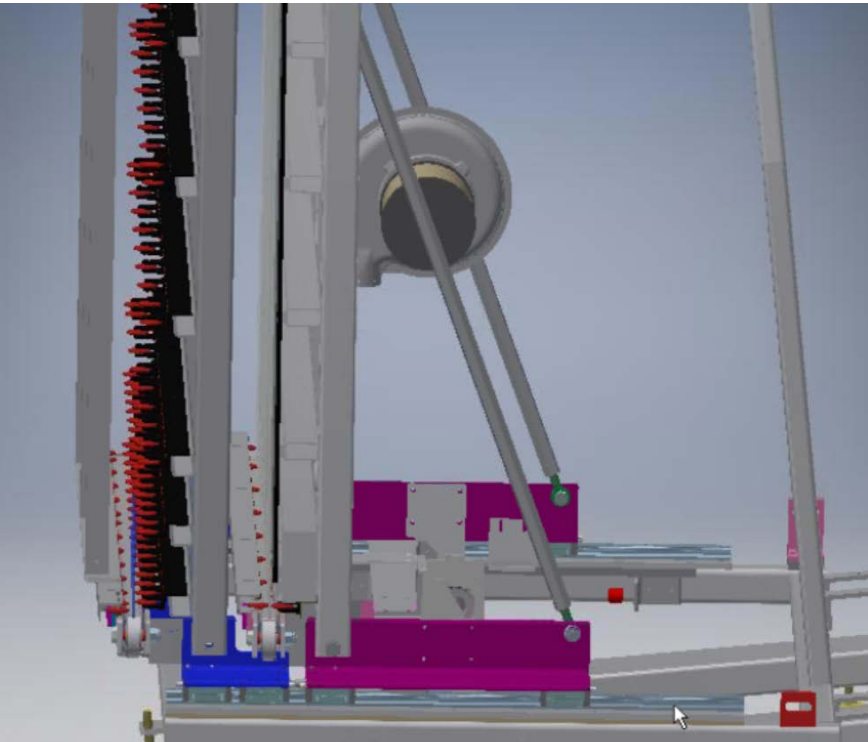
Infeed and outfeed product detect eyes  
Home and over travel proxs



# Gas press infed Shuttle station



Staged and outfeed eye

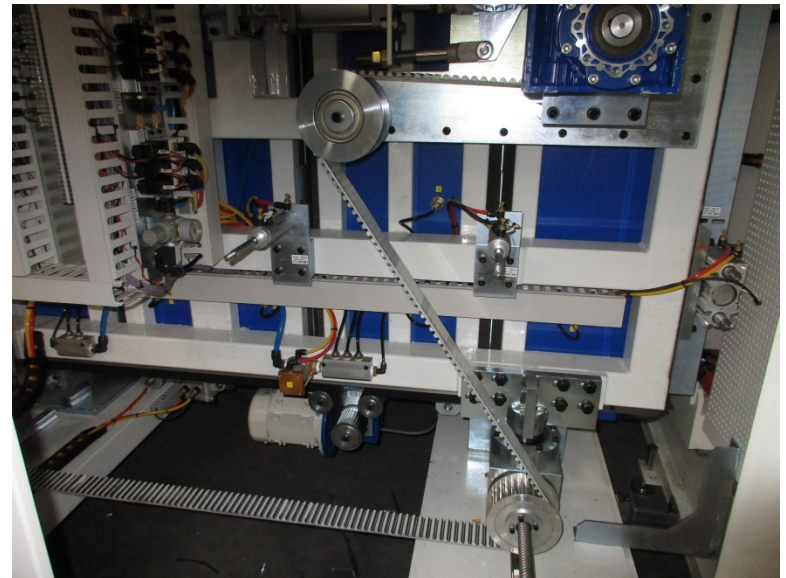
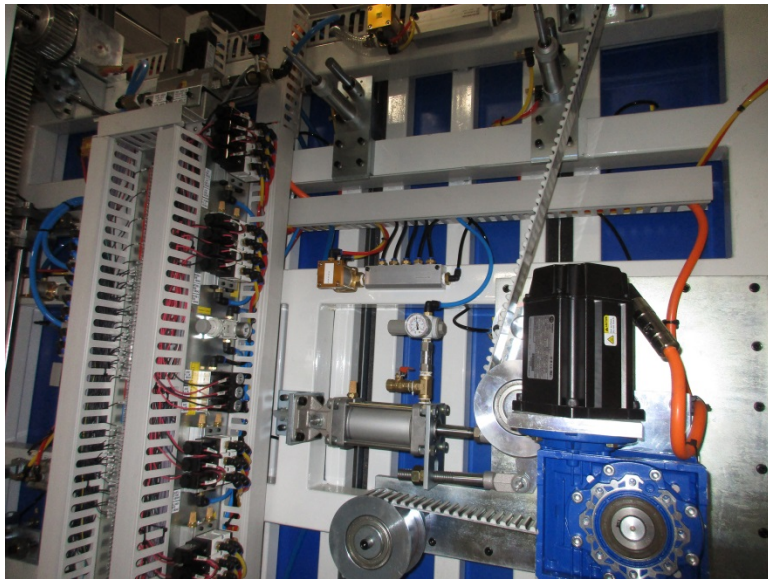
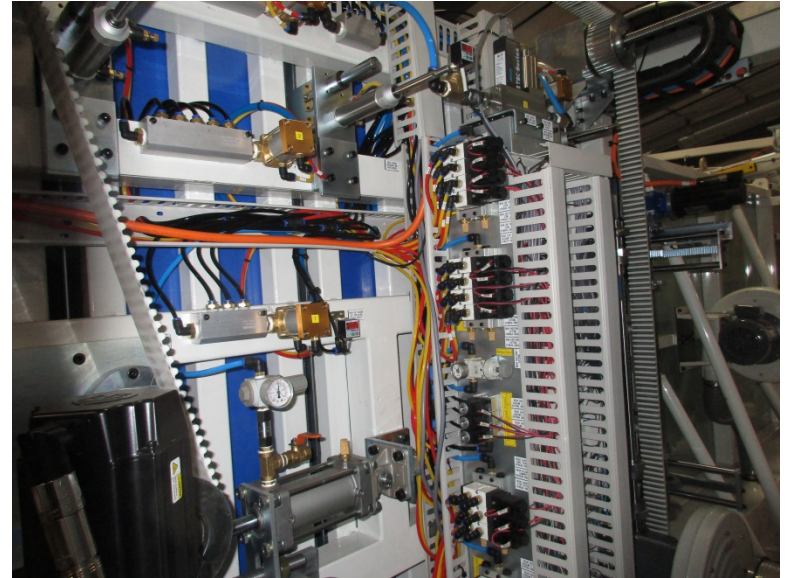


# Dual chamber gas press

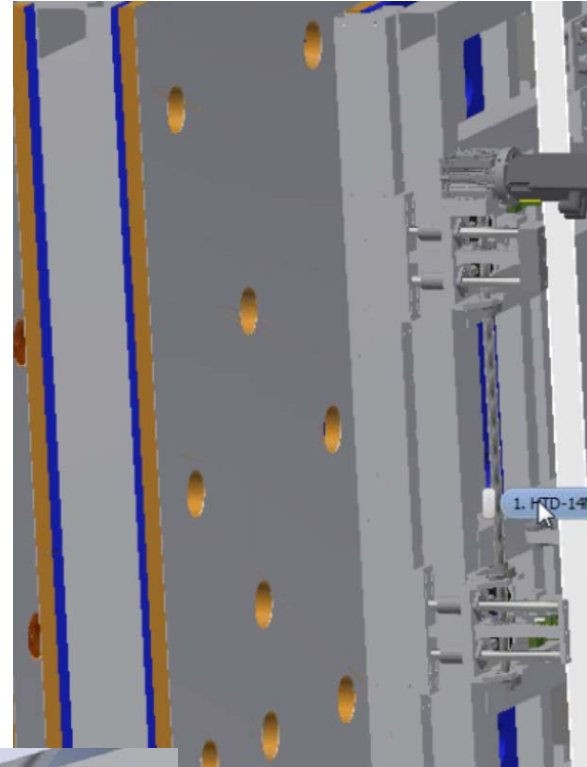
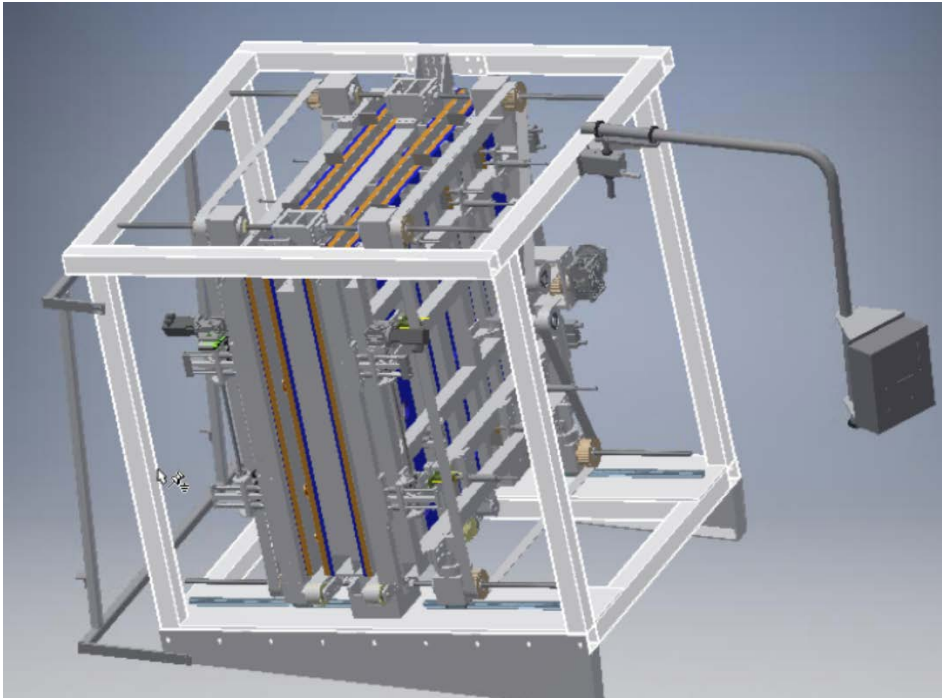
Drive components

Vac, gas sensors

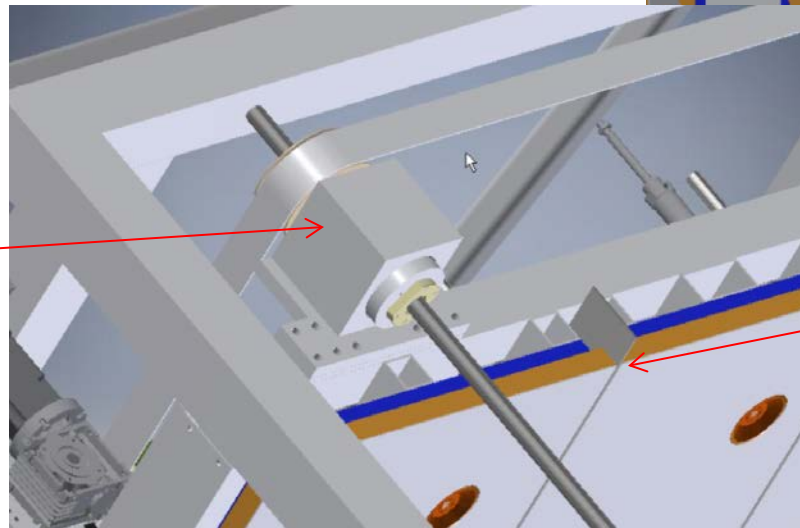
Prox and Halifax switches



Gas press guarding removed



Upper ball  
nut housing

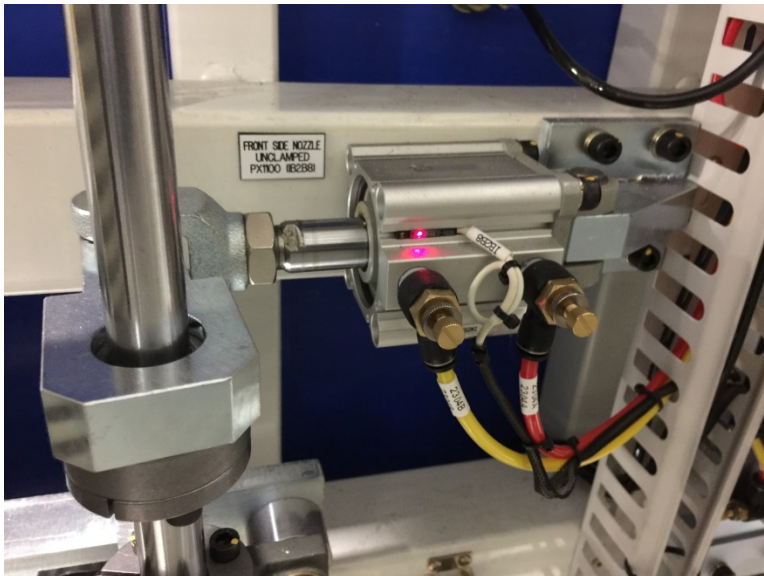


Top view  
showing  
Partition

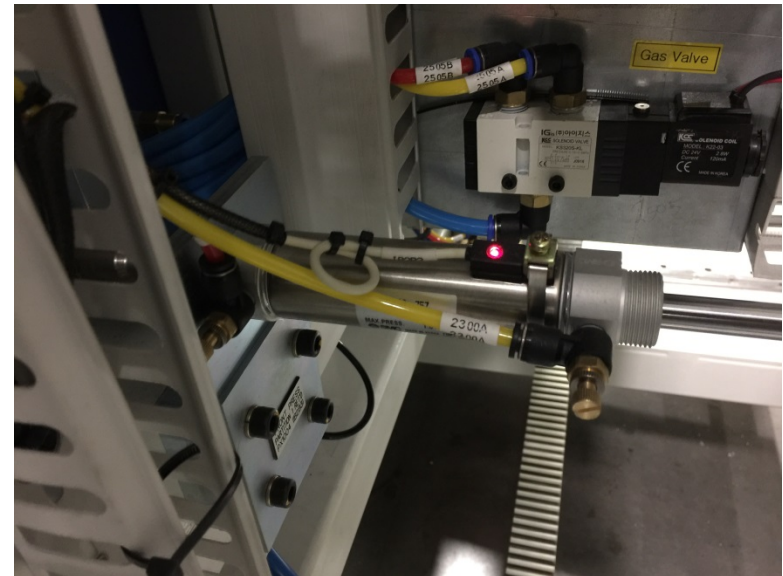
Home corner vacuum sensor

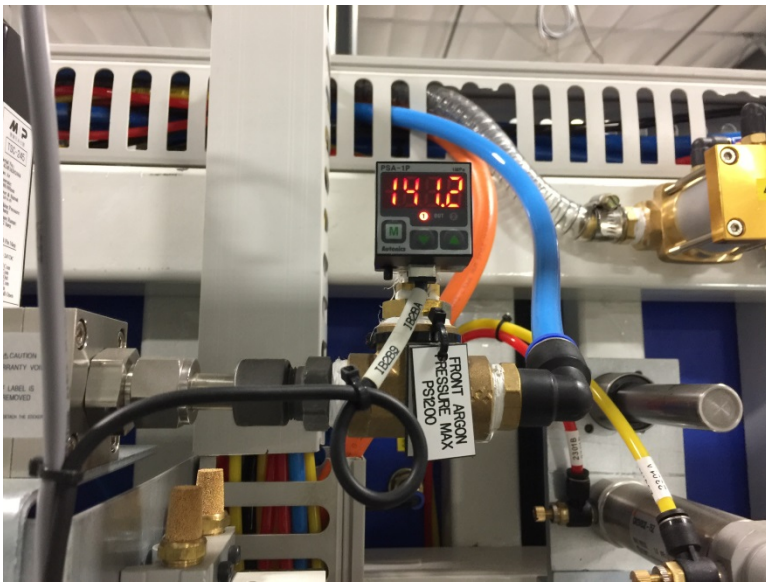


Gas nozzle extend retract actuator

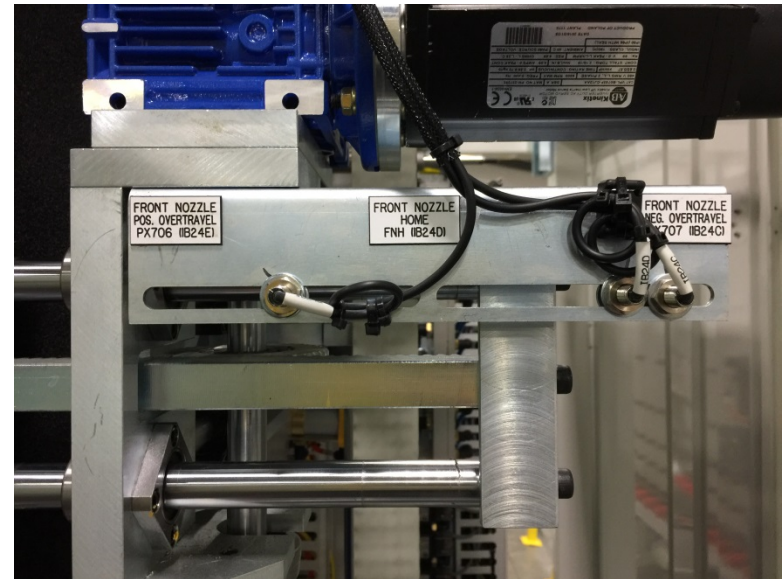


Partition position sensor

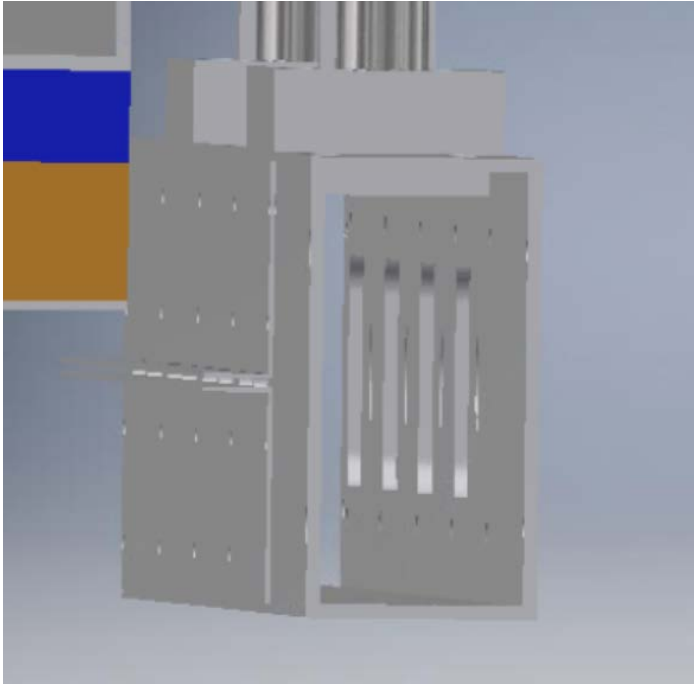




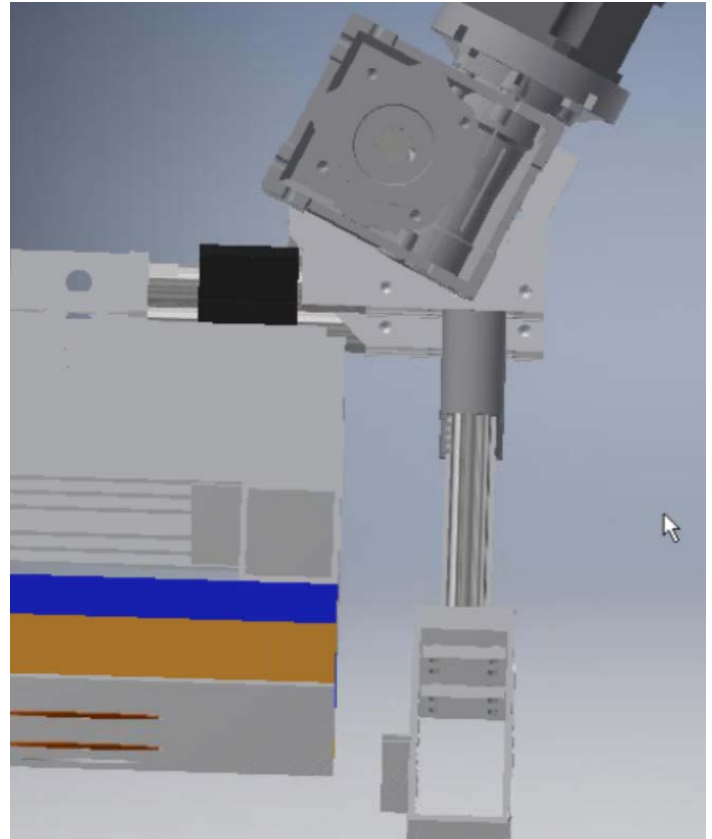
Gas pressure sensor



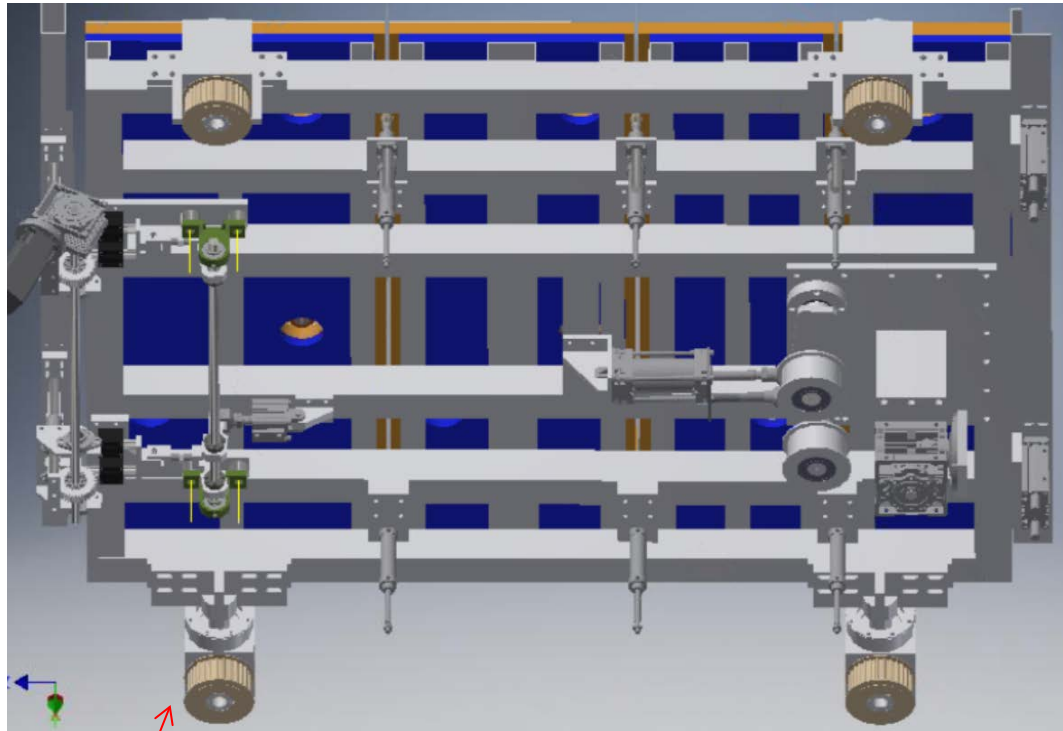
Gas nozzle positioning proxs



Gas nozzle  
housing



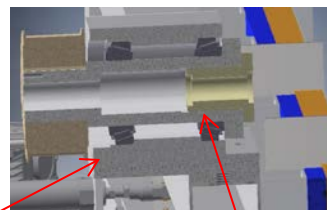
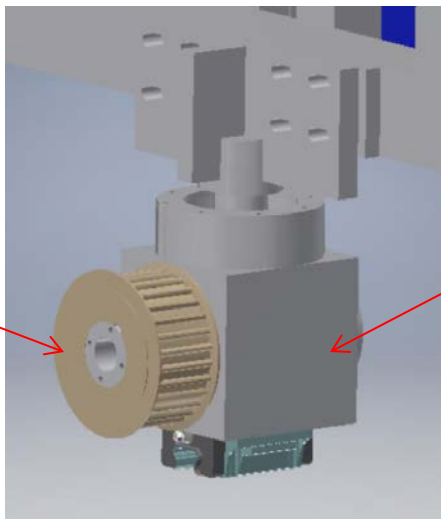
Top view of  
Gas nozzle  
assembly



Gas nozzle  
assembly

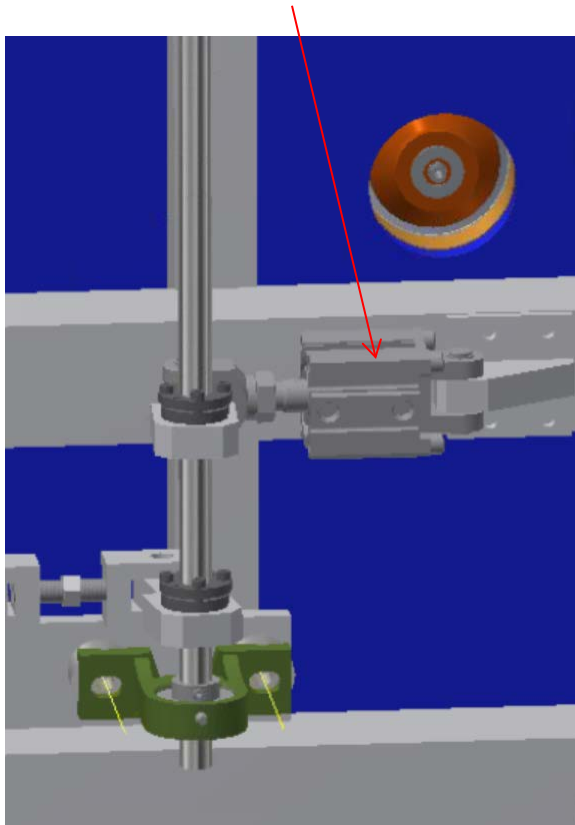


Ball screw  
drive pulley

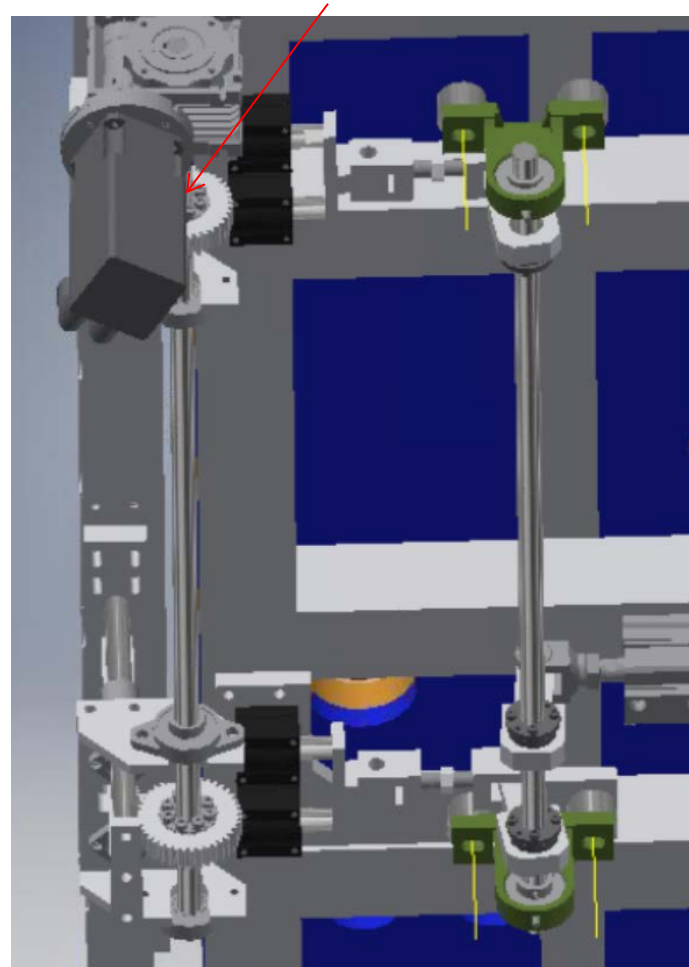


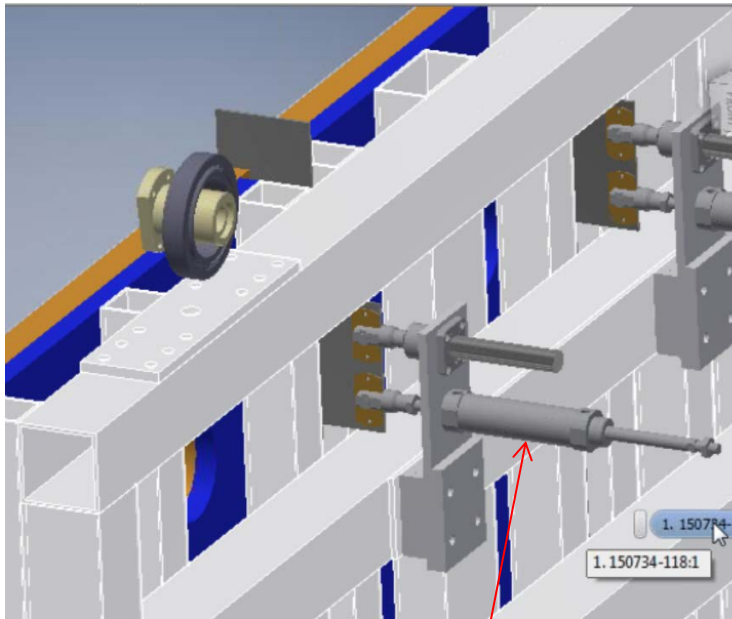
Section view  
of Ball nut  
and housing

Argon nozzle extend and retract actuator

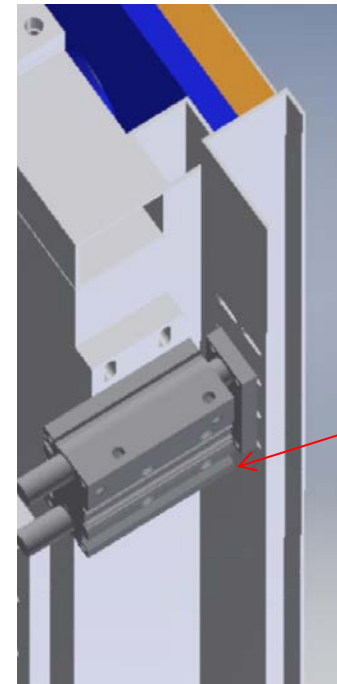


Argon nozzle positioning drive assy



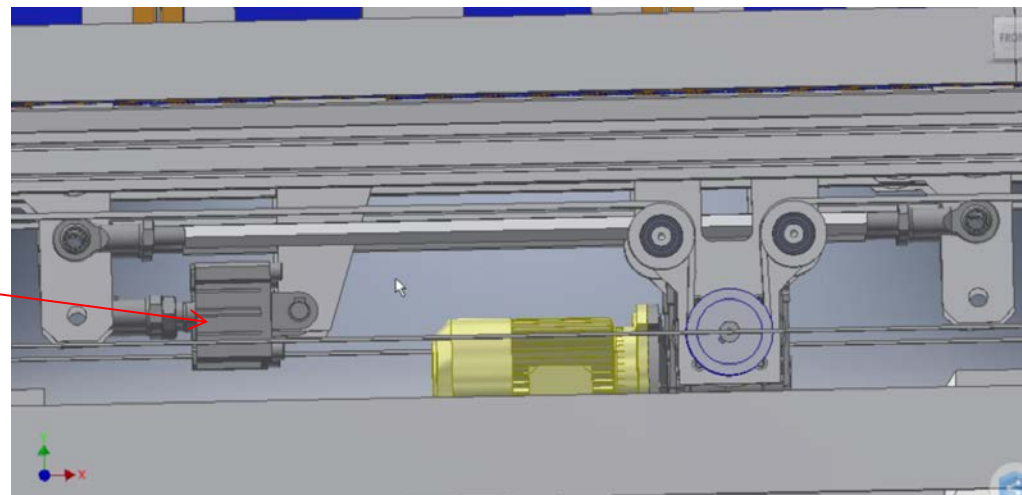


Partition Actuator

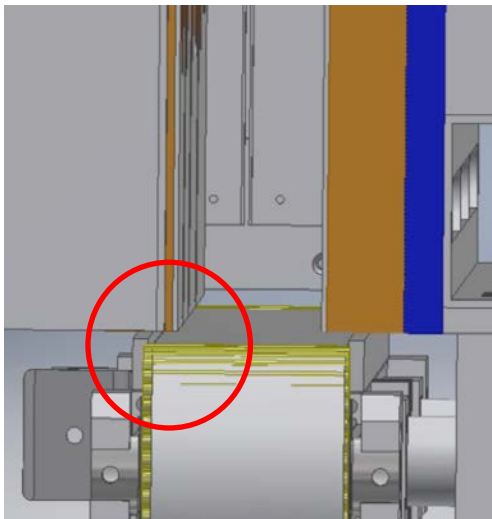
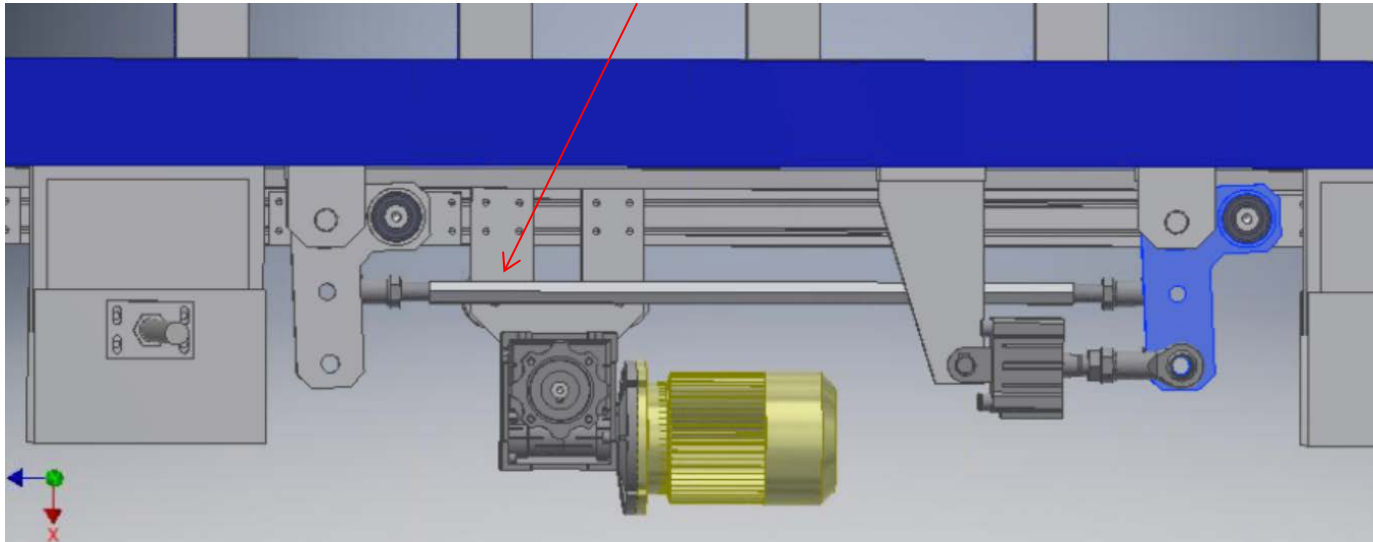


End partition thruster

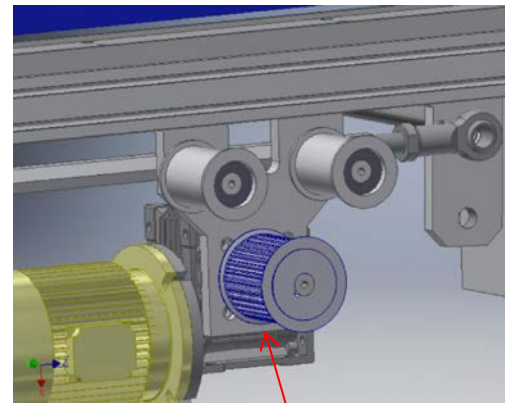
Raise lower Actuator



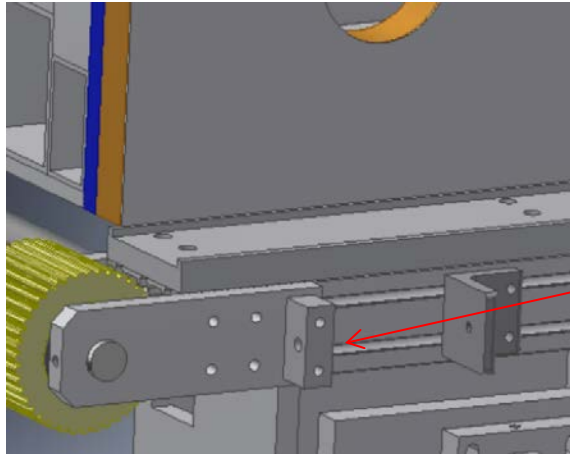
Conveyor raise/lower linkage



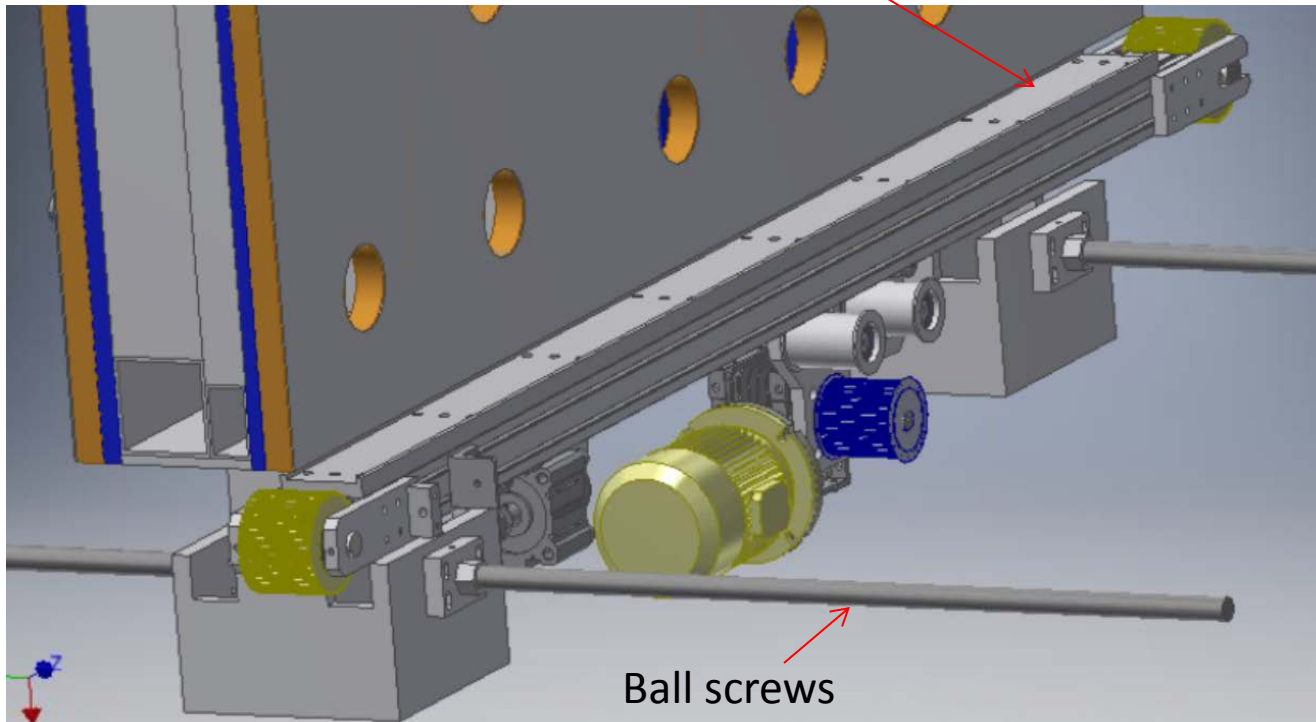
Conveyor raised sealing  
against platen



Conveyor drive

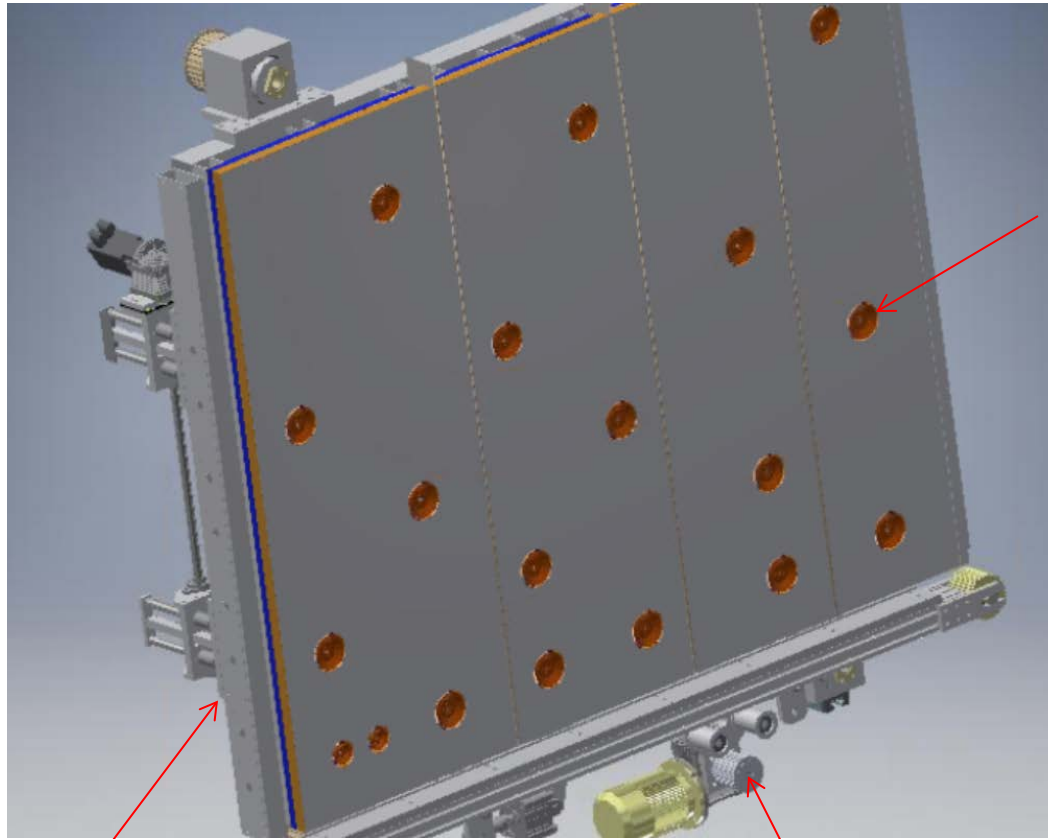


Conveyor Belt tensioner



Belt guide

Ball screws



Front platen suction cups

Argon nozzle assy

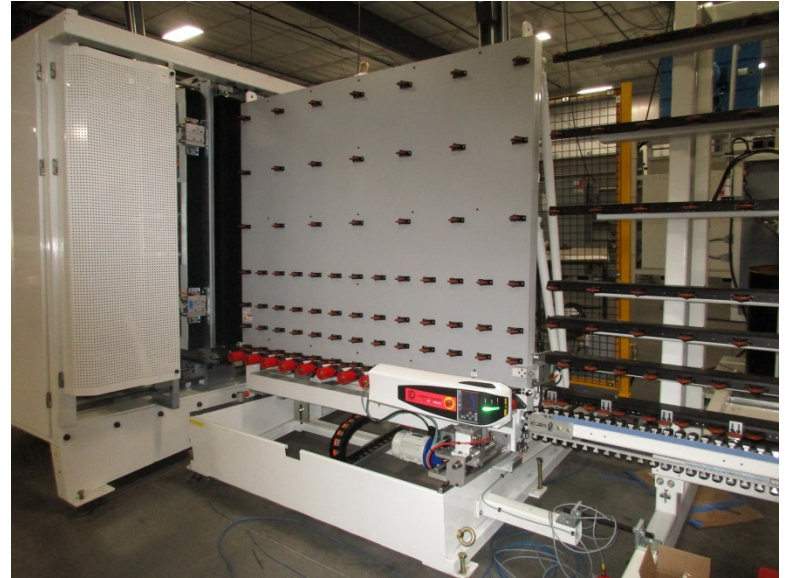
Belt drive assy

# Second shuttle

Drive components

Product detect eyes

Home and over travel



(Optional laser etcher shown)

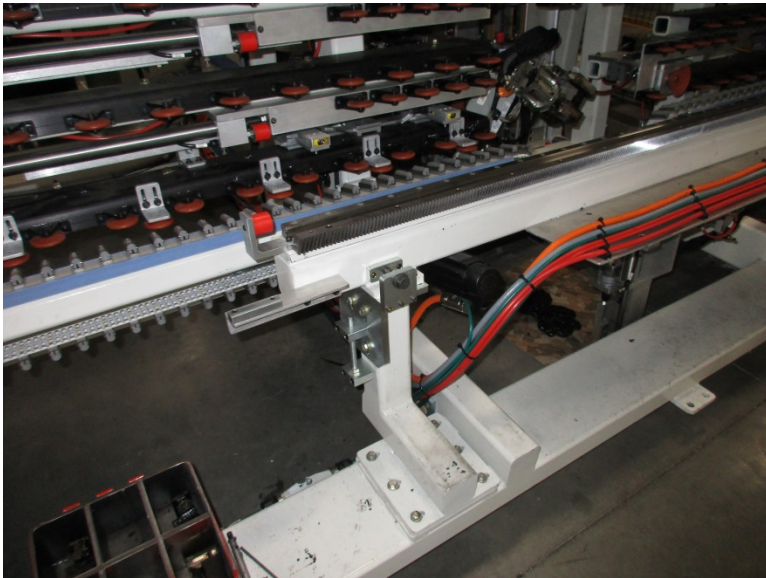
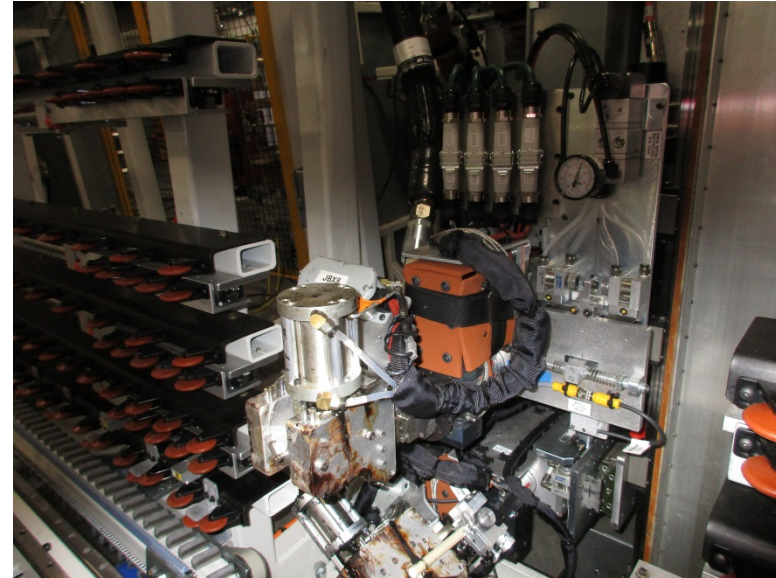


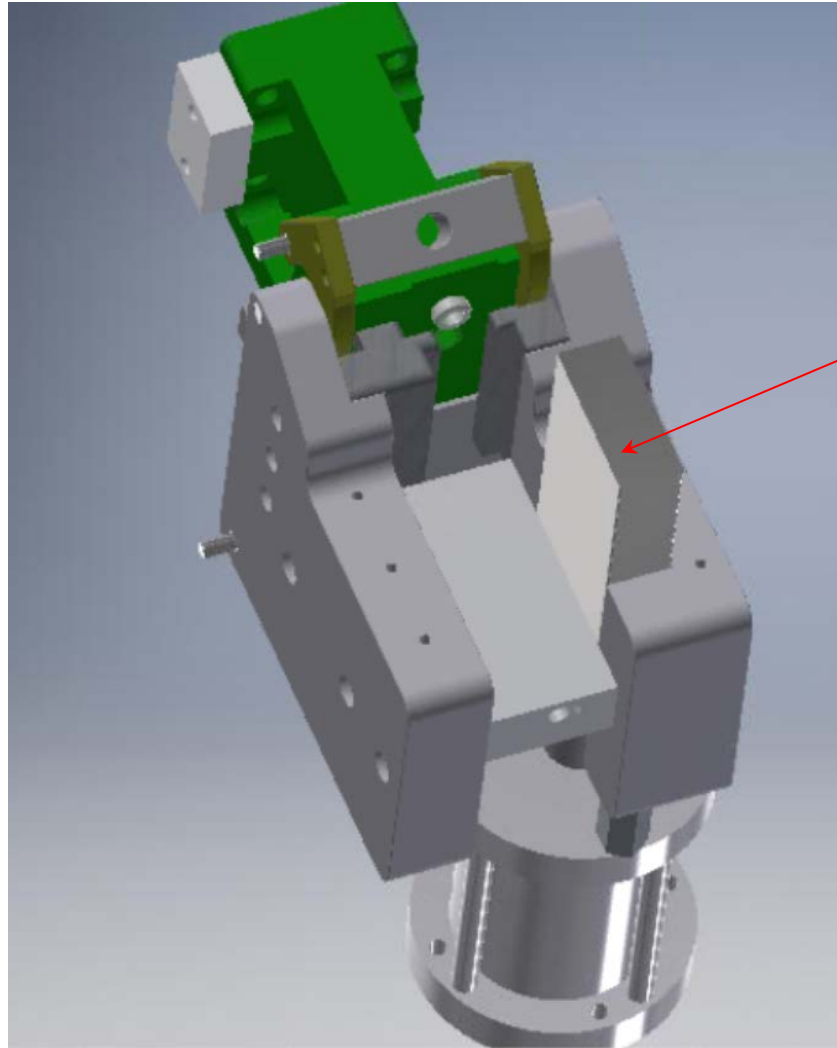
# IG Secondary Sealer

Product detect eyes

Vacuum trolley H/OT

Sealer head operation

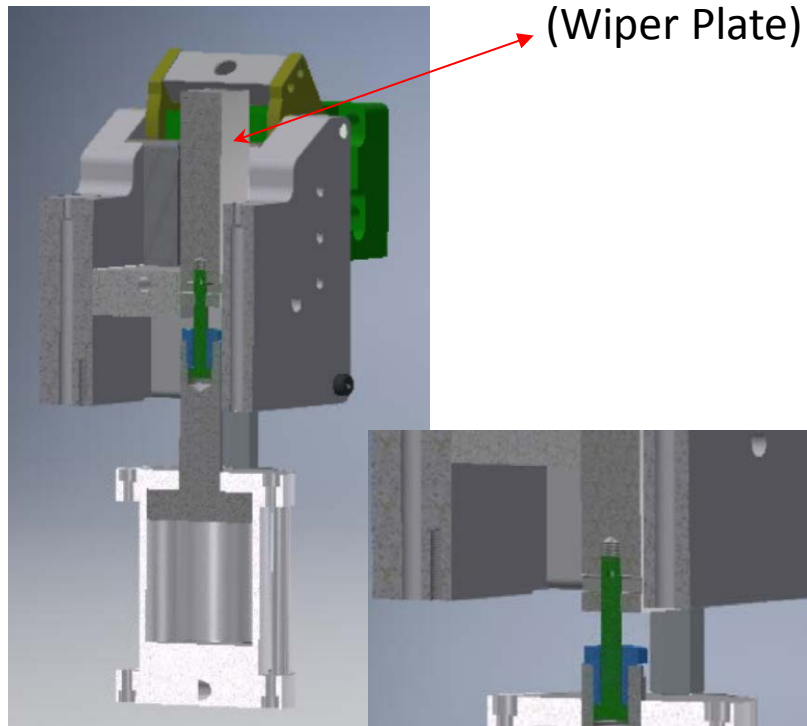




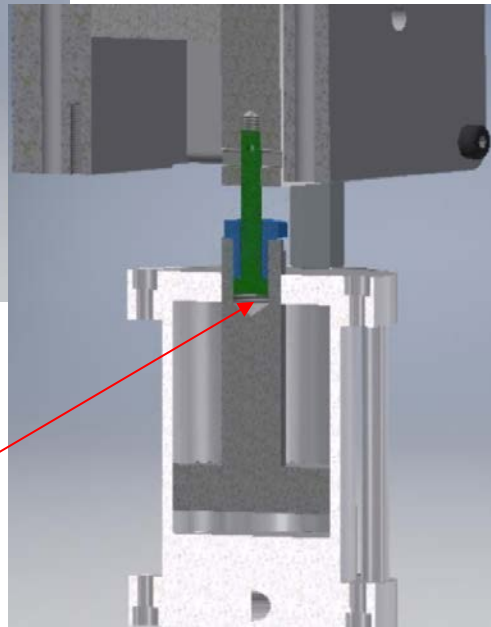
(View of Extended  
Bottom Wiper)

View of Bottom Wiper  
Assembly

## Section View of Bottom Wiper Assembly (Shown Extended)

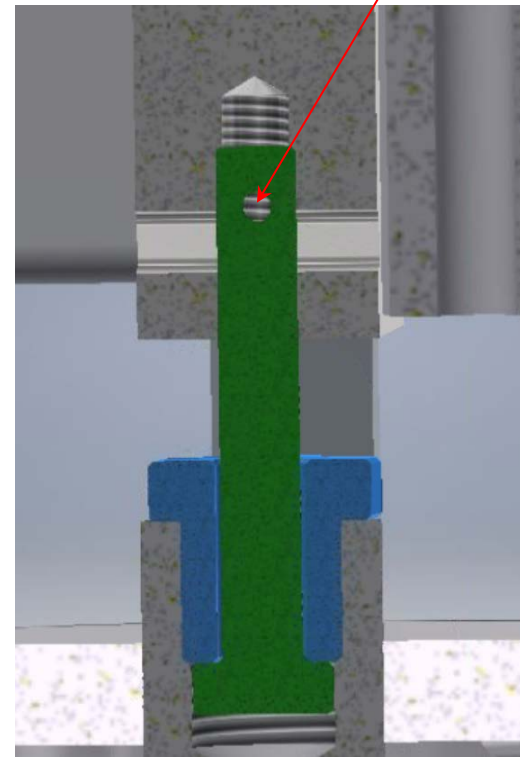


(Designed Alignment Coupler)

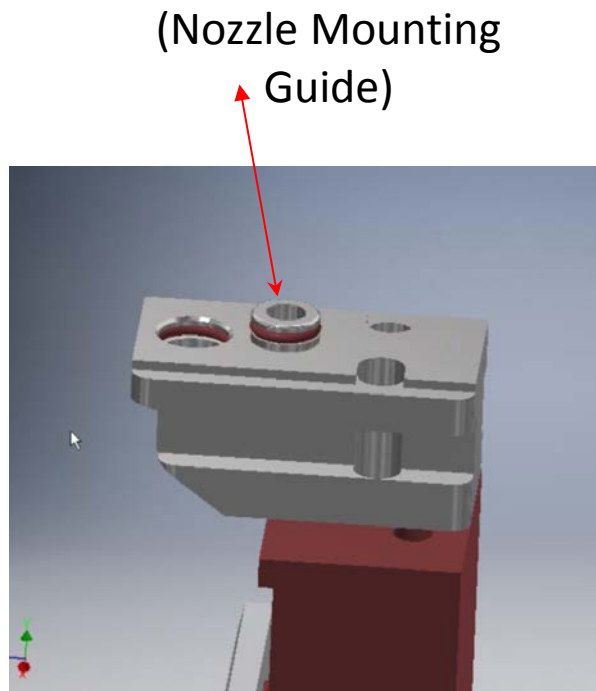


Section View of Bottom Wiper Assembly Air Cylinder (Shown in Retract Position)

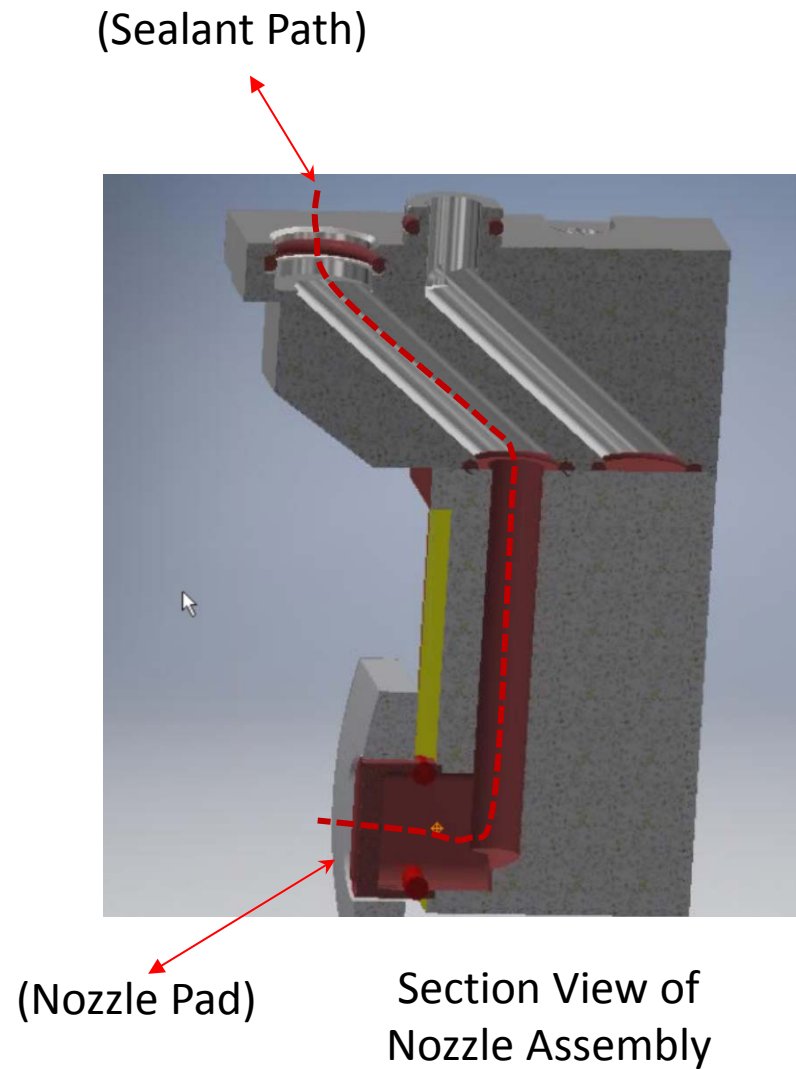
(Set Pin Hole)



Section View of Bottom Wiper Assembly (Showing Attachment Coupler)



Top View of  
Nozzle  
Assembly



(Nozzle Pad)

Section View of  
Nozzle Assembly

# Section View of Lower Sealant Head (Sealant Path)

(Sealant Path)

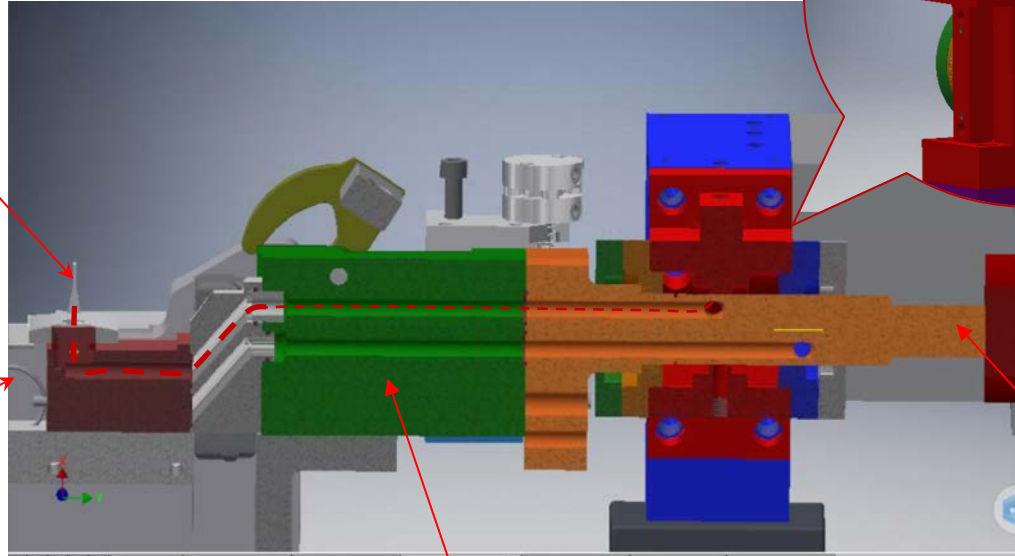
(Nozzle Assy)

(Nozzle Adpater)

(Metering  
Gear Pump)

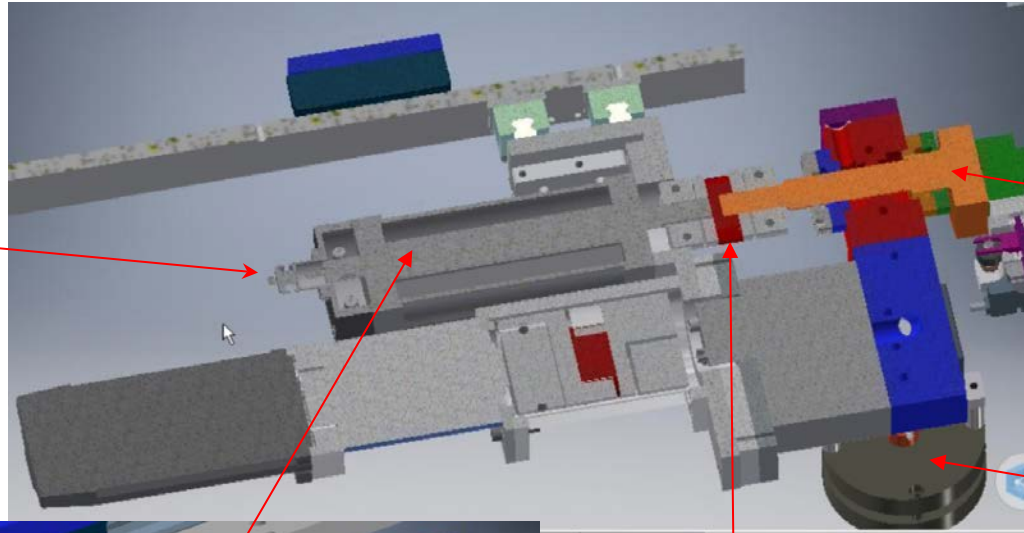
(Indexer  
Housing  
"H-Block")

(Index Shaft)



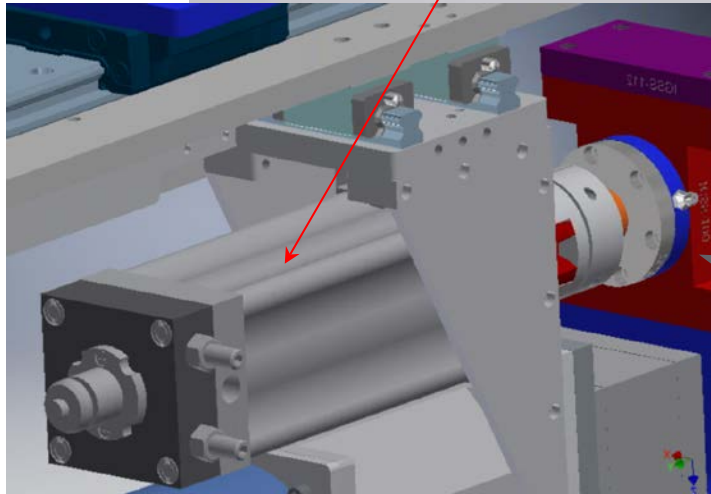
## Section View of Lower Sealant Head (Rotate Actuator)

(Rotate Actuator)



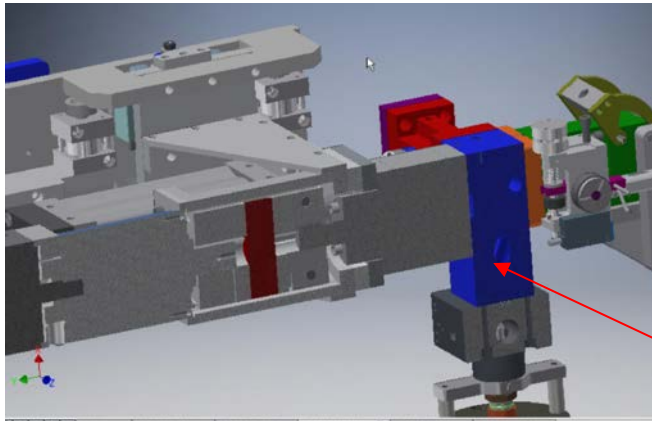
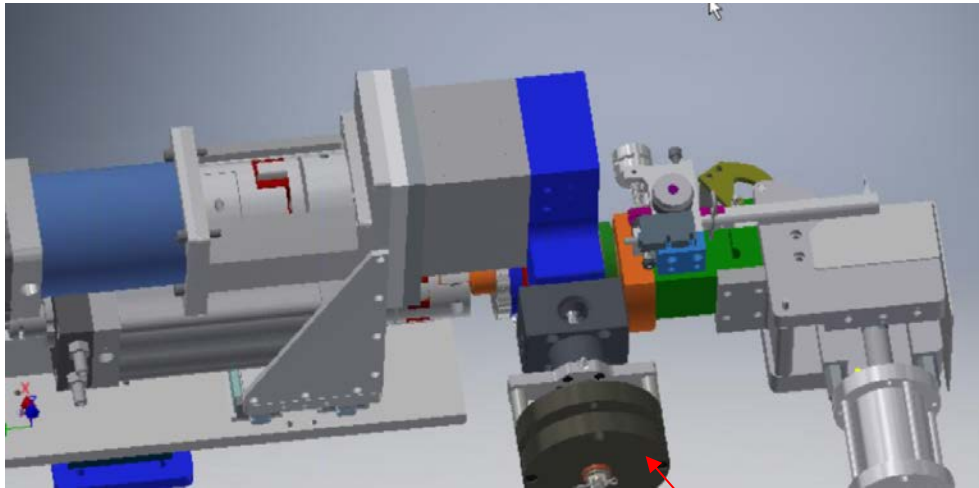
(Index Shaft)

(High Flow Sealant Valve)



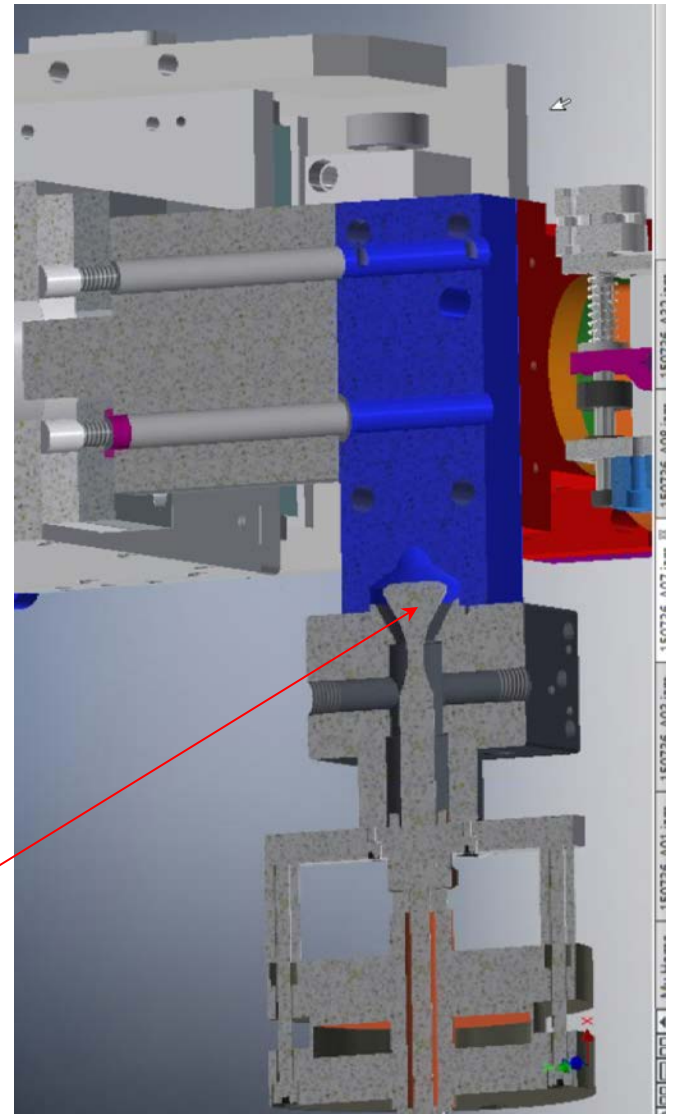
(Rotating Actuator Coupler)

## Exposed View of Lower Sealant Metering Assy

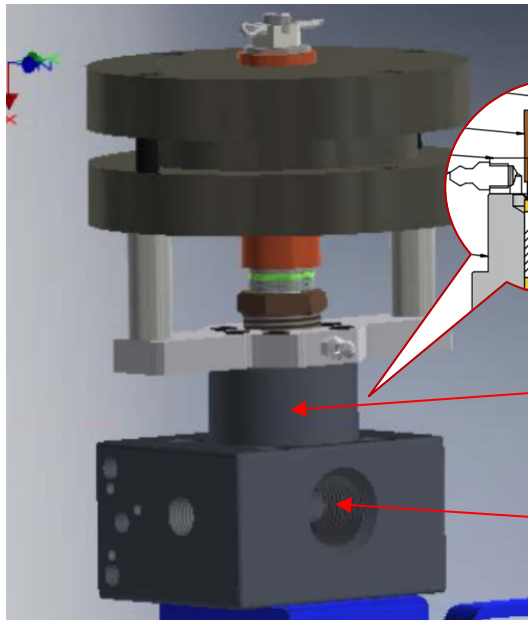


(High Flow  
Sealant Valve)

(Metering  
Pump Adapter)

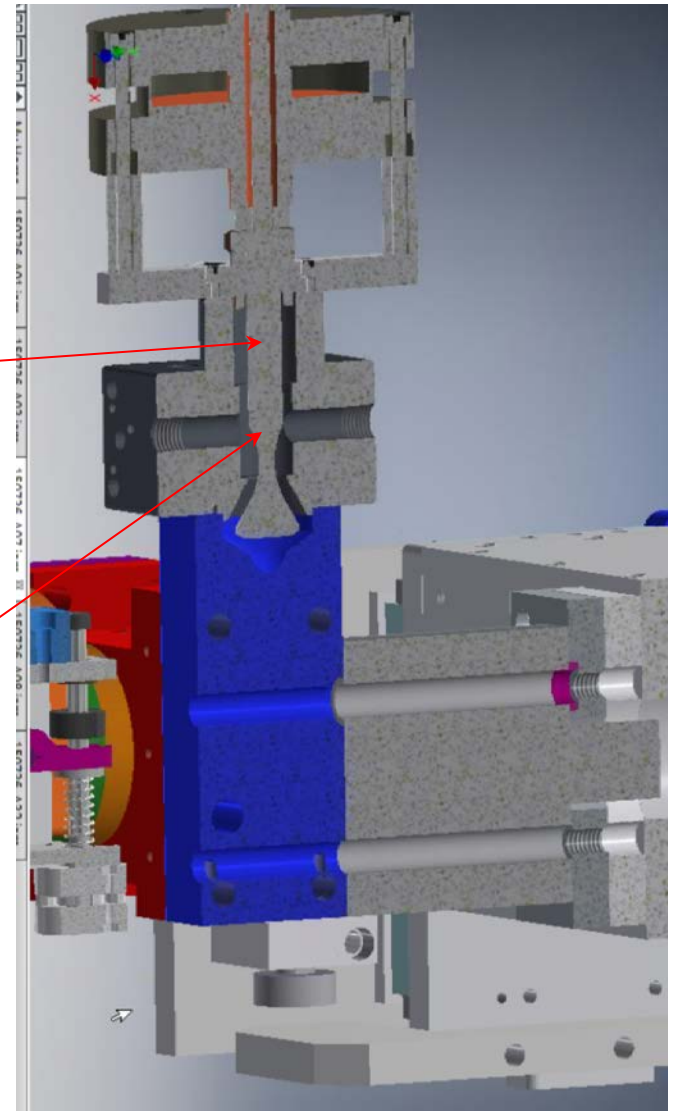
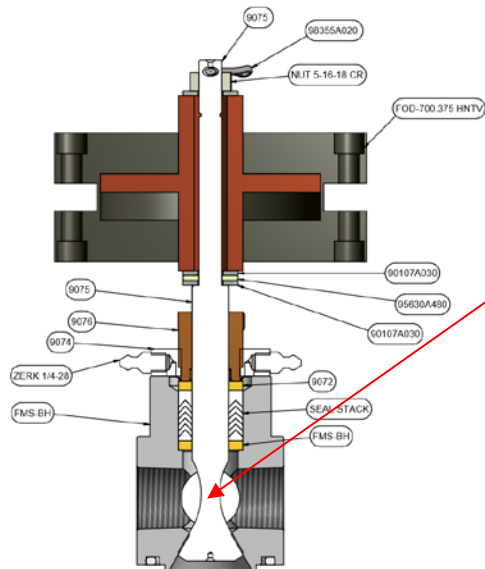


# High Flow Sealant Valve



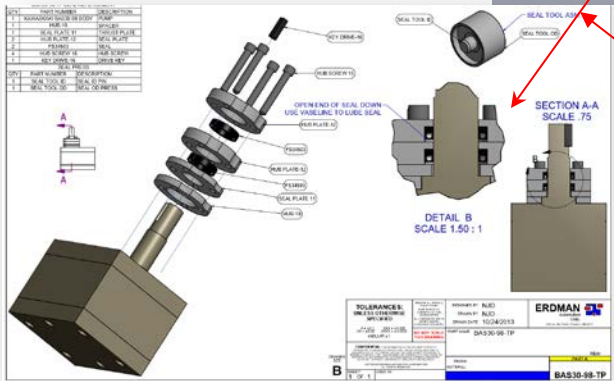
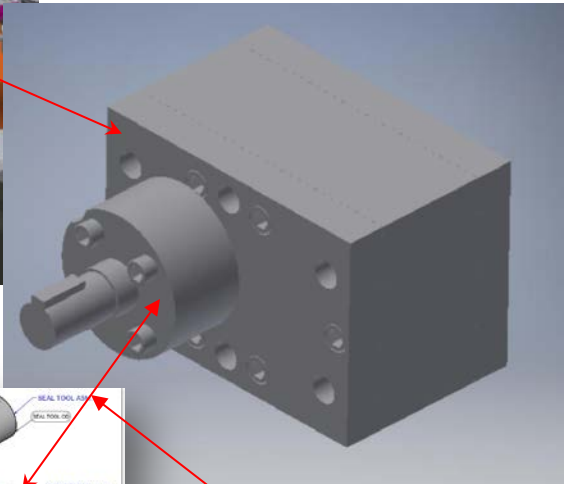
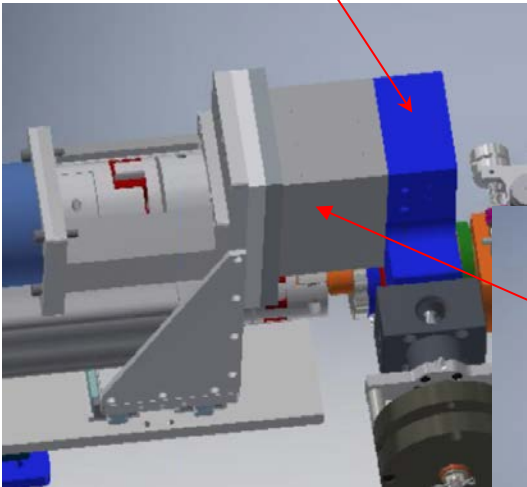
Valve  
Packing  
Assy

Sealant Hose  
Attachment  
point from  
Mastic  
Regulator



# Kawasaki Sealant Metering Pump (K Series)

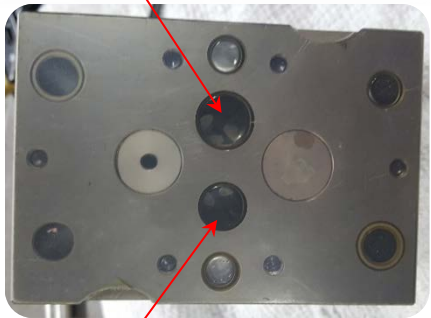
(Pump Adapter)



(High Pressure  
Lip Seals)

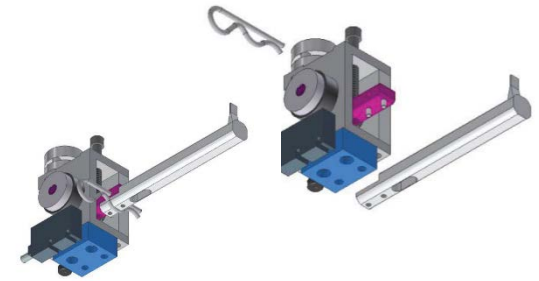
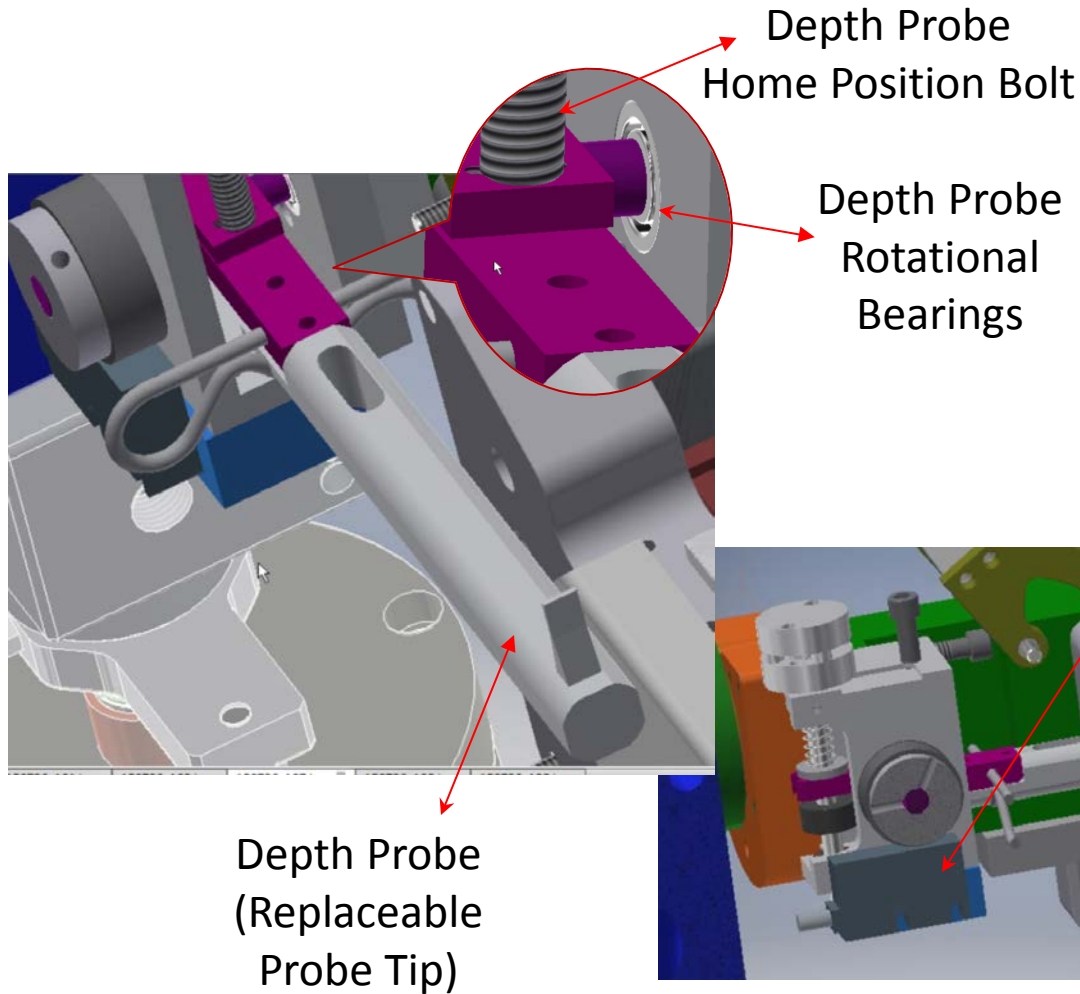


(Inlet)

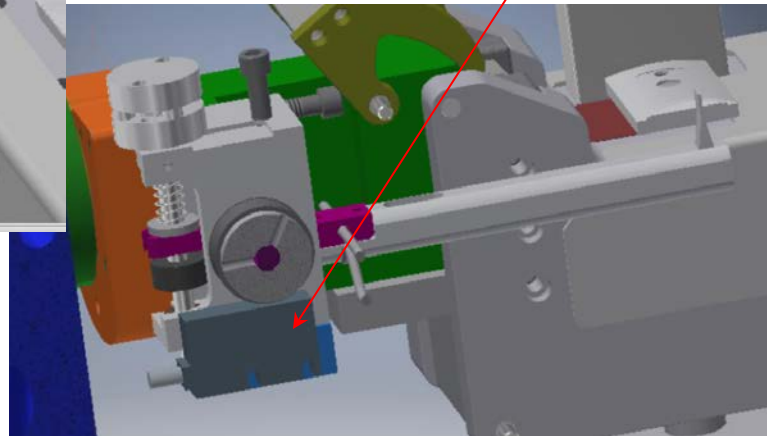


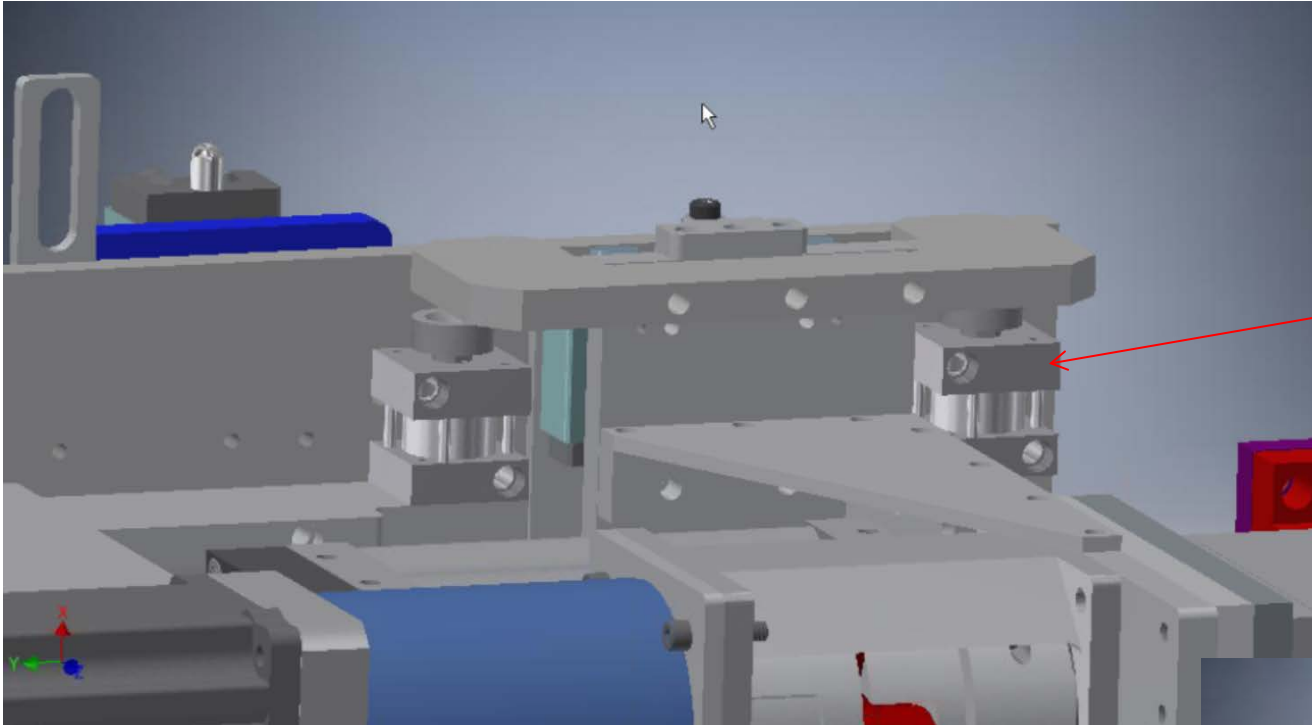
(Outlet)

# Depth Probe Assembly (Lower Shown (Upper Similar))

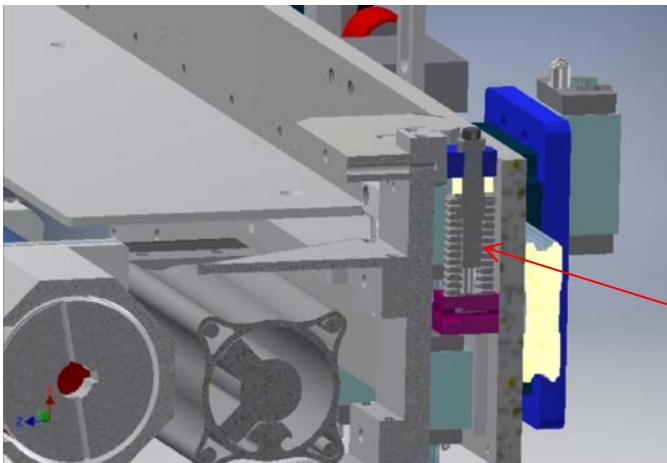


Depth Probe Encoder for Position Monitoring

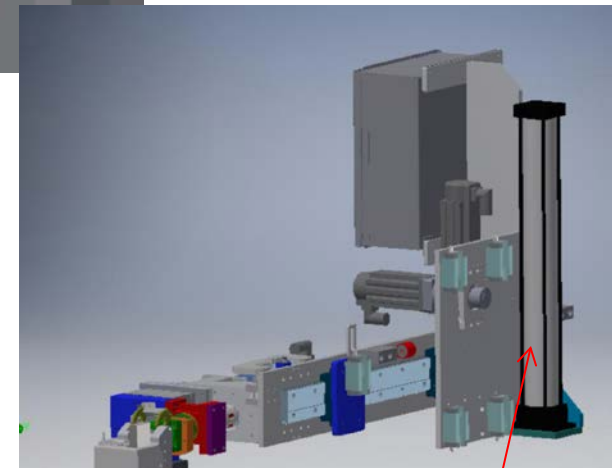




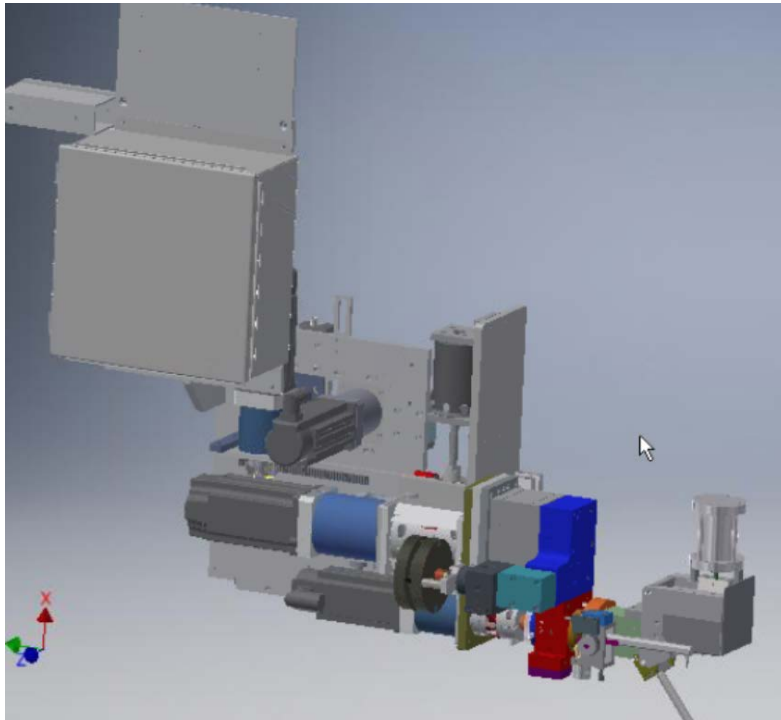
Locking cylinders  
lower head y axis



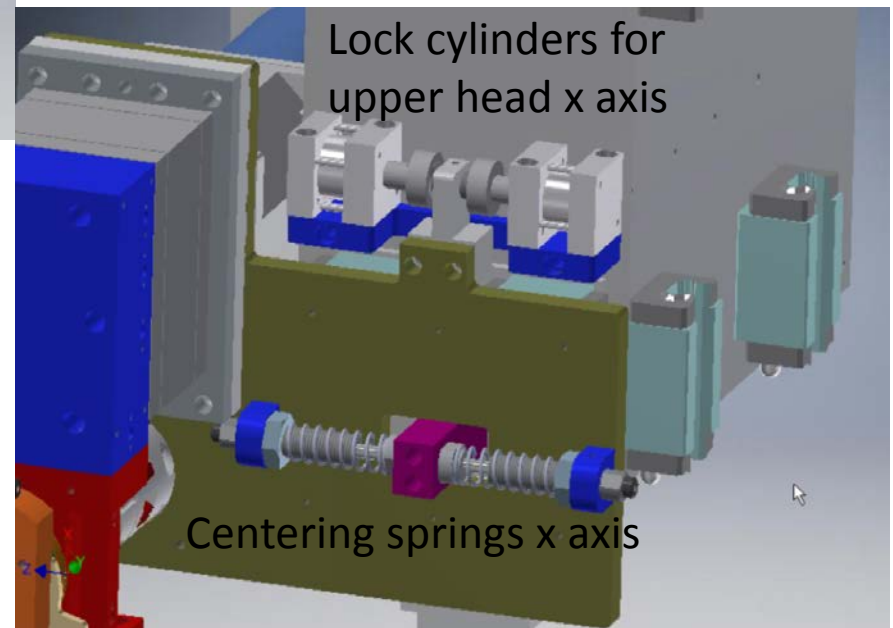
Support spring  
lower head y axis



Counter balance  
cylinder for lower  
head

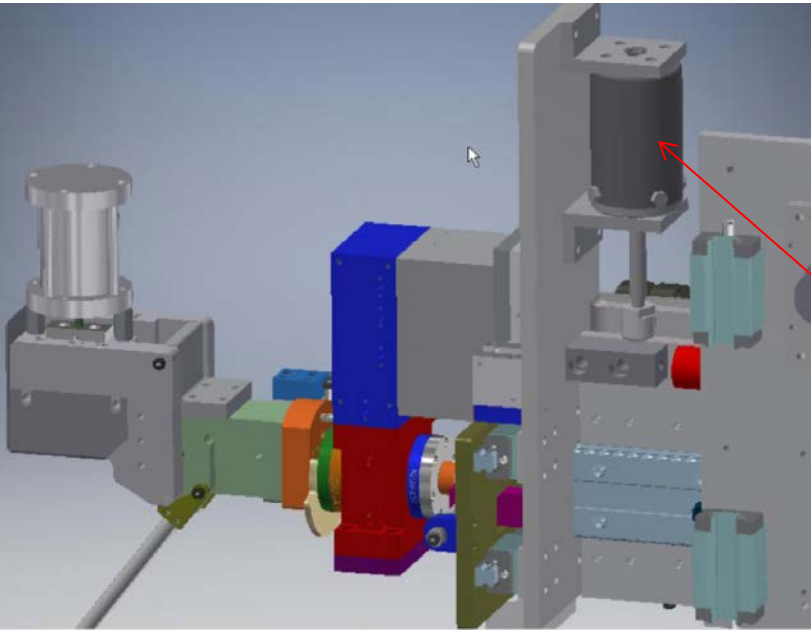


Upper floating  
head assembly

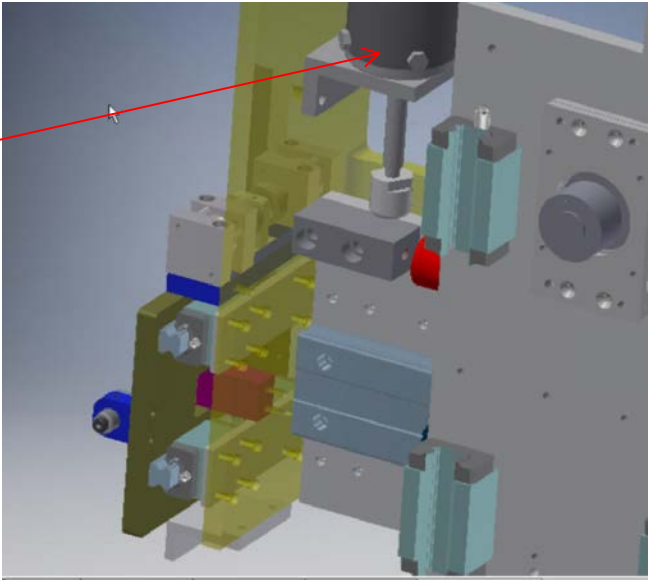


Lock cylinders for  
upper head x axis

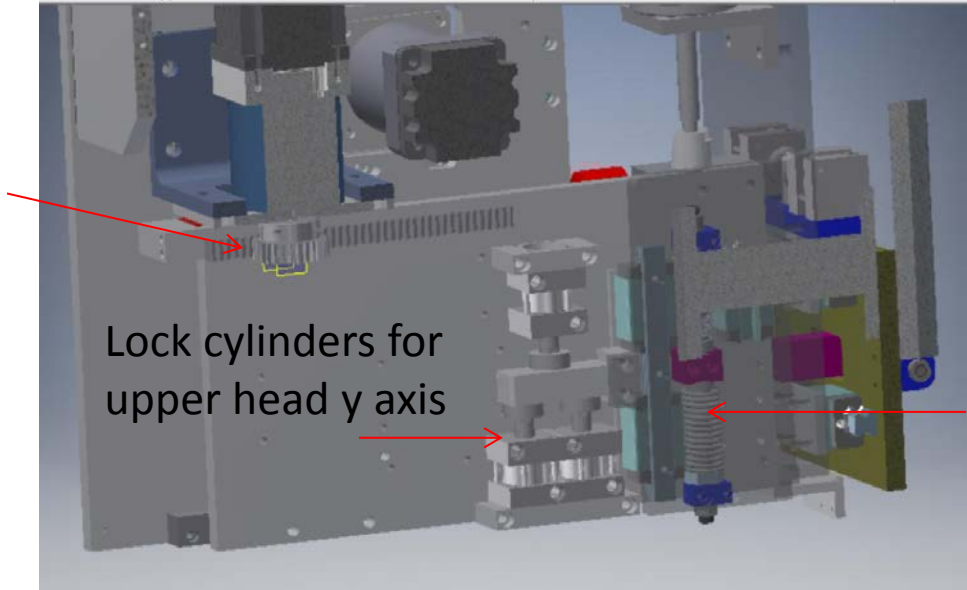
Centering springs x axis



Upper head  
diaphragm cylinder  
for floating y axis

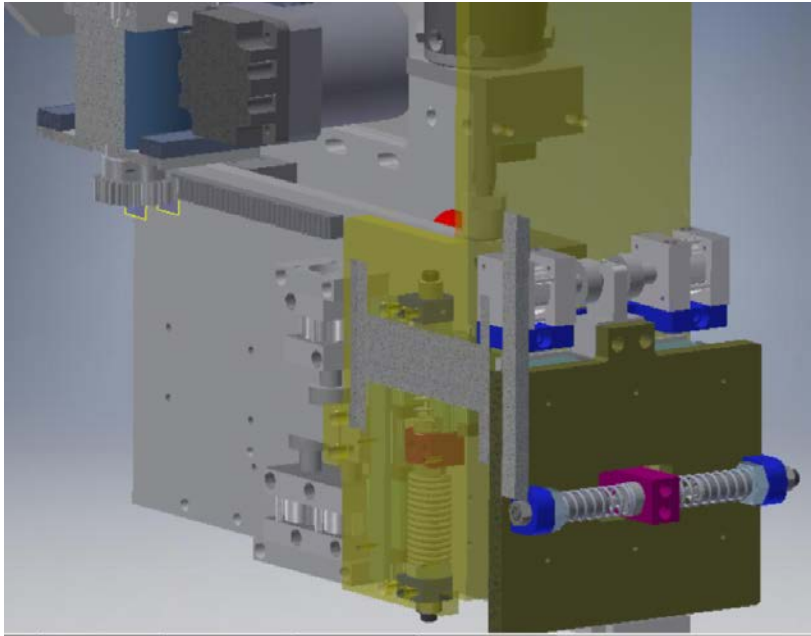


Z axis drive

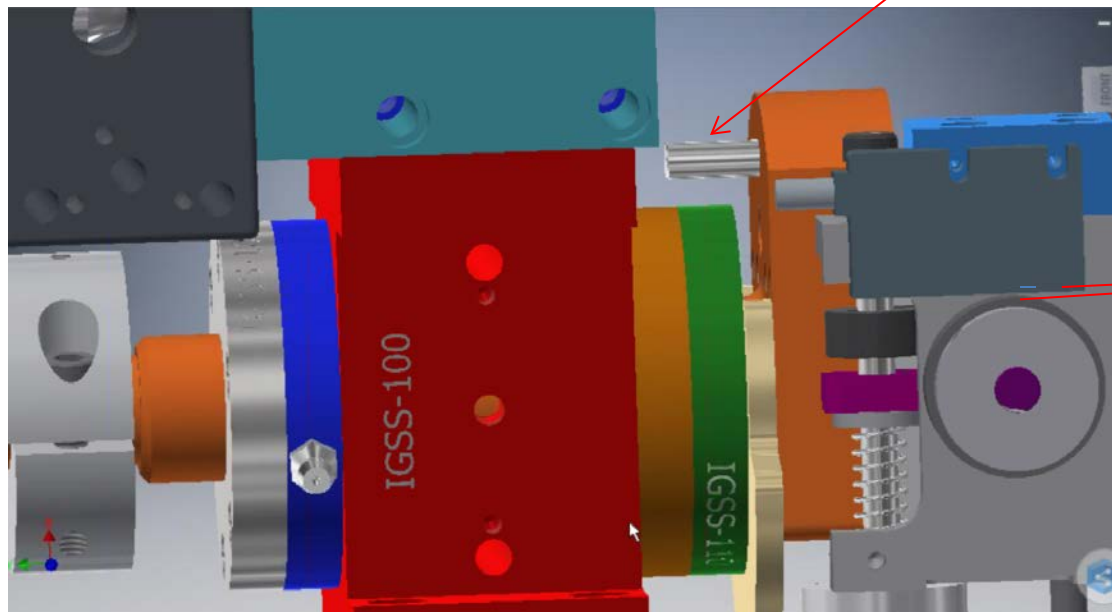


Lock cylinders for  
upper head y axis

Upper head  
support spring y  
axis

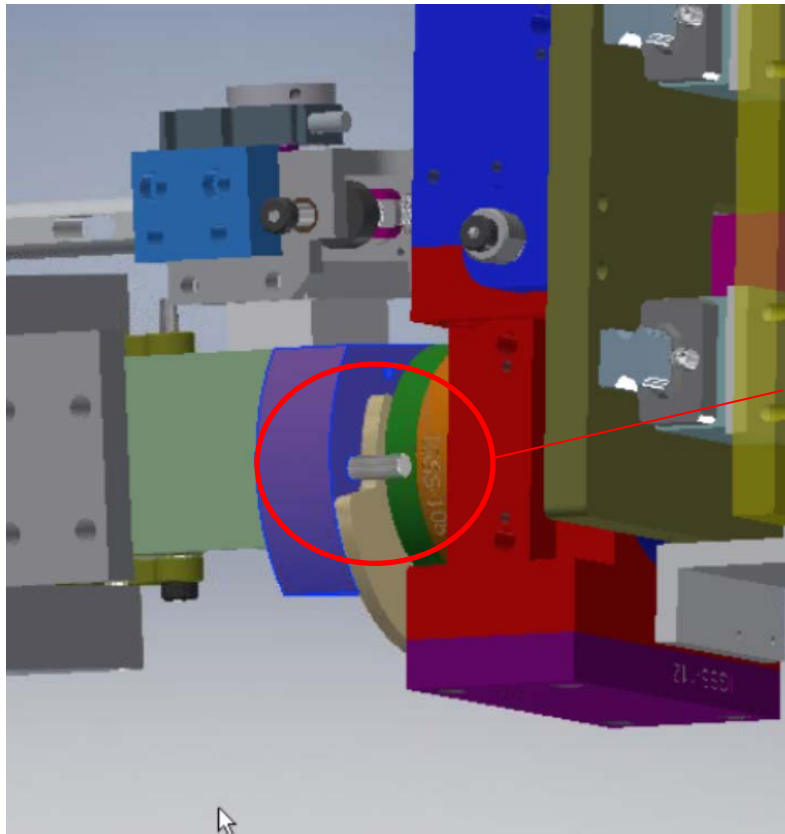


Cross view showing upper floating head springs

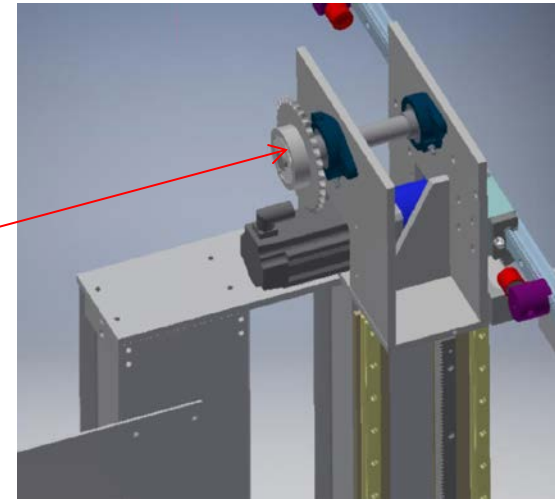


Index home pin

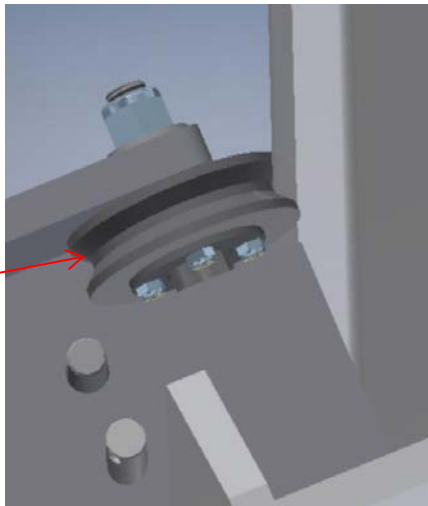
.015 gap between encoder and wheel



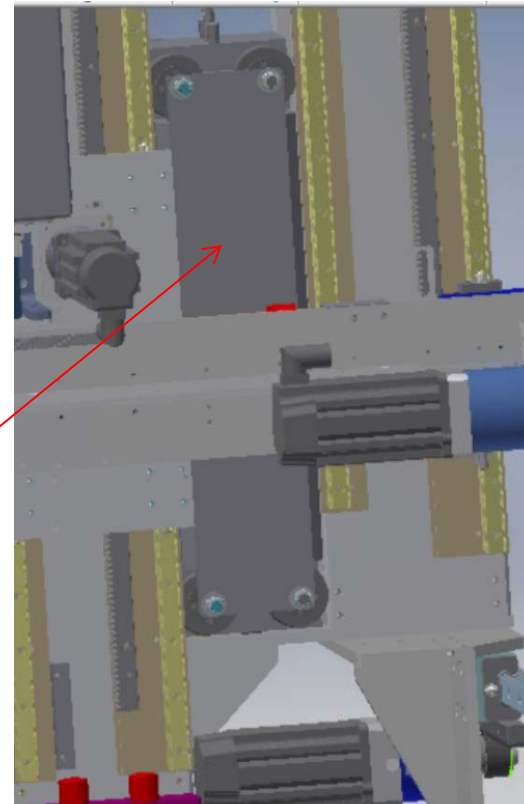
Index home position



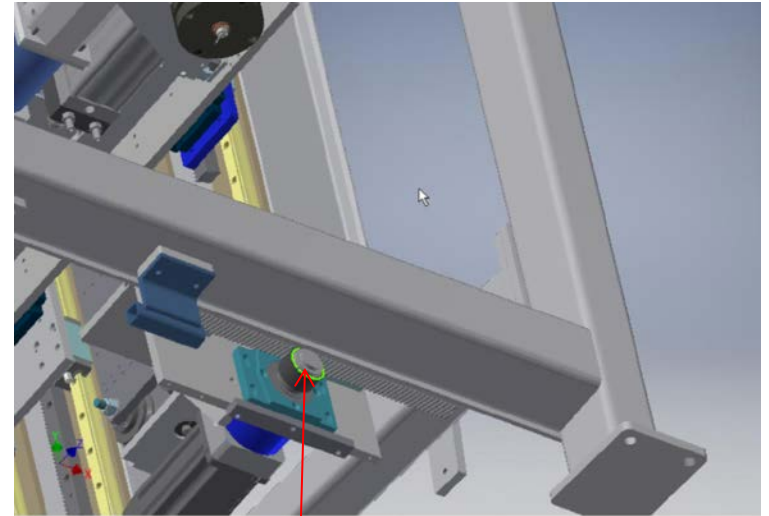
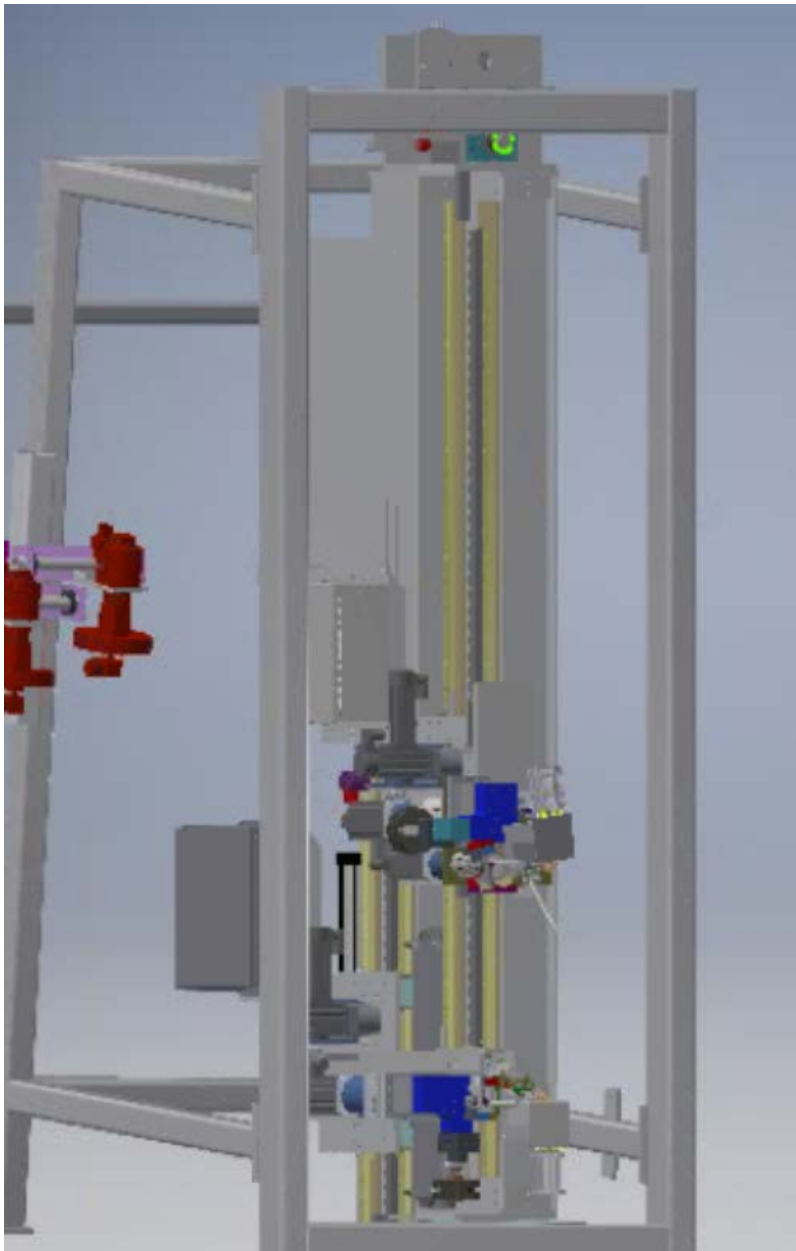
Counter weight sprocket



Counter weight guide rollers



Counter weight assembly

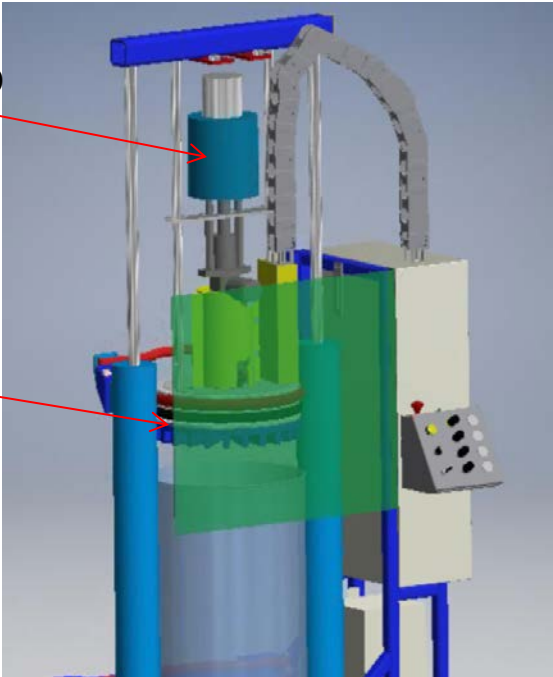


Lower x axis drive

Sealer gantry with upper  
and lower head

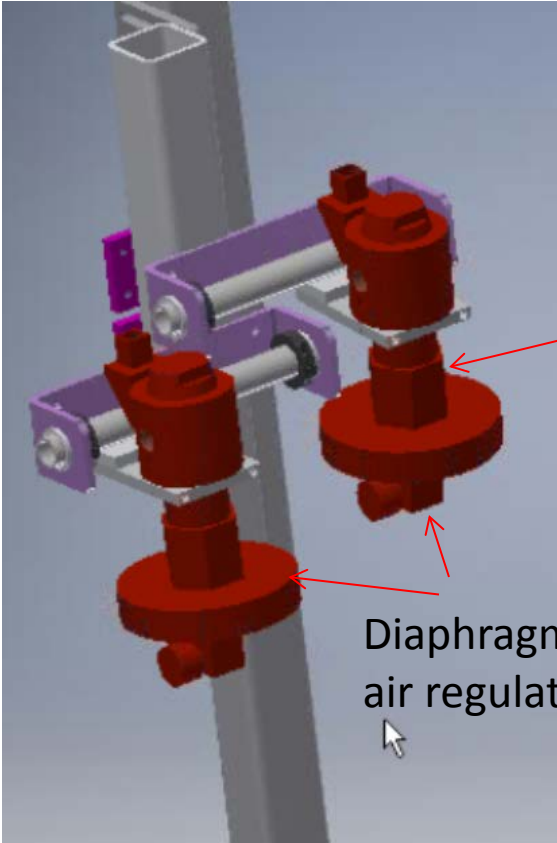
Unloader pump  
motor

Heated finned  
platen



Mastic regulators

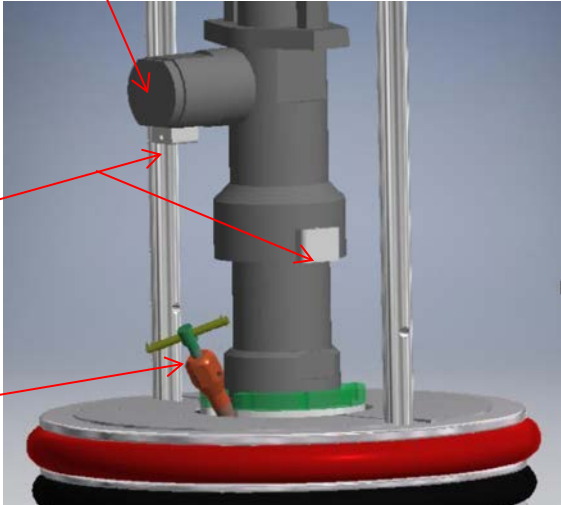
Diaphragm and  
air regulator



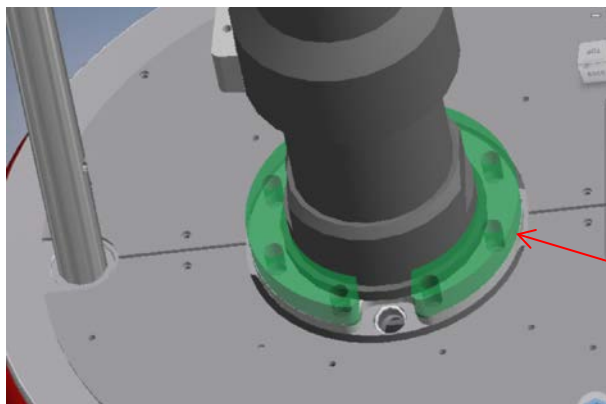
Check valve

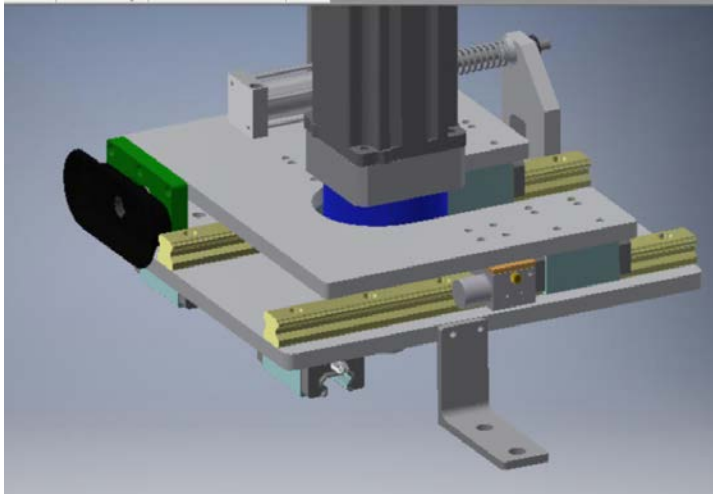
Rtd  
 housings

Aeration  
valve

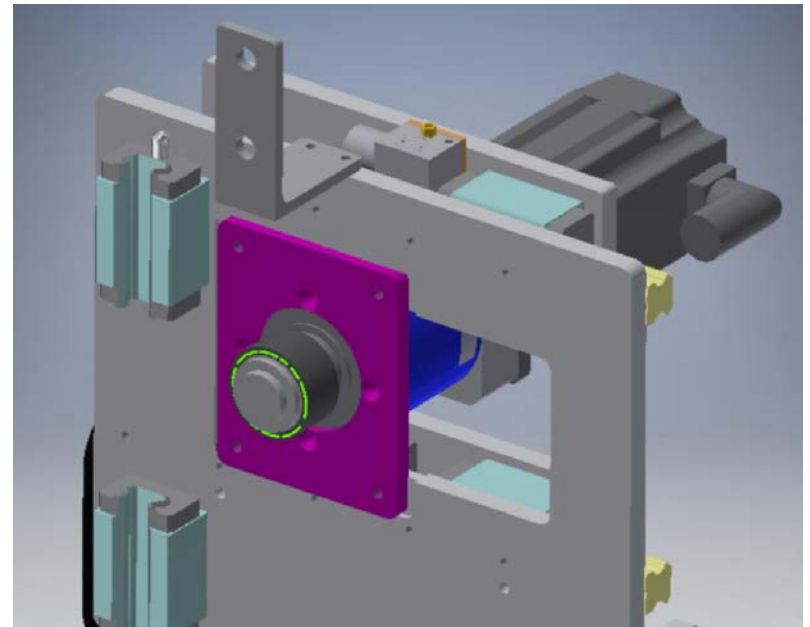


Pump retainer ring



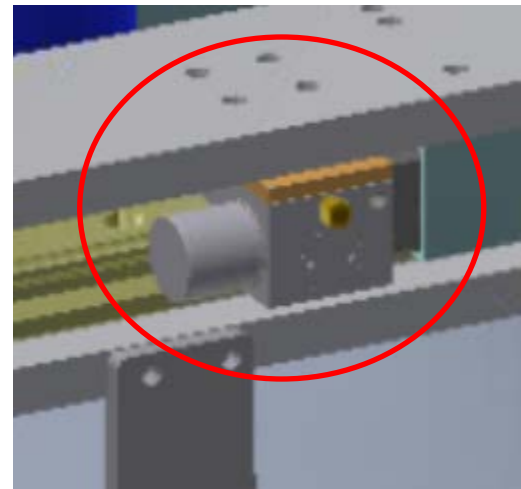
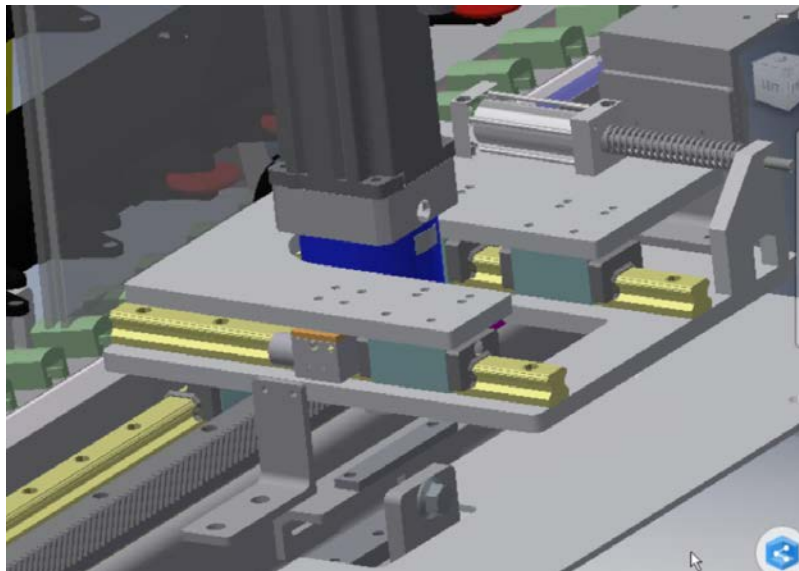


Isolated view of Vacuum trolley

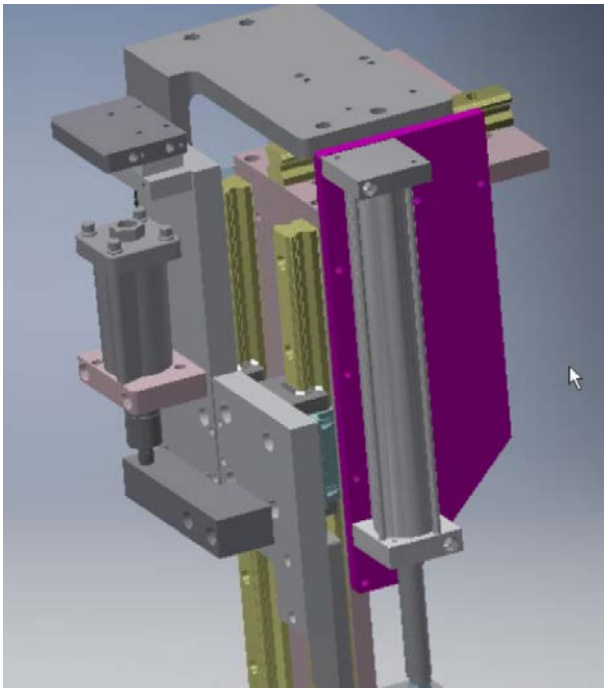


Bottom view of trolley showing pinion gear and bearings

Vacuum trolley main view

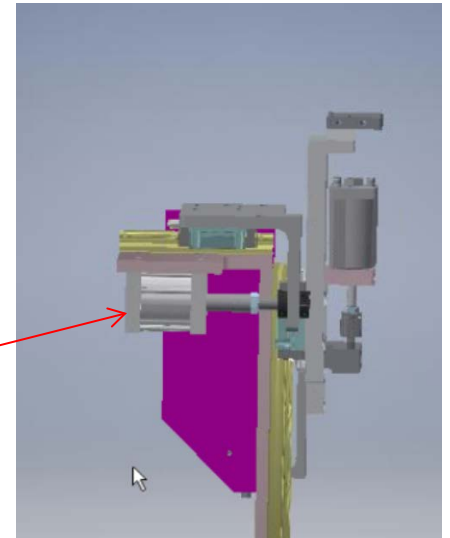


Rail brake for vacuum cup pick up plate (Zimmer brake)

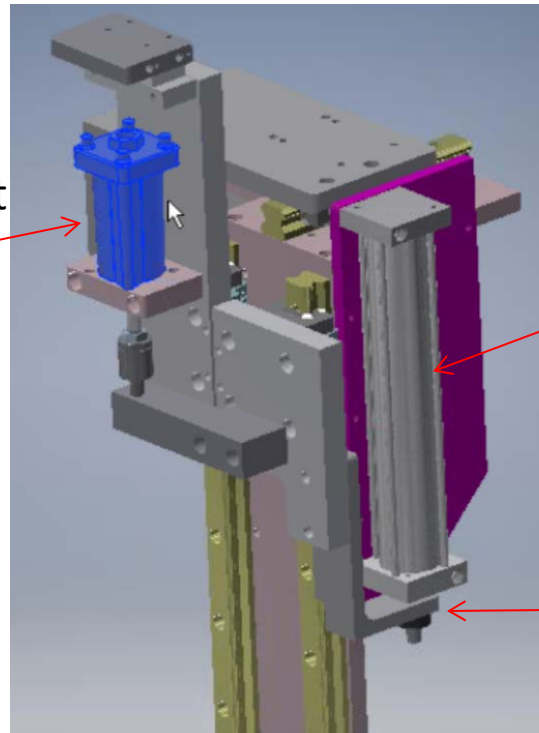


Exposed view of lower fixed wiper

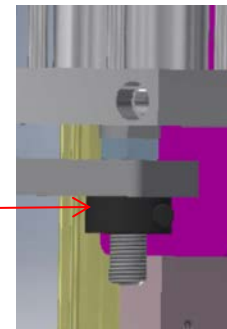
Lower fixed wiper in/out shift cylinder

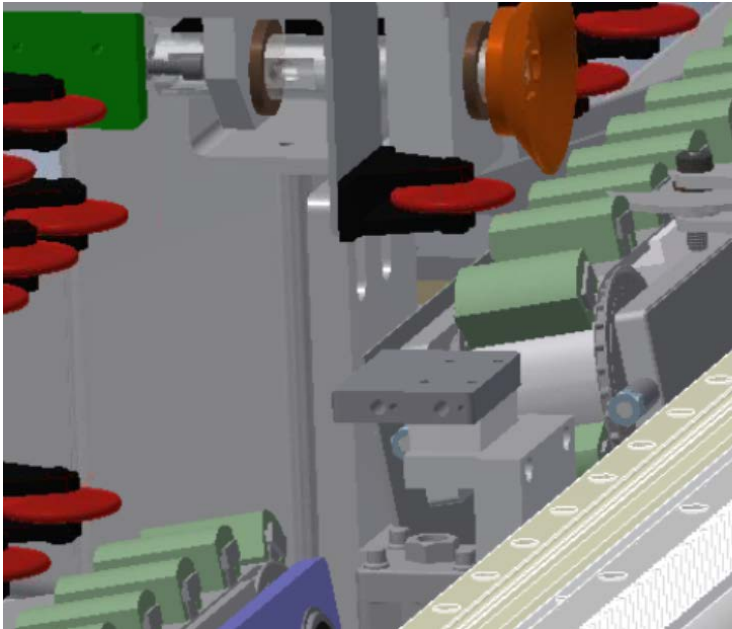


Lower fixed wiper Float cylinder

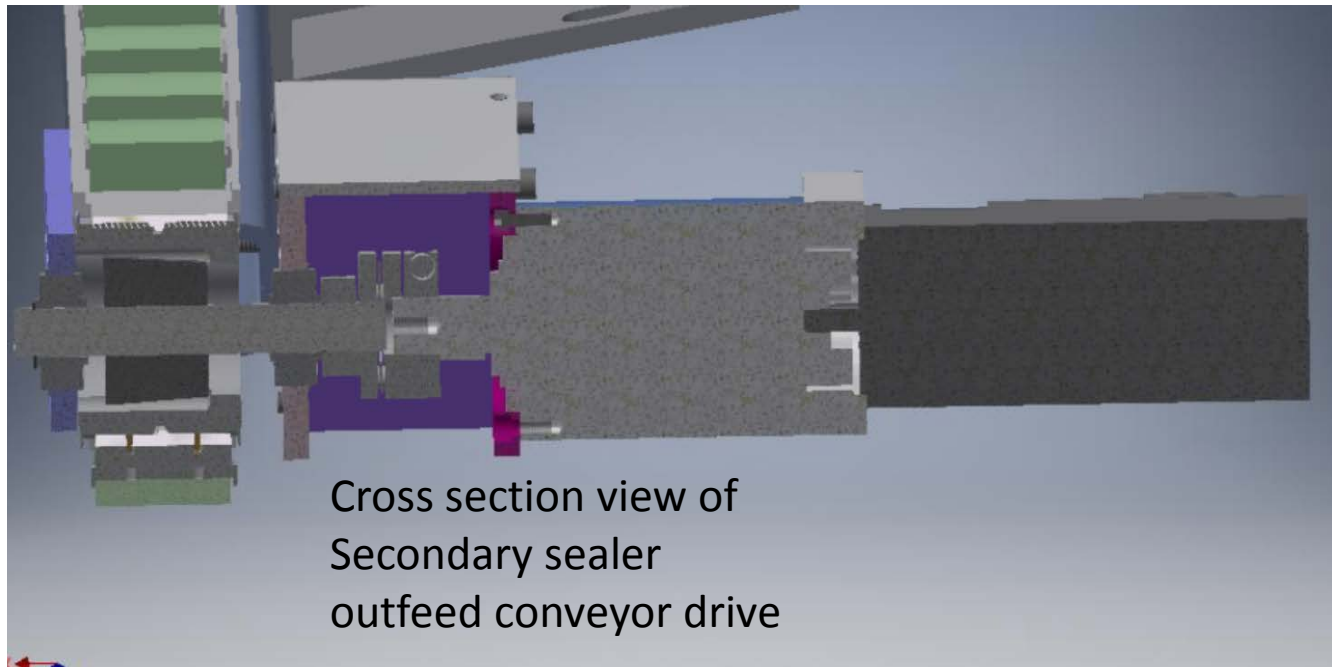


Lower fixed wiper raise / lower cylinder

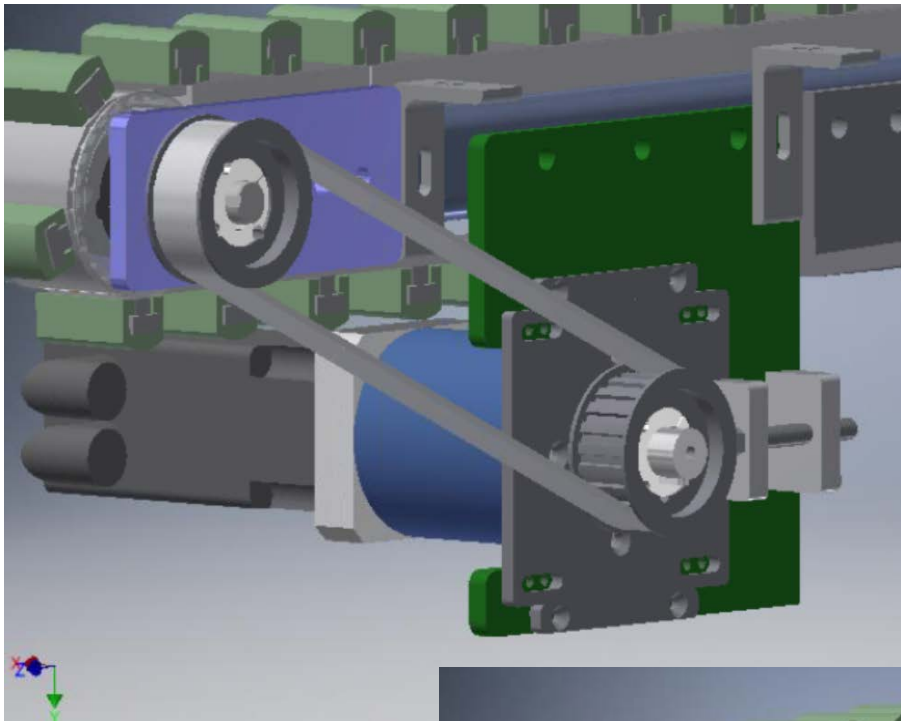




Fixed wipers shown in position

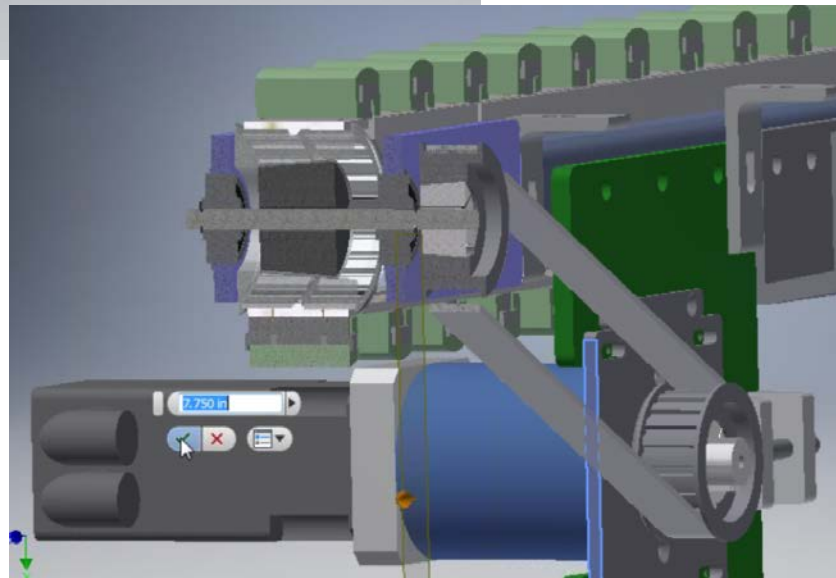


Cross section view of  
Secondary sealer  
outfeed conveyor drive

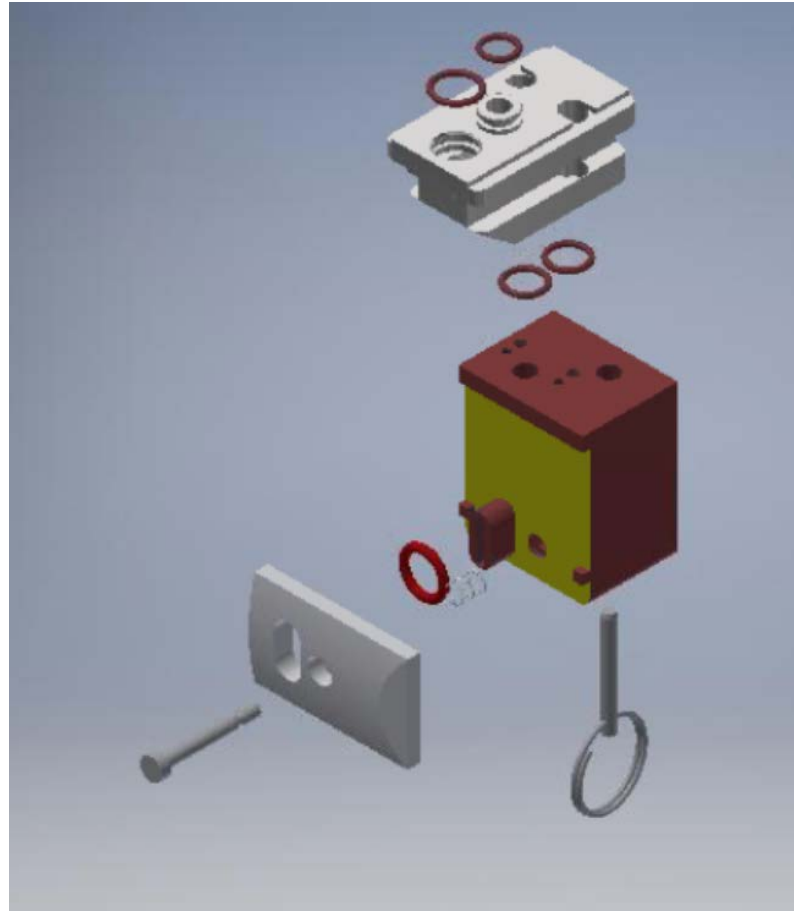


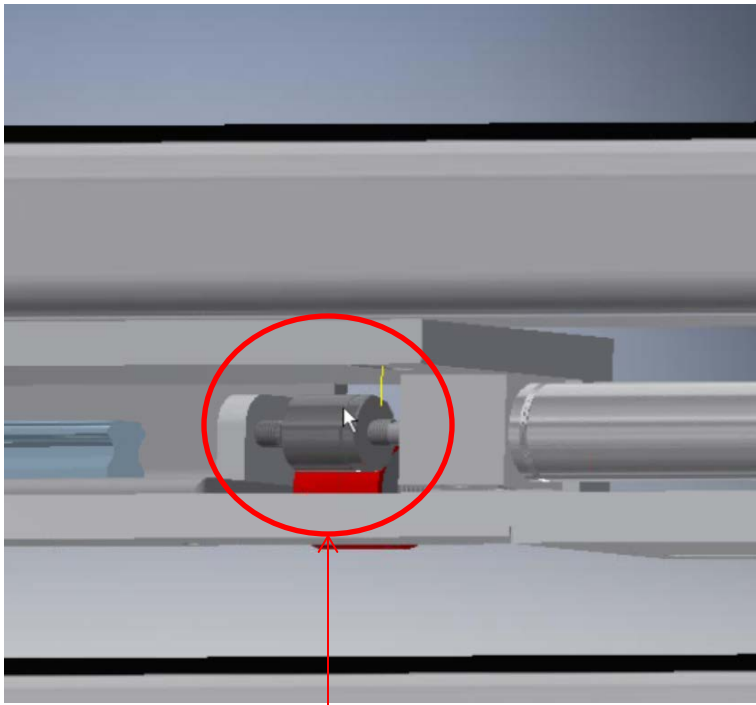
Secondary sealer infeed conveyor drive

Cross section of Secondary sealer infeed conveyor drive bearings and pulleys

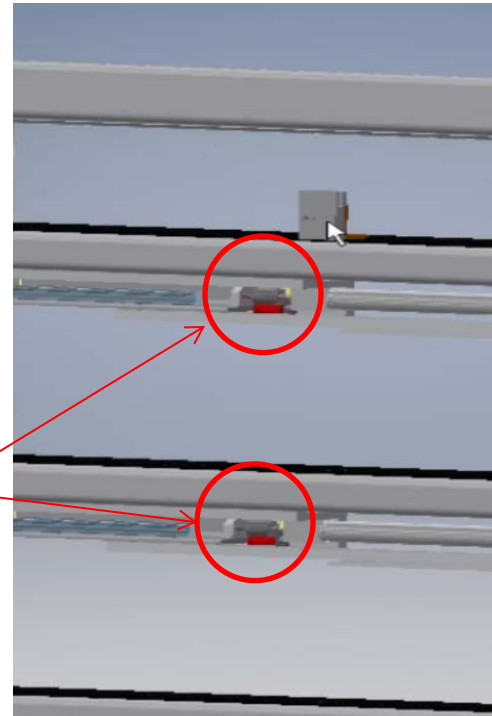


# Exploder view of sealing nozzle assembly





Alignment couplers  
for pop out supports  
on secondary sealer



# Out feed Inspection station

Conveyor drive

Product detect eyes

