



The Lynx an Electric Automatic Corn Cutter

Installation, Operation, and Maintenance

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Table of Contents

About This Manual	6
Intended Use	6
Manufacturer's Declaration of Conformity	7
About Magnuson CCM	8
Contacting Magnuson CCM	9
Service and Support	9
Shift Mechanic	10
Shift Operator	10
Safety Guidelines	12
Conventions Used in this Manual	12
Safety Notices	12
Information Notices	12
Magnuson CCM General Safety	12
Warning Labels	16
Warning Label Locations	17
Safety Information	21
Hazards	23
Mechanical Hazards	23
Electrical Hazards	25
Thermal Hazards	25
Noise Hazards	26
Ergonomic Hazards	26
Functional Disorders	27
Improper Use of Safety Measures	27
Overview	28
Advantages of Using the EACC	28
Specifications	29
Work Zones	31
Elevations	32
Parts and Assemblies	36
Sequence of Operation	37
Baseline Settings	51
Installation	54
Accepting Delivery	54
Confirming Site Requirements	54
Machine Installation	55
Electrical Installation	56
Lifting Points	57
Installation Recommendations	57
Mechanical Adjustments	60
Special Equipment and Tools Needed	60
Handling and Support Equipment	60
Special Tools	60
Light Source Tool	63

Adjusting the Infeed Chute	63
Adjust the Ear In Sensor Blade	66
Adjust the Pressure Arm	68
Adjust the Flipper Gate	71
Adjust the Turn Ramp	74
Adjust the Feed/Cob Roll Tension	76
Adjust the Feed Troughs (Upper and Lower)	77
Assemble the Cutter Alignment Fixture	78
Center the Nose Wheels Horizontally (Horizontal Adjustment)	80
Center the Nose Wheels Vertically (Vertical Adjustment)	83
Adjusting the Center (Equalizer) Fingers	86
Place the Alignment Shaft	86
Adjust the Equalizer Rods	87
Adjusting the Feed/Cob Roll Shaft	88
Adjust the Feed/Cob Roll Shafts Vertically	89
Adjust the Feed/Cob Roll Shafts Horizontally	92
Adjust the Model 2 Cutter Head	95
Adjusting Pneumatic Controls	96
SPAU Pressure sensor	97
Electrical Adjustments	101
LED Indicators	102
Sensor Adjustment	104
Adjust the Cob Out Sensor	105
Adjust the Ear In Sensor	106
Motor Adjustment	107
Drive Settings	108
Drive BLE2 Series	109
Drive GS10	112
Operation	114
Controls	114
.....	115
Start and Stop the EACC	115
Monitoring Operations	116
HMI	117
Output Parameters	129
Clear Blockages	132
Seasonal Operations	133
Start of Shift Procedures	133
Visual Inspection	133
Assigning Maintenance Tasks	134
Profile Board	135
Profile Board Features	135
Board Jumpers	137
Profile PCB Jumper Settings JP1 - JP3	137
Profile PCB Jumper Settings JP4 - JP9	138
Profile PCB Jumper Settings J10 - J12	138
Beacon Light Information	140
Beacon Light Codes	140
Profile Board Software	141

Special Function Parameter	141
Infeed Parameters	141
Recycle Parameters	142
Stalk Detect Parameters	143
Additional Information	144
Error Codes	144
Fuses	145
Eye Count vs. Width or Diameter	146
Length Table	146
Profile PCB LED Definitions	148
Maintenance	151
In-Season	151
Removing and Replacing Cutter Head	151
Sharpening the Knives	156
Cleaning the EACC	156
Lubrication	157
Off-Season	159
Maintenance, Off-Season	159
Cleaning and Lubricating	159
Inspecting and Ordering Parts	160
Preparing for Storage	160
Pre-Season Set-Up	161
Replacing Parts	162
Ordering Replacement Parts	162
Recommended Replacement Parts	162
Troubleshooting	166
Observe Product Condition	166
Two-Minute Check	167
Troubleshooting Techniques	168
Machine Does Not Start	168
Machine Starts but Shuts Down Immediately	169
Dump Gate Malfunctions	169
Upper Feed Trough Malfunctions	170
Machine Will Not Recycle	170
Too Many Ears of Corn in the Infeed Wheel	170
Flipper Gate Does not Turn Ears Correctly	170
Flipper Gate Will Not Reject Nubbins	171
Too Small a Gap Between Ears Entering the Gray Track	171
Ears Bounce on the Lower Feed Trough Belt	172
Ears Jam at the Nose Wheel	172
Infeed Conveyor Runs Continuously	172
Infeed Conveyor Does Not Run	172
Machine Keeps Recycling	173
Rejecting Too Many Good or Long Ears	173
Power Bay Not Supplying Power to One or More Cutters	173
Drawings	175
Pneumatic Schematic	175
Water Schematic	176
Power Circuit	177

Control Circuit	178
Input/Output Circuit	179
Jumper Setting	180
AY,ACC ELECTRIC (4010000.8000.4)	182
AY,ACC ELECTRIC W/ CE (4010000.8000.5)	185
AY,FRAME ELECTRIC (4010000.8100.3)	187
AY,BODY ELECTRIC (4010000.8101.2)	191
ASSY,FLIPPER GATE CYL (4010043.0001)	195
AY,INFEED WHEEL ELECTRIC (4010000.8102.1)	197
AY,INFEED CONVEYOR SUPPORT (4010000.8103)	199
AY,INFEED CONVEYOR ELECTRIC (4010000.8104.3)	201
AY,FEED TROUGHS ELECTRIC (4010000.8105.1)	203
ASSY,2ND FLIPPER ACTUATING (4010046.0001)	205
AY,UPPER FEED TRH ELECTRIC (4010102.0005)	207
AY,LOWER FEED TRH LESS BELT (4010103.0008)	209
AY,ELECTRIC CUTTERBOX (4010000.8106.2)	211
NUBBIN KNOCKER-SUBASSY (4011381)	222
AY,CUTTER COVER (4011760.0002)	224
AY,COVERS ELECTRIC (4010000.8108.3)	225
AY,METERING BELT ELECTRIC (4010000.8109.1)	226
AY,PRESSURE ARM ELECTRIC (4010000.8110.1)	228
CHUTE,CUT CORN (4010000.8112)	229
AY,CNTRL ELEC ACC (4010000.8113.2)	230
AY,EACC E-STOP (4011728.0001)	236
LIGHT SOURCE,LED PROFILE (4011332.0002)	238
AY,LABELS EACC CE (4010000.8114.2)	239
AY,LABELS EACC (4010000.8114.3)	241
AY,H2O CUTTERHEAD LUBRICATION (4010000.8118)	243
AY,UTILITY ELECTRIC (4010000.8119)	244
AY,CUTTER HEAD MOD 2 CCM (4010106.0006)	250
TOOL,ALIGNMENT (4011662)	255
Warranty	257
Appendix	262
Drive BMU Series	262
Notes	265

About This Manual

In this manual, you will find all the information you need to install, start up, and operate your Magnuson Electric Automatic Corn Cutter (EACC). This manual includes engineering drawings and lists for part numbers for each assembly. You will also learn about:

- Features of the EACC
- Important safety information and guidelines
- How to install the EACC and make adjustments
- Operation and maintenance procedures
- Corrective actions to take for common issues that may arise
- Ordering spare and replacement parts

Read this manual carefully and keep it to get the most out of your Electric Automatic Corn Cutter (EACC).



WARNING

Read and save these instructions before attempting to assemble, install, operate, or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage. Retain these instructions for future reference.



WARNING

Read and understand the **Safety Guidelines** chapter of this manual before you attempt to operate or maintain the Electric Automatic Corn Cutter (EACC). Failure to do so may result in personal injury.

Intended Use

The Electric Automatic Corn Cutter is intended for use in cutting ears of fresh, sweet corn in a sweet corn processing plant environment. Any use other than specified in the manufacturer's Operations and Service documentation is not recommended. Such use could injure workers, damage the machine, and invalidate the machine warranty.

Manufacturer's Declaration of Conformity

About Magnuson CCM

For over 80 years, Magnuson CCM has been your world leader in sales of vegetable, fruit, nut, and meat processing machinery. But we don't just supply peelers, feeders, corn cutters, and more. Through our support, leadership, and innovation, we power you to greatness.

In 1994, Magnuson acquired Computer Controlled Machines (CCM), the manufacturer of manual and automatic corn cutters, semi-automatic cob saws, green corn eliminators, seed corn sorters, and knife sharpeners. Today, Magnuson CCM is the trusted authority for equipment and expertise in the corn processing industry. See how all our machines each have their own kernels of greatness.

Magnuson CCM is a full-service company dedicated to the development, manufacture and worldwide marketing of advanced specialized food processing and product handling machinery, and process and quality control instrumentation. Over 80 years of solid engineering experience has allowed us to develop an ever-expanding and diversified line of equipment. Whether the operation is small, medium, or large, food processors the world over have increased their profits, production efficiency, and quality control utilizing Magnuson CCM equipment.

Magnuson CCM supplies the root vegetable, corn, pistachio, fruit, onion, and tomato industries with machines that span all phases of production preparation. Magnuson CCM has developed anti-pollution fruit and vegetable washing and peeling methods that have helped revolutionize the industry's ecology problems. Magnuson CCM is now designing equipment to more readily enable the food processor to meet their own and increasingly rigid government standards and specifications.

Magnuson CCM headquarters is located in Centennial, Colorado with manufacturing facilities located in Pueblo, Colorado. Visitors are welcome and encouraged to observe the precision and quality that go into all Magnuson CCM systems.

Visit us online at <https://www.magnusoncorp.com/>.

Contacting Magnuson CCM

Service and support that never stop working for you.

Powering customers to greatness takes boots on the ground, parts in the right places, and a team of service and support specialists when and where you need them. Whatever the task may be, we're here to answer your call.

- To ask a question
- To get help with troubleshooting
- To report missing or damaged items
- To order OEM replacement parts

Contact us through our website at <https://www.magnusoncorp.com/contact-us> or reach out to us using any of the information listed below.

Corporate Office	Online: https://www.magnusoncorp.com Email: sales@magnusoncorp.com Mailing Address: 7304 S. Joliet Street, Suite 300, Centennial, CO 80112 Telephone: +1 (720) 750-6113
Sales and Service	Telephone: +1 (720) 750-6113 Fax: +1 (720) 583-0816 Email: MagnusonOrdersMailbox@magnusoncorp.com
Customer Service	Telephone: +1 (720) 750-6113 ext-704 Email: MagnusonOrdersMailbox@magnusoncorp.com



TIP

When contacting us, be sure to have the following information:

- Equipment name, model, and serial number
- Date of purchase
- Description of problem

Service and Support

Magnuson CCM sells the corn cutting equipment to the sweet corn processing plant. As a part of the sale, you may request Magnuson CCM to provide personnel to support start-up.

The Sales and Service Representative can support members of your plant operations and maintenance team during the initial layout, installation, and start-up of the equipment. The Service Representative coordinates with plant personnel to ensure maximum efficiency and safe operations of equipment provided by Magnuson CCM.

When requested, the Service Representative can assist in installing new equipment, installation inspections, and training plant personnel. The Service Representative can assist Supervisors and Mechanics in troubleshooting, making repairs, conducting off-season refurbishing, and ordering replacement parts.



WARNING

Read and understand the **Safety Guidelines** chapter of this manual before you attempt to operate or maintain the Electric Automatic Corn Cutter (EACC). Failure to do so may result in personal injury.

Installation and Inspection

The Service Representative can support the initial installation, inspection, and adjustment of the equipment. Thereafter, a daily visual inspection is required and is conducted by the designated plant personnel.

Training

The Service Representative can assist in training operators and plant personnel who work on the Electric Automatic Corn Cutter (EACC) equipment.

Shift Mechanic

The Shift Mechanic performs maintenance and repair of the EACC that may include:

- Providing troubleshooting and required repairs, maintenance, or adjustments.
- Refurbishing parts and cutting mechanisms.
- Conducting preventive maintenance during the off-season.
- Tracking spare parts.

Shift Mechanics should receive thorough training in machine service techniques as provided in the Magnuson CCM Operations and Service documentation. Mechanics may also have special training and certification in electrical maintenance and repair. Most repairs and adjustments to the Electric Automatic Corn Cutter (EACC) should be conducted only by trained Mechanics or a Magnuson CCM Service Representative.



WARNING

Read and understand the **Safety Guidelines** chapter of this manual before you attempt to operate or maintain the Electric Automatic Corn Cutter (EACC). Failure to do so may result in personal injury.

Shift Operator

The Shift Operator must be trained to monitor operations of the EACC and report equipment or process problems. In some instances, after receiving the appropriate training, the Operator may be required to fix the problem. These instances may include:

- Check and reset Emergency Stop or guard devices in the event of a shut down or if the EACC does not start.
- Clear blockages at times when the recycle system cannot clear the jam.
- Remove and replace cutter heads if they are damaged or need cleaning.
- Shut down the equipment if cutting defects occur or if an emergency exists.



WARNING

Do not attempt to clear a blockage while the machine is running. **SHUT DOWN** the machine first before clearing any blockages. **Failure to do so may result in personal injury.**

- Remove and replace cutter heads if they are damaged or need cleaning.
- Shut down equipment if cutting defects occur or if an emergency exists.

Sometimes a problem may need to be referred to the Shift Mechanic for resolution. They may decide to consult the Magnuson CCM Service Representative. Problems that should be referred to others include:

- Any electrical repair or adjustment.
- Cutting defects that indicate the need for extensive troubleshooting.
- Computer malfunction.

The Shift Operator also supports the Sanitation and Lubrication crews by ensuring proper start-up and shut-down status during their operations.

Safety Guidelines

Follow all safety guidelines when assembling, operating, or servicing this machine.

Conventions Used in this Manual

This section describes how information is presented, organized, and referenced within this manual.

Safety Notices

This manual uses these symbols and standards to identify conditions related to safety hazards and equipment damage.



DANGER

Indicates an imminent hazard which, if not avoided, will result in death.



WARNING

Indicates a hazard which, if not avoided, could result in serious personal injury or death.



CAUTION

Indicates a hazard which, if not avoided, could result in minor or moderate personal injury.



NOTICE

Indicates a situation that can result in equipment or property damage but poses no risk of personal injury.

Information Notices

This manual uses these symbols to emphasize certain types of information that are not related to safety.



NOTE

Indicates general information that provides additional context or guidance.



IMPORTANT

Indicates information that requires you to pay special attention.



TIP

Indicates information that can help you perform a task more efficiently.

Magnuson CCM General Safety



WARNING

Read and save these instructions before attempting to assemble, install, operate, or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage. Retain these instructions for future reference.

**WARNING**

All equipment must be used in accordance with local, state, and federal (OSHA) requirements governing occupational safety, fire protection, and machine operations. **Disclaimer:** Magnuson CCM is not responsible for any injury, illness, or property damage that results from not abiding by local, state, or federal (OSHA) requirements that govern occupational safety, fire protection, and machine operations.

**WARNING**

Lockout/tagout (LOTO) procedures must be followed before performing any work, cleaning, or removal of plugged product in this machine.

**WARNING**

Electrocution or serious injury may result when working on an energized circuit. Disconnect power at the main breaker or service disconnect switch before working on the circuit. Lockout/tagout the breaker to indicate that work is being performed on the circuit.

**WARNING**

Do not operate or perform maintenance or repair on any machine when taking any kind of drug or sedative, while under the influence of alcohol, or when overly fatigued.

**WARNING**

Never reach into a moving or jammed machine. Turn off the machine and lockout/tagout the circuit before removing jams.

**WARNING**

High-voltage and rotating parts can cause serious or fatal injury. Installation, operation, and maintenance of this product must be performed only by qualified personnel, in accordance with all applicable safety regulations and guidelines.

**WARNING**

Only a trained and licensed electrician should perform wiring and connections to Magnuson CCM machinery. Failure to follow proper installation requirements could result in death, serious injury, and damage to equipment or property.

**WARNING**

Never allow anyone to climb up on the to clean or service it. Always use OSHA-approved portable ladders or scaffolding, if necessary. Train all cleaning personnel to be aware of hazards of working around operating and non-operating machinery.

**WARNING**

Always wear shoes with firm soles and tops while working. Wearing sandals, sneakers (tennis or jogging shoes), high-heeled dress shoes, or open-toe shoes must be strictly avoided.

**WARNING**

Never start a machine until you are certain that all personnel and foreign objects have been cleared away.

**WARNING**

Never attempt to make any safety device inoperative or bypass or override any controls.

**CAUTION**

All persons who will operate, service, inspect, or otherwise handle Magnuson CCM machinery must read and understand the safe operating practices, safety precautions, and warning messages in this documentation.

**CAUTION**

Always visually inspect the before performing any maintenance.

**CAUTION**

Always wear approved personal protective equipment (PPE)—safety glasses, hard hats, hearing protection, or any other necessary equipment—in areas where PPE is required or while performing work.

**CAUTION**

Check all switches and safety devices daily to ensure that they operate properly.

**CAUTION**

Do not use any cleaning solutions or chemicals on Magnuson CCM equipment other than sodium hydroxide (NaOH) or potassium hydroxide (KOH) at 1.5–2.5% concentration at 160–170 °F (71–77 °C) without authorization from Magnuson CCM. Solutions containing chlorine (Cl) or similar oxidants are strictly prohibited on Magnuson CCM equipment.

**CAUTION**

Keep hands out of machines while they are operating.

**CAUTION**

Keep the floor around the machines clean and free of obstructions and water. If water is necessary at the machines, be sure to wear shoes that do not slip on wet surfaces.

**CAUTION**

Never wear loose clothing, watches, or jewelry of any kind while working on or around any machinery.

**CAUTION**

Operators must read and understand all manufacturer instructions prior to use.

**CAUTION**

Safety labels must be visible at all times. If labels become faded or illegible, immediately replace them.

**CAUTION**

Shut off power at the main electrical supply and the disconnect before opening or probing around in the electrical compartment.

**CAUTION**

Slipping Hazard - After applying lubricant, ensure that all the excess is removed to prevent it from accumulating on the floor.

**CAUTION**

Store all parts in an area that protects them from damage from the elements. Do not store spare parts inside the processing area.

**CAUTION**

This unit and its associated equipment must be installed, adjusted, and maintained by qualified personnel who are familiar with the construction and operation of all equipment in the system and the potential hazards involved.

**CAUTION**

Under no condition should any unauthorized person unbolt and open the electrical panel.

**CAUTION**

Keep the area surrounding this machine clean and orderly.

**CAUTION**

Lubricate the machine when the power is OFF and locked out. Be sure to clean up any grease or oil that drops on the floor.

**CAUTION**

Do not operate this machine unless all guards are in place.

**CAUTION**

When working with or near parts that move when the machine is operating, be sure that the power is turned OFF at the control panel and at the main power source in the plant. Be sure that the power cannot be turned ON again without your consent (lockout switch) as required by your local, state, and national regulations.

**CAUTION**

Do not attempt to operate any machine until you understand how it functions. If you are not certain how to perform any procedure after studying this Manual, contact your Magnuson CCM Sales and Service Representative.

**CAUTION**

Keep all access covers closed during operation for protection of both operating personnel and the machine.

**IMPORTANT**

Return all worn and removed parts to the shop for disposition.

**NOTICE**

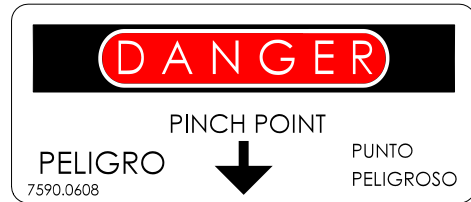
Always use Magnuson CCM-recommended spare or replacement parts. Parts should ALWAYS be replaced with the EXACT replacement part or with parts explicitly approved by Magnuson CCM. Failure to do so may affect the performance, void the machine warranty and could impact future service support.

**IMPORTANT**

Do not remove safety labels. If labels are missing, faded, illegible, or destroyed, contact Magnuson CCM for replacements. See [Contacting Magnuson CCM \(page 9\)](#).

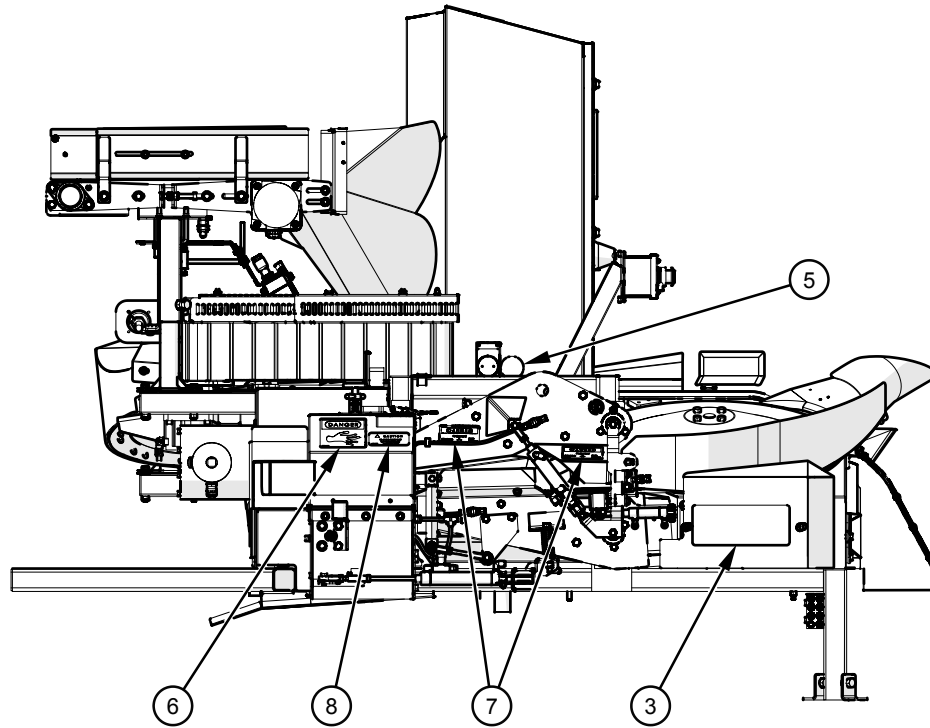
Warning Labels

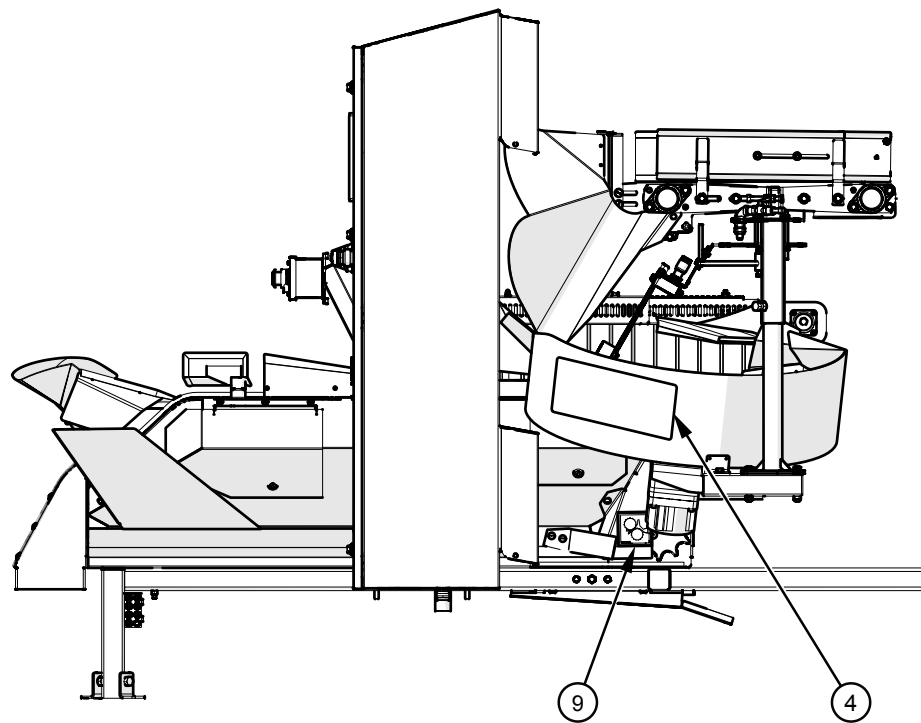
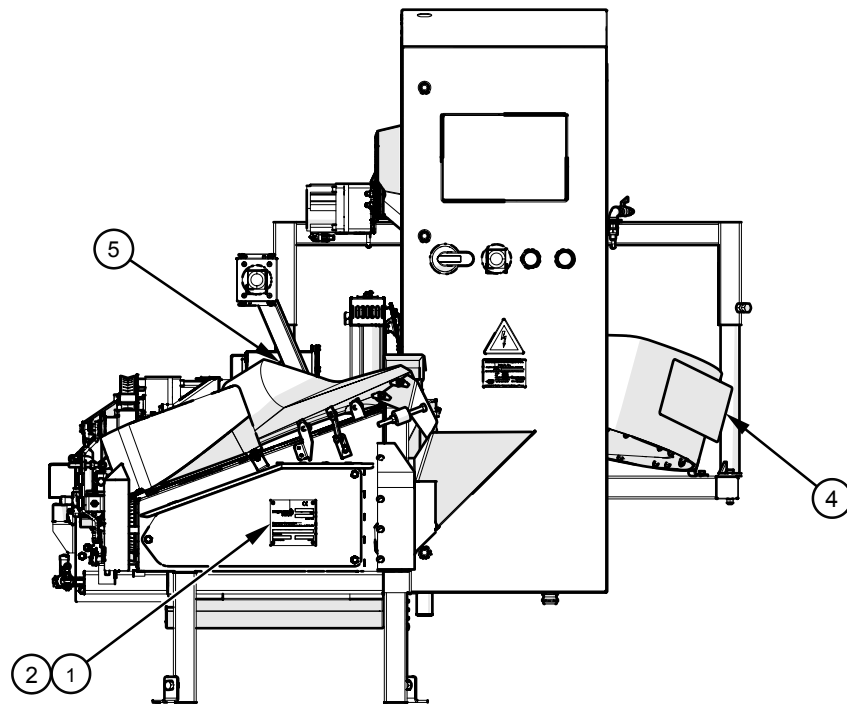
The Magnuson CCM Electric Automatic Corn Cutter (EACC) has warning labels affixed to the machine. Below are examples of the warning labels, the part number for each label, and the locations of the warning labels on the machine.



Warning Label Locations

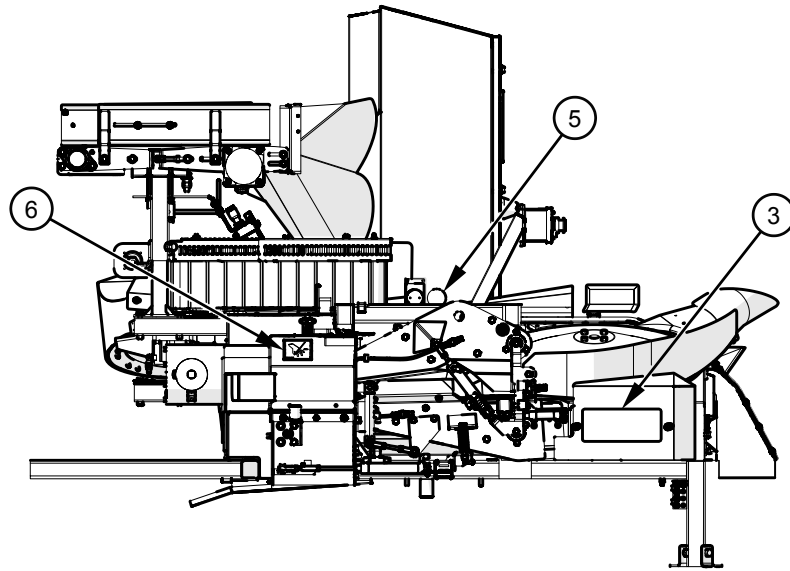
AY,LABELS EACC (4010000.8114.3)

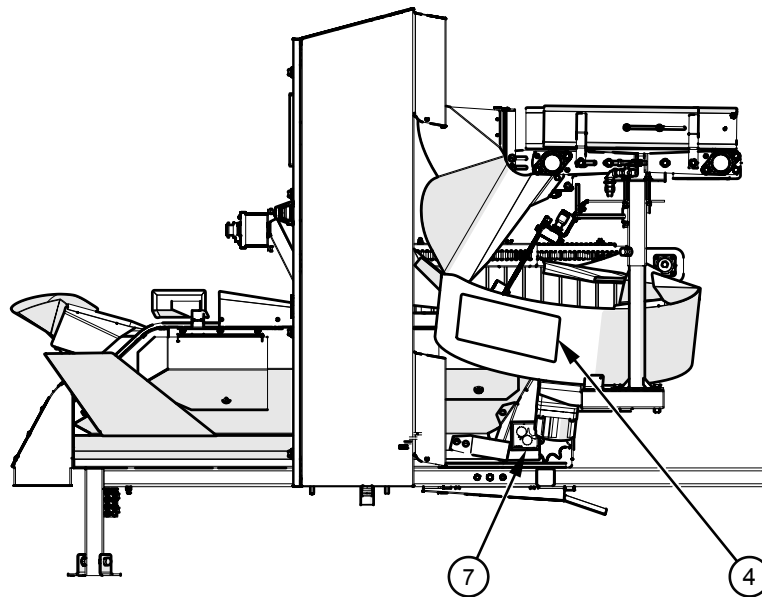
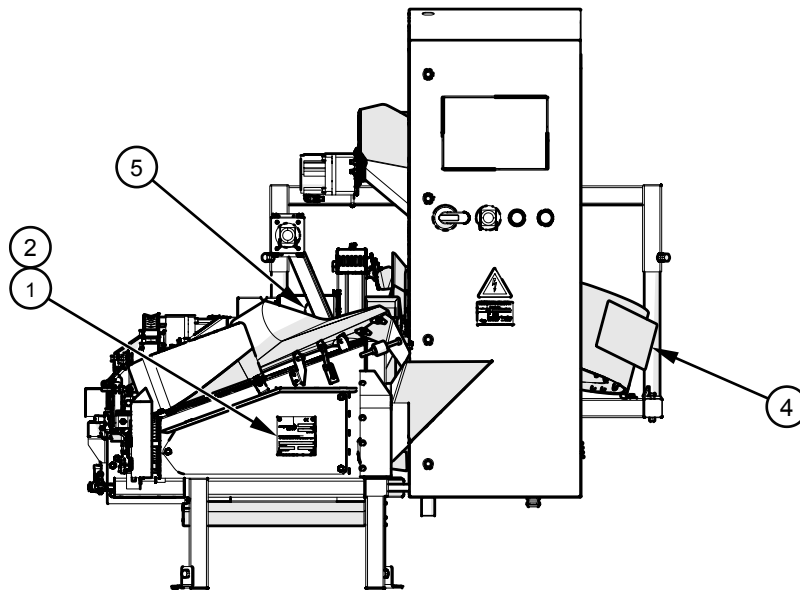




Item	Part Number	Description	Quantity
1	0009.0013	MAG/CCM NAMEPLATE,CE	1
2	224.006	RIVET,BLND 1/8 x 3/16-1/4 SS	4
3	7590.0500	LABEL,MAG/CCM-SMALL	1
4	7590.0502	LABEL,MAG/CCM-LARGE	1
5	7590.0603.003	LABEL,NO ABRASIVES GRAPHIC	2
6	7590.0605	LABEL,DANGER	1
7	7590.0608	LABEL,DANGER-PINCH POINT	2
8	7590.0609	LABEL,CAUTION CLEARING	1
9	7590.0616	LABEL "CAUTION ENTANGLEMENT"CE	1

AY,LABELS EACC CE (4010000.8114.2)





Item	Part Number	Description	Quantity
1	0009.0013	MAG/CCM NAMEPLATE,CE	1
2	224.006	RIVET,BLND 1/8 x 3/16-1/4 SS	4
3	7590.0500	LABEL,MAG/CCM-SMALL	1
4	7590.0502	LABEL,MAG/CCM-LARGE	1
5	7590.0603.003	LABEL,NO ABRASIVES GRAPHIC	2

Item	Part Number	Description	Quantity
6	7590.0614	LABEL,WARNING "CUT/SEVER" CE	1
7	7590.0616	LABEL "CAUTION ENTANGLEMENT"CE	1

Safety Information

This Safety section of the Operations Manual contains information about potential hazards encountered when operating the EACC and provides measures to reduce such hazards. Understanding this information is important for personnel who work with the Electric Automatic Corn Cutter (EACC): Trainers, Supervisors, Operators, Mechanics, Sanitation, and Lubrication Crews, and all others who work in close proximity to the equipment.

Magnuson CCM ships each Electric Automatic Corn Cutter (EACC) with the appropriate safety guards. The guards are pre-installed at the manufacturer's facility and are designed to protect the operators who use and maintain the machine. Magnuson CCM has also developed the operation and safety protocols to ensure the safe operation of the machine.

- The machines are designed with safety in mind. Each machine incorporates safety features that make them as safe as possible. However, because of the inherent dangers associated with the process, Magnuson CCM recommends that operators and mechanics receive appropriate initial, and recurring training to ensure they know how to safely operate and maintain the equipment.
- The Electric Automatic Corn Cutter (EACC) is supplied with industry-standard safety features. The machine incorporates guards, mechanical and electrical lockouts, placards, and other safety devices that, when used properly, minimize the chance of contact with moving parts or cutting surfaces. A safe workplace is created when safety training is provided.
- Some operations require the implementation of a lockout/tagout procedure to ensure the machine is de-energized. Description of a basic Lockout/Tagout process is provided. Plant-specific lockout/tagout procedures must always be followed.
- Every employee who will operate, and/or perform maintenance of any type on this machine must be thoroughly familiar with the steps required to make the machine safe for maintenance. Magnuson CCM recommends that training and testing on the procedures be provided periodically to ensure familiarity.

Safety Training

Recurring safety training for operators and mechanics is extremely important. The training must address the use of lockout/tagout procedures, and supervisors must enforce all safety rules. Safety training will encourage operating personnel not to disable, ignore, or remove safety signs, shielding devices or fail to observe safety warnings and procedures.

Emphasis on Safety. Safety must receive special emphasis from managers and supervisors. Supervisors must always be on the alert to detect and correct any unsafe behavior. Safety training and active enforcement of rules outlined in this section will help prevent accidents. Magnuson CCM recommends that these rules be followed:

- Install, operate and maintain the machines in accordance with the manufacturer's requirements outlined in this manual.
- Use lockout/tagout procedures to make machines safe before clearing a blockage or performing any kind of maintenance or adjustment.
- **NEVER** attempt to clear blockages, repair or adjust parts, or remove material while the machine is running.

- Wear recommended protective gear such as:
 - Safety glasses or face shields.
 - Hearing protection.
 - Nonskid boots to guard against falling in a slippery environment.
 - Elastic sleeve guards and/or close-fitting work clothes to avoid entanglement.
 - Gloves to protect hands from cuts and abrasions.
 - Hard hat to safeguard against head injuries.
 - Avoid wearing loose clothing and jewelry.
 - Hair or beard nets to prevent entangling long hair or beards.
- Do not remove covers or other mechanical safety devices that cover belts, pulleys, gears, chains, and drive linkages except when required to perform maintenance.
- Never remove covers until the machine has been made safe for maintenance.
- Never operate the machines without the covers being properly reinstalled after maintenance.
- Always follow recommended procedures for machine operations, cleaning, and maintenance.
- Use specified tools or special tools that may be offered by the manufacturer, when repairing or adjusting the machine.
- Use caution when handling cutter heads with knives during cleaning and maintenance operations.

Recommended Lockout/Tagout Procedure

Magnuson CCM strongly recommends that each customer develop a standardized lockout/tagout procedure that each employee is required to use to make the machine safe for maintenance. The following requirements should be considered the minimum necessary to create a safe operating and maintenance environment:

1. Employees who operate and perform maintenance on the machine must receive initial and recurring training on how to lockout electrical power to the machine. This training should also cover the proper sequence to shut down the machine, including turning off water, air, and electrical disconnect switches.
2. Employees must be trained to determine if the machine is safe for maintenance.
3. Provide a positive means for removing power from the electrical circuit to the machine at the power entrance box. The switch on this box must be equipped with a positive means of locking it in the OFF position.
4. Tags indicating who locked the machine out, when and why should be provided, along with the locking devices to be used to lock the electrical switch.
5. All employees who operate or maintain the machine must receive training on the tasks that require the machine to be made safe for maintenance by the lockout, and supervisors must ensure the requirements are adhered to.

The Electric Automatic Corn Cutter (EACC) has a low-volt electrical system, hazard and warning labels, and ample guarding and interlocks. The machine uses a computer control system to monitor machine functions through various sensing devices and adjusts operations accordingly.

Automatic features, together with thorough personnel training, help promote workplace safety and limit accident potential.



WARNING

Before attempting to operate, maintain, or repair the Electric Automatic Corn Cutter (EACC), ensure that you read and understand all SAFETY information. Failure to do so may result in personal injury.

Hazards

As with all operations using moving parts, electrical supplies, and cutting mechanisms, potential hazards exist when operating the EACC. These hazards can exist because of the way the machine functions, process requirements, poor personnel training, human error, or for a combination of reasons.

Strict adherence to safety procedures and recommended maintenance routines, together with the EACC's built-in safety features, promote worker health and safety. Use the simple common-sense measures discussed in this section to prevent accidents and maintain a safe work environment.

The locations of hazards described in this document were identified with the machine installed as shown in the [Work Zones \(page 31\)](#) and [Confirming Site Requirements \(page 54\)](#) sections of this manual. The recommended installation provides adequate protection through the use of factory-installed guards and interlocks. If you cannot install the machine using the recommended layout, it is your responsibility to install additional guards and warnings and provide personnel protection as required by local codes and regulations. If you need more information regarding safe operation or maintenance of the EACC, see your service documentation or contact Magnuson CCM Corporation or your authorized distributor.

Mechanical Hazards

Moving parts and cutting surfaces present mechanical hazards and can cause injury during operations. Factory-installed guard devices protect personnel from mechanical hazards. When guards are not present, operator safety depends on the use of recommended procedures and tools.

The EACC contains mechanical parts and cutting surfaces which can inflict injury during operation. If the machine is properly installed, operated, and maintained, there should be a minimal risk from hazards caused by mechanical parts.

Potential Mechanical Hazards

Crushing	The infeed conveyor presents the potential for crushing injury, especially to fingers and hands, between the chain and gears in the metering belt hydraulic drive.
Shearing	Shearing injuries can also occur at the infeed conveyor between the chain and gears in the metering belt drive.
Cutting	Cutting hazards exist wherever there are sharp edges, knives, and blades. Especially at the cutter head assembly, the cutting blades present a hazard.
Entanglement	Conveyor tracks, belts, and wheels present a hazard for entangling long hair, loose clothing, fingers, and hands: • At the metering belt, fingers and hands can be entangled between the metering belt and the belt drive roller. • At the cutter head assembly, the area around the cob roll shaft presents an entanglement hazard.

Drawing-In or Trapping	The area around the saw blades presents the potential for drawing-in or trapping long hair, loose clothing, fingers, etc., especially near the saw blades (roll conveyor). • Rubber cob rolls in the corn cutter housing. • Steel cob rolls in the corn cutter housing.
Stabbing or Puncture	The area around the saw blade assembly also presents the potential for puncture injury at the rubber and steel cob rolls in the corn cutter housing.
Friction or Abrasion	The area around the saw blade assembly also presents the potential for puncture injury at the rubber and steel cob rolls in the corn cutter housing.
Slip, Trip, and Fall	Food processing equipment typically uses water to lubricate and clean parts and materials. The use of water and the presence of processed products around the machine creates an environment that can be wet and slippery.

Guard Against Mechanical Hazards



WARNING

Read and understand the operating procedures in [Seasonal Operations \(page 133\)](#) before operating or maintaining the EACC. Use caution when performing procedures that require that the EACC is running. Failure to do so may result in personal injury.

To prevent injuries that can occur when working near moving parts and cutting surfaces, follow these procedures:

- Install equipment in accordance with recommended layouts as provided in [Work Zones \(page 31\)](#) and [Confirming Site Requirements \(page 54\)](#) to obtain maximum use of safety features.
- Turn equipment “OFF” and Lock Out/Tag Out prior to reaching into the machine for any reason. Do not attempt to clear blockages, open the Cutter Cover, or remove the product while the equipment is running. Unless specified by the procedures, shut down the machine and lock out/tag out before performing repairs or adjustments. Use the By-Pass Mode to lock out air power when a repair procedure requires the use of electricity at the machine.
- In an emergency, use the Emergency Stop system for instant shut down of the Electric Automatic Corn Cutter (EACC).
- Wear recommended protective gear:
 - Hair net to prevent entangling long hair.
 - Safety glasses or face shield to guard against injury from processed materials or equipment parts that can accidentally eject from the machine.
 - Non-slip boots to guard against slipping in a wet environment.
 - Elastic sleeve guards or close-fitting work clothes to avoid entangling clothing.
 - Gloves to protect hands from cuts and abrasions.
 - Hearing protection to avoid hearing impairment.
 - Hard hat to safeguard against head injuries.
- Avoid wearing loose clothing and jewelry that can become entangled or trapped in equipment parts.
- Use caution when changing cutter blades. See [Removing and Replacing Cutter Head \(page 151\)](#) for procedures related to safe removal and handling.

- Never disable a guard device or interlock. These devices are built-in protection against potential hazards such as cutter blades, conveyor belts and chains, and water splash-back that can contain processed material.
- Observe warning labels and signs that alert you to areas of the potential hazard.
- Do not stand on or lean into the machine.
- Follow recommended procedures for operations and maintenance.
- Use recommended or specified tools when repairing or adjusting equipment.

Electrical Hazards

The Electrical Control Box houses the electrical power supply for the Electric Automatic Corn Cutter equipment. High voltage potential exists inside this enclosure. Areas marked with a lightning bolt symbol house electrical wiring of 200-240 volts AC, or other voltages as specified by the customer.



WARNING

All electrical repairs on the Electric Automatic Corn Cutter (EACC) equipment should be performed by trained personnel who qualify under local, state, and Federal or International regulations.

Guard Against Electrical Hazards

Use correct procedures whenever you work around electrical systems, especially the Electrical Control Box:

- Observe warning labels and signs that point out areas containing high voltages, extreme heat, or other potential hazards.
- Disconnect and lockout/tagout equipment from power sources before maintenance or repair to avoid electrical shock or unintended machine startup.
- Use the By-Pass Mode to lock out the air systems when maintenance or repairs require the use of electrical power at the machine.
- Keep the Power Enclosure locked at all times except during repair or maintenance to avoid access by untrained personnel.
- Read and understand procedures before attempting repair or adjustment of the Corn Cutter. Some adjustments and repairs require that the machine's electrical supplies are turned ON. Use caution when making such repairs.

Thermal Hazards

Thermal hazards exist in areas of extreme radiated heat and can cause burns or scalds.

Potential Hazards Caused by Thermal Sources

Injury from radiated heat can occur near electric motors where temperatures can reach up to 176° Fahrenheit (80° Celsius).

Guard Against Thermal Hazards

Protect your skin from burns, especially when working near the electric, by heeding burn warning labels posted on the motors. Also remember to:

- Allow hot surfaces to cool before attempting repairs and adjustments.
- Wear gloves or use other protective measures when working near hot motors.

Noise Hazards

Continuous exposure to noise levels above 80 decibels (dB) can cause loss of hearing acuteness and, in extreme cases, fatigue, stress, or loss of balance.

Potential Hazards Caused by Noise

During the operation of the Electric Automatic Corn Cutter in a system environment with many machines running, noise levels may exceed 80 decibels.

Guard Against Noise Hazards

To guard against hazards generated by noise:

- Wear hearing protection that is sufficient to protect against hearing loss in an environment of 80 dB or more.
- Verify that you understand spoken instructions or warnings. Repeat instructions to the speaker to ensure understanding.

Ergonomic Hazards

The design of the Electric Automatic Corn Cutters includes automatic operations which reduce the need for an operator.

Potential Ergonomic Hazards

Areas of ergonomic concern include:

- Availability of suitable personal protection equipment.
- Proper installation of equipment using recommended layouts and safe operating guidelines.
- Adequate lighting in work areas.
- Safeguards against human error including adequate training and supervision.
- Adherence to recommended maintenance and cleaning schedules.

Guard Against Ergonomic Inadequacies

Ergonomic considerations can exist which are outside the area of machine design. Eliminating such hazards is the responsibility of both Plant Management and the individual worker.

To ensure a safe and healthy work environment, Plant Management should provide:

- Personnel training in the specified operations and maintenance responsibilities of the worker and in overall plant safety.
- Training documentation and performance verification for employees.
- Personal protection equipment includes hearing and eye protection, hair nets, gloves, etc., as required.
- Adequate lighting in the workplace to be at least the minimum lumens required by local codes and regulations. Factory personnel who operate, maintain, repair, clean, and lubricate the EACC are responsible for:
 - Participating in training to the extent that they are able to perform job functions safely and effectively.
 - Demonstrating performance capability as required to meet the training documentation criteria and verification standards of the factory.
 - Using personal protective equipment as specified.

- Working in accordance with established procedures.
- Maintaining an alert mental state to minimize the potential for human error.
- Communicating the status of operations and any problems.
- Using the equipment only for the purpose intended.

Functional Disorders

Failure of equipment or parts can cause injury to plant personnel. While the EACC includes many features to reduce the potential for failure, functional disorders can occur due to errors of fitting, inadequate maintenance, or improper placement of guard devices.

Potential for Functional Disorder

In spite of the Electric Automatic Corn Cutter's record of reliability, certain hazards exist due to unexpected ejection of processed materials and fluids. Use of a daily inspection routine will verify that guards are in place and that there is no undue wear on machine parts. Your factory Sales and Service Representative can assist you in ensuring the proper function and installation of your EACC.

Guard Against Functional Disorders

The Emergency Stop system guards against the failure of the energy supply. To avoid accidents that can be caused by equipment failure:

- Ensure that all guards and covers are in place and functioning before operating the EACC.
- Stop the machine immediately in the event of an abnormal operation.
- Wear safety glasses or a face shields and other specified personal protection equipment.
- Perform preventive maintenance regularly.
- When making repairs or adjustments, use off-the-shelf tools as recommended by the EACC documentation or special tools provided with the equipment.
- Refer frequently to the Magnuson CCM service documentation for current repair and maintenance information.

Improper Use of Safety Measures

If operating personnel disable or remove safety signs and signals, shielding devices, and Emergency Stop systems, or fail to observe safety warnings and procedures, potential exists for injury or damage to health.

Identify Proper Use of Safety Measures

Once you read and understand the safety procedures and receive thorough training, you will be able to identify proper procedures and actions for a safe working environment. If you notice unsafe situations or practices, take steps to correct them.

Guard Against Improper Use of Safety Measures

The EACC arrives at the plant equipped with safety devices and warning labels that are required to promote safe operation. To operate the EACC in the safe manner intended by the manufacturer, read and understand the procedures and provide thorough training for operations.

Overview

The Electric Automatic Corn Cutter (EACC) is an automatic corn feeder, orienter, and cutter. It processes ears of corn in a cost-effective manner and provides increased production volume and orientation efficiency.

Options

The EACC may be ordered with these options:

- Single Point or Multiple Point Lubrication System
- Oil or Water Lubrication for Cutter Head
- Beacon Light (Red, Yellow, Green)
- Additional Upper Feed Trough Guard

Features

At the corn processing plant, the EACC removes the kernels from the ears of fresh, sweet (thawed) corn. The process includes:

1. **Infeed and Metering** – The machine accepts ears of corn from the plants' conveyor and meters them onto the Infeed Wheel. See [Sequence of Operation \(page 37\)](#).
2. **Measuring Size and Orientation** – The Infeed Wheel and Metering System route ears of corn through a sensing unit. The Profile Board (computer) analyzes the ears to determine ear size and orientation (tip-first or butt-first) before routing the ears via the Track Assembly to the Flipper Gate and Turn Wheel.
3. **Sorting and Orienting** – Using the data received from the computer, the Flipper Gate activates to sort and orient the ears of corn. The Flipper Gate's functions are:
 - a. Discards short ears before they enter the Turn Wheel.
 - b. Conveys correctly oriented (tip-first) corn to the cutter head.
 - c. Re-oriens incorrectly oriented (butt-first) corn before conveying to the cutter head.
4. **Cutting** – With the ear now properly oriented (tip first), the kernels are cut from the cob with six (6) rotating knives at the cutter head. The knives cut under the kernels without damaging the kernels.

Advantages of Using the EACC

Operation Advantages

The EACC comes with many operational advantages.

Controller Operations	A proprietary control board (Profile Board) analyzes the ears of corn and controls all machine functions using various sensing and signaling devices. A display and keypad is used to view machine performance data and make adjustments to machine operating parameters.
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Self-Clearing	Computer sensors activate automatic reversal of product jams at the cutter head to provide virtually uninterrupted product flow.
Sanitation	All parts in contact with the product are manufactured of stainless steel or food-grade plastic and are easily accessible for cleaning. A sloped top computer enclosure to help reduce standing water and custom-designed hinges to help reduce bacteria growth areas.
Compatibility	The system installs in-line without major structural changes and accommodates belt or oscillating conveyor systems.
Gentle Handling	The belt feeder system ensures gentle handling and maintains center alignment of ears for a top-quality cut of the finished product.
Design	Units are sturdy and compact in size and are designed to facilitate lower maintenance costs. The design employs an electric drive system and air-actuated cylinders for primary control.
Safety	Electrical design includes a low volt, computerized system. Safety switches mounted on guards in the cutter area will shut down the machine if the guards are opened during operation.
Orientation	85%-95%
Floor Space Requirements	EACC systems require less floor space than competitive cutters (5'6" to 6' centers).

Overall Performance Advantages

- Ability to recognize shank.
- Nubbin removal prior to knives (through flipper gate).
- Stuck or jammed cobs are automatically removed on the EACC with the use of a Nubbin Knocker, leading to higher capacity rates, less wear on knives and avoiding the need to remove stuck cobs by hand (improved safety).
- Very rapid reversing and clearing of the machine.
- Enables connectivity to the central computer.

Capacity Advantages

Tonnage Into Cutter	EACC: Average capacity of 2000 kg/hr (max 3700 kg/hr*).
Tonnage Out of Cutter	EACC: Average capacity of 750 kg/hr (max 1350 kg/hr*).
Fewer spikes on the infeed rolls	One (1) set of spiked rolls feeding cutter for EACC.

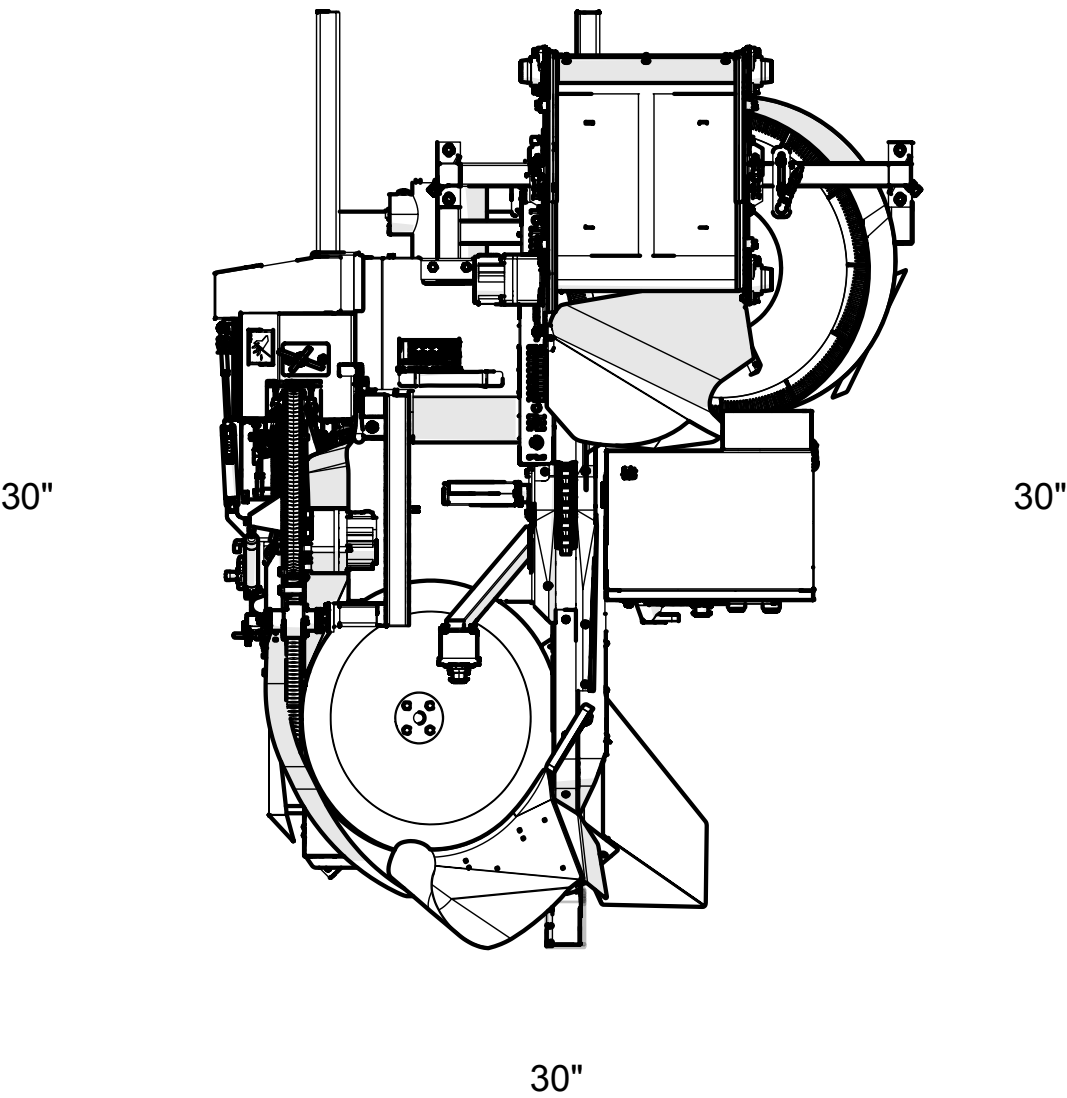
Specifications

This section lists the specifications and electrical requirements for your Magnuson CCM Electric Automatic Corn Cutter (EACC).

Technical Specifications

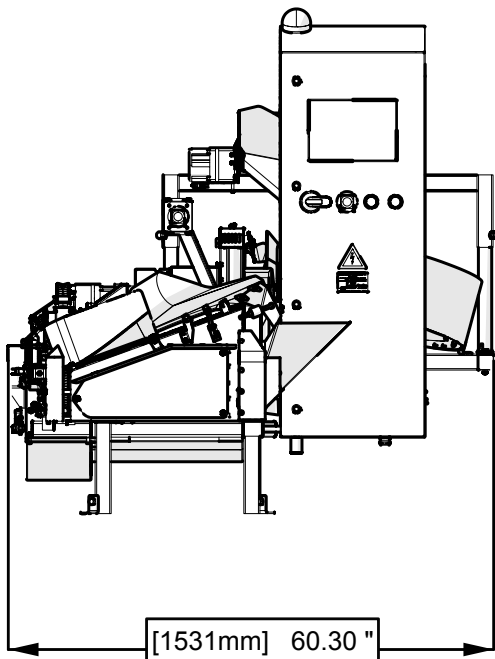
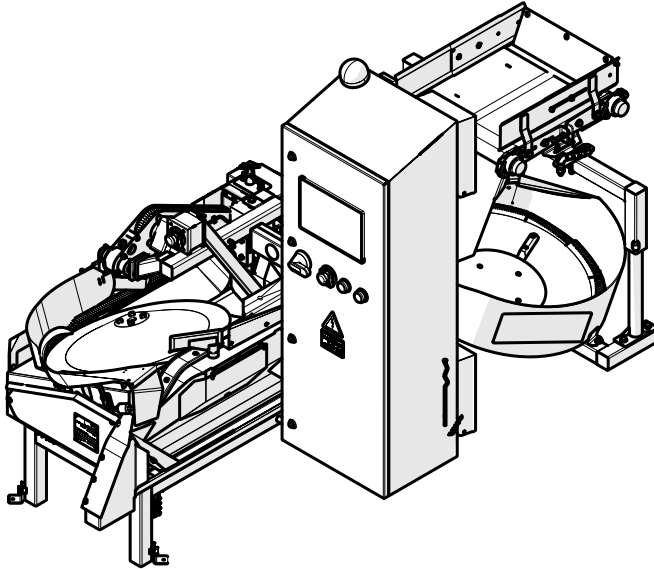
Item	Specification
Model	4010000.8000.4
	4010000.8000.5
Serial Number	Specific to each machine (sales order #)
Inlet Height	Variable standard 66"
Weight	940 lb (426 kg)
Length	81" (2057 mm)
Width	61" (1550 mm)
Ambient Air Temperature	40 °F to 120 °F (4.5 °C to 48.9 °C).
Humidity	Up to 100%
Altitude	Sea level to 10,000 feet (3048 meters)
Max Corn Diameter	2 3/4" (69.9 mm)
Average Input Capacity	4400 lbs/hr (2000 kg/hr) (per cutter)
Average Output Capacity	1650 lbs/hr (750 kg/hr)
Instantaneous Rate	185 ears/min
Average Processing Rate	100 to 130 ears/minute
Processing Accuracy	85% to 95%
Electrical	200-240VAC, 3-phase, 50/60Hz, 30A
Air Requirement	45 SCFM (1274 liters/hour) @ 80 psi (5.5 bar)
Water Consumption	Approx. 10 gph (38 liters/hour)
Minimum Spacing	5.5' on center

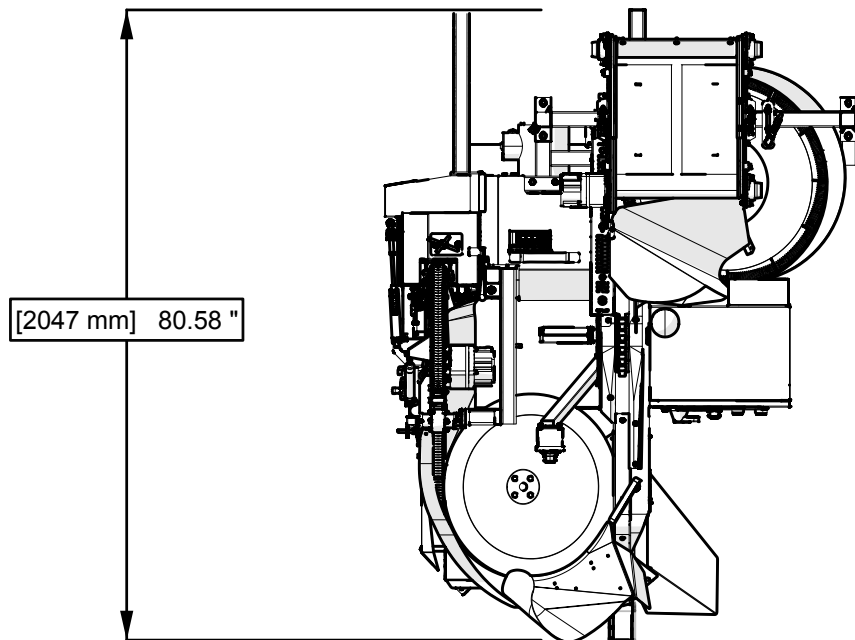
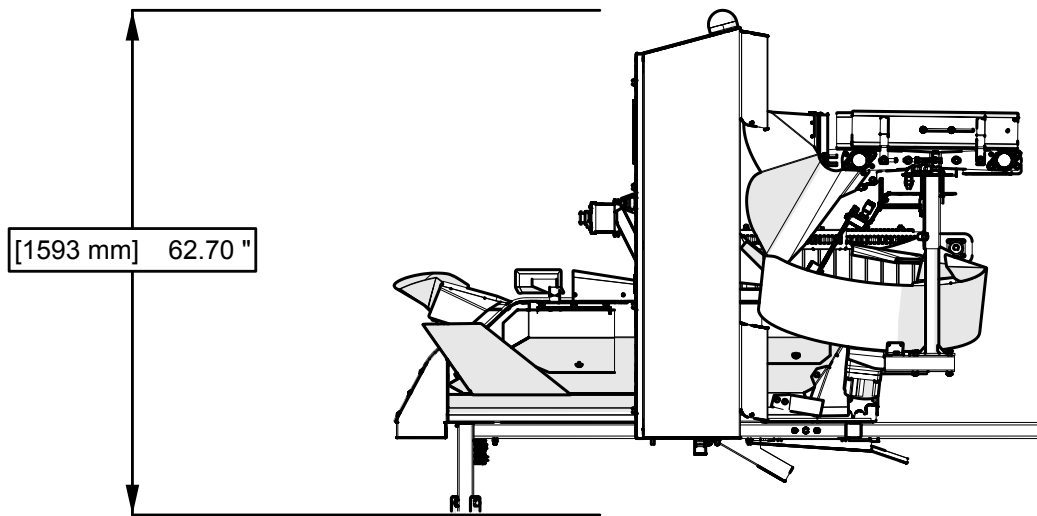
Work Zones



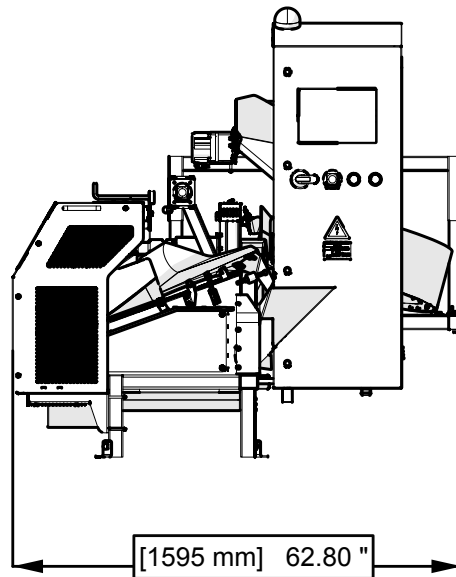
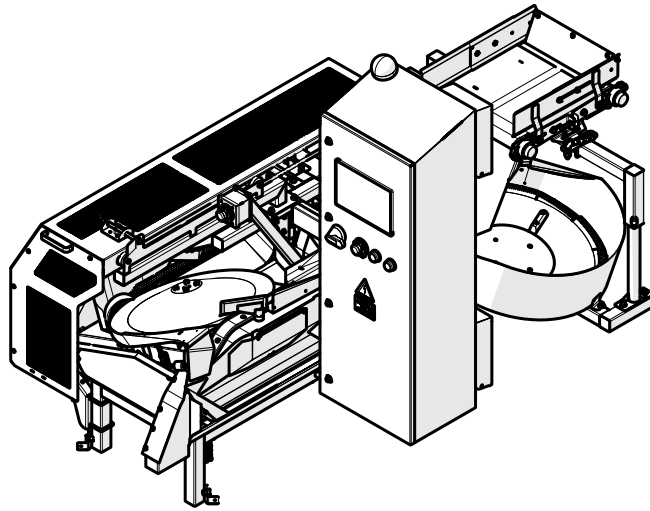
Elevations

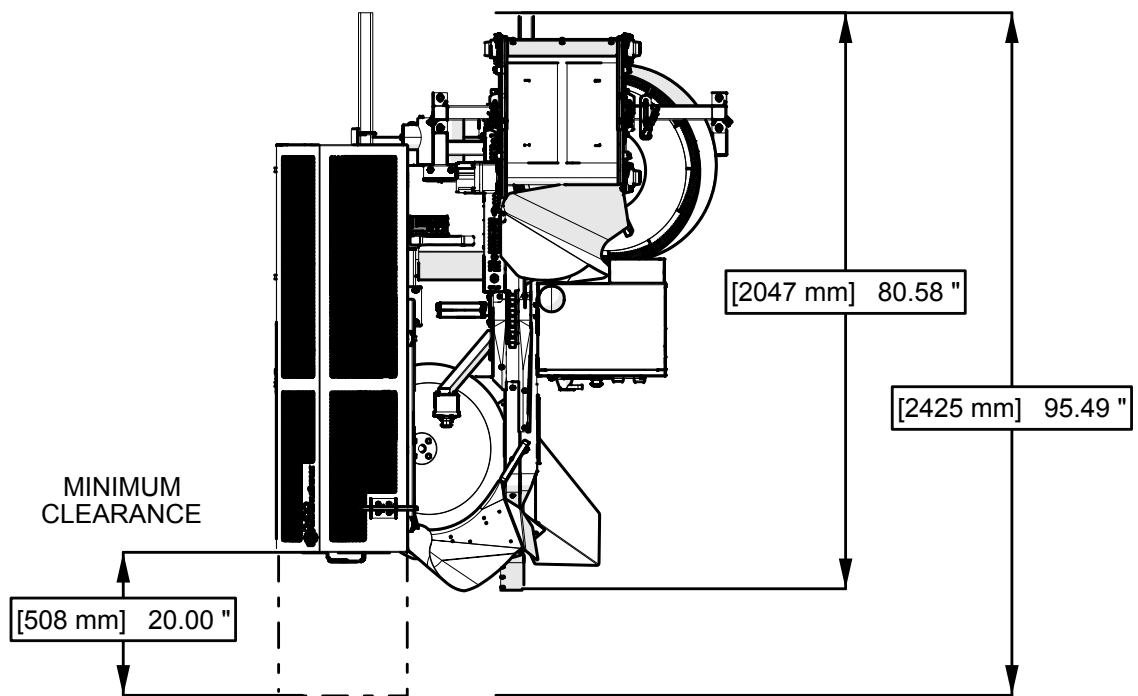
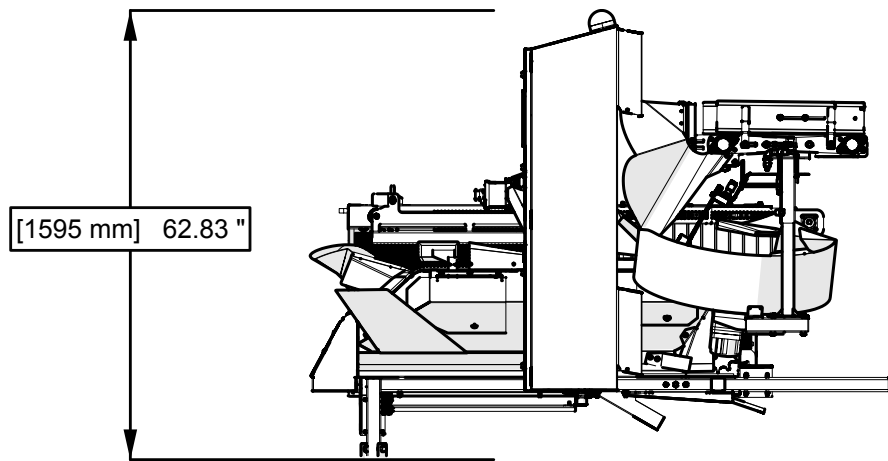
Elevations - EACC without Optional Guard



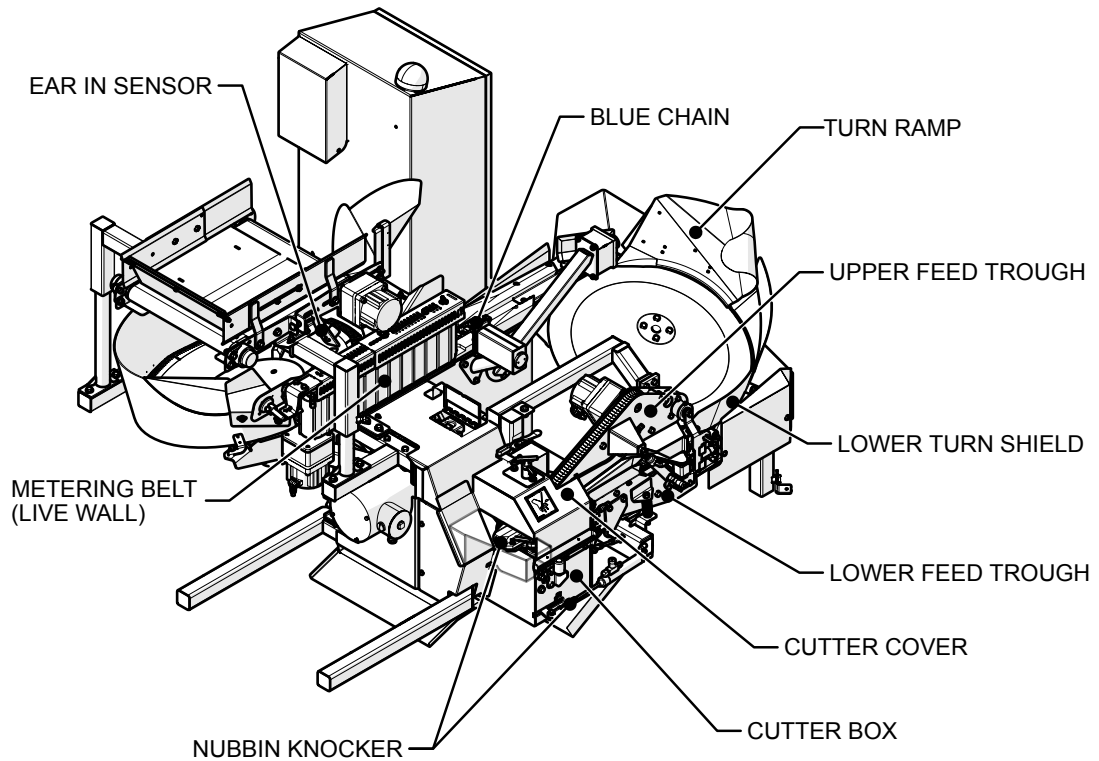
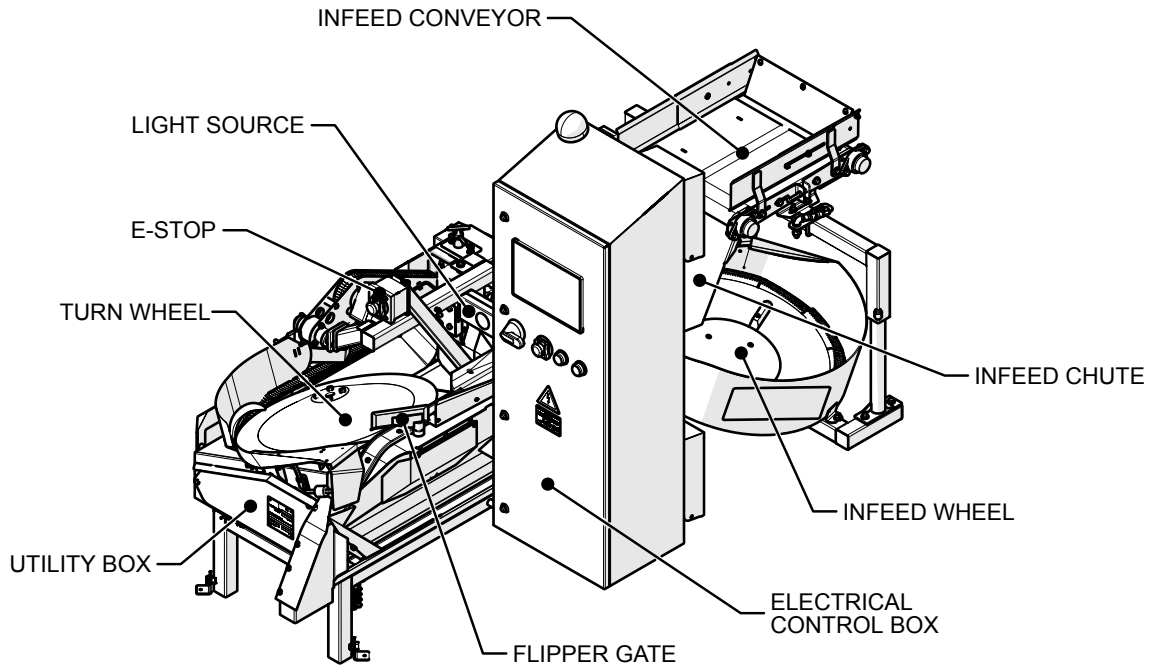


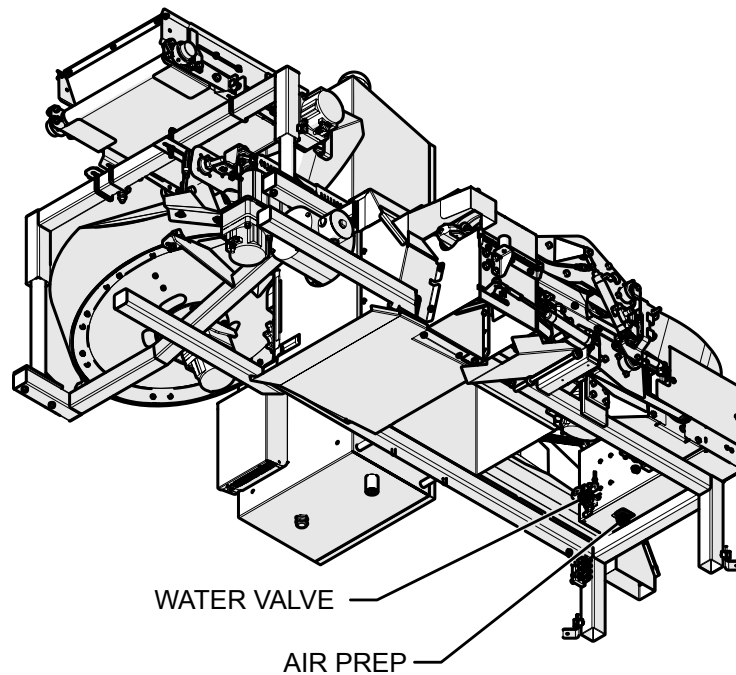
Elevations - EACC with Optional Guard





Parts and Assemblies





Sequence of Operation

The Electric Automatic Corn Cutter is a self-contained production machine that orients, feeds, and cuts the kernels off the ears of sweet corn with increased production volume and orientation efficiency. For the best recovery, ears of corn should be fed into the cutter head tip-first so the six rotating knives can open and follow the contour of the ear of corn and cut the maximum number of kernels off. The following sections explain how the Magnuson CCM Electric Automatic Corn Cutter operates.

Infeed Conveyor/Infeed Wheel

- Ears of corn are transferred onto the Infeed Conveyor by various optional feed mechanisms, such as a distribution shaker or conveyor.
- The Infeed Conveyor is driven by an electric motor and the speed is controlled by an electronic drive located in the Electrical Control Box.
- The ears of corn slide down the Infeed Chute which guides them onto the Infeed Wheel. This tilted Infeed Wheel allows the ears of corn to travel to the outside where special plastic segments bring the ears up to the Pressure Arm and Metering Belt.
- A small water nozzle is positioned above the Turn Wheel to help minimize waste buildup within the wheel and plastic segments, which can hinder the ability to transfer the ears of corn up through the Pressure Arm.
- If too many ears of corn collect inside the Infeed Wheel, the Ear In Sensor Blade will raise up causing the sensor, called the Ear In Sensor, to turn off. This will tell the computer to stop the Infeed Conveyor. It will remain stopped until the paddle drops back to the home position, causing the sensor to turn back on letting the computer know it's okay to turn on the Infeed Conveyor to feed more corn.
- The Infeed Wheel is driven by an electric motor and the speed is controlled by an electronic drive located in the Electrical Control Box.



Pressure Arm/Metering Belt

- The Pressure Arm is used to help guide and singulate the ears of corn onto the Blue Chain and provide some spacing between the ears for inspection. The Pressure Arm is adjusted to allow one ear of corn under it and extra ears will be directed around it and back into the Infeed Wheel.
- With the proper amount of pressure on the Pressure Arm, the ears of corn will be guided up to the blue vertical Metering Belt, to help guide the corn onto the Blue Chain.
- This combination provides good singulation and spacing of the ears of corn for proper presentation of the ears as they travel by the Sensing Unit.





Sensing Unit

- Once the ears of corn leave the Pressure Arm and are guided onto the Blue Chain, they will travel by the Sensing Unit, which consists of a Light Source and computer board inside the Computer Box, known as the Profile Board.

- This board contains 36 “photo-eyes” that are used to analyze the ear of corn to determine the width, length, profile, and orientation. For optimum performance, areas in front of the Light Source and Computer Box windows should be kept clean and free of debris.
- When the ear of corn leaves the Sensing Unit, the computer’s algorithms determine the size and direction of the ear of corn (nubbin, tip-first, or butt-first).
- Also in the Computer Box is a Display and Keypad, which are used to see operational and performance numbers, and adjust the various operational parameters and timers.





Flipper Gate/Turn Wheel

- After leaving the Sensing Unit, the ears of corn will travel to the Flipper Gate and Turn Wheel for proper orientation. The Flipper Gate, when in its home position, will be in the middle of the Blue Chain.
- There are three different possibilities for each ear of corn that passes the Sensing Unit:
 1. *The ear of corn is too short or too thin.* If a short or thin ear of corn is detected, also known as a nubbin, the Flipper Gate will retract or open and allow the nubbin to travel by. It will then fall onto the bottom of the Blue Chain and travel behind the Computer Box to the trash section of the Take-Away Conveyor or Shaker underneath.
 2. *The ear of corn is tip-first.* If the ear of corn is tip-first, the Flipper Gate will extend or close before the ear gets to it and will guide it onto the Turn Wheel. The Turn Wheel will then transfer it to the orange Feed Trough belts tip-first.
 3. *The ear of corn is butt-first.* When the ear of corn is butt-first, the Flipper Gate will wait until the ear gets approximately 50% past before it extends or opens, which will tap the back half of the ear of corn causing it to rotate and re-orient onto the Turn Wheel. The Turn Wheel will then transfer it to the orange Feed Trough belts tip-first.
- The timing of these decisions and actuations are controlled by a built in motor speed sensor.
- This sensor is the most important sensor in the machine because it is vital to the overall timing and orientation efficiency.

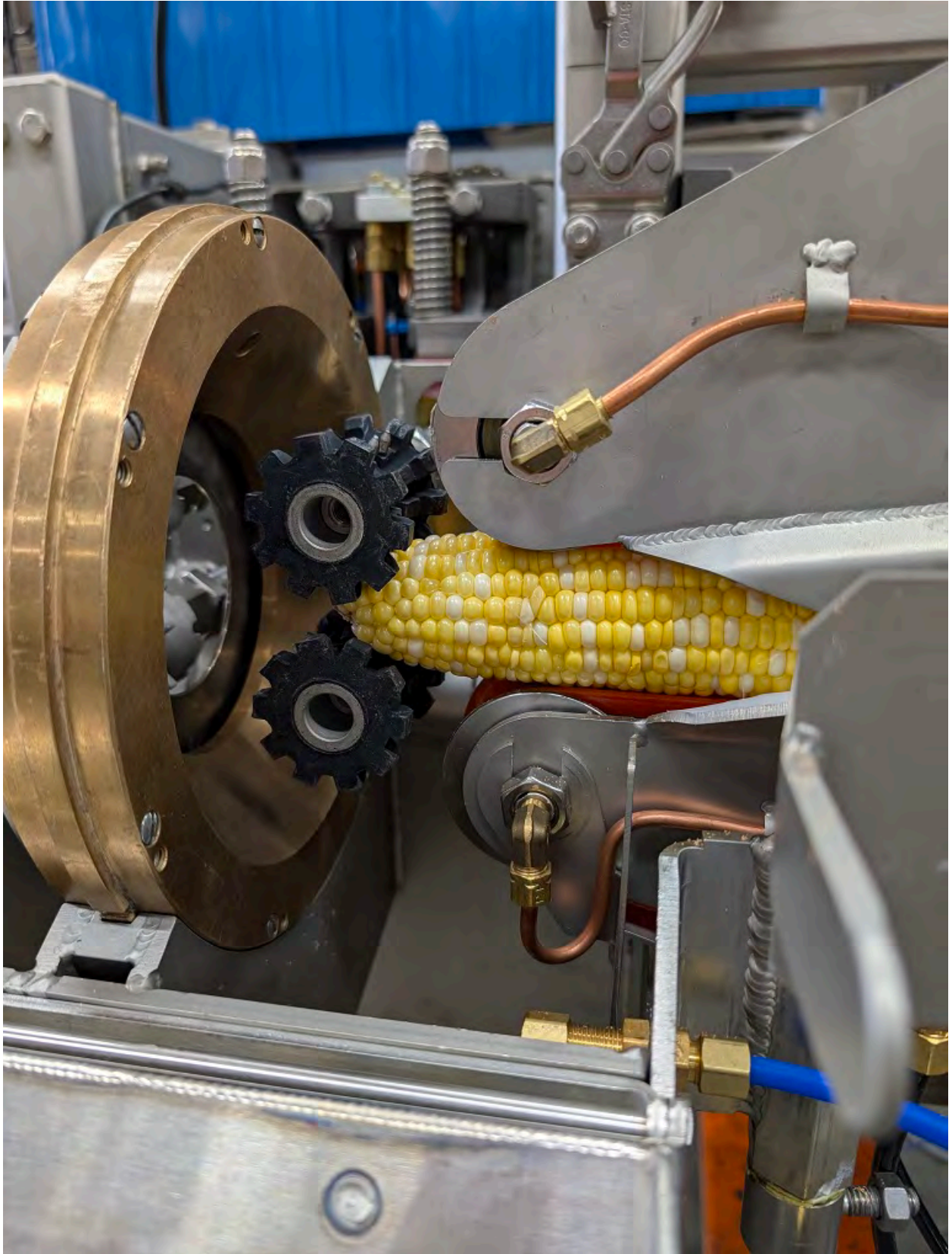




Feed Trough/Cutter Feed System

- After the Turn Wheel has transferred the now properly oriented tip-first ears of corn to the Feed Trough orange belts, the Upper and Lower Feed Trough will apply constant pressure on the ears as they transfer them to the Cutting Feed System.
- There are also two Finger Guides after the Feed Troughs that are used to help guide the ears of corn straight into the first set of rolls.
- Within this Cutter Feed System are two sets of spring-loaded rolls, a Cutter Head with six rotating knives, and a Nubbin Kicker to assist in clearing jams. The first set of rolls are called the Feed Rolls (inlet) and the second set of rolls are called the Cob Rolls (outlet).
- The outlet Cob Rolls are stainless steel with spikes and are used to grab the bare cob as it is exiting the Cutter Head and will send it into the trash part of the take-away conveyor or shaker.
- There is a sensor in the Cutter Feed System that detects when a cob exits the Cutter head, called the Cob Out Sensor. It is a hall effect sensor that works by sensing a magnet.
- During normal operation, the Cob Out Sensor is on and when a cob is exiting the machine, the Cob Roll shaft raises and pulls the magnet away from the hall effect sensor causing it to turn off. The computer recognizes this and counts this as one ear out. This Cob Out Sensor is important for the operation of the machine to not only count the ears going out but also to detect jams or feed problems.





Recycle

- This Recycle operation will reverse the motors that drive the orange Feed Trough belts, Feed and Cob Rolls.
- The Nubbin Kocker air cylinder is also actuated, causing a rod to extend into the backside of the cutter head area. This will help punch out any small broken pieces that may be jammed inside the Cutter Head and knives.
- During this operation, the Upper Feed Trough will lift, allowing any jammed ears of corn to back out and fall into the recycle section of the machine to the take-away conveyor or shaker below. After this timed sequence is completed, it will then reverse itself and go back into normal forward operation.
- If the computer still does not see any cobs being counted by the Cob Out Sensor, it will try another Recycle operation to clear the jam. The computer will try three consecutive Recycle Operations before shutting off the machine to allow operators to manually clear the jam.

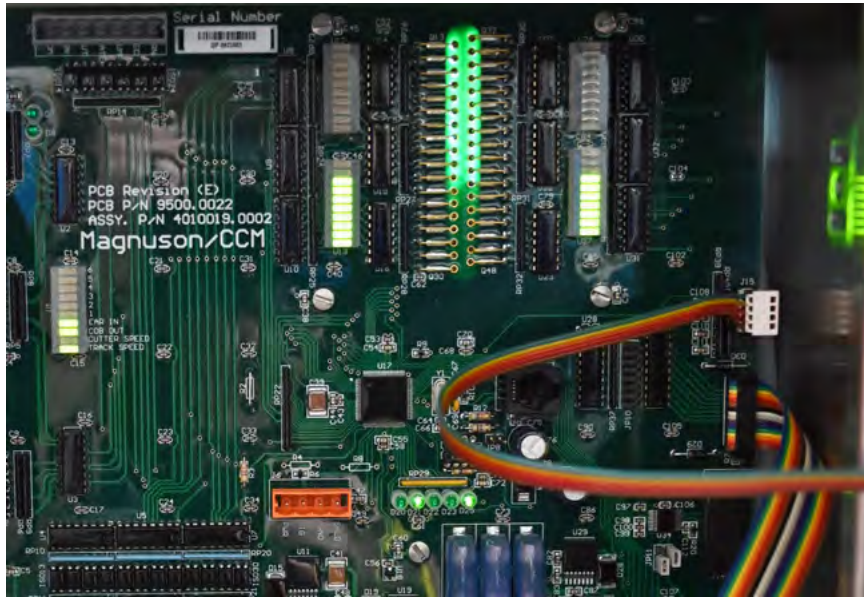




Computer Generated Shutdowns

- The computer will automatically turn off the machine if performance is compromised for two different reasons. These parameters are adjustable.

Figure 1. Photo Eyes (Profile Board)



1. If four or more “photo-eyes” are blocked for a couple of seconds, which are identified by the LEDs that are ON next to the “photo-eyes”, the computer will send a shutdown signal to the KA1 relay. This relay will turn off power to the computer and cause the machine to turn off. Blocked “photo-eyes” could cause inaccurate decisions on the ears of corn as they pass by the sensing unit. The usual reasons the “photo-eyes” get blocked are caused by an ear of corn stuck in front of the Light Source area, corn buildup on the lens of the Light Source or the Computer Box, or misalignment of the Light Source or light bulb in the Light Source.
2. If three Recycle Operations have been attempted to clear a jam, and the computer still does not see the Cob Out Sensor turn off signaling that cob has gone through the Cutter Head, the computer will send a shutdown signal to the KA2 relay to turn off power to the computer and cause the machine to turn off.

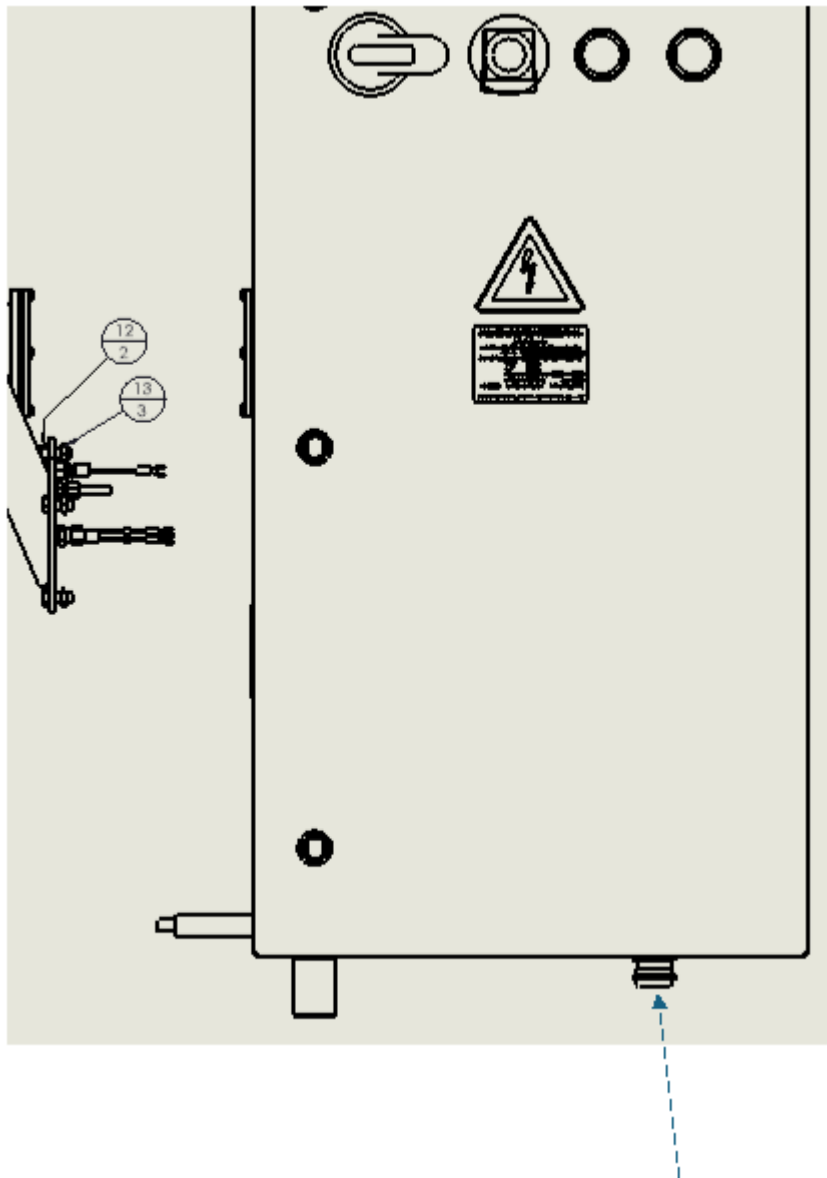
Baseline Settings

The following are the recommended baseline settings for the Electric Automatic Corn Cutter, along with how to adjust them. These settings, which are adjustable, may vary slightly based on plant installation, corn variety, and corn conditions.

Power Input:	200-240VAC, 3-phase, 50/60Hz, 30A
Main Air Pressure Input:	80 to 85 PSI
Flipper Gate Air Pressure:	30 to 40 PSI
Upper Feed Trough Downfeed Air Pressure:	35 to 40 PSI
Infeed Conveyor:	10 to 14 FT/MIN

Infeed Wheel:	72 to 74 FT/MIN
Blue Chain (Track):	235 to 240 FT/MIN
Orange Belts:	225 to 230 FT/MIN
Track Speed ("TS" reading on Display):	63 to 66
Cutter Speed ("CS" reading on Display):	78 to 80

Electrical Control Box





Route the input power through the liquid-tight fitting located in the bottom of the control enclosure. Inside the control panel connect the power to the line filter (located on the right side of the enclosure near the bottom. See image above.

Item	Description
1	AC Input (200-240VAC, 3-phase, 50/60Hz, 30A)

Installation

Accepting Delivery

Your Magnuson CCM Electric Automatic Corn Cutter (EACC) has received a careful final inspection and dry run in our facility. It has been crated securely to ensure delivery without damage or loss of any parts.

Upon delivery, inspect the equipment for any visual damage. If damage has occurred, record this information on the freight bill and have the driver sign it. Uncrate the equipment as soon as possible and if you find any damage notify the delivering carrier so that they may return to inspect it. Confirm any telephone conversations in writing. When the carrier makes the inspection, fill out any inspection report they furnish.

You must notify the carrier within 15 days from the date of delivery in order to present a claim. If the carrier does not make an inspection, prepare an affidavit stating:

- Date of notification
- Description of the problem
- Failure of the carrier to comply with the inspection request



IMPORTANT

Retain all containers and packing materials, and make your claim promptly. The transportation company will not consider a claim unless presented within a timely matter. The number of days will vary depending on the transportation company and may change without notice.

All parts and equipment are shipped F.O.B., Magnuson CCM's plant, Pueblo, Colorado, unless other arrangements have been specified. Passage of title occurs upon Magnuson CCM's delivery to the buyer's carrier and the buyer is responsible for providing insurance and processing claims, if required. While Magnuson CCM's responsibility ends when the equipment is turned over to the transportation company, we will provide assistance as necessary should a claim be filed. However, in doing so, Magnuson CCM Corporation does not assume any responsibility for collection of claims or replacement of material.

Magnuson CCM recommends storing the crate indoors pending installation. If you must store the crate outside, protect it and its contents from moisture to prevent damage to equipment.

Confirming Site Requirements

Before beginning the installation procedure, confirm that the site where the EACC will be installed meets these requirements:

- The area is level or can be made level. If the EACC is mounted on a deck, it needs to have supports located under each leg to evenly support the weight.
- The area around the EACC is clear and free of debris.
- The foundation or structure can support the EACC weight of about 1,000 lbs (454 kg) and is free from vibration.
- The appropriate miscellaneous hardware kits and options are provided with the machine, if applicable.
- The area is large enough to allow:

- A minimum of 3' (0.91 m) on each side of the EACC.
- A minimum of 4' (1.2 m) above the EACC.



TIP

To see dimensions, go to [Work Zones \(page 31\)](#).

- A. licensed electrician has verified that the electrical requirements of the EACC are met. See [Specifications \(page 29\)](#).

Machine Installation

The safe and cost-effective use of the Magnuson CCM Electric Automatic Corn Cutter (EACC) depends in part on your planning for initial installation and subsequent seasonal set-up of the equipment. Magnuson CCM provides guidelines and recommendations for machine setup that should be followed for the safe and efficient operation of machines.

Magnuson CCM manufacturing and engineering personnel design and install personal protection devices at the factory. These devices include:

Interlocks prevent machine operation when hazardous areas of the Corn Cutter are open.

Guards prevent access to moving and cutting parts during operation.

Seals and locks protect personnel from electrical hazards of motors and wiring.

Caution signs and labels instruct personnel about potential hazards.

Failure to set up equipment in ways which use these built-in safeguards can result in injury to personnel and/or damage to the equipment. Also, disabling or removing Magnuson CCM-installed safeguards can cause injury or damage and invalidate the warranty.

Initial Installation

The Electric Automatic Corn Cutter unit arrives ready to use as is – shop assembled, tested, and factory set. A Magnuson CCM Service Representative can assist you with the initial layout, start up, and adjustment of the Corn Cutter, and provide training for your personnel. The Service Representative works with you to ensure that your facility is equipped to operate the equipment.

Prior to installation, the Service Representative will recommend setup in accordance with the Manufacturer's Recommended Installation provided in this section. Use these recommendations whenever possible.

Facility Requirements

Before taking delivery of the Electric Automatic Corn Cutter, check that your facility has sufficient space for line installation and that you provide the required structural support and electrical, air, and water resources.

Physical Characteristics

The Electric Automatic Corn Cutter is a self-contained production machine.

Electric Automatic Corn Cutter

Each Electric Automatic Corn Cutter measures 81 inches (2057 mm) long by 61 inches (1550 mm) wide when assembled as shown in drawings starting in [Work Zones \(page 31\)](#). The Corn Cutter weighs 940 lbs (426 kg). Export Crated Weight is 1,200 pounds (544 kg). Requirements of the Electric Automatic Corn Cutter are:

- Electrical – 200-240VAC, 3-phase, 50/60Hz, 30A
- Air required – 45 SCFH (1274 liters/hour) @ 80 PSI (5.5 bar)
- Water required – 10 GPH (38 liters/hour)

The Electric Automatic Corn Cutter accommodates belt or oscillating distribution conveyors.

Electrical Installation

Power Input: 200-240VAC, 3-phase, 50/60Hz, 30A

Run power cable through cable gland located in bottom of Electrical Control Box. Connect Power to EMI Filter located inside Electrical Control Box.

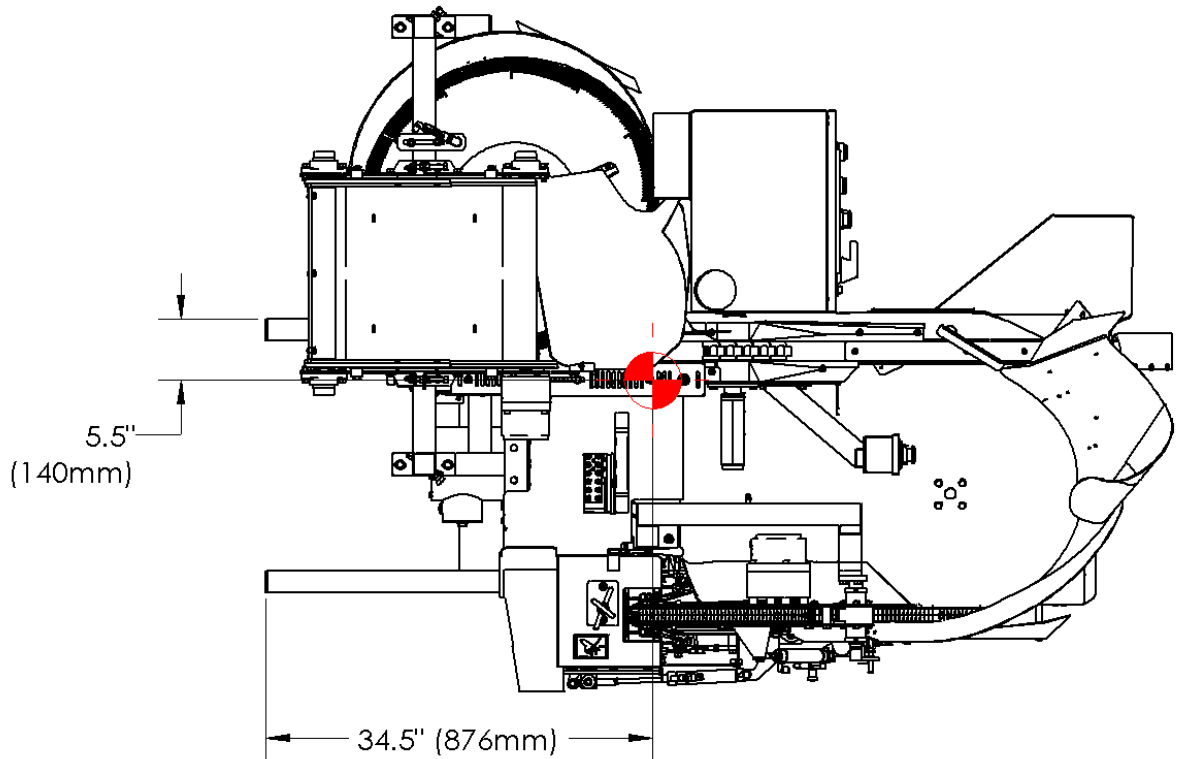
Connect to the input/output terminals of the three-phase EMI Filter via the ring lug terminals and fasten them with the recommended torque below. Please limit the number of ring lug terminals to the same connection point to two.

The three-phase EMI Filter's input/output terminal block tightening recommended torque is 2 to 2.3 N·m. The compatible crimp terminal shape is defined as below:

- Line terminal up to 14-5 (terminal width dimension 12 mm),
- Ground terminal up to R5.5-4 (terminal width dimension 9.5 mm).

Since this part is not a terminal block, it may be deformed if extreme torque or repeated mounting and dismounting occurs.

Lifting Points

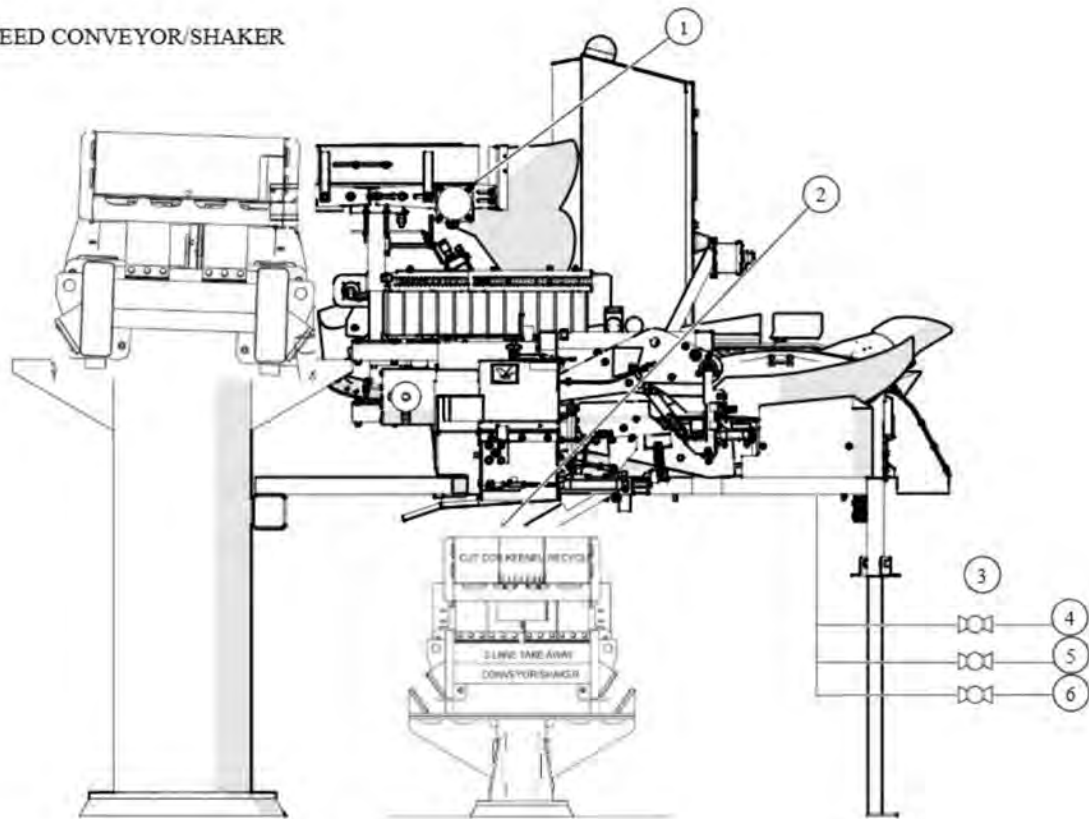


Pictured above is the lifting points and center of gravity.

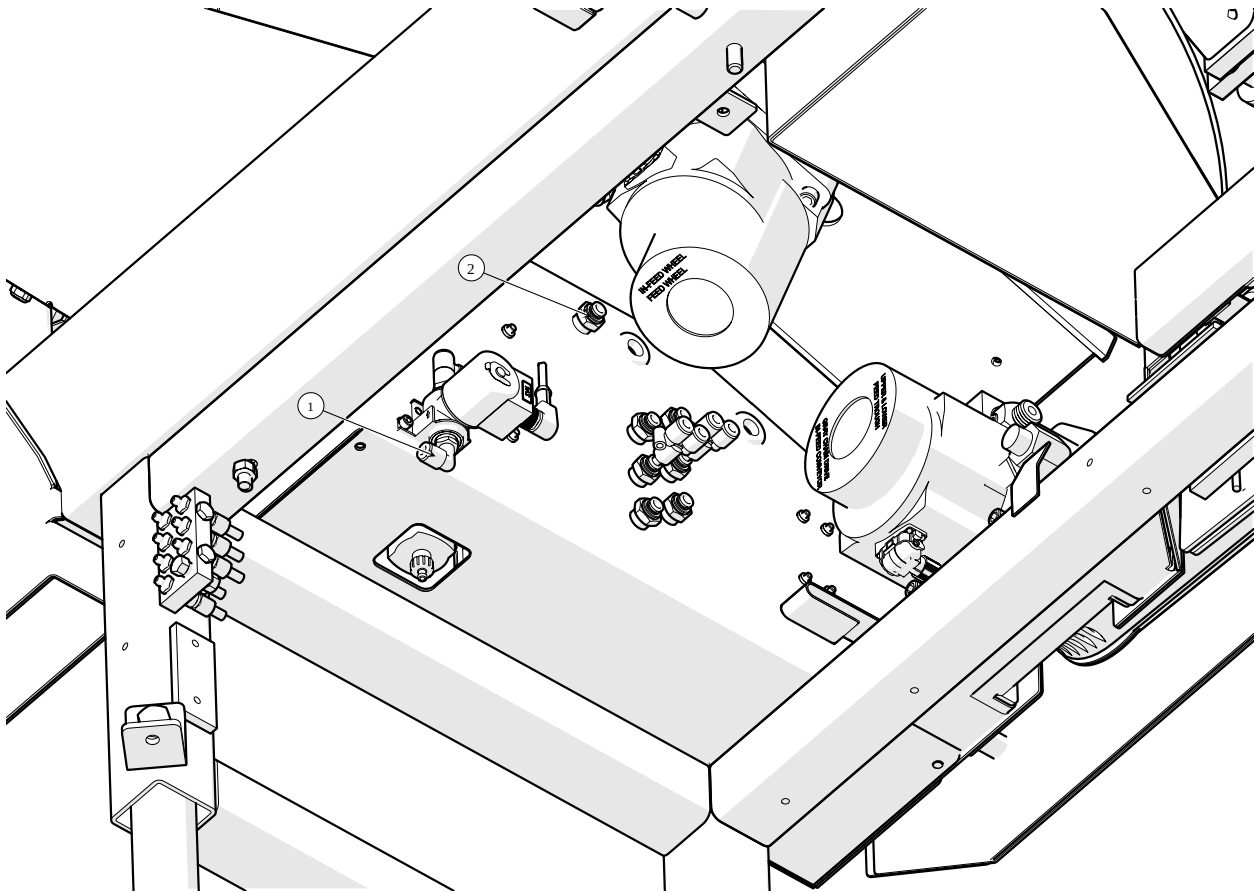
Installation Recommendations

- EACCs should be installed on 6' centers. A minimum spacing of 5' 6" centers is recommended.
- Infeed conveyor belt should be 1"–2" below the opening of the distribution shaker.
- The sides of the 3-lane take-away shaker should be 2"–4" below the bottom of the cutter box.
- To obtain maximum efficiency and throughput of the EACC, a form of nubbin elimination should be performed prior to feeding the EACCs.
- The customer must install an appropriately sized electrical disconnect (not supplied by Magnuson CCM) between the EACC and the plant line power. Check FLA rating on the nameplate of each EACC for electrical load information. Wiring should be done in a manner that minimizes potential water and dust intrusion into the enclosure.

FEED CONVEYOR/SHAKER



Item	Description
1	Recommended spacing: 1"-2" from the bottom of Feed Shaker to top of EACC Infeed Conveyor Belt.
2	Recommended spacing: 2"-4" from the bottom of Cutter Box to top of 3 Lane Take-Away Shaker.
3	Customer supplied Lockout Tagout Valves.
4	Air Supply.
5	Water Supply.
6	Electrical 200-240VAC, 3-phase, 50/60Hz, 30A



Item	Description	Notes
1	Water Pressure - Inlet	1/4" Tube, tube lock fitting
2	Air Pressure - Inlet	1/4" Tube, tube lock fitting

Mechanical Adjustments

This section describes procedures for mechanical adjustments that are required during installation.



CAUTION

Always perform MECHANICAL adjustments BEFORE setting or adjusting electronic elements. Failure to do so may result in misadjustment.



IMPORTANT

Some of the adjustments described in this manual are performed with the EACC locked out/tagged out, others can be performed by stopping the machine.



IMPORTANT

Perform mechanical adjustments to the EACC in the order of presentation in this section, beginning with feed/cob roll tension.

Special Equipment and Tools Needed

EACC installation and adjustment require the use of specified handling and support equipment and special tools.

Handling and Support Equipment

Use a forklift to move the EACC. See [Lifting Points \(page 57\)](#) for lift points and center of gravity.

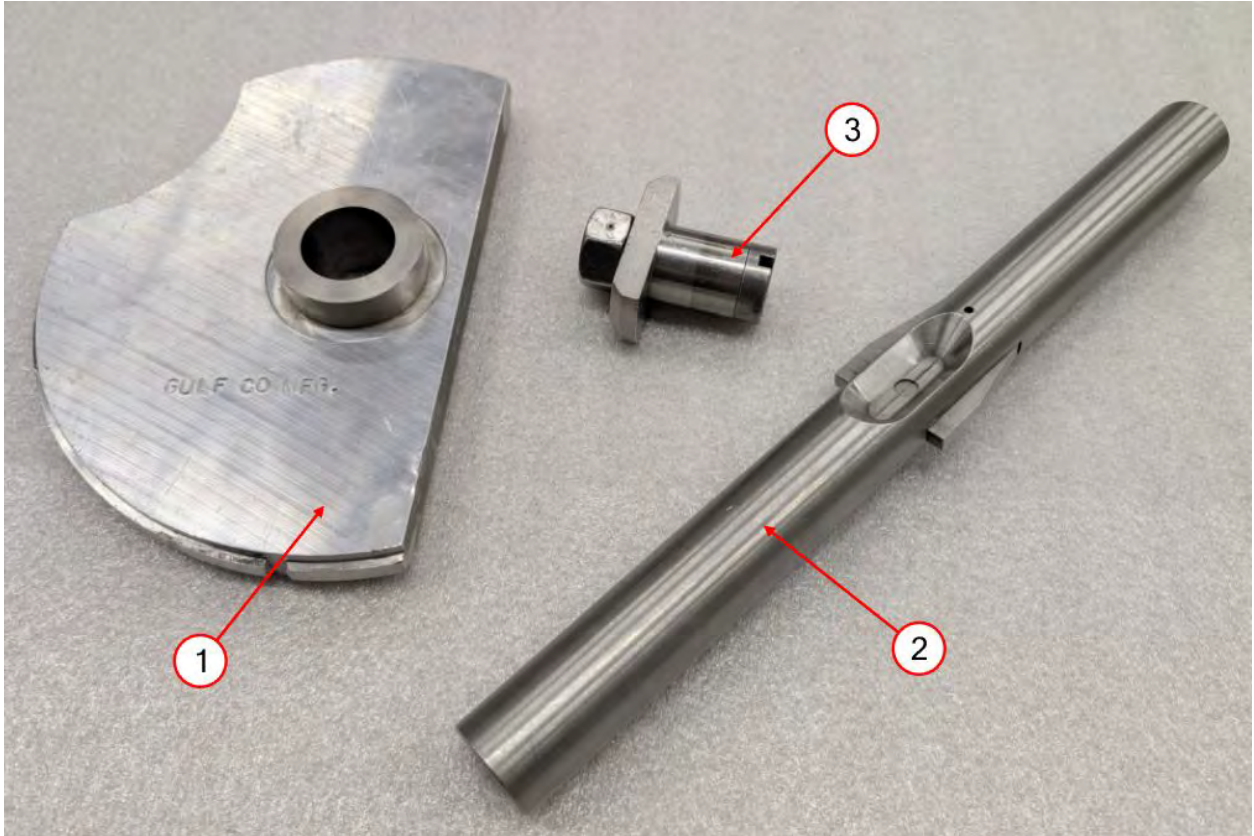
Special Tools

Magnuson CCM designs and manufactures special tools for adjusting major subassemblies of the EACC. Magnuson CCM provides some of the tools as part of the EACC purchase package, and others can be purchased separately. The use of specified tools ensures the most cost-effective and efficient operation. Special tools include:

- Cutter Alignment Tools
- Tension Adjustment Tool
- Knife Sharpener

Cutter Alignment Tools

For the Electric Automatic Corn Cutter, Magnuson CCM offers Cutter Alignment Tool Set (P/N 4011662) to properly align and position the Feed Troughs, Feed/Cob Rolls, and Centering Fingers to ensure a properly cut based on the center of the cob.



Item	Part Number	Description
1	4011582	Alignment Disc AY
2	4011573	Tool, Cutter Gauge
3	4011578	Gauge AY, Cob Roll

The number of recommended tools depends on the number of Corn Cutters.

- 1-25 Cutters - One Alignment Tool Set
- Over 25 Cutters - Two Alignment Tool Sets

Tension Adjustment Tool

For the Model 2 Cutter Head, Magnuson CCM offers a Tension Adjustment Tool (P/N 4011588.0001). The number of tools required depends on the number of machines in line:

- 1-2 Cutter – One Tension Adjustment Tool
- 3-10 Cutters – Two Tension Adjustment Tools
- 11 or more Cutters – Three Tension Adjustment Tools

Figure 2. Tension Adjustment Tool



Knife Sharpener

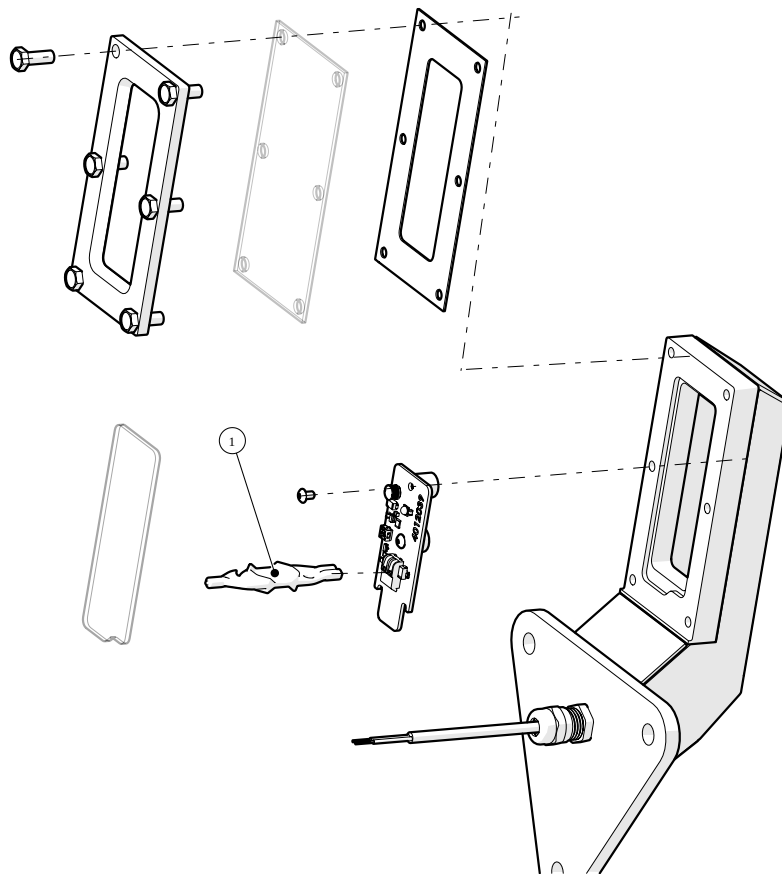
Magnuson CCM recommends the use of the Manual Knife Sharpener (MKS) for honing and reconditioning cutter knives. This machine can be purchased separately. See [Maintenance \(page 151\)](#) for knife maintenance procedures.

The recommended number of Manual Knife Sharpeners depends on the number of Corn Cutters.

- 1-25 Cutters - 1 Manual Knife Sharpener
- 26-50 Cutters - 2 Manual Knife Sharpeners

Light Source Tool

The Light Source Tool is used to install or remove wires from the connector on the circuit board.



Item	Part Number	Description
1	4012039.T	TOOL, LIGHT SOURCE WIRE INSTL

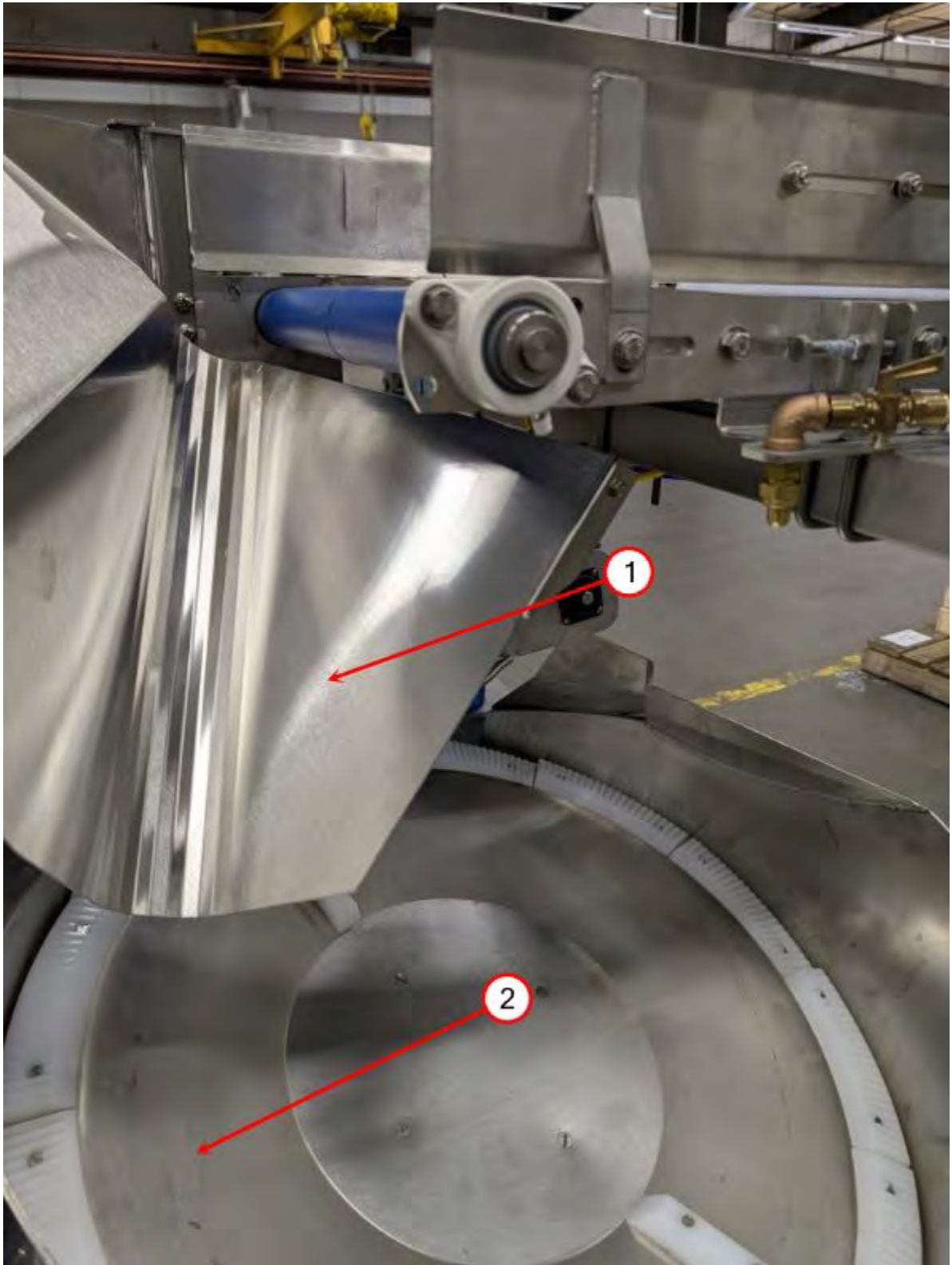
Adjusting the Infeed Chute



WARNING

LOCKOUT/TAGOUT MACHINE. Failure to do so may result in personal injury.

This procedure describes how to adjust the infeed chute. The infeed chute adjustment is unique to each plant. Factors such as plant layout and height of conveyors affect the setting. The main objective is to obtain a smooth transition of corn from the infeed conveyor belt as it slides down through the infeed chute subassembly onto the infeed wheel. The ears of corn should drop toward the outside of the infeed wheel.



Item	Description
1	Infeed Chute

Item	Description
2	Infeed Wheel

To align the infeed chute subassembly, loosen the screws holding the infeed chute to the Infeed Conveyor and Support Frame and adjust as required.

Adjust the Ear In Sensor Blade

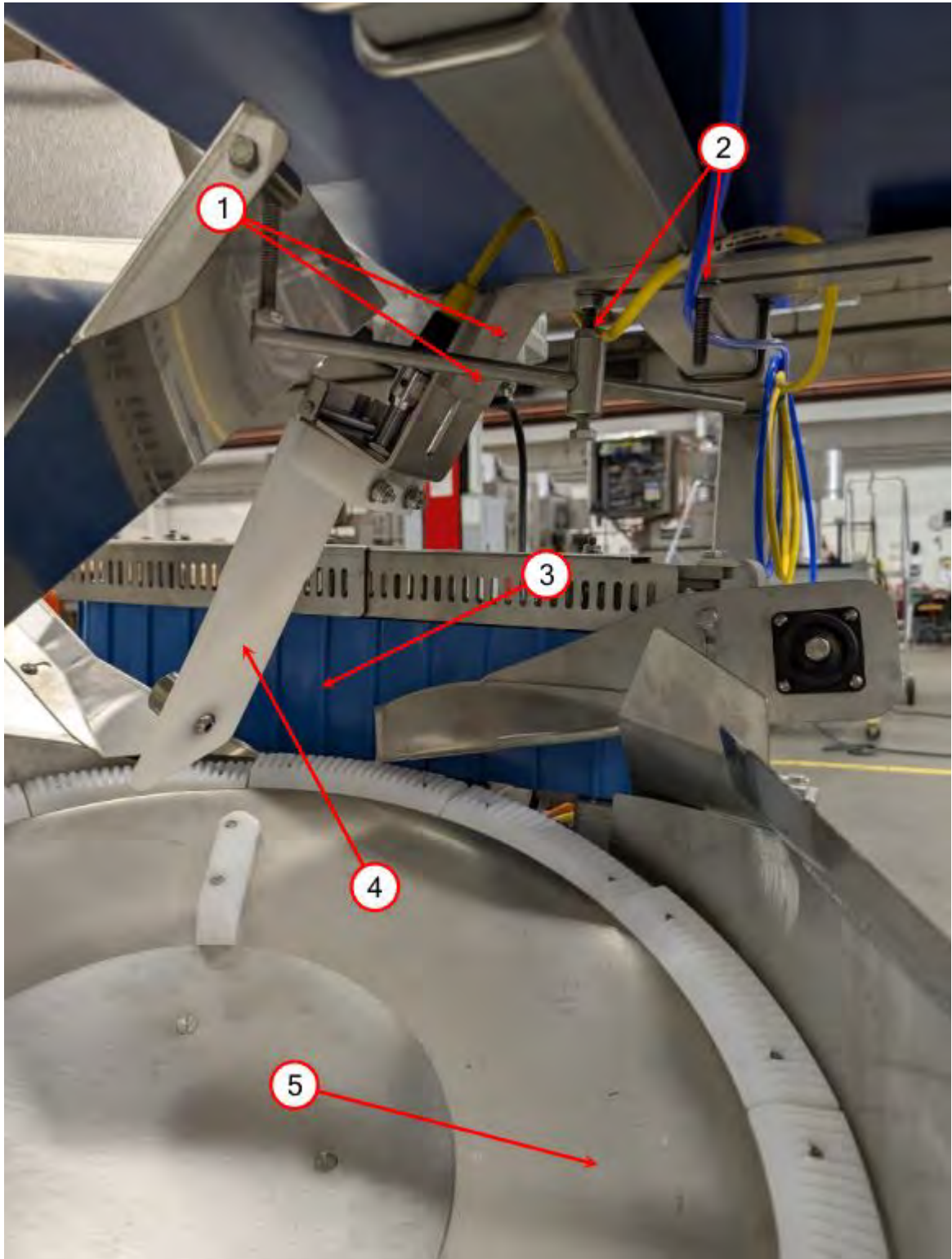


WARNING

LOCKOUT/TAGOUT MACHINE. Failure to do so may result in personal injury.

This procedure describes how to adjust the Ear In Sensor Blade. The goal is to maintain 6 to 10 ears of corn inside the Infeed Wheel during operation.

1. Loosen the mounting bolts that hold the Sensor Blade on the cross member support of the infeed conveyor.
2. Slide the Sensor Blade forward and back, left and right, until the:
 - a. Distance from the centerline of the infeed wheel equals 5-1/2" (140 mm).
 - b. Distance from the metering belt equals 8" (203 mm).



Item	Description
1	Vertical Adjustment Screws
2	Lateral Adjustment Screws

Item	Description
3	Metering Belt (Livewall)
4	Ear In Sensor Blade
5	Infeed Wheel

3. Retighten the mounting bolts.
4. Loosen the two height adjustment bolts.
5. Adjust the down-facing point of the Sensor Blade to 4" (102 mm) from the wheel.
6. Retighten the bolts.

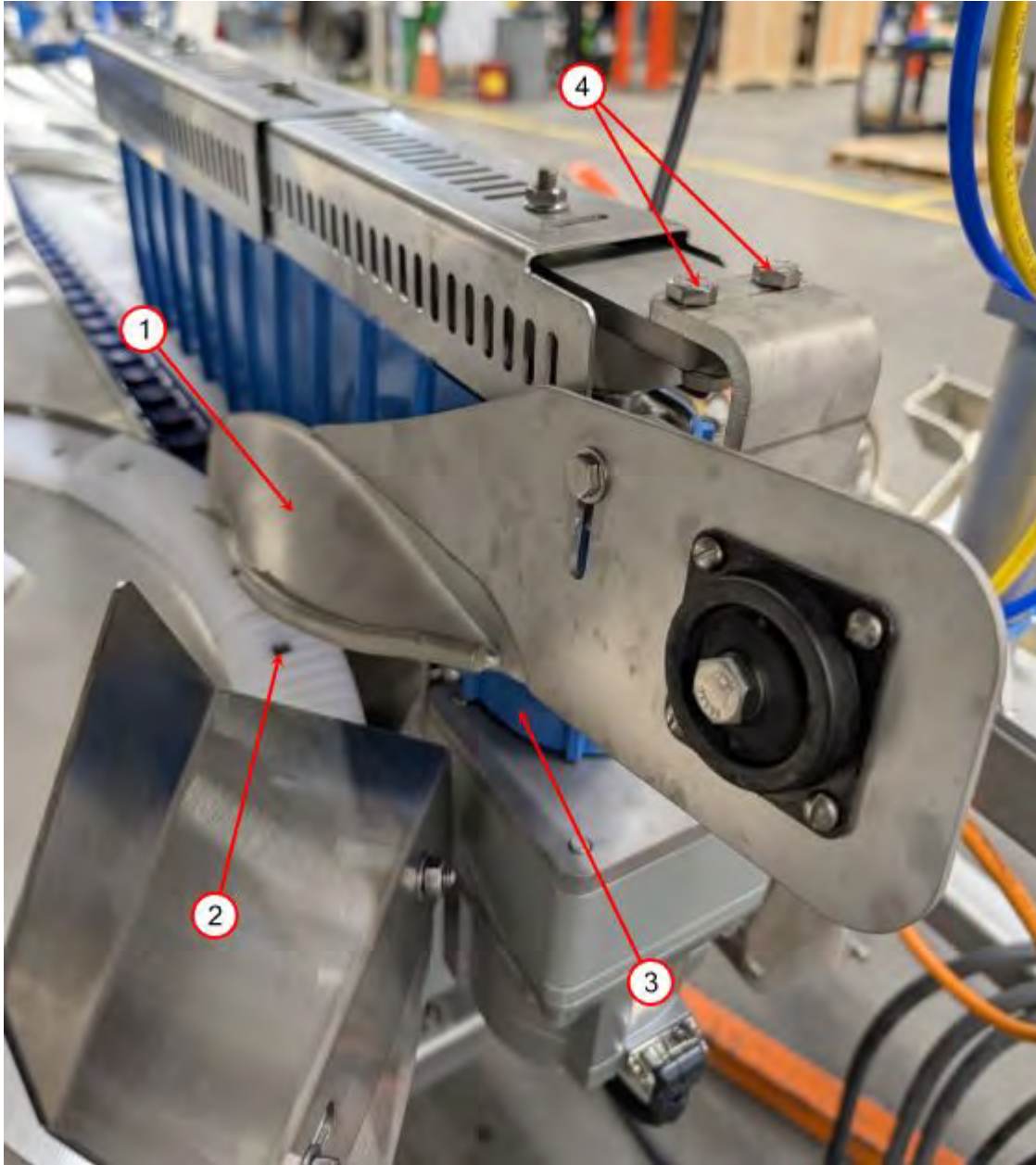
Adjust the Pressure Arm



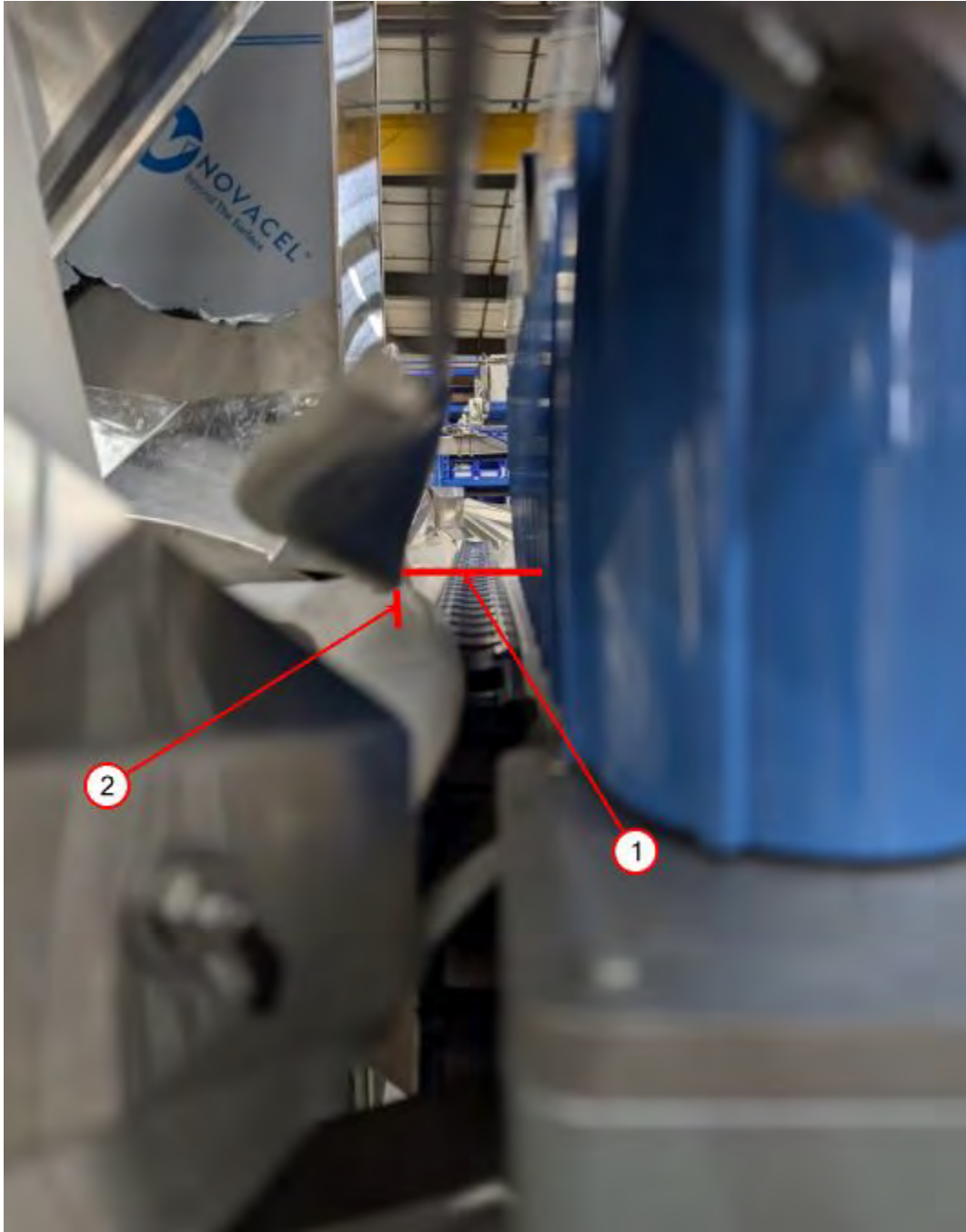
WARNING

LOCKOUT/TAGOUT MACHINE. Failure to do so may result in personal injury.

This procedure describes how to vertically and horizontally adjust the pressure arm. The Pressure Arm is used to guide the ears of corn onto the Blue Chain and help provide spacing between the ears as they travel past the Light Source and Profile Board for analysis.



Item	Description
1	Pressure Arm
2	Infeed Wheel
3	Metering Belt (Livewall)
4	Screws, 5/16-18 x 3/4



Item	Description
1	3/4" gap, pressure arm to the belt.
2	1/4" gap, pressure arm to Infeed Wheel.

1. Loosen the 5/16-18 x 3/4 screws while holding the back of the pressure arm to the pressure arm brackets.
2. Position the pressure arm so that it is 3/4" (19 mm) away from the blue Metering Belt and 1/4" (6 mm) above the Infeed Wheel.

3. Retighten bolts.

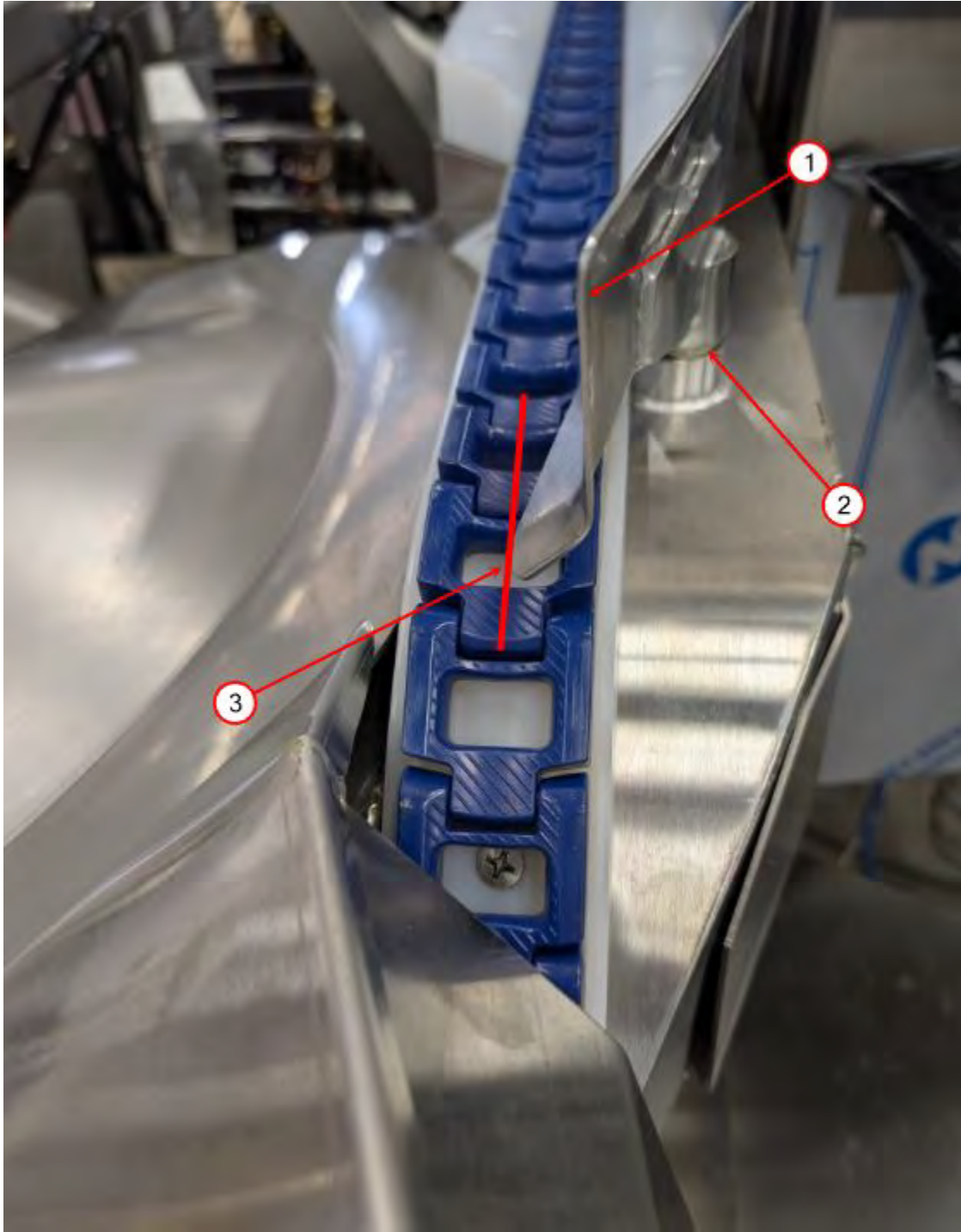
Adjust the Flipper Gate



WARNING

LOCKOUT/TAGOUT MACHINE. Failure to do so may result in personal injury.

This procedure describes how to adjust the flipper gate. The flipper gate taps the incoming ears of corn to provide a smooth movement onto the turn wheel assembly and orient the ears for entry into the feed trough assembly.



Item	Description
1	Flipper Gate
2	Bronze Bearing
3	Flipper Gate 'Home' position, centered over Blue Chain

1. Move the flipper gate back and forth to ensure it does not bind. If the gate does not move freely, loosen the set screws and provide a .002" (.05 mm) minimum clearance between the bronze bearing and the flipper gate actuator shoulder.



Item	Description
1	Set Screws

2. Adjust the Flipper Gate home position by loosening the two 3/8-16 x 3/8 set screws located behind the access door below the Flipper Gate housing.
3. With the machine running, adjust the force with which the flipper gate strikes the oncoming ears of corn by adjusting the Flipper Gate Pressure Regulator to 30-40 PSI, located in the Utility Box shown

in [Adjusting Pneumatic Controls \(page 96\)](#). The recommended adjustment allows the flipper gate to tap the ears just enough so that the narrow end of the ear drops into the turn wheel.

Adjust the Turn Ramp

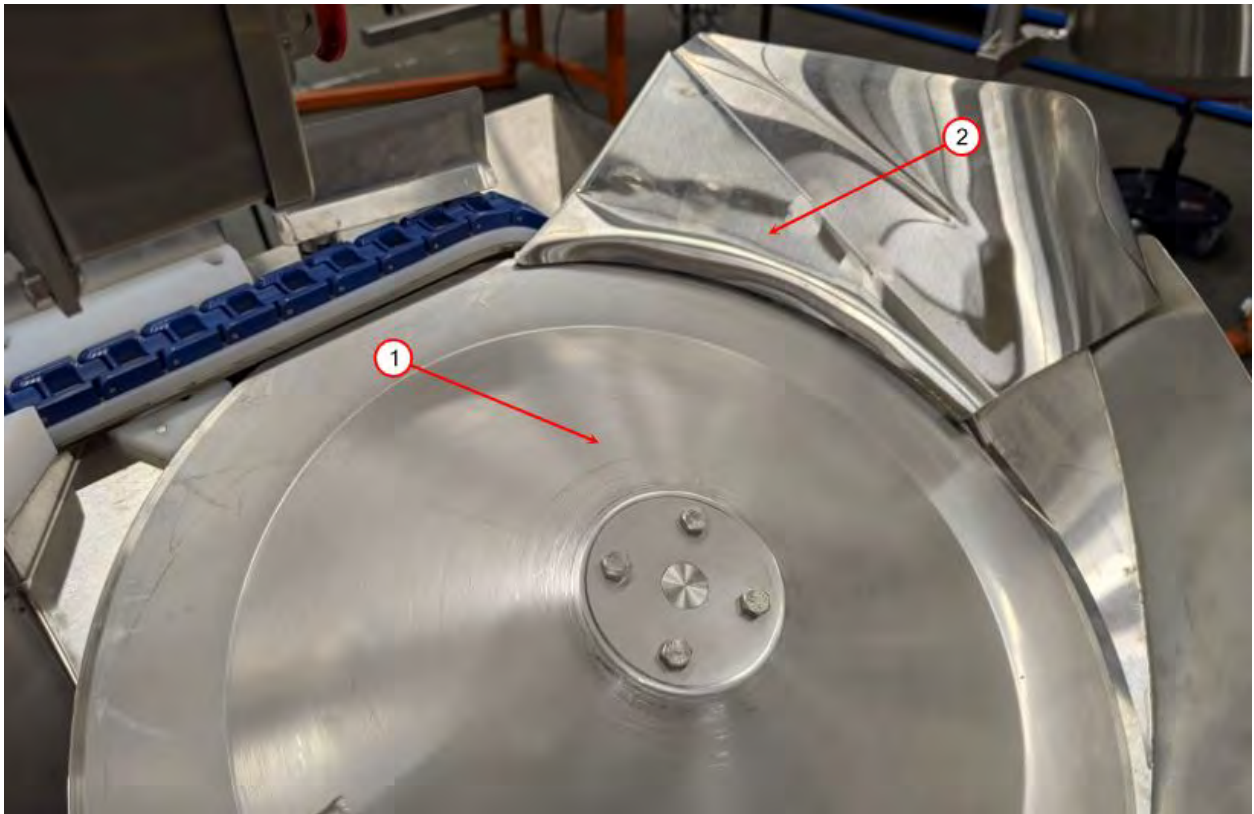


WARNING

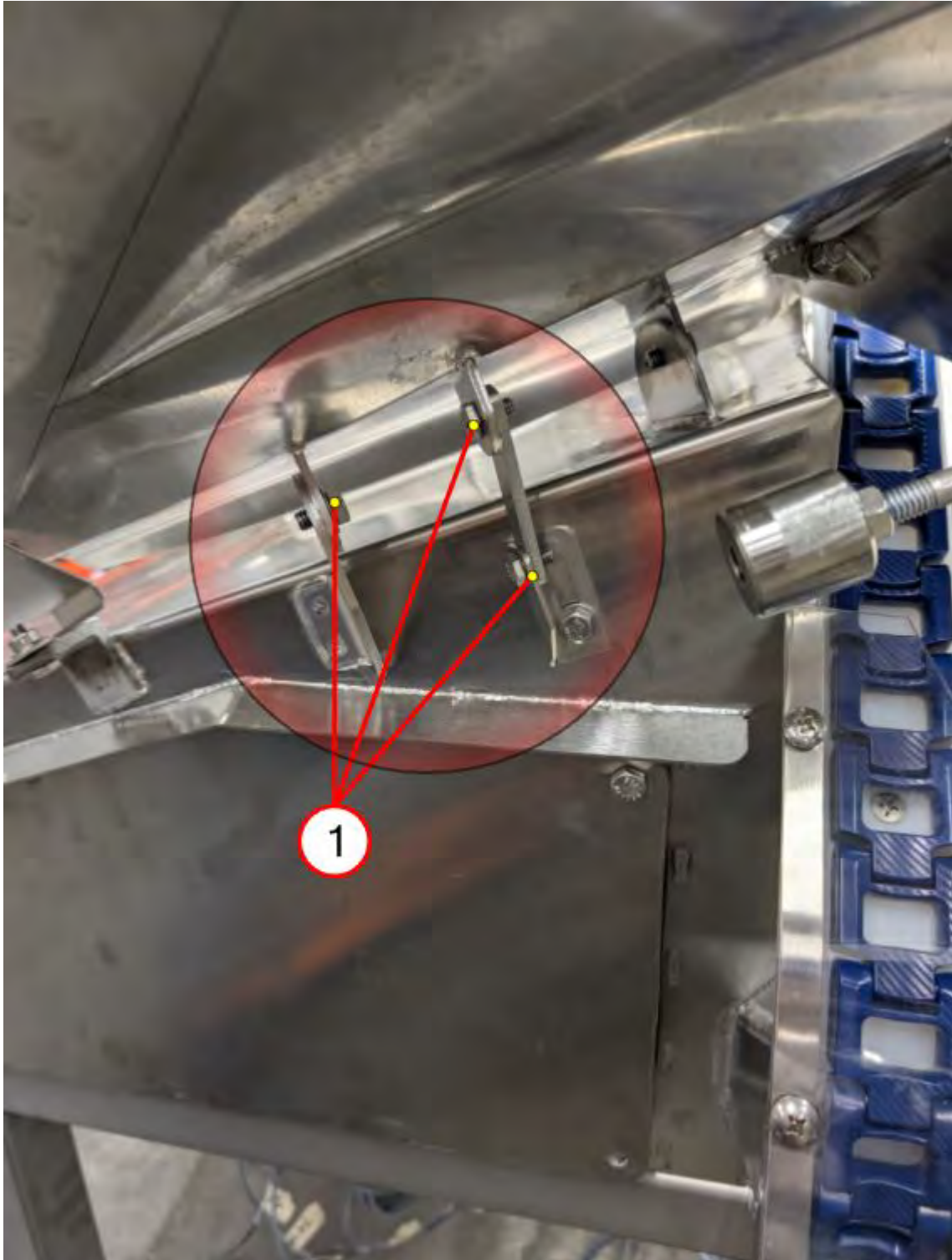
Always stop and LOCKOUT/TAGOUT the machine before performing manual adjustments or when removing product blockages or other obstructions. Failure to do so may result in personal injury.

This procedure describes how to adjust the turn ramp. Adjust the turn ramp to provide a smooth transition for ears of corn moving from the turn wheel hub assembly through the feed troughs and into the cutter head assembly.

1. Place the turn ramp as closely as possible to the turn wheel, not to exceed 1/8" (3 mm gap).
2. Adjust the inner edge of the turn ramp to follow the curvature of the turn wheel as closely as possible.



Item	Description
1	Turn Wheel
2	Turn Ramp



Item	Description
1	Turn Ramp Adjustment Screws

Adjust the Feed/Cob Roll Tension



WARNING

LOCKOUT/TAGOUT MACHINE. Failure to do so may result in personal injury.

This procedure describes how to adjust the feed/cob roll tension. The EACC has two sets of rolls. The set that handles the ears of corn first are the feed rolls. The set that handles the cobs, after the kernels are cut, are the cob rolls. The adjustment procedures are the same for each set of rolls.

Each pair of feed/cob rolls is spring-loaded. The tension of the springs on the feed/cob rolls prevents the ears of corn from slipping or rotating. Follow these procedures to adjust the tension using the feed/cob roll tension adjustment nuts.

1. Visually inspect the contact between the tooth on the lower center lever arm and the groove at the lower end of the upper center lever arm to ensure that there is light contact between tooth and groove.
2. To remove space or play from the assembly:
 - a. Loosen the pivot lever nut attached to the pivot lever.
 - b. Loosen or tighten the pivot lever screw.



CAUTION

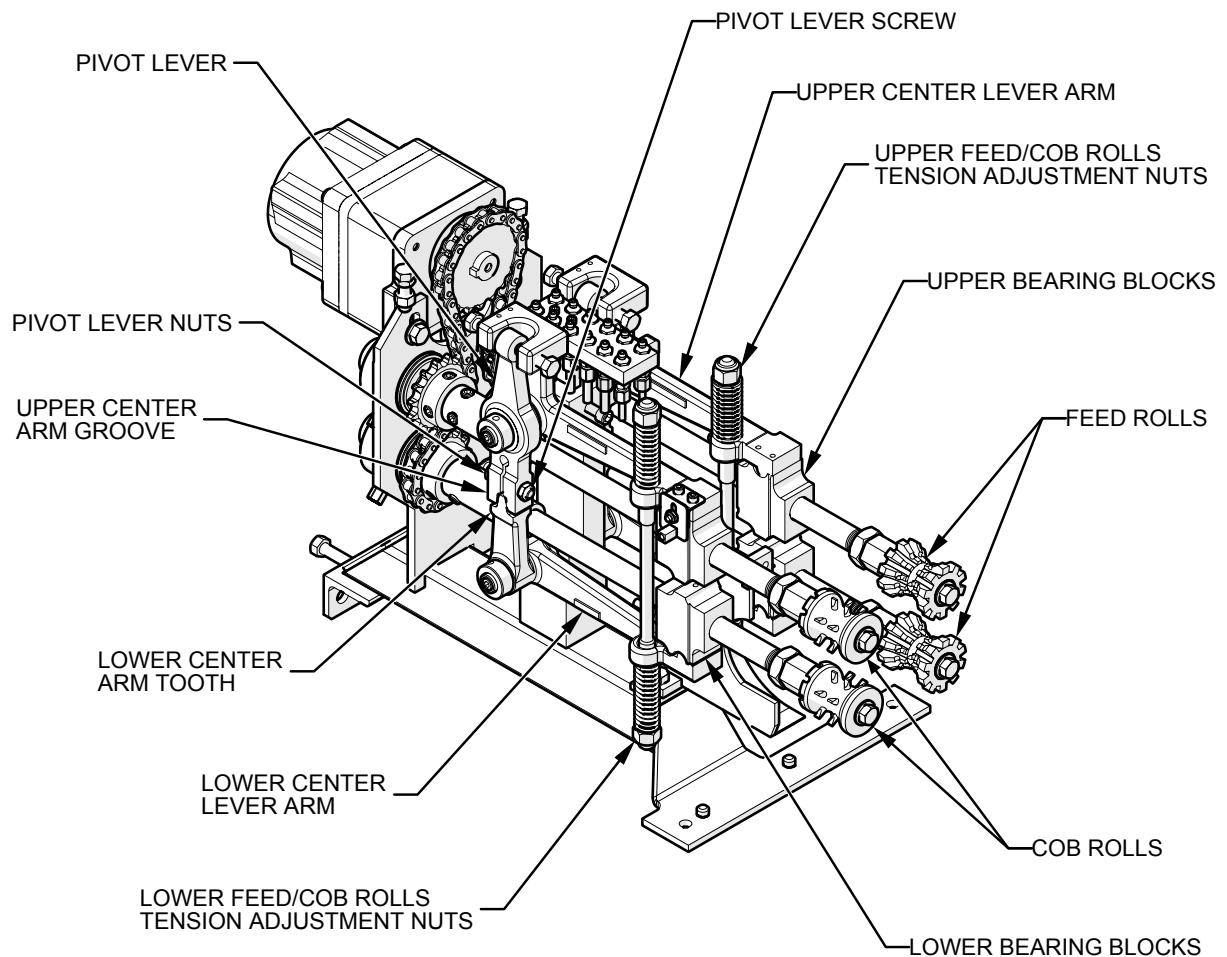
Do not over-tighten the pivot lever screw. Stripping or damage may occur.

3. Retighten the pivot lever nut.
4. Visually inspect the contact between tooth and groove again to ensure that there is no space.
5. Set feed/cob roll tension by tightening the two sets of feed/cob roll tension adjustment nuts. Holding either the top or bottom tension adjustment nut, tighten the other so that the upper bearing block touches the lower bearing block.
6. Perform Step 5 for both feed and cob rolls.



CAUTION

Unnecessarily high spring tension results in kernel damage, broken cobs, and hesitation of ears when they enter the feed rolls.



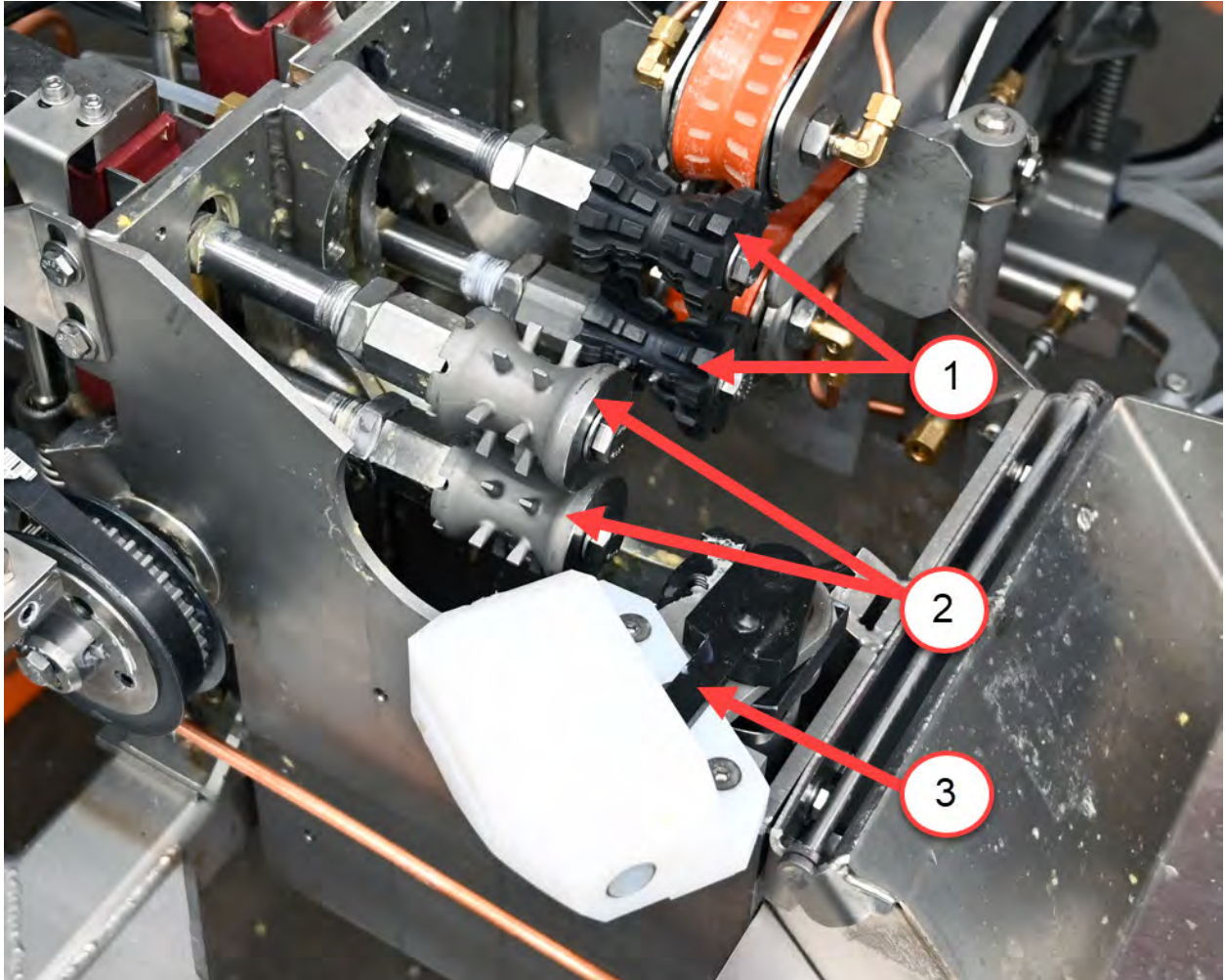
Adjust the Feed Troughs (Upper and Lower)



WARNING

LOCKOUT/TAGOUT MACHINE. Failure to do so may result in personal injury.

This procedure describes how to adjust the feed trough. The feed trough adjustment aligns and centers the upper and lower trough assemblies to ensure a center cut. Remove the nubbin knocker and feed/cob rolls from the cutter body subassembly.



Item	Description
1	Rubber Feed Rolls
2	Steel Cob Rolls
3	Nubbin Knocker

Assemble the Cutter Alignment Fixture

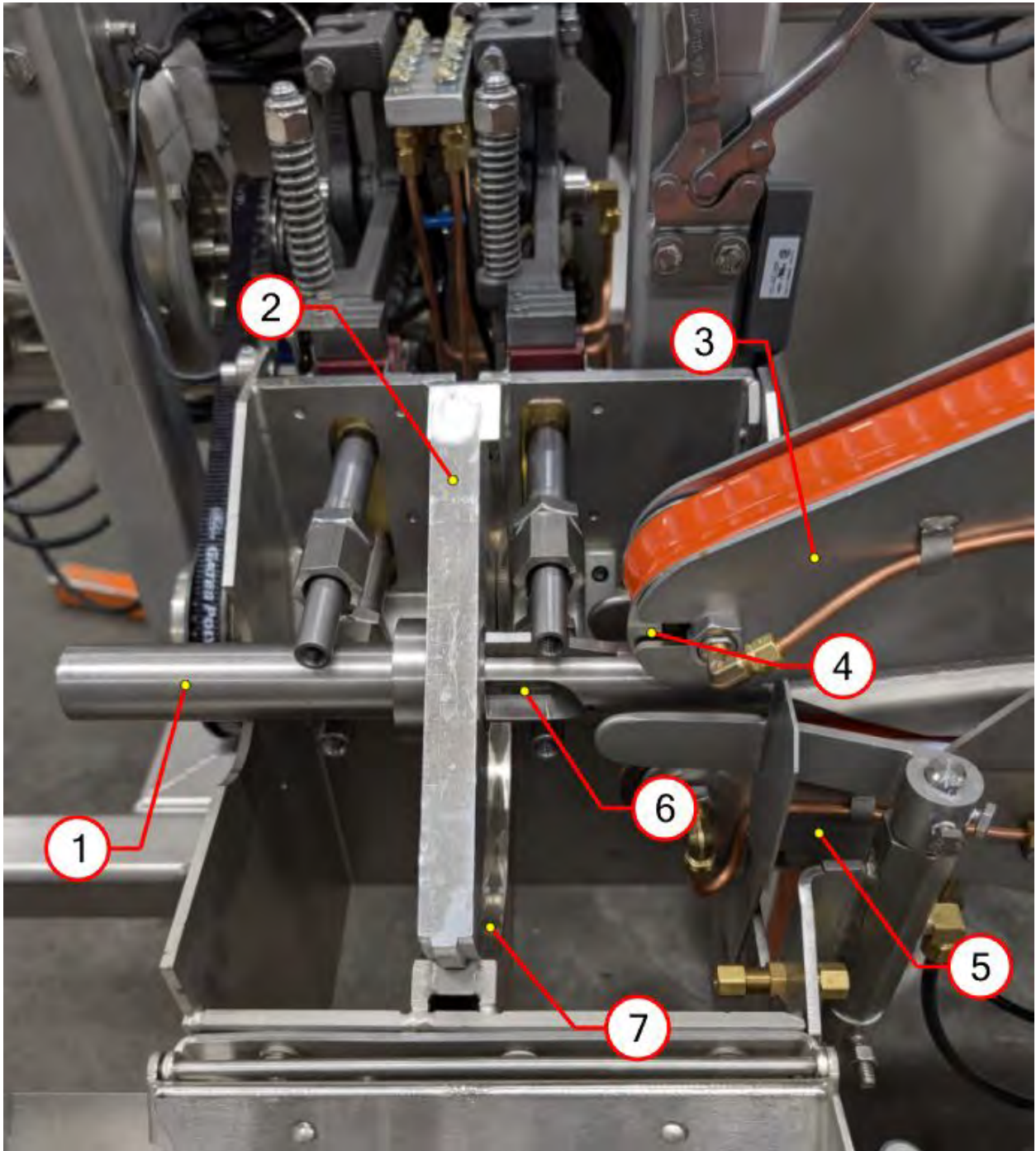
To adjust the Feed Trough, use the alignment disc and shaft. See [Special Equipment and Tools Needed \(page 60\)](#).

1. Mount the alignment disc into the half-moon slot on the cutter box subassembly, where the cutter head is located.
2. Raise the upper feed trough and insert the short end of the alignment shaft through the center of the hole in the middle of the alignment disc.
3. Lay the long end of the alignment shaft on the orange feed trough belt of the lower feed trough, alignment tool placement.

**NOTE**

The adjustable wing gauge on the alignment shaft should be horizontal. The adjustable wing gauge should not touch any part of the lower feed trough.

4. At the manifold, shut off the air supply. Refer to alignment tool placement to the corn cutter so that the upper feed trough lowers over the alignment shaft.

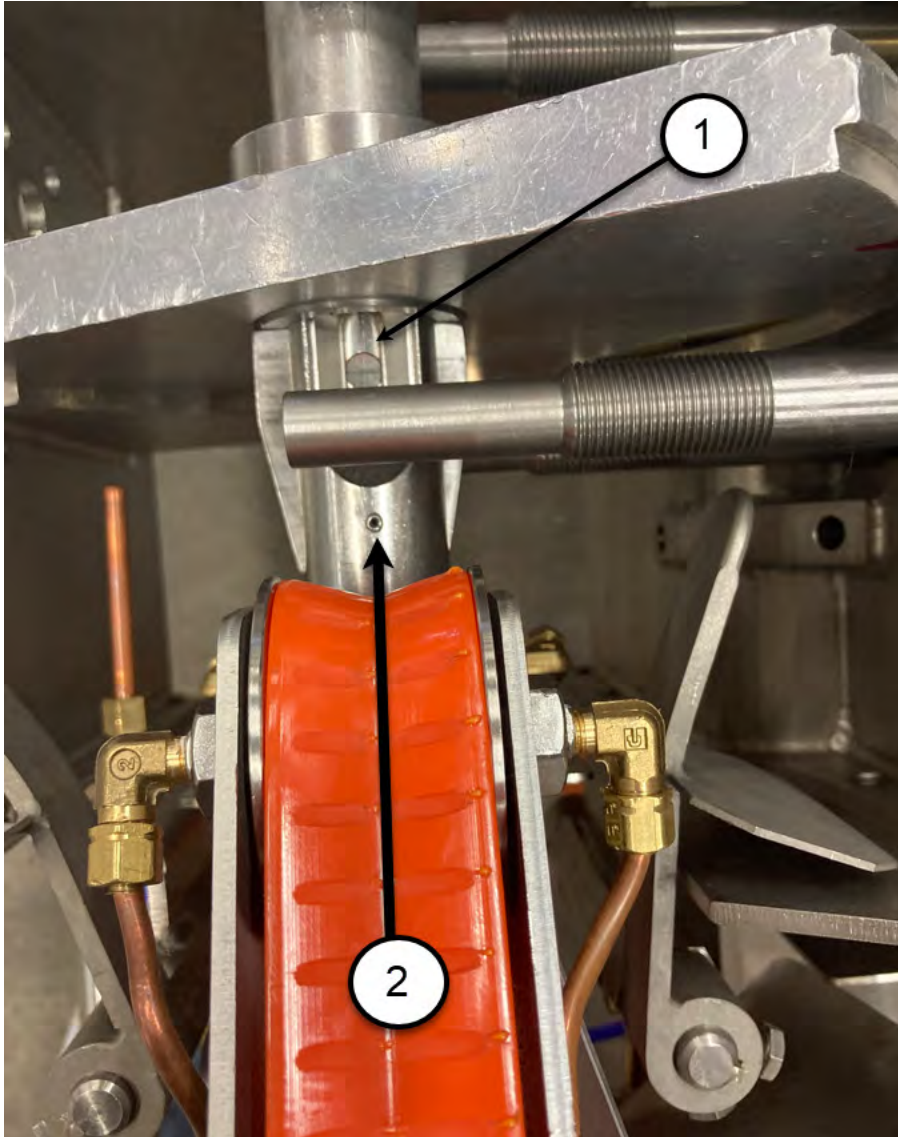
Alignment Tool Placement

Item	Description
1	Alignment Shaft
2	Alignment Disc
3	Upper Feed Trough
4	Nose Wheels
5	Lower Feed Trough
6	Adjustable Wing Gauge
7	Half-moon slot on Cutter Body

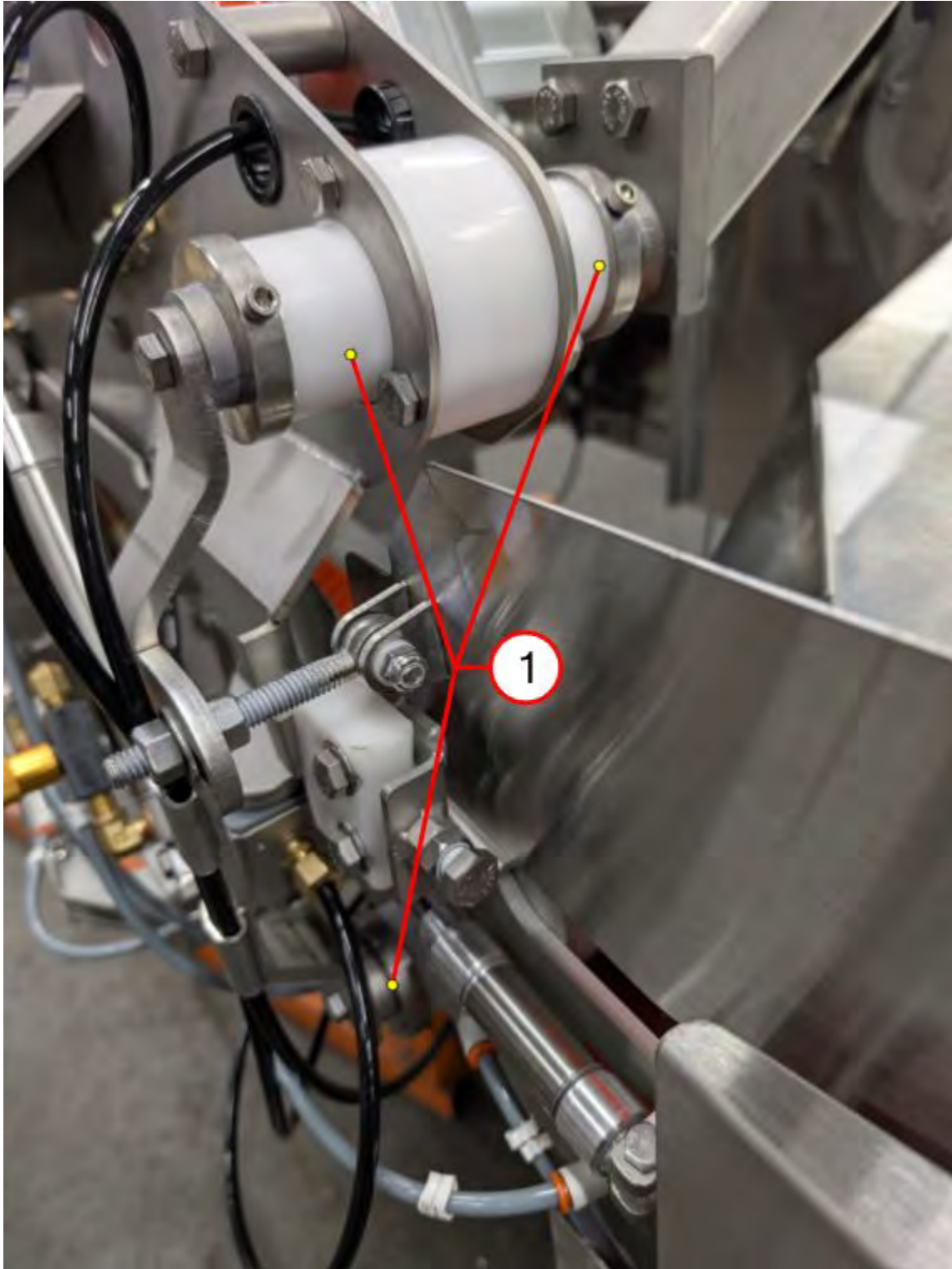
Center the Nose Wheels Horizontally (Horizontal Adjustment)

This procedure describes how to horizontally center the nose wheels.

Center the nose wheels located on the upper and lower feed troughs by sliding one or both of the Troughs in or out on the bearing support as required.



Item	Description
1	Alignment shaft with wing gauge in the horizontal position and against the alignment disc.
2	Nose Wheels should be centered with the Alignment Shaft.



Item	Description
1	Spindle Collars

1. Loosen the set-screws on the spindle collars.

2. With the alignment shaft still installed between the upper and lower feed troughs, slide the feed troughs either in or out to center them on the alignment shaft.

**TIP**

To do this, apply lateral pressure on the backside of the feed trough while pushing the backside of the feed trough in the desired direction and bouncing the center nose wheels up and down.

3. Tighten the set screws.

Center the Nose Wheels Vertically (Vertical Adjustment)

This procedure describes how to vertically center the nose wheels.

1. Place the alignment shaft between the upper and lower feed troughs so the long end of the shaft rests on the orange feed trough belt of the lower feed trough. See the Nose Wheels figures below for reference.



Item	Description
1	Alignment Shaft with wing gauge in vertical position.

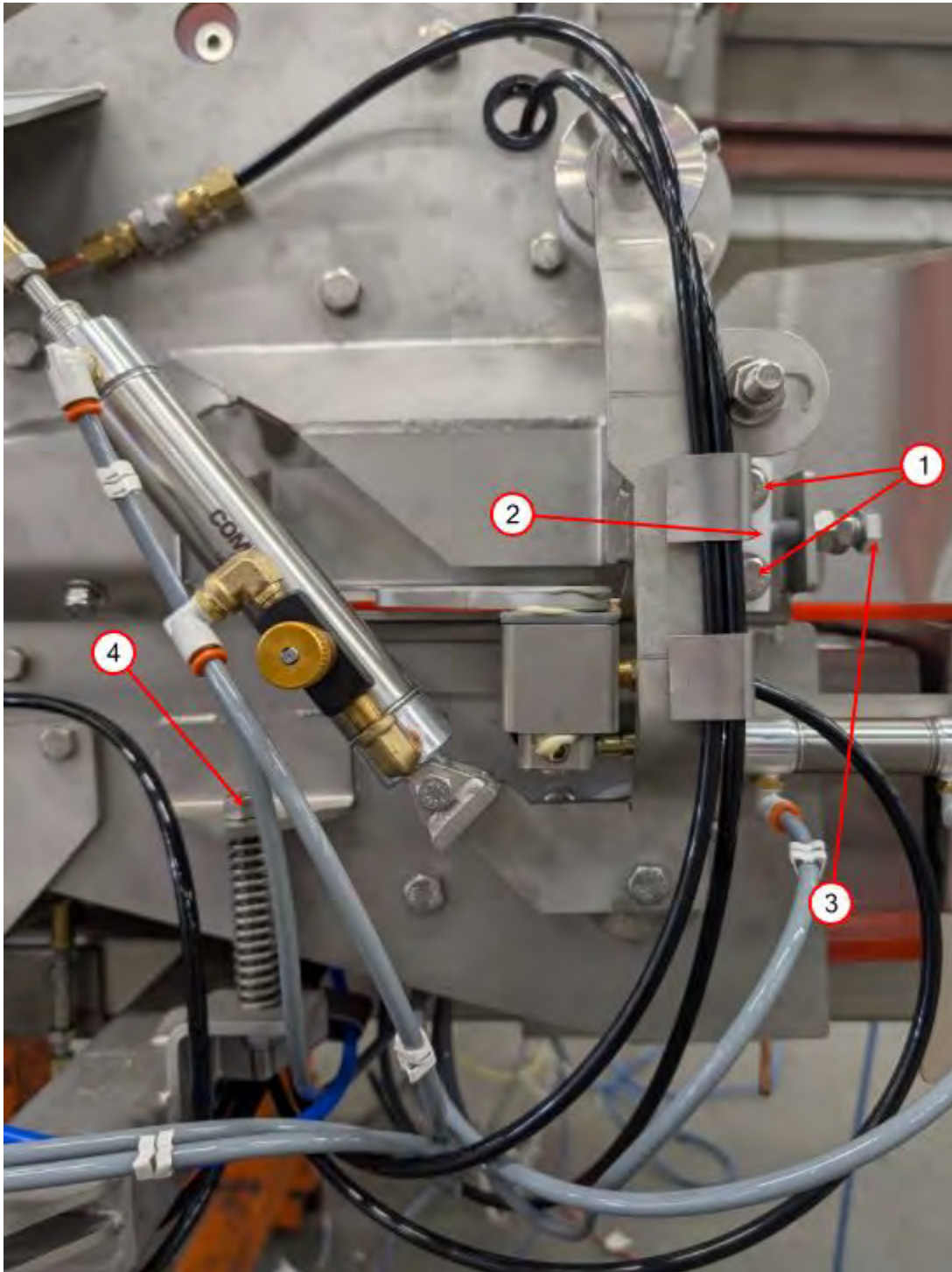
- a. Position the adjustable wing gauge on the alignment shaft vertically between the feed troughs with the niche in the shaft facing the operator.



TIP

With the alignment fixture shaft in place, find the line etched in the middle of the niche. Then move the adjustable wing gauge back and forth until you find the line etched into the middle of the gauge. Use these lines to achieve vertical alignment as you proceed to the next steps.

- b. Loosen the gap adjustment nut until there is a play between the angular plate and the spring.
2. Lower the upper feed trough onto the alignment shaft.
3. Loosen the two 5/16-18 x 1" bolts that hold the plastic rocker block just enough so that the rocker block can move. See the **Nose Wheels** figures below for reference.
4. Turn the vertical adjustment screw to align the line in the middle of the adjustable wing gauge to the line in the niche so that they form a continuous, unbroken line.
 - a. Turn the vertical adjustment screw inward to raise the upper and lower feed trough noses.
 - b. Turn the vertical adjustment screw outward to lower the upper and lower feed trough noses.
5. Tighten the screws on the plastic rocker block and lock the vertical adjustment screw in position with the lock nut. Actuate the upper feed trough three times to insure it returns back to the adjusted position.
6. Push the alignment shaft to the left toward the alignment disk until the adjustable wing gauge contacts the alignment disk.
7. A spring is used as a cushion when the lower feed trough drops down. To adjust the spring action, tighten the gap adjustment nut through the spring until the nose wheels start to separate from the alignment shaft.
8. Remove the alignment shaft from the upper and lower trough assemblies, OR leave the alignment shaft in place and proceed to the next step for center fingers adjustment.



Item	Description
1	Bolts
2	Rocker Block
3	Vertical Adjustment Screws
4	Gap Adjustment Nut

Adjusting the Center (Equalizer) Fingers

Correct alignment of the EACC center fingers ensures that ears of corn enter the cutter head in the correct position for the most productive cut.

Adjustment of the center fingers requires placement of the alignment shaft [Place the Alignment Shaft \(page 86\)](#) and adjustment of the equalizer rods [Adjust the Equalizer Rods \(page 87\)](#).

Place the Alignment Shaft

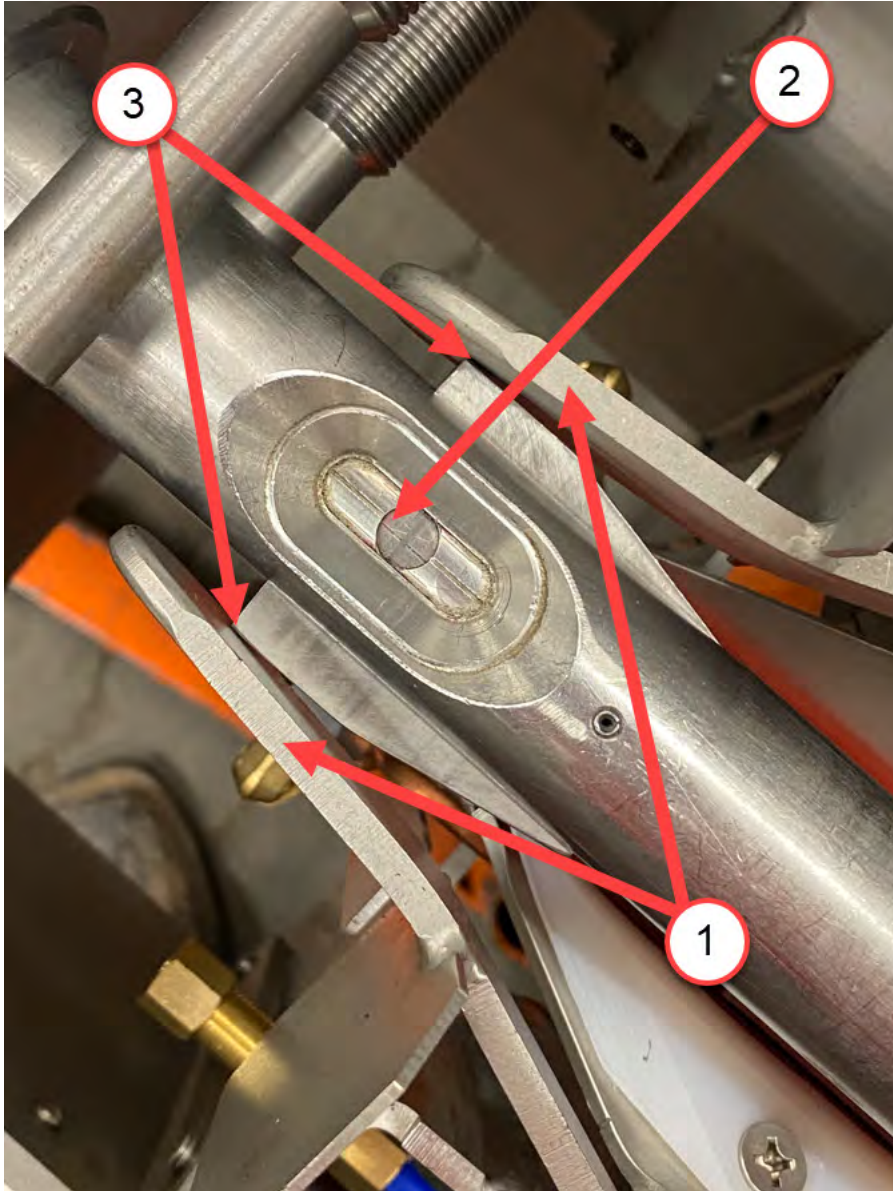
This procedure describes how to place the alignment shaft.



WARNING

LOCKOUT/TAGOUT MACHINE. Failure to do so may result in personal injury.

1. Place the alignment shaft on the orange feed trough belt of the lower feed trough. Be sure that you place:
 - a. The alignment shaft with the niche up and facing the operator.
 - b. The adjustable wing gauge laying horizontally in relation to the lower feed trough. The adjustable wing gauge should not touch any part of the lower feed trough. See the figures in [Center the Nose Wheels Vertically \(Vertical Adjustment\) \(page 83\)](#) for reference.
2. Position the adjustable wing gauge so that the etched line in the middle of the adjustable wing gauge is aligned with the etched line located in the niche of the alignment shaft.
3. Lower the upper feed trough.



Item	Description
1	Center Fingers
2	Etched lines should line up
3	Adjust for a gap of 3/16" between fingers and wing gauge.

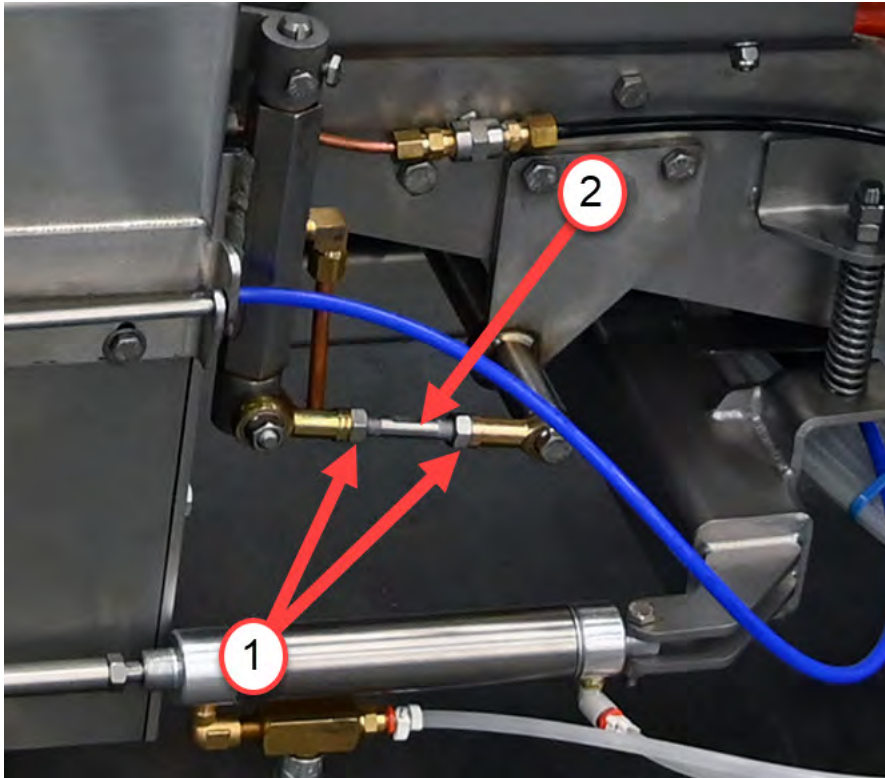
The alignment shaft is placed.

Adjust the Equalizer Rods

This procedure describes how to adjust the equalizer rods. Adjust both equalizer rods on each side of the lower feed trough assembly so that the center fingers are equally distant from the adjustable wing gauge. They are not intended to touch every ear of corn, just the misaligned ears.

The recommended distance from the edge of the wing gauge to the center fingers is 3/16" (4.8 mm). Change this adjustment as required for average corn ear size: the larger the ears of corn, the larger the gap.

1. Loosen the lock nuts on the center finger adjustment rods.
2. Rotate each rod until there is a 3/16" (4.8 mm) clearance between the edge of the wing gauge and the center fingers.
3. Tighten the locknuts.
4. Ensure that both center fingers are placed the same distance from the adjustable wing gauge.



Item	Description
1	Equalizer Rod
2	Locknuts

The equalizer rods are adjusted.

Adjusting the Feed/Cob Roll Shaft



WARNING

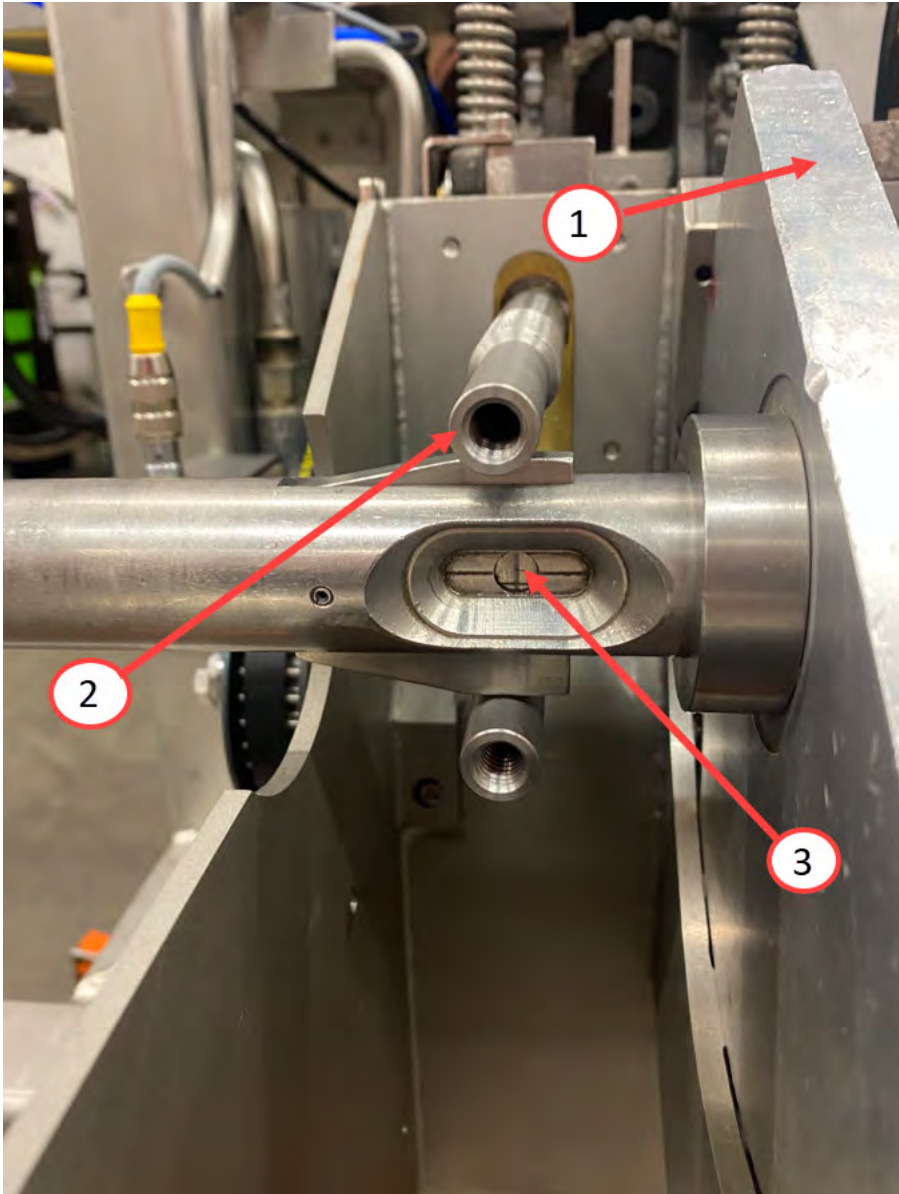
LOCKOUT/TAGOUT MACHINE. Failure to do so may result in personal injury.

Correct feed/cob roll shaft alignment ensures a clean, regular cut of corn. To align the feed/cob roll shafts, adjust them both vertically and horizontally. To perform these adjustments, you must first remove the nubbin knocker and the feed/cob rollers. See [Adjust the Feed Troughs \(Upper and Lower\) \(page 77\)](#).

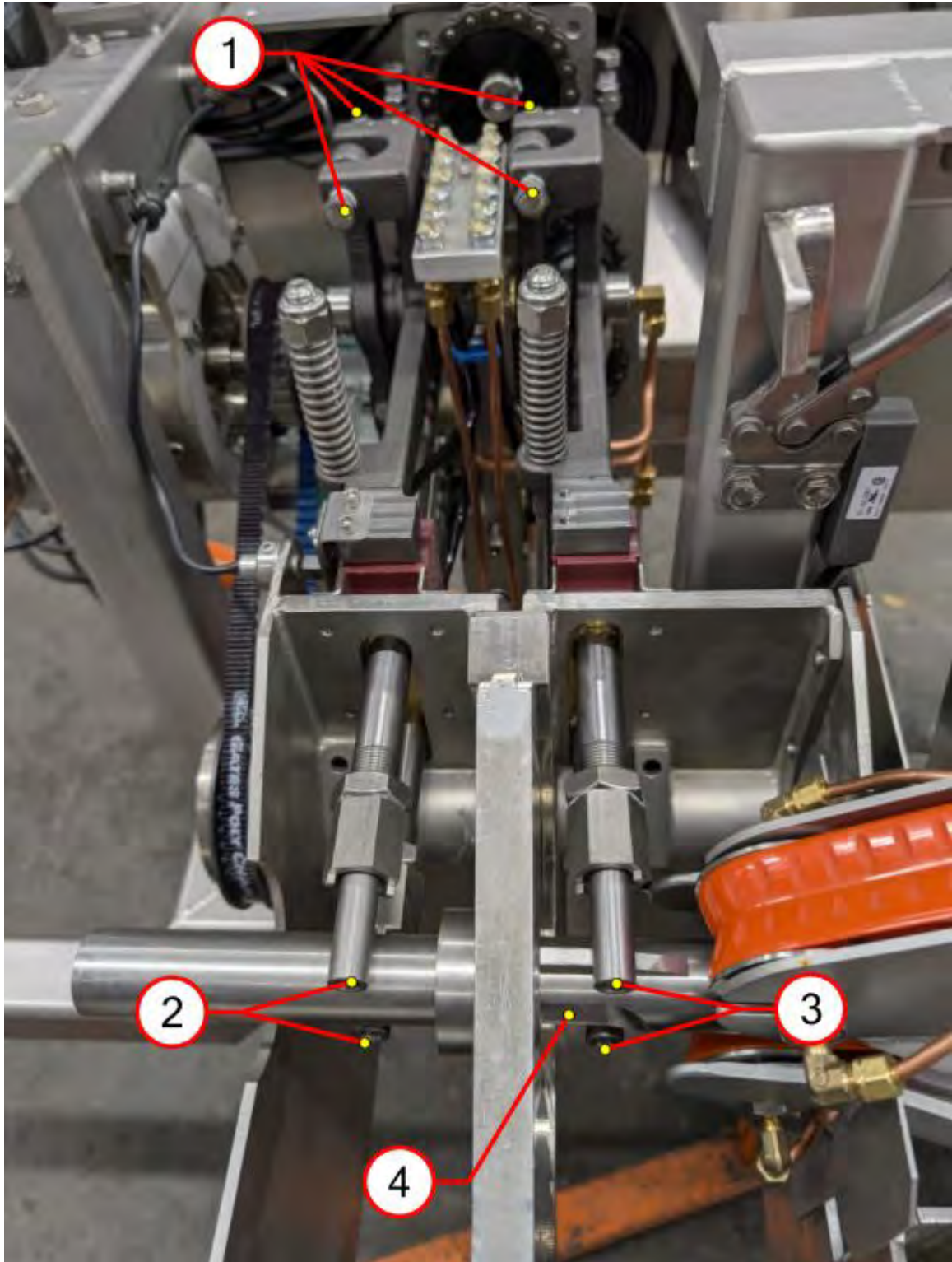
Adjust the Feed/Cob Roll Shafts Vertically

This procedure describes how to vertically adjust the feed/cob roll shafts.

1. Seat the alignment disc in the half-moon slot of the cutter subassembly.
2. Slide the alignment shaft in the hole of the alignment disc. Ensure that the niche on the shaft is facing up.
 - a. Rotate the shaft so that the adjustable wing gauge is in a vertical position between the first two cob roll shafts with the niche facing out.
 - b. Using the feed/cob roll vertical adjustment screws located on the upper center lever arm. The two etched lines should form an unbroken, continuous line when adjusted correctly.
3. Actuate the shafts and recheck.



Item	Description
1	Alignment Disc
2	Adjustable Wing Gauge
3	Niche



4.

Item	Description
1	Feed/Cob Rolls Vertical Adjustment Screws
2	Cob Rolls

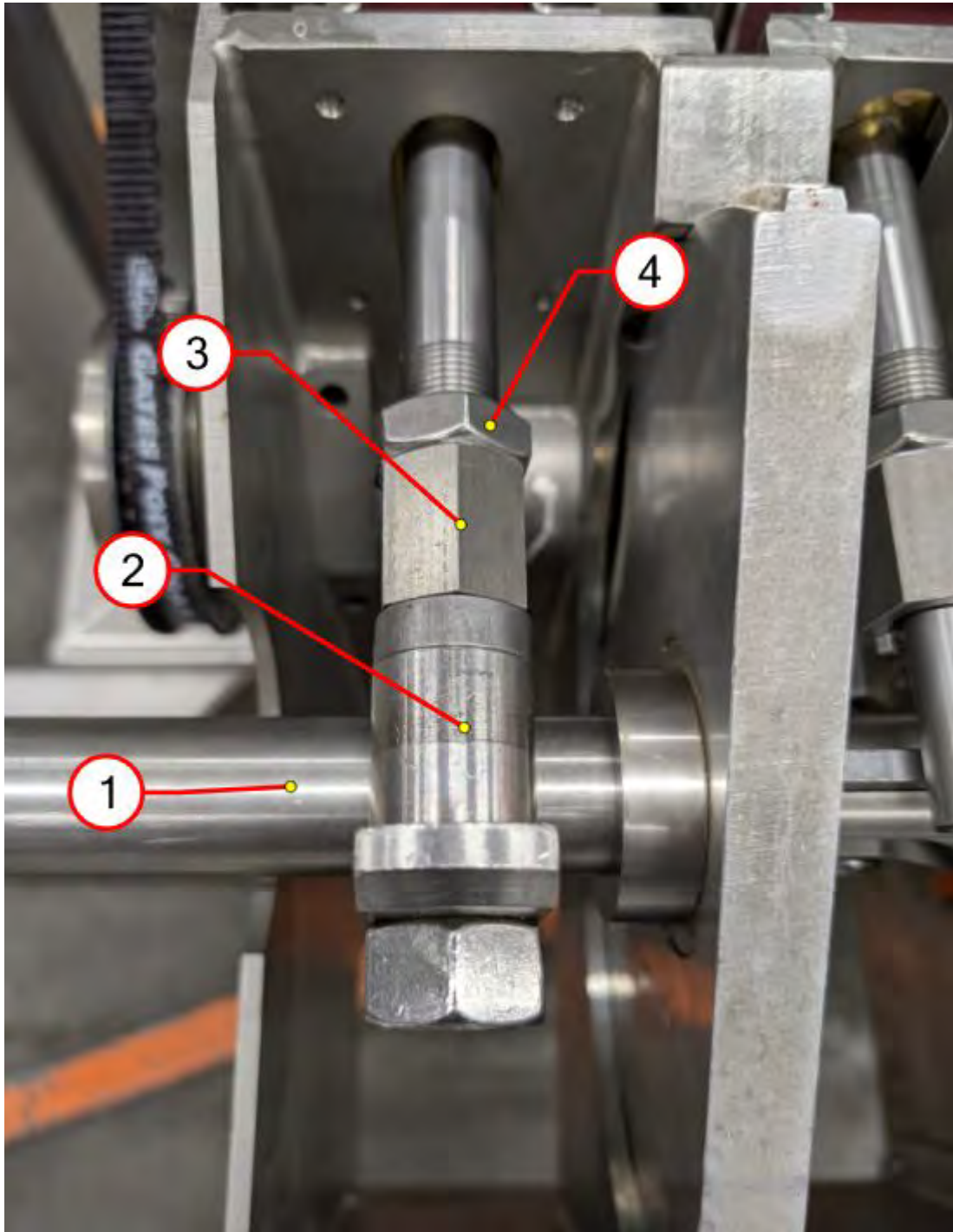
Item	Description
3	Feed Rolls
4	Gage-etched lines

5. Remove the alignment shaft and insert it into the other side of the alignment Disc.
6. Perform Step 2 for both feed and cob rolls.

Adjust the Feed/Cob Roll Shafts Horizontally

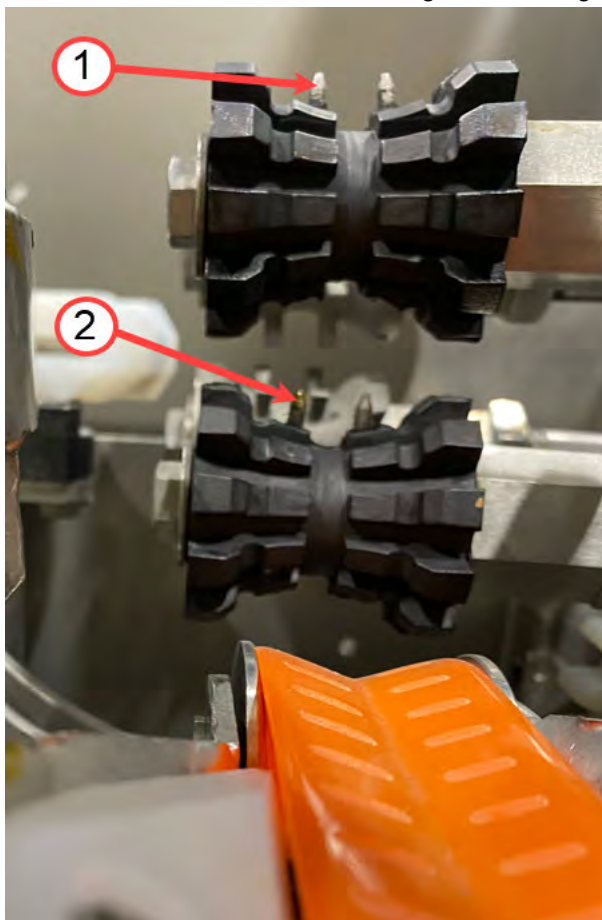
This procedure describes how to horizontally adjust the feed/cob roll shafts.

1. Using the feed/cob roll gauge, rotate the alignment shaft so that the adjustable wing gauge lays horizontally in relation to the feed/cob roll shafts.



Item	Description
1	Alignment Shaft
2	Feed/Cob Roll Gage
3	Feed/Cob Roll Hex Nut
4	Jam Nut

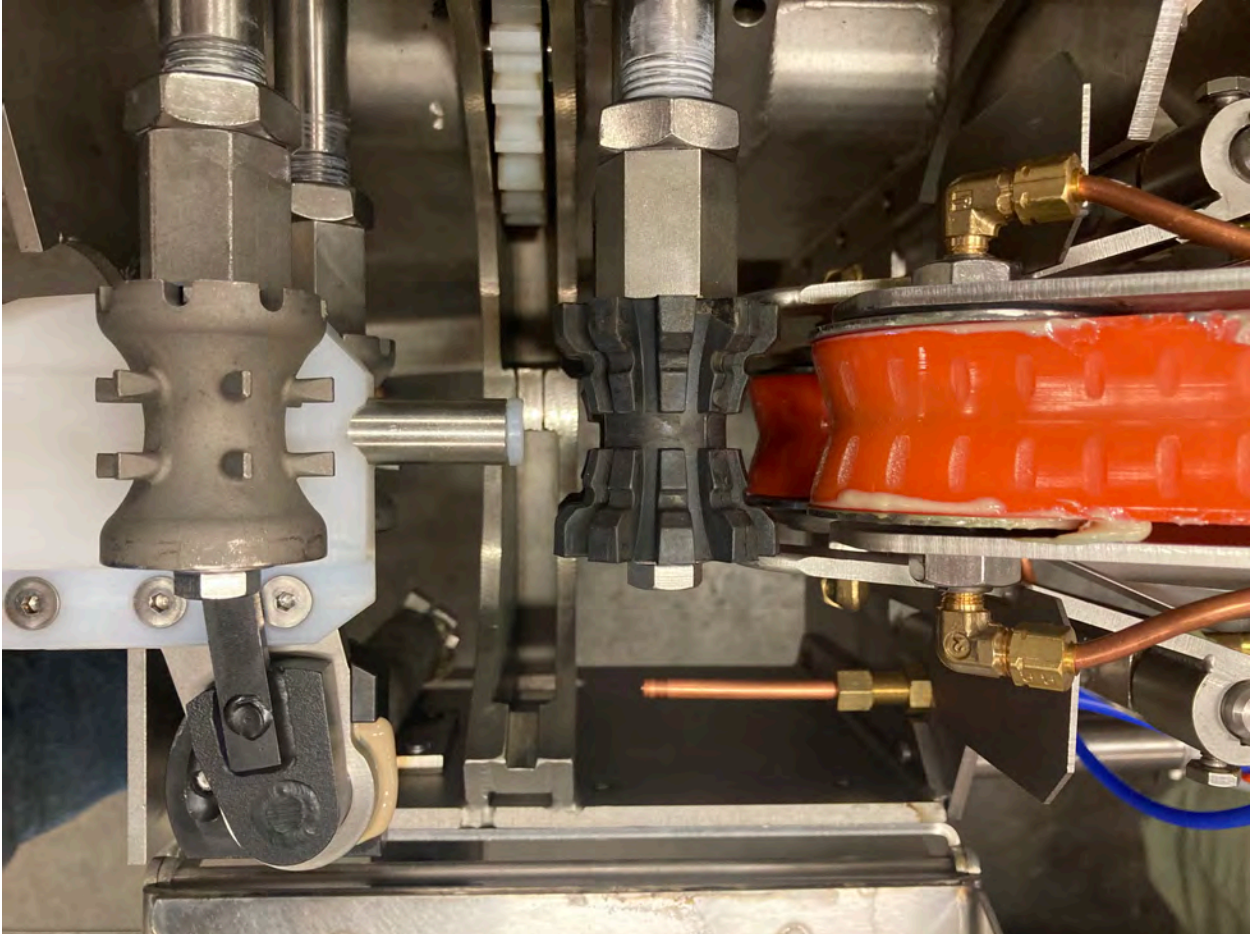
2. Install the feed/cob roll gauge on one of the four feed/cob roll shafts. Ensure that the slotted end of the feed/cob roll gauge fits over the two slots of the feed roll hex nut.
3. Adjust the feed/cob roll gauge so that the flat face of the tool is flush and touches the alignment shaft. Using the nut on the opposite end of the tool, adjust so that there is no space between the alignment shaft and the inside horizontal and vertical edges of the cob roll gauge.
4. Repeat the procedure for the remaining three (3) roll shafts.
5. Remove the alignment shaft from the machine.
6. Reinstall the feed/cob rolls. Ensure that:
 - a. The hex nuts on the feed/cob roll shafts do not turn, and
 - b. The feed rolls are installed so that as the rolls rotate, one set of spikes in the rubber feed rolls are making contact with the cob at a time. When the top rubber feed roll has its spikes pointing up at the 12 o'clock position, the bottom rubber feed roll should have its spikes pointing up at the 12 o'clock position as well.
7. Reinstall the nubbin knocker, leaving the bolts slightly loose.



Item	Description
1	Upper Feed Roll - spikes pointing up
2	Lower Feed Roll - spikes pointing up

- a. Adjust the nubbin knocker to ensure that the cob rolls hit the plastic housing at the same time.

- b. Ensure that the face of the plastic housing is parallel to the rubber rollers.
- c. For a final check, install a Cutter Head with knives and confirm that the steel core of the Nubbin Kicker passes through the center of the knives without contacting them.



Adjust the Model 2 Cutter Head



WARNING

Cutter heads contain extremely sharp knives. Handle with care and in accordance with safety procedures. Failure to do so may result in personal injury.

This procedure describes how to adjust the Model 2 cutter head. Model 2 cutter head adjustments set the cutter head knives to achieve the smallest opening possible for the size of cobs that are being cut. The smaller the opening, the greater the depth of cut on the ear.

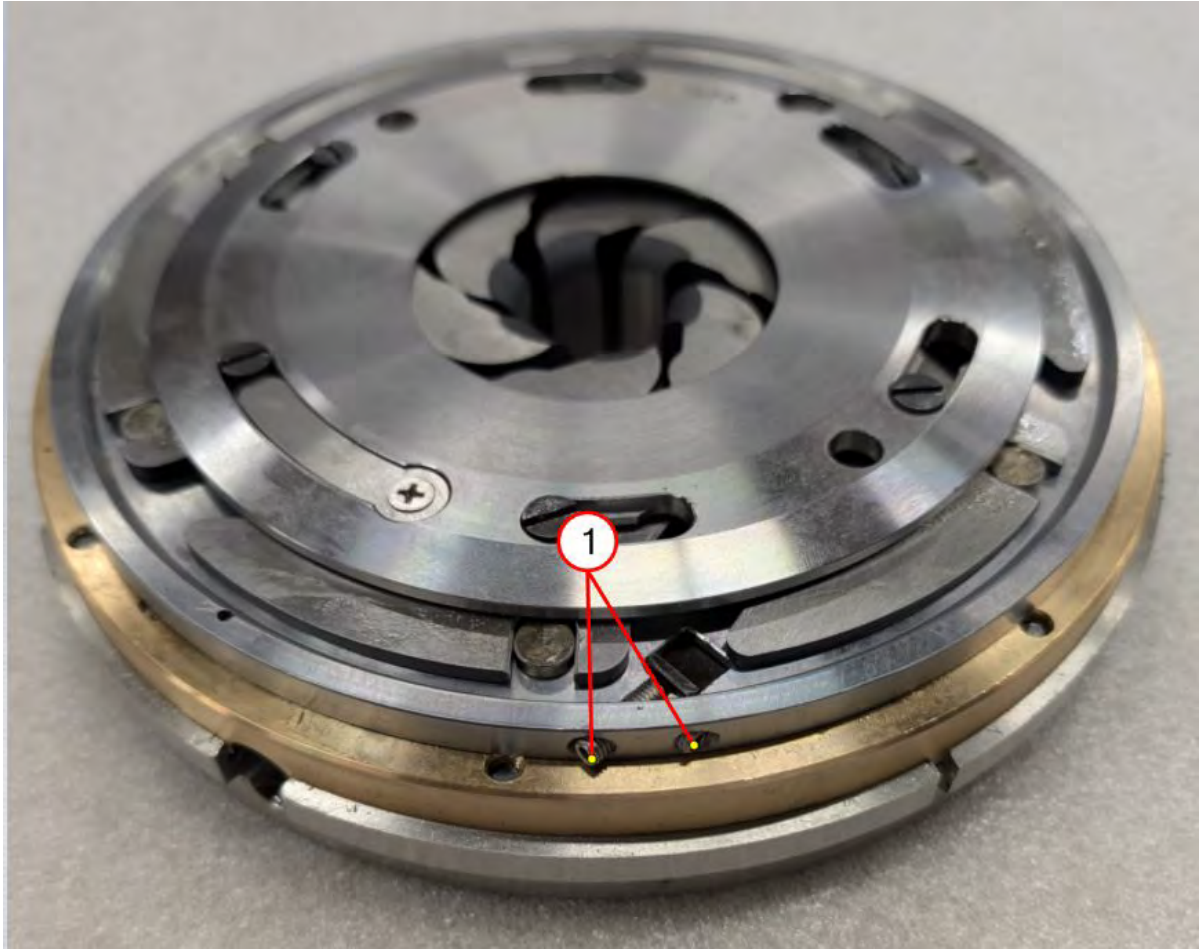


WARNING

Read and understand the procedures for opening and closing the cutter cover and handling the cutter head. Failure to do so may result in personal injury.

1. Open the cutter cover.

2. Remove the cutter head from the cutter body subassembly.
3. Rotate the cutter head until you can reach the adjustment setscrews.



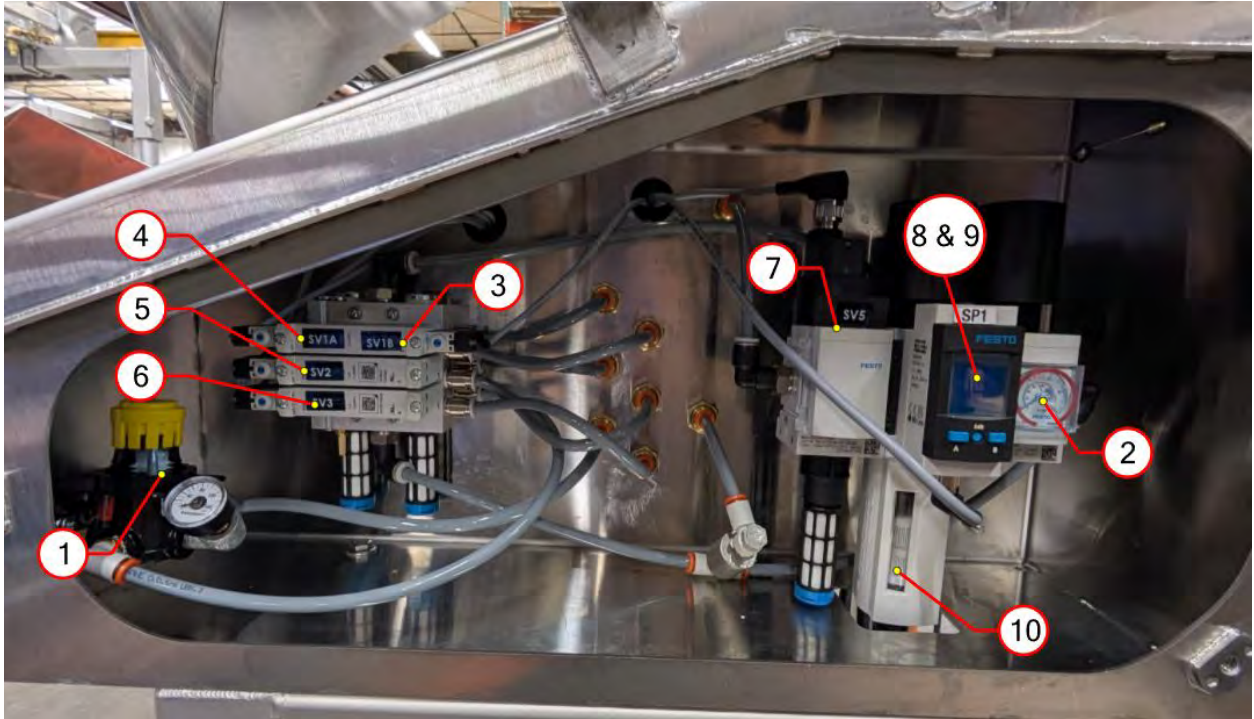
Item	Description
1	Adjustment Setscrews

4. Loosen both set screws. DO NOT REMOVE THESE SCREWS!
5. Using a hex key, change the size of the iris by turning the set screw.
 - a. Turn the set screw clockwise to enlarge the iris.
 - b. Turn the set screw counterclockwise to reduce the size of the Iris.
6. Tighten locking set screw.
7. Place the cutter head back into the cutter body assembly.
8. Close the cutter cover.

Adjusting Pneumatic Controls

Adjust specified controls in the Utility Box to control related machine functions.

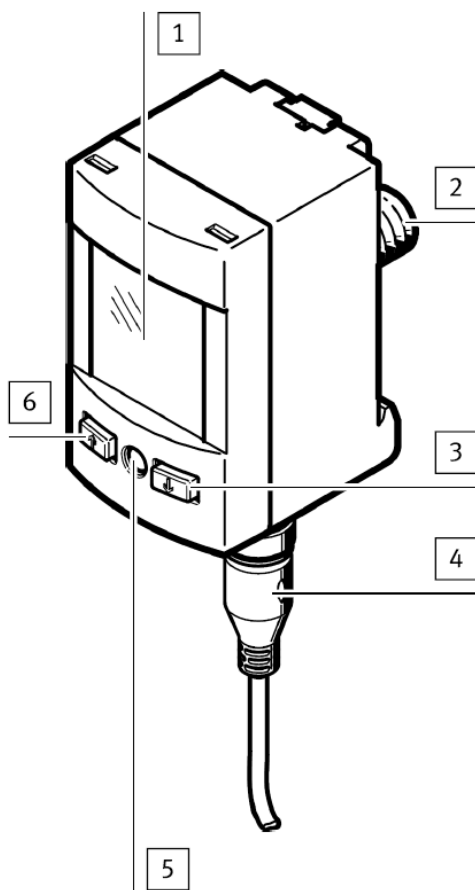
Utility Box



Item	Description	Notes
1	Upper Feed Trough Downfeed Pressure	Set at 35-40 PSI
2	Flipper Gate Pressure Regulator and Gauge	Set at 35-40 PSI
3	TURN - air valve	
4	REJECT - air valve	
5	REVERSE - air valve	
6	LIFT - air valve	
7	Air Dump	
8	Main Air Pressure Regulator and Gauge	Set at 80-85 PSI
9	Air Pressure Switch	Factory set at 60 PSI
10	Air Filter	
11	Water Valve	

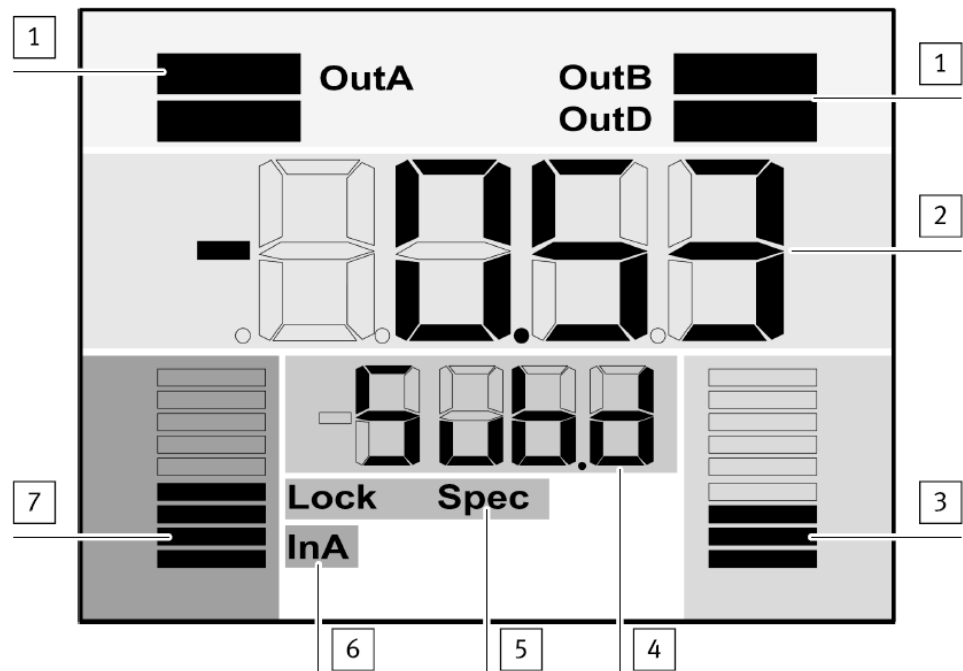
SPAU Pressure sensor

Overview



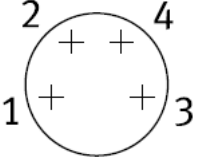
- 1 Display
- 2 Pneumatic connection
- 3 B pushbutton
- 4 Electrical connection
- 5 Edit button
- 6 A pushbutton

LCD Display

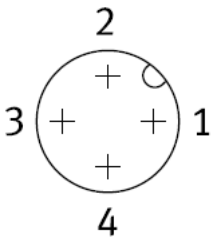


- | | |
|---|---|
| 1 | Output display |
| 2 | Main display (e.g. measurement value) |
| 3 | Bar graph for analogue output (only visible for scaled analogue output) |
| 4 | Lower display (e.g. unit) |
| 5 | Status information |
| 6 | Input display |
| 7 | Bar graph for input signal |

Pressure Switch Cable Pinout (M8 Connectors):

Connection - M8	Pin	Function	Core Color
	1	+24V DC	Brown (BN)
	2	Switching output OutB, OR Analogue OutD. (NOT USED)	White (WH)
	3	0V DC	Blue (BU)
	4	Switching output OutA	Black (BK)

Dump Valve and Water Valve Cable Pinout (M12 Connectors):

Connection - M12	Pin	Function	Core Color
	1	NOT USED	Brown (BN)
	2	NOT USED	White (WH)
	3	0V DC	Blue (BU)
	4	+24V DC	Black (BK)

Pressure Switch Settings:

Spec: Filt: 640 ms

Unit: PSI

OutA: ☐ Fctn

SP: 60 PSI



NOTE

Visit <http://www.festo.com> for full user manual.

Electrical Adjustments



WARNING

Read and understand the **Safety Guidelines** chapter of this manual before you attempt to operate or maintain the Electric Automatic Corn Cutter (EACC). Failure to do so may result in personal injury.

The EACC operates on 200-240VAC, 3-phase, 50/60Hz, 30A.



WARNING

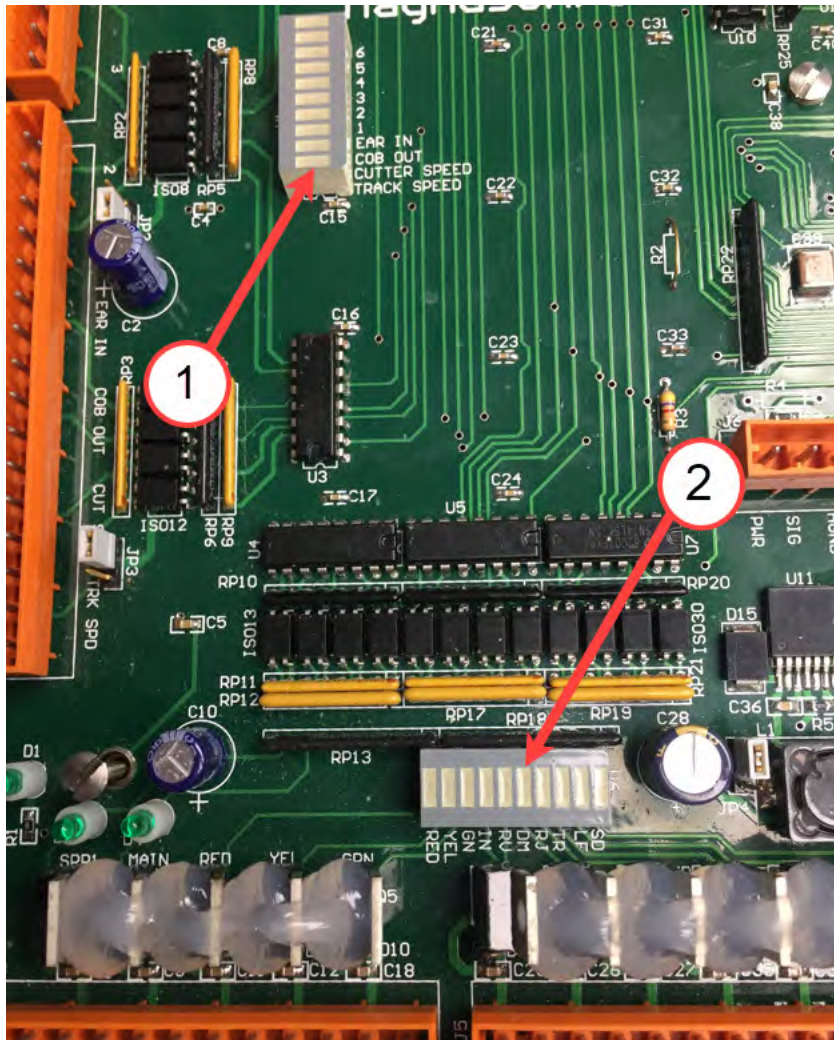
All electrical repairs on the Electric Automatic Corn Cutter (EACC) equipment should be performed by trained personnel who qualify under local, state, and Federal or International regulations.



CAUTION

Always perform MECHANICAL adjustments BEFORE setting or adjusting electronic elements. Failure to do so may result in misadjustment.

LED Indicators



Item	Description
1	Input LEDs
2	Output LEDs

Input Indicators (Sensors)

A single row of six LEDs at the upper left verify the function of the sensors:

EAR IN	Turns OFF when an ear of corn or other object makes contact with and moves the infeed sensor blade away from the proximity switch. When the machine is running, this LED will remain ON until there is an excess of corn in the infeed wheel.
COB OUT	Turns OFF when a cob is in the cob out rollers. When the machine is running, the LED will be illuminated until a cob goes through the rollers.
CUTTER SPEED	Illuminates once for each revolution of the cutter. When the machine is running, this LED turns on and off at such a rapid rate that it will appear as dim light.

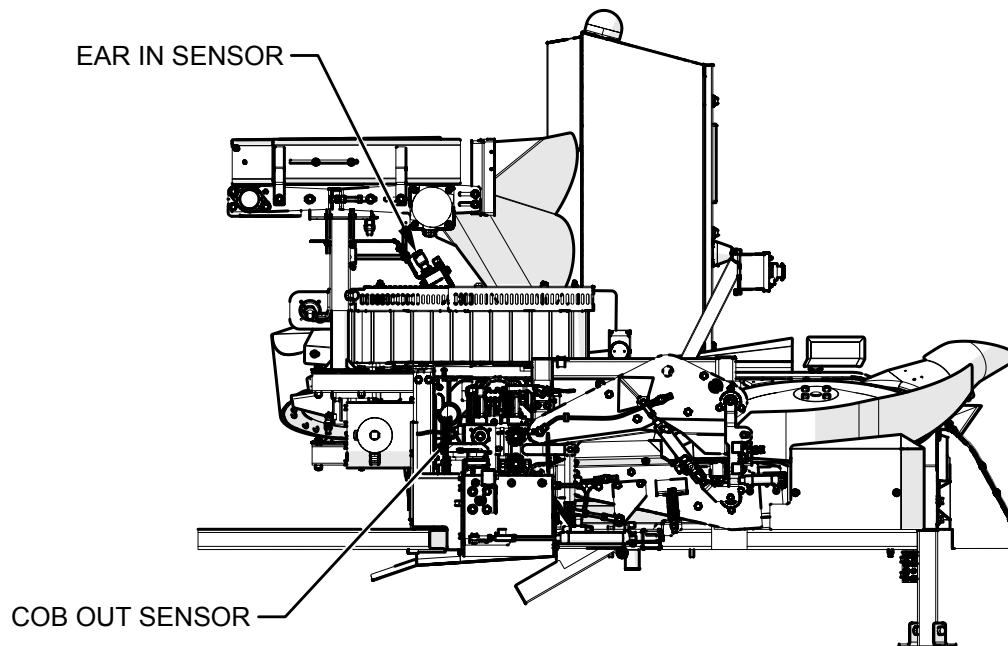
TRACK SPEED	Illuminates 20 times for each revolution of the turning wheel. When the machine is operating, the LED blinks at a steady rate.
----------------	--

Output Indicators

At the bottom left, ten indicators verify signals going out to the air valves and optional beacon lights.

RED	When this red LED is ON, a signal travels to the optional Beacon Light and turns ON the red light.
YEL	When this red LED is ON, a signal travels to the optional Beacon Light and turns ON the yellow light.
GN	When this red LED is ON, a signal travels to the optional Beacon Light and turns ON the green light.
IN (INFEED)	When this red LED is ON, a signal travels to the infeed conveyor On/Off valve causing the infeed conveyor to run. The speed of the infeed conveyor is determined by the adjustment of the hydraulic needle valve. During normal operations, the INFEED LED is ON. When the ear in sensor detects overfill at the infeed wheel, the machine stops, and the INFEED LED turns OFF.
RV (REVERSE)	When this LED is ON, a signal travels to the reverse air valve, which sends air to the hydraulic directional/reversing valve. This will cause the orange belts and feed/cob rolls to reverse direction.
DM (DUMP)	When this red LED is ON, a signal travels to the recycle air valve to actuate the recycle cylinder. During normal operation, the RECYCLE LED will be OFF and will turn ON during a recycle operation.
RJ (REJECT)	When this red LED is ON, a signal travels to the reject air valve causing the flipper gate to move to the REJECT position. During normal operation, the REJECT LED will be OFF until a nubbin passes the light source.
TR (TURN)	When this red LED is ON, a signal travels to the turn air valve causing the flipper gate to move to the TURN position. During normal operation, the TURN LED will be OFF until an ear of corn passes the light source.
LF (LIFT)	When this red LED is illuminated, a signal travels to the lift air valve causing the Upper Trough to drop to the DOWN position. When it is OFF, the upper feed trough is in the UP position. During normal operations, the LIFT LED is ON.
SD (Shut Down)	- When the light source is blocked, causing five or more of the “eyes” on the Profile Board to be OFF. Value is adjustable. - After three recycling attempts to clear a blockage. Value is adjustable.

Sensor Adjustment



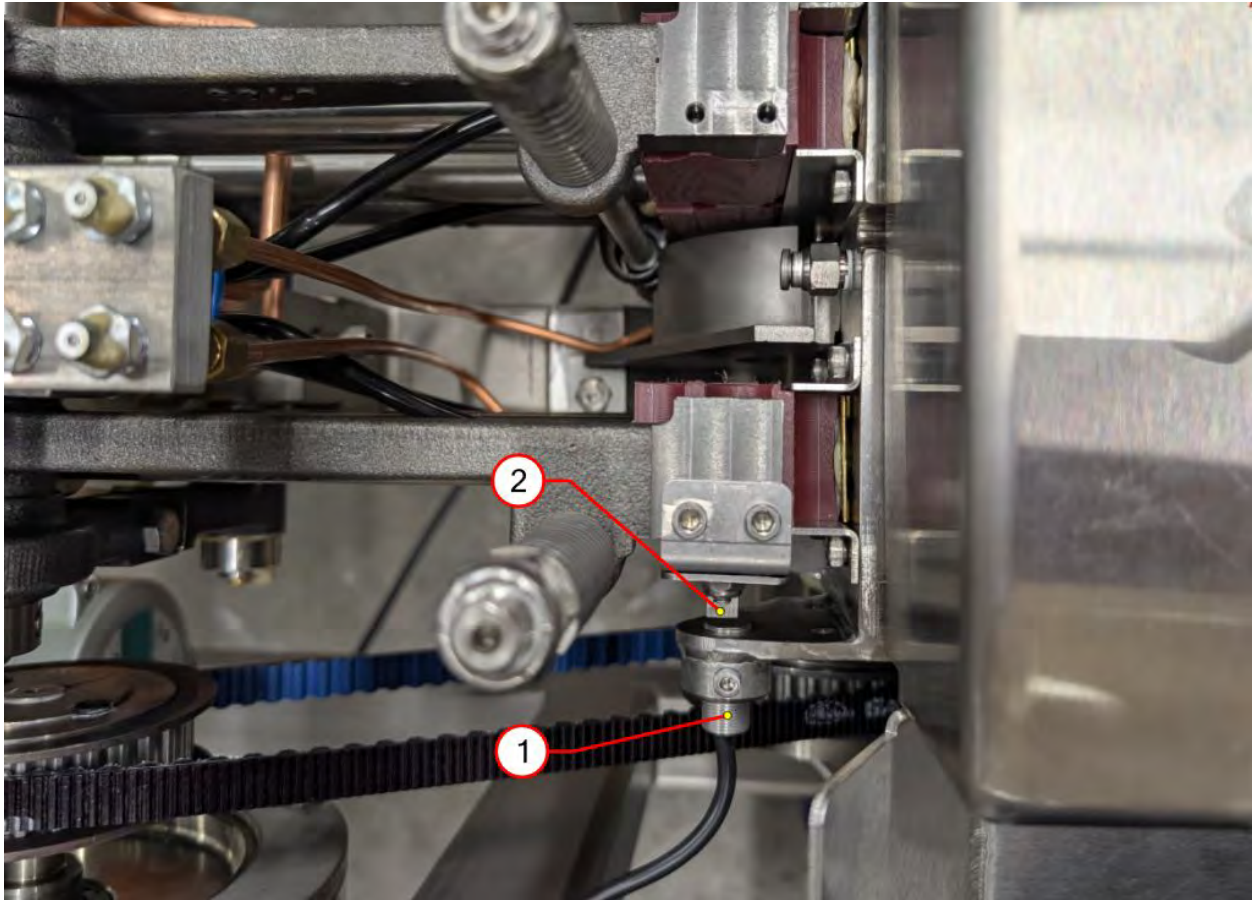
Sensor	Function
COB OUT	A Hall Effect sensor located by the feed rolls senses a magnet and turns off when a cob goes through the feed rolls. For more information, see Adjust the Cob Out Sensor (page 105) .
EAR IN	A proximity switch located by the infeed wheel senses a set screw in the sensor blade and controls the infeed conveyor. For more information, see Adjust the Ear In Sensor (page 106) .



CAUTION

Before setting sensors, ensure that you have completed all mechanical adjustments. Failure to do so may result in misadjustment.

Adjust the Cob Out Sensor



Item	Description
1	Cob Out Sensor
2	Magnet

This procedure describes how to adjust the cob out sensor. Prior to setting the cob out sensor, verify that all previous adjustments have been performed correctly.

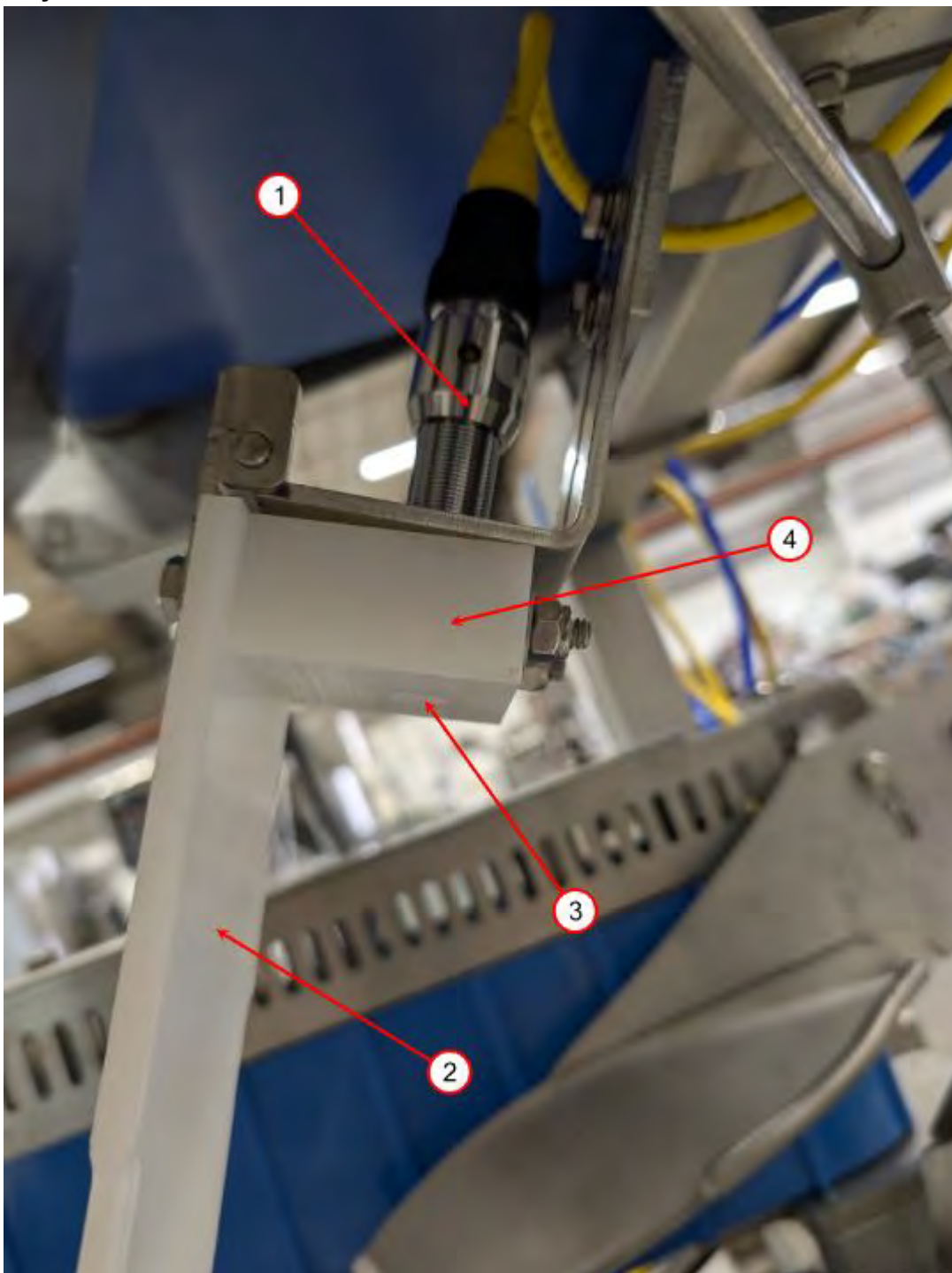
1. Put the EACC in By-Pass mode. See ???.
2. Manually turn the air valves OFF.
3. At the controller box, press the green Start button to apply electrical power to the machine.
4. At the feed roller assembly, adjust the cob out sensor body and magnet bracket to obtain a .05" (1.3 mm) gap between the magnet and the sensor body.
5. Loosen the two screws that hold the cob out sensor body bracket.
6. Position the sensor body bracket so that the Cob Out LED is ON.
7. Lift the steel upper cob roll approximately 1/4" (6.4 mm). The light of the Cob Out LED should go OFF.
8. Lockdown the bracket; then release. The Cob Roll LED should go ON.
9. Repeat the lift and release of the cob roll to ensure correct OFF-ON operation.



IMPORTANT

Reminder: The LED must be ON in the release position.

Adjust the Ear In Sensor



Item	Description
1	Ear In Sensor
2	Sensor Blade
3	Set Screw
4	Sensor Target Block

This procedure describes how to adjust the Ear In Sensor. The Ear In Sensor senses a set screw that is screwed into the sensor target block.

1. Press the E-Stop to stop machine for safety purposes.
2. Manually turn the air and hydraulic valves OFF.
3. At the computer box, press the green Start button to apply electrical power to the machine.
4. At the Ear In Sensor Blade, the LED on the Ear In Sensor should be ON when the sensor blade is in the down position, and go OFF when the sensor blade is lifted up.
5. To get the LED to turn ON, adjust the set screw further in the sensor blade block towards the end of the Ear In Sensor. Also, check the Ear In Sensor to make sure it is adjusted down enough to sense the set screw in the sensor target block.
6. Raise and lower the sensor blade to verify the LED on the sensor turns ON and OFF.
7. Turn the machine off and return the By-Pass switch to the off position.

Motor Adjustment

The EACC has nine electric motors controlled by drives located on the inside of the Electrical Control Box.



DANGER

Disconnect power before servicing Electrical Control Box. Failure to do so may result in personal injury or death.



WARNING

Do not perform maintenance on this machine unless you have been trained in the maintenance and safety procedures.

[-- insert pic of drives --]

Drive	Function
U1	Cob Rolls
U2	Upper Feed Trough
U3	Lower Feed Trough
U4	Infeed Conveyor
U5	Infeed Wheel
U6	Metering Belt
U7	Blue Chain
U8	Turnwheel

Drive	Function
U9	Cutter Head

Drive Settings

U1-8 Drive Parameters

Parameter	Description	Setting	default
418	Speed Information	50 to 5000 [r/min]	5000
450	Motor rotation direction	1: Positive direction=CW	1
2085	Speed upper limit	50 to 4000 [r/min]	4000
2086	Speed lower limit	50 to 4000 [r/min]	50
426	Undervoltage Information	120 to 280 [V]	120
329	Acceleration/deceleration unit selection	1: [s]	0
330	Impact softening filter		0
2033	Speed reduction ratio	100 to 9999	100
2038	Speed reduction ratio digit setting	0: ×1, 1: ×0.1, 2: ×0.01	2

Parameter	U1	U2	U3	U4	U5	U6	U7	U8
	Cob Rolls	Upper Feed Trough	Lower Feed	Infeed Conveyor	Infeed Wheel	Metering Belt	Gray Chain	Turn Wheel
418	2280	2950	2950	600	1785	2424	2424	2030
450	0	1	0	0	1	1	0	0
2085	2500	3250	3250	700	1985	2624	2624	2230
2086	2000	2650	2650	500	1585	2242	2242	1830
426	200	200	200	200	200	200	200	200
329	1: [s]	1: [s]	1: [s]	1: [s]	1: [s]	1: [s]	1: [s]	1: [s]
330	2	2	2	2	2	2	2	2
2033	500	1500	1500	1500	5000	1500	1500	5000
2038	2	2	2	2	2	2	2	2

U9 - VFD 1 Drive Parameters

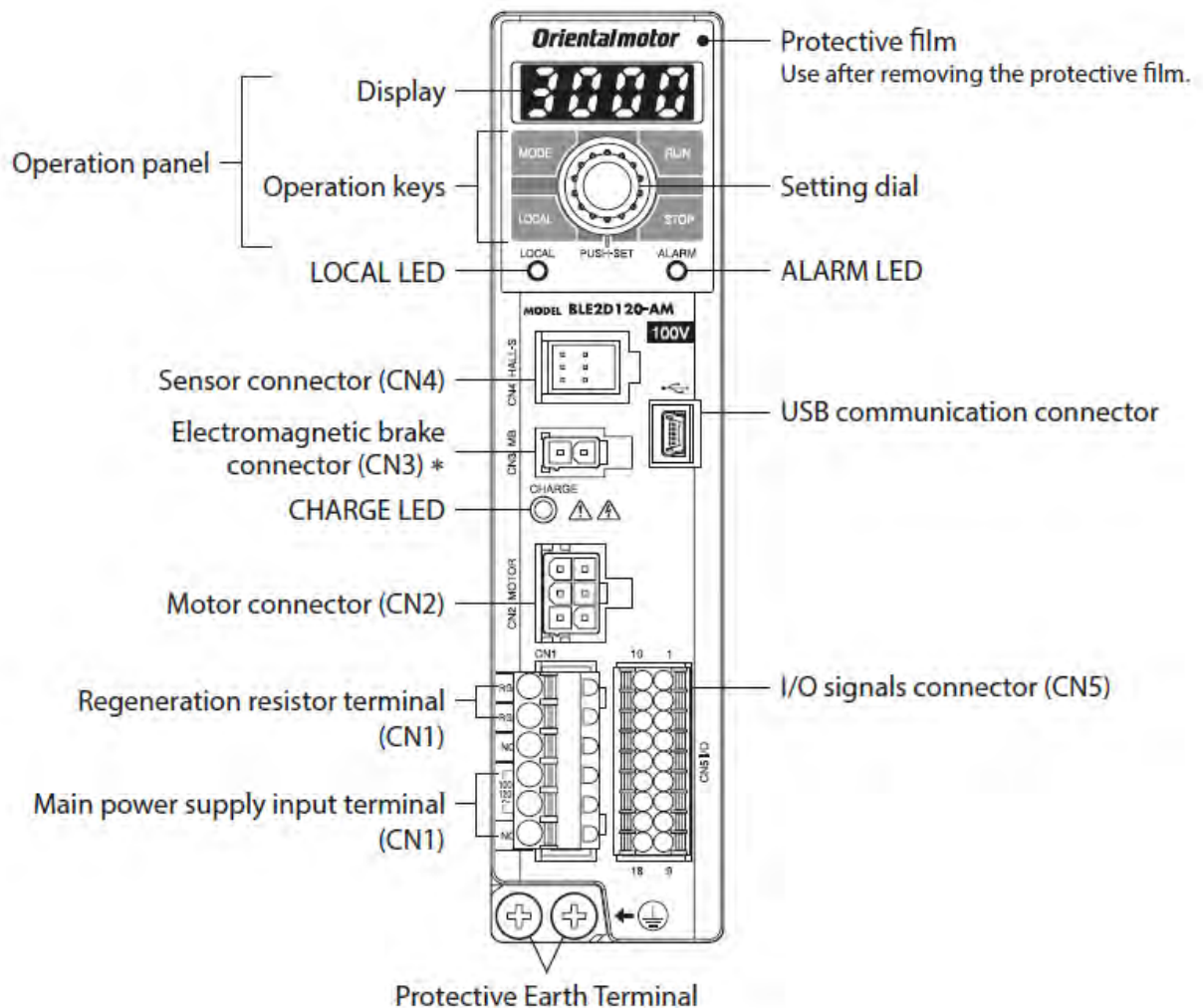
Parameter	Value	Description
00.21	1	Terminal control (disables keypad RUN/STOP)
01.12	2.00	Acceleration time (seconds)
01.13	2.00	Deceleration time (seconds)
2.00	1	2-Wire control mode

Drive ID & Speed, Motor Cable

Drive	Function	Set Speed (RPM)	Cable	Description
U1	Cob Rolls	2280	0005.1084.01	Opposite Shaft
U2	Upper Feed Trough	2950	0005.1084.02	Toward Shaft
U3	Lower Fedd Trough	2950	0005.1084.01	Opposite Shaft
U4	Infeed Conveyor	600	0005.1084.01	Opposite Shaft
U5	Infeed Wheel	1785	0005.1084.02	Toward Shaft
U6	Metering Belt	2424	0005.1084.01	Opposite Shaft
U7	Blue Chain	2424	0005.1084.01	Opposite Shaft
U8	Turn Wheel	2030	0005.1084.02	Toward Shaft

Drive	Function	Set Speed (Hz)
U9	Cutter Head	54.0

Drive BLE2 Series



Item	Description
Display	This display shows the monitor items, setting screen, alarms, etc.
Operation keys	These keys are used to switch the operation mode or change parameters. When the local control operation is performed, the motor can be operated and stopped using RUN key and STOP key.
Setting dial	Turn - Setting of parameter value, screen transitions Press - Determine (SET)
LOCAL LED	This LED is lit in green when the local control operation is performed.
ALARM LED	This LED blinks in red when an alarm is generated. This LED blinks in orange when information is generated.
CHARGE LED	This LED is lit in red while the main power is supplied. After the main power is turned off, the LED will turn off once the residual voltage in the driver drops to a safe level.
Main power supply input terminal (CN1)	Connects the main power supply. Three-phase 200-240 VAC: Connects a three-phase 200-240 VAC power supply to L1, L2, L3.
Regeneration resistor terminal (CN1)	Connects the regeneration resistor (sold separately).
Motor connector (CN2)	Connects the power connector (white) of the connection cable.
Electromagnetic brake 17 connector (CN3) *	Connects the electromagnetic brake connector (white) of the connection cable. * Only drivers for electromagnetic brake motor
Sensor connector (CN4)	Connects the sensor connector (black) of the connection cable.
USB communication connector	Connects a PC in which the MEXE02 has been installed.
I/O signals connector (CN5)	Connects input signals and output signals. Connects the external potentiometer (sold separately) or external DC power supply.
Protective Earth Terminal	Connects the ground terminal of the connection cable and the grounding wire.
Mounting holes (two places at the rear)	These mounting holes are used to install the driver with screws (M4).

Operating using the operation panel

1. **AC power ON:** When the power supply is turned on, the display shows Rotation speed 0 r/min (standstill).
2. **Operation selection:** Press the LOCAL key. The LOCAL LED is lit in green. The operation using the operation panel is set, and the rotation speed and rotation direction are alternately continued to show on the display.
3. **Rotation direction selection:** Press the MODE key. The motor rotation direction changes whenever the MODE key is pressed. Check the operating manual of the motor for the rotation direction of the gearhead output shaft. In the case of the gearhead output shaft, the rotation direction varies depending on the gear ratio of the gearhead.
4. **Start of motor:** Press the RUN key. The motor rotates.
To stop the motor, press the STOP key. The motor stops.

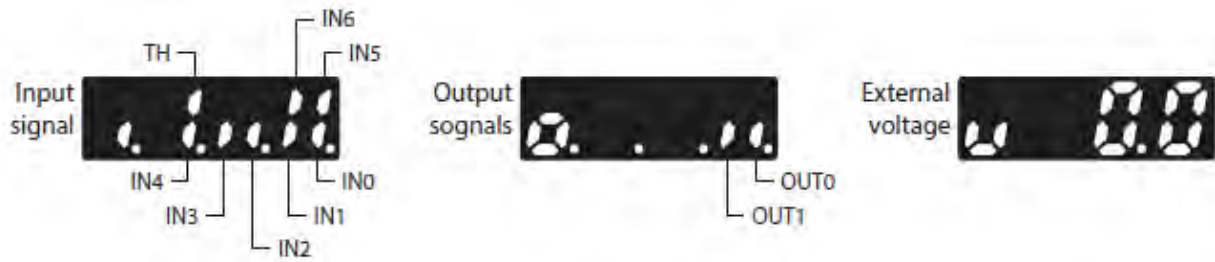
5. **Changing speed of motor:** Press the Setting dial. The display blinks. You can adjust the speed while blinking. If "Err" is displayed, set the "Speed, torque limiting command selection" parameter to "0: Digital setting." If the rotation speed or the torque limiting is set to the analog setting, an external control device is required to connect to rotate the motor.

Adjustment: Turn Setting dial to the left (counter-clockwise) to decelerate. Turn Setting dial to the right (clockwise) to accelerate.

Set: Press the Setting dial. The display changes to lighting from blinking, and the speed will be set. When you start the motor next time, it will rotate at the set speed.

I/O monitor

The ON-OFF status of each I/O signal for the driver can be checked. Each digit on the 7-segment LED display corresponds to a signal. The corresponding digit is lit when the signal is ON, and the digit is unlit when the signal is OFF. Also, the voltage value that was set using the external potentiometer or external DC voltage can be checked.



I/O test

With the I/O test, the ON-OFF status of each input signal can be checked, and the ON-OFF status of each output signal can be switched. The ALARM LED on the driver blinks in orange when the screen is moved to the I/O test. During the I/O test screen, the I/O terminals of CN5 are disabled, and the motor does not rotate even if the operation input signal is turned ON. When an electromagnetic brake motor is used, the electromagnetic brake actuates to hold the motor shaft.



NOTE

If the setting dial is pressed to move to the I/O test screen while the load holding function is enabled, the holding force is lost. When the screen is returned to the top screen of the test mode, the holding force is generated.

- **Input signal:** Each digit on the 7-segment LED display corresponds to a signal. The corresponding digit is lit when the signal is ON, and the digit is unlit when the signal is OFF. The connection with a programmable controller can be checked. In this time, the motor does not rotate even if the input signal is turned ON.
- **Output signal:** The ON-OFF status of the output signal can be switched using the setting dial.
- **External voltage:** The voltage value input by the external analog setting device can also be checked.



NOTE

For additional information, visit <http://www.orientalmotor.com> for full technical specification and user manual.

**NOTICE**

For EACC that uses BMU Series motor drives, see [Drive BMU Series \(page 262\)](#) for operating procedure.

Drive GS10

GS10 Digital Keypad

Key	Description of Functions
RUN	- Valid only when the source of operation command is from the keypad. - RUN can be pressed even when drive is in process of stopping. - When in "LOCAL" mode, RUN is valid only when the source of operation command is from the keypad.
STOP/RESET	<i>This key has the highest processing priority in any situation.</i> - When the drive receives a STOP command, whether the drive is in operation or stop status, the drive will execute a "STOP" command. - The RESET key can be used to reset the drive after a fault occurs. For those faults that can't be reset by the RESET key, see the fault records after pressing MENU key for details. <i>NOTE: The ability to STOP the drive from the keypad is effective ONLY if the drive is configured to RUN and/or STOP from the keypad. Keypad STOP can be disabled by parameter 00.32, Digital Keypad STOP Function.</i>
ENTER	Press ENTER to go to the next menu level or accept parameter entry. If it is the last level, then press ENTER to execute the command.
MENU	Press MENU to return to the Main Menu or cycle through the available menu options.
Direction: Up	Press to make the value set on the current menu/parameter higher.
Direction Left/Down	- Press to make the value set on the current menu/parameter lower. - In the menu/text selection mode, the arrows are used for item selection. Long press the MENU key to use the left direction function.
Frequency Setting Dial (Potentiometer)	The dial can be set as the main frequency input. Set Parameter 00-20 or 00-30 to equal '7-Digital Keypad Dial'.

Keypad Indicator LEDs

The left and right sides of the digital display contain a series of LEDs that light up to indicate certain drive functions.

Descriptions of LED Functions	
RUN	Steady ON: Drive is running.
	Blinking: Drive is stopping or in base block.
	Steady OFF: Drive is not running.
FWD	Steady ON: Drive is operating in Forward mode.
	Blinking: Drive is changing direction.
	Steady OFF: Drive is operating in Reverse mode.
REV	Steady ON: Drive is operating in Reverse mode.
	Blinking: Drive is changing direction.
	Steady OFF: Drive is operating in Forward mode.
STOP	Steady ON: Drive is stopped or in the process of stopping.
	Blinking: Drive is in standby (run but does not output).
	Steady OFF: Drive is not currently executing an operational (STOP) command.
<i>NOTE: The ability to STOP the drive from the keypad is effective ONLY if the drive is configured to RUN and/or STOP from the keypad. Keypad STOP can be disabled by parameter 00.32, Digital Keypad STOP Function.</i>	



NOTE

Visit <http://www.automationdirect.com> for full technical specification and complete user manual for DURApulse GS10 Drive.

Operation

Personnel who work on or around the Electric Automatic Corn Cutters (EACC) must understand the basic, safe operating procedures used daily for automatic corn processing. These procedures include:

- Starting and stopping the machine in normal and emergency situations
- Monitoring machine performance
- Clearing blockages and jams
- Changing cutter heads



WARNING

Do not perform maintenance on this machine unless you have been trained in the maintenance and safety procedures.

Controls

The Start, and Stop controls are located on each EACC machine. These controls incorporate safeguards against accidents such as:



WARNING

Do not attempt to disable or remove safeguards. Severe injury to personnel can occur if safeguards do not function.

Interlock Switch	Prevents machine start-up if the cutter cover is not closed or the optional feed trough guard is not closed.
“Reverse” Control	Signals the reverse air valve and causes the recycle gate to shift and the hydraulic motors to reverse in the event of a blockage. After four recycle attempts to clear a blockage, the sensor sends a shut-down signal to turn off the machine.
Infeed Sensors	Send a signal to stop the conveyor when the infeed wheel overfills with corn.
Circuit Breakers	Protects the machine's overcurrent condition. If certain machine elements do not function, the circuit breakers may be tripped.

If the EACC will not start using normal start-up procedures, perform the Two-Minute Checkout and other troubleshooting techniques described in [Troubleshooting \(page 166\)](#).

Use of correct start-up procedures ensures the safety of personnel working near the automatic corn cutting equipment and prevents wear on machine parts. For more details, see [Start and Stop the EACC \(page 115\)](#).



WARNING

Before starting the Electric Automatic Corn Cutter (EACC), ensure that all guards are in place and latched. **Failure to do so may result in personal injury.**

This procedure describes how to start and stop the EACC.



Item	Description
1	START push button
2	STOP push button
3	E-Stop button

To start the EACC:

1. Ensure that all personnel are well away from the machine.
2. Reset the Emergency Stop if actuated.
3. Push the green Start button on the side of the computer box to start the machine.

To stop the EACC:

- Use the red Stop button located on the electrical enclosure.

Shut down the machine to stop moving parts before clearing blockages or performing maintenance. Lockout/tag out the electric power source at the computer box to protect personnel from accidental start-up.

In an emergency:

- Push the EMERGENCY STOP button.

After the emergency passes, ensure that all personnel are at a safe distance from the machine and pull the EMERGENCY STOP button OUT. Restart the machine using normal start-up procedures.



WARNING

Regularly test the Emergency Stop and Interlock systems to ensure adequate function. **Failure to do so may result in personal injury.**

Monitoring Operations

When the EACC is running, qualified personnel must be in attendance to observe the operation and:

- Stop the machine when necessary for emergencies or repair.
- Locate and clear blockages that cannot be cleared by automatic features of the machine.
- Adjust the machinery for the most cost-effective results, due to changes in corn variety, size, and or shape.
- Periodically check the oil level of the cutter head oiler, if equipped with one. Refill if the oil level is low.

During corn processing, evaluate machine performance in three ways:

1. Monitor the Process

Monitor the process and check for product jams at the infeed, misoriented corn, frequent recycle operations and other indications of worn parts or defective sensor devices.

2. Observe Product Condition

Monitor machine input and output to check for product defects that indicate the need for adjustment or repairs. First, observe the ears of corn as they enter the machine to determine if they can be cut. For example:

- Banana-shaped, oval, or other irregular-shaped ears cannot be cut in the center.
- Damaged ears yield ragged cuts.
- Broken ears yield broken cobs.

Then, observe cut cobs for the misalignment of the cut. See [Troubleshooting \(page 166\)](#) for identification of many common defects in the finished product and the solutions for each.

HMI

The EACC is equipped with a Human Machine Interface located on the front of the Electrical Control Box. The touchscreen displays the status of machine functions as monitored by the sensors.

Navigation, Help, and Languages



31/Mar/2025 - 03:53:18 PM
Machine # 001 VER: 1.06A

31/Mar/2025 - 03:53:18 PM	Current Date & Time	I/O	Navigate to the Machine I/O Screen
Machine #001	Machine Number	?	Help
Home	Navigate to the Home Screen	English / Inglés	Change the Language to English
Login	Navigate to the User Login Screen	Spanish / Español	Change the Language to Spanish
Params	Navigate to the Machine Parameter Screens		
Data	Navigate to the Machine Data Screens		
Alarms	Navigate to the Machine Alarms Screen		

Home

Login

Params

Data

Alarms

I/O

?

Help

Blue navigation buttons are located at the bottom of the screen. Press the Help button to see description of each button and language options.

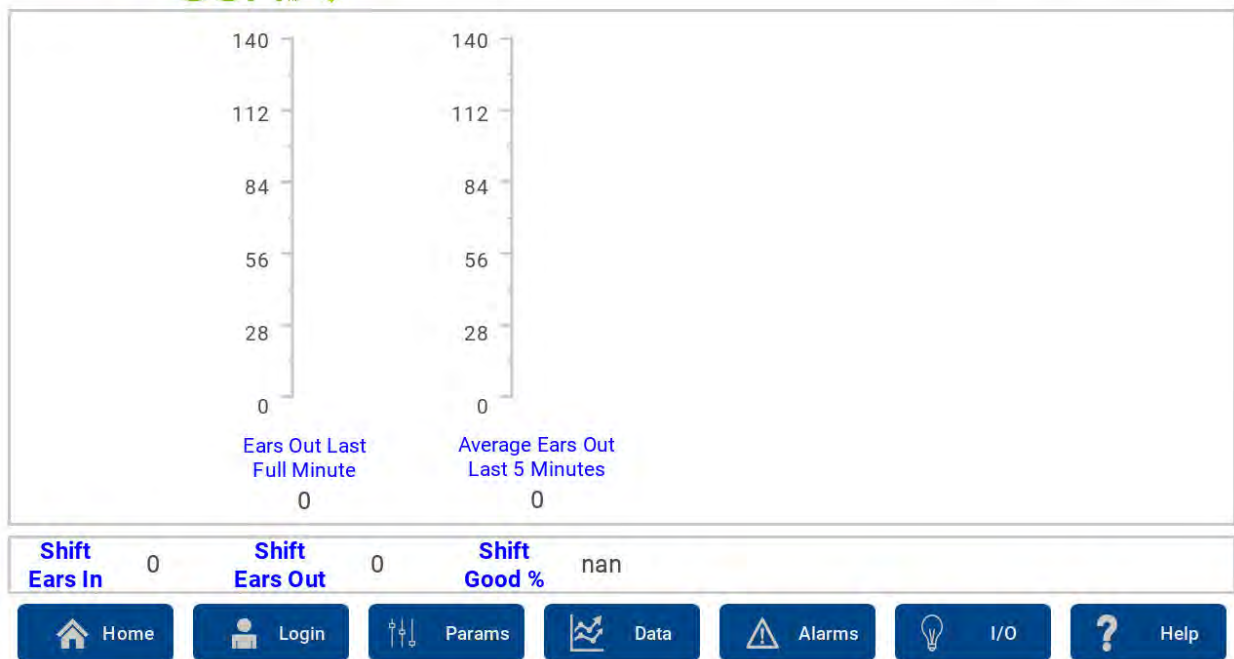
Button	Description
Home	Navigate to the Home Screen
Login	Navigate to the User Login Screen
Params	Navigate to the Machine Parameter Screens

Button	Description
Data	Navigate to the Machine Data Screens
Alarms	Navigate to the Machine Alarms Screen
I/O	Navigate to the Machine I/O Screen
Help	Navigate to the Machine Help Screen
English/Inglés	Change the Language to English
Spanish/Español	Change the Language to Spanish

Home



31/Mar/2025 - 03:42:15 PM
Machine # 001 VER: 1.06A



The Home Screen shows a summary of what has been processed in 1 min and the last 5 min, the total number of ears entered, the total number of cobs output, and the yield.

- **Ears Out Last Full Minute:** Shows what has been processed in the last 1 minute.
- **Average Ears Out Last 5 Minutes:** Shows an average of ears processed over the last 5 minutes.

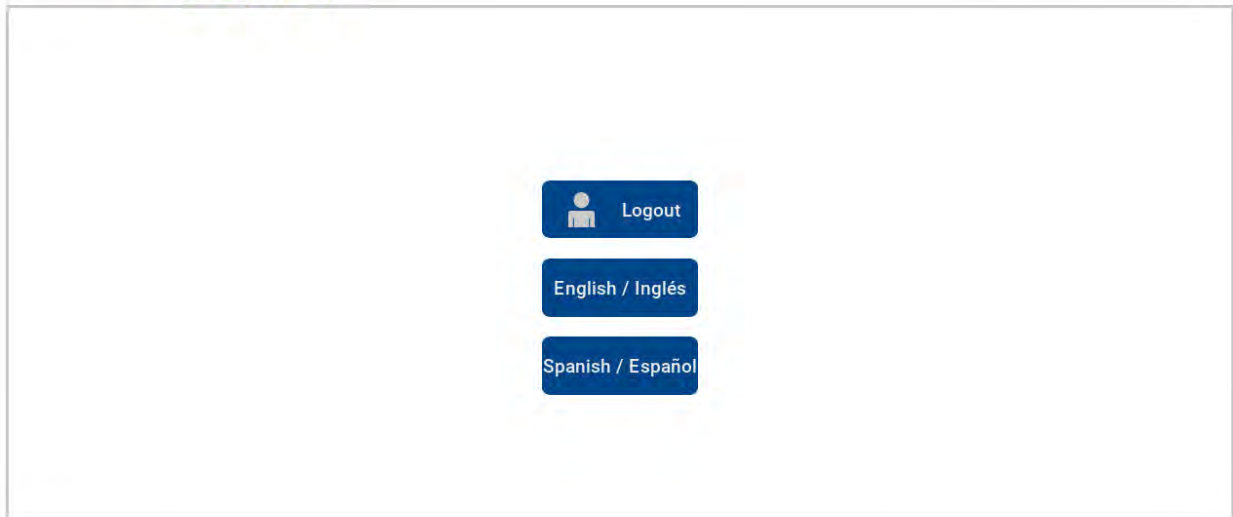
Horizontal Bottom Bar:

- **Shift Ears In:** Total ears of corn entered into the machine counted by light sensor.
- **Shift Ears Out:** Total cobs output from the machine counted by the ear out sensor.
- **Shift Good:** It is the percentage of return of what goes out to what comes in; example, $1278/1305=0.98$. Yield = 98%

Login



31/Mar/2025 - 03:43:42 PM
Machine # 001 VER: 1.06A



The Login Menu has the options to enter the password and make factory changes. It also has the option the change the language to English or Spanish.

Parameters

The Parameter Screen displays the general settings parameters of the machine.

Ear Out Deb Cnt	0	Infeed On Bump	0	Recycle Enable	0
Flip Normal	0	Infeed On Debounce	0	Recycle Clear Time	0
Flip Denominator	0	Infeed Off Bump	0	Recycle Stop Count	0
Flip Numerator	0	Infeed Off Debounce	0	Recycle Hold Time	0
Flip Delay	0			Recycle Increment	0
Nubbin Length	0	Low Output Value	0	Recycle Lift Dwell	0
Nubbin Flip Delay	0	Minimum Width	0	Recycle Lift Delay	0
Nubbin Duration	0	Maximum Width	0	Recycle Ear Count	0
Guide Delay	0	Maximum Length	0	Special Function	0
Guide Delay EXT 	-				

Previous
Next

 Home
 Login
 Params
 Data
 Alarms
 I/O
 Help

- **Ear Out Deb Cnt:** Counter for stem or foreign matter rejections.
- **Flip Normal:** Normal or 1 is tip first (DO NOT CHANGE).
- **Flip Numerator/Flip Denominator:** Used to determine where to flip the ear of corn (DO NOT CHANGE).
- **Flip Delay:** Sets the number of samples between the sensor and the flipper (FIFO tail length). (Default: 550.)
- **Note:** There are 24 inches between the sensor array and the end of the flipper. This means that the distance between samples is currently about .044 inches (1.1mm). Distance between light sensor and flipper 550 is the good number to start with.
- **Instructions for determining the activation delay:** Use a "nubbin" or the tip of the first "ear" to adjust the activation delay of the flipper. Notice when the gate returns to its neutral position after the nubbin has passed through the flipper. The flipper should barely lose contact with the nubbin.
- **Important:** The stalk is ignored when determining the action of the flipper.
- **Nubbin Length:** Sets the maximum rejected length of the nubbins; it is recommended to look at the length table above.
- **Nubbin Flip Delay:** Delay of the flipper for a nubbin cob (set to 100).
- **Nubbin Duration:** Amount of time in milliseconds the flipper is open to let a nubbin pass by.
- **Guide Delay:** Delay needed from a tip first cob past the light source to the flipper.
- **Guide Delay EXT:** Rejection time of the nubbin, open flipper.
- **Infeed On Bump:** When the infeed bowl needs corn (see "In On Delay (0.1 sec)" and (In Off Delay (0.1 sec))), the infeed conveyor will turn on for the time set by this parameter before turning off for "In Off Bump (0.1 sec)". This cycle will continue until either the bowl has enough corn or 10 seconds have expired. After the 10 second period, the infeed conveyor will stay on until the bowl has enough corn.

- **Infeed On Debounce:** Used to reduce double counts from the infeed sensor.
- **Infeed Off Bump:** For a continuous infeed conveyor feeding when the infeed bowl needs corn.
- **Infeed Off Debounce:** Used to increase if double ear out counts occur at the cob roll exit.
- **Low Output:** Set number to determine when the yellow light comes on. If set to 60. then when rate is above 60 ears per minute, light will be green. When rate is below 60 ears per minute, light will be yellow.
- **Minimum Width:** Minimum width that an ear has to be before it is considered an ear.
- **Maximum Width:** Maximum width of an ear of corn before it is rejected.
- **Maximum Length:** Maximum length of an ear of corn before it is rejected.
- **Recycle Enable:** Set to 1 (if 0, recycle will turn off).
- **Recycle Clear Time:** After a reverse cycle, do NOT check for ears out for this amount of time. If only one or two ears go through, do not reset the Recycle Stop Count counter.
- **Recycle Stop Count:** Number of times the machine will attempt to recycle before the machine is stopped. (Resets after a jam is cleared). Default is 4.
- **Recycle Hold Time:** After the lift cylinder is lowered, how much time before the orange belts rotate forward again. (Incremented in 0.1 seconds)
- **Recycle Increment:** Recycle time adder for consecutive reverse cycles. We want the lift cylinder to remain on longer if we continue to recycle. (Incremented in 0.1 seconds).
- **Recycle Lift Dwell:** The time the lift cylinder is raised during a recycle operation. (Incremented in 0.1 seconds).
- **Recycle Lift Delay:** How long the orange belt will be reversed BEFORE the lift cylinder is raised. (Incremented in 0.1 seconds).
- **Recycle Ear Count:** Number of ears IN with no ears OUT before a Recycle cycle starts.
- **Counters Reset:** When the number of cobs reaches the designated number, the program resets the total of cob counter to 0. This feature will be deleted in future versions of HMI software.
- **Special Function:** This is the working mode of the machine. If it is at 0, the machine is in operations. If the option is at 1, the machine will remain stopped.

IP Address_1	172	Strong Tip Tail Level	2
IP Address_2	16	Minimum Stalk Diff	1
IP Address_3	20		
IP Address_4	1	Stalk Width	7
Subnet Mask_1	255	Minimum Eye Count	3
Subnet Mask_2	255	Track Gear Box	15
Subnet Mask_3	0	Track Inch Per Rot	18
Subnet Mask_4	0	Track Mtr Pulse Per	30

Previous

Next

Home

Login

Params

Data

Alarms

I/O

Help

- **IP Address_1:** Sets the IP Address of the Profile Board when connected to a remote monitoring system. (MSB)
- **IP Address_2:** Sets the IP Address of the Profile Board when connected to a remote monitoring system.
- **IP Address_3:** Sets the IP Address of the Profile Board when connected to a remote monitoring system.
- **IP Address_4:** Sets the IP Address of the Profile Board when connected to a remote monitoring system. (LSB)
- **Subnet Mask_1:** Range of IP addresses used to create multiple sub-networks within an extensive network.
- **Subnet Mask_2:** Range of IP addresses used to create multiple sub-networks within an extensive network.
- **Subnet Mask_3:** Range of IP addresses used to create multiple sub-networks within an extensive network.
- **Subnet Mask_4:** Range of IP addresses used to create multiple sub-networks within an extensive network.
- **Strong Tip/Tail Level:** The averaging algorithm used to determine cob orientation (tip or tail).
- **Minimum Stalk Diff:** Number of samples considered as stalk at the tip of the corn compared to the number of samples at the tail of the corn.
- **Stalk Width:** Sets the reject minimum height (in blocked photo eyes) of an ear.
- **Minimum Eye Count:** Anything less than or equal to this number of eyes off, the scan is not considered an ear but may cause a block eye warning.

- **Track Gear Box:** Gearbox ratio for the track speed. 15 would be 15:1 reduction.
- **Track Inch Per Rot:** The number of inches the track moves to 1 rotation of the track motor.
- **Track Mtr Pulse Per:** The number of pulses output per 1 rotation of the track motor.



31/Mar/2025 - 03:46:40 PM
Machine # 001 VER: 1.06A

Beacon State	1	Eye Value (LIVE)	0	Running	0
Blocked Eye	0	Flipped Ears	0	Sort Category	100
Board Hours	16	Ears In / MIN	0	Thin Ears	0
EarsOutBoardLife	1268	Nubbins / MIN	0	Tip Tail Strength	99
Ears In / SHIFT	0	Ears Out / MIN	0	Track Speed	0
Ears Out / SHIFT	0	Recycle / MIN	0	Board Software REV	410
% Good / SHIFT	nan	Tail First / MIN	0	Counter 0-100	0
		Thin Ears / MIN	0		
Ear Length	0	Tip First / MIN	0	MSB_EOBL	0
Ear Width	0	Nubbin Cycles	0	LSB_EOBL	1268

[Previous](#)
[Next](#)

[Home](#)
[Login](#)
[Params](#)
[Data](#)
[Alarms](#)
[I/O](#)
[Help](#)

- **Beacon State:** 1 - RED color; 2 - YELLOW; 3 - GREEN color.
- **Blocked Eyes:** Number of times the light sensor is blocked.
 - Light sensor has 36 eyes (3 blocked eyes will result in a shutdown). This number will show if you have eyes blocked.
- **Board Hour:** Number of hours the E-ACC control board has been powered on.
- **Ears Out Board Life:** Total number of ears counted at the output, this value is maintained, even if the counter charts are reset.
- **Ears In / SHIFT:** Total ears of corn entered counted by the light sensor per shift.
- **Ears Out / SHIFT:** Total ears at output counted by the output sensor per shift.
- **% Good / SHIFT:** Percentage of return of what goes out to what enters per shift.

- **Ear Length:** Indicates the length of the cob entered into the machine according to the table of values in the manual for the use of the shelling machine.

Length in Samples	Approximate Length of Cob	Length in Samples	Approximate Length of Cob
1	0.25" (6.4 mm)	21	5.25" (133.4 mm)
2	0.50" (12.7 mm)	22	5.50" (139.7 mm)
3	0.75" (19.1 mm)	23	5.75" (146.1 mm)
4	1.00" (25.4 mm)	24	6.00" (152.4 mm)
5	1.25" (31.8 mm)	25	6.25" (158.8 mm)
6	1.50" (38.1 mm)	26	6.50" (165.1 mm)
7	1.75" (44.5 mm)	27	6.75" (171.5 mm)
8	2.00" (50.8 mm)	28	7.00" (177.8 mm)
9	2.25" (57.2 mm)	29	7.25" (184.2 mm)
10	2.50" (63.5 mm)	30	7.50" (190.5 mm)
11	2.75" (69.9 mm)	31	7.75" (196.9 mm)
12	3.00" (76.2 mm)	32	8.00" (203.2 mm)
13	3.25" (82.6 mm)	33	8.25" (209.6 mm)
14	3.50" (88.9 mm)	34	8.50" (215.9 mm)
15	3.75" (95.3 mm)	35	8.75" (222.3 mm)
16	4.00" (101.6 mm)	36	9.00" (228.6 mm)
17	4.25" (108.0 mm)	37	9.25" (235.0 mm)
18	4.50" (114.3 mm)	38	9.50" (241.3 mm)
19	4.75" (120.7 mm)	39	9.75" (247.7 mm)
20	5.00" (127.0 mm)	40	10.00" (254.0 mm)

-
-

- **Ear Width:** Indicates the thickness of the cob entered into the machine according to the table of values in the manual for the use of the shelling machine.

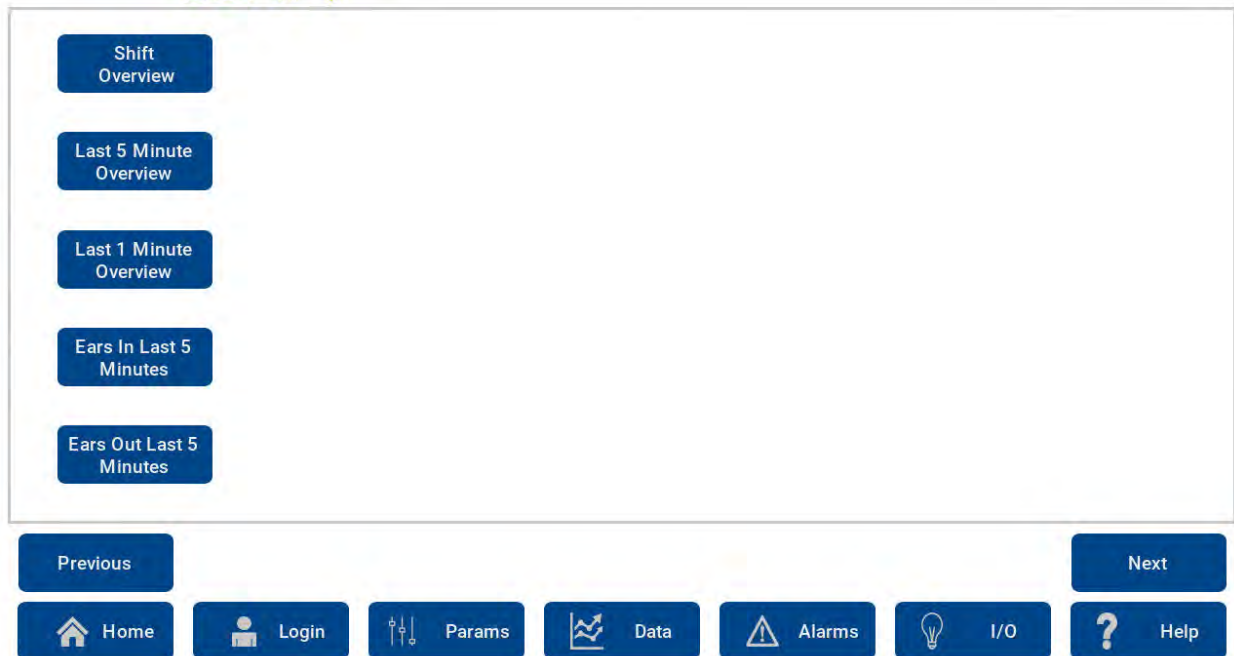
Eyes Blocked Count	Approximate Width	Eyes Blocked Count	Approximate Width
36	3.08" (78.2 mm)	19	1.80" (45.7 mm)
35	3.00" (76.2 mm)	18	1.73" (43.9 mm)
34	2.93" (74.4 mm)	17	1.65" (41.9 mm)
33	2.85" (72.4 mm)	16	1.58" (40.1 mm)
32	2.78" (70.6 mm)	15	1.50" (38.1 mm)
31	2.70" (68.6 mm)	14	1.43" (36.3 mm)
30	2.63" (66.8 mm)	13	1.35" (34.3 mm)
29	2.55" (64.8 mm)	12	1.28" (32.5 mm)
28	2.48" (63.0 mm)	11	1.20" (30.5 mm)
27	2.40" (61.0 mm)	10	1.13" (28.7 mm)
26	2.33" (59.2 mm)	9	1.05" (26.7 mm)
25	2.25" (57.2 mm)	8	0.98" (24.9 mm)
24	2.18" (55.4 mm)	7	0.90" (22.9 mm)
23	2.10" (53.3 mm)	6	0.83" (21.1 mm)
22	2.03" (51.6 mm)	5	0.75" (19.1 mm)
21	1.95" (49.5 mm)	4	0.68" (17.3 mm)
20	1.88" (47.8 mm)		

- **Eyes Value (LIVE):** Number of eyes blocked in production.
- **Flipped Ears:** Number of times the paddle is activated to flip the cobs.
- **Ears In / MIN:** Ears in, in the last minute.
- **Nubbins MIN:** Nubbins in, in the last minute.
- **Ears Out / MIN:** Ears out, in the last minute.
- **Recycle / MIN:** Number of Recycles in the last minute.
- **Tail First / MIN:** Number of ears traveling stalk/tali first in the last minute.
- **Thin Ears / MIN:** number of thin/small diameter ears in the last minute (these will go to trash).
- **Tip First / MIN:** Number of ears traveling tip first in the last minute.
- **Nubbin Cycles:** Number of times the paddle is activated to reject nubbins.
- **Running:** 1 - Machine is running; 0 - Machine is off.
- **Sort Category:** The board's decision on the last ear.
- **Thin Ears:** Number of ears rejected due to being thin.
- **Tip Tail Strength:**
- **Track Speed:** Speed of the Blue Chain.
- **Board Software REV:** Software version of the profile board.
- **Counter 0 – 100:** Counter that counts to 100.

Data



31/Mar/2025 - 03:47:31 PM
Machine # 001 VER: 1.06A



Buttons on the left side of the screen it shows direct links to the charts.

Shift Overview

Shows a total of what has been processed since the machine is started and can also be used to collect information in turns.

To return the counters to 0, press **Clear Counters**.

- **Ears In Shift:** Total ears of corn entered into the machine counted by light sensor.
- **Ears Out Shift:** Total cobs output from the machine counted by the output sensor.
- **Rejects Short Shift:** Total rejects of short cobs.
- **Rejects Long Shift:** Total rejections of long cobs.
- **Rejects Thin Shift:** Total rejections of thin ears.
- **Rejects Thick Shift:** Total rejections of coarse cobs.
- **Recycles Shift:** Total times the machine recycled. (Change of rotation orange straps).

All of this data is over the shift (from when the machine gets power to when the power is shut off).

Last 5 Minute Overview

Each bar marks the sum of the last 5 min; For example, in the previous image (option 6) it shows the number of ears entered for each minute for 5 minutes when adding their quantity (99 min 1 + 112 min 2 + 101 min 3 + 99 min 4 + 95 min 5 = 506) The result is reflected in the first graph, this is repeated for each bar.

To return the counters to 0, press Clear Counters.

- **Ears In Last 5 Min:** Sum of the cobs of the last 5 minutes.
- **Ears Out Last 5 Min:** Sum of the corn output of the last 5 min.
- **Short Rejects Last 5 Min:** Sum of the rejected short cobs of the last 5 minutes.
- **Rejects Long Last 5 Min:** Sum of the rejected long cobs of the last 5 min.
- **Rejects Thin Last 5 Min:** Sum of the rejected thin ears of the last 5 min.
- **Rejects Thick Last 5 min:** Sum of the rejected coarse cobs of the last 5 min.
- **Recycles Last 5 Min:** Sum of the recirculations in the last 5 min. (Change of rotation orange belts).

Last 1 Minute Overview

Displays the total amount over the entire working time of the machine, values of Ears In Last Full Minute, Output (Ears Out Last Full Minute), Rejects Last Full Minute and Recirculation Recycles Last Full Minute

- **Ears In Last Full Minute:** Total ears entered.
- **Ears Out Last Full Minute:** Total ears of corn from starts.
- **Rejects Last Full Minute:** Total number of rejections.
- **Recycles Last Full Minute:** Total recirculations. (Change of rotation orange belts).

Next screen shows how many rejections and what type of rejections the machine has had in the last minute. The program makes different decisions depending on whether the cob is short or long, thick or thin (cobs that do not have kernels). It is used when in the process there is no control of the raw material on the line.

- **Recycles Last Full Minute:** Total recirculations. (Change of rotation orange straps)
- **Long Rejects Last Full Minute:** Rejects of long cobs.
- **Thick Rejects Last Full Minute:** Rejections of coarse cobs.
- **Thin Rejects Last Full Minute:** Thin cob rejects.

All of this data is over the last full minute.

Ears In Last 5 Minutes

Shows the number of cobs entered into the machine after 1 minute, every minute the values move to the right, for example; 95 ears entered on the chart (Ears In/min 5 Minutes Ago) after 1 minute the value 99 (Ears In/min 4 Minutes Ago) will take the place of 95 and a new value will appear on the chart (Ears In Last Full Minute).

To return the counters to 0, press **Clear Counters**.

- **Ears In Last Full Minute:** Number of ears entered into the machine in 1 min.
- **Ears In/min 2 Minutes Ago:** The number of ears that entered 2 minutes ago.
- **Ears In/min 3 Minutes Ago:** Number of ears that entered 3 minutes ago.
- **Ears In/min 4 Minutes Ago:** Number of ears that entered 4 minutes ago.
- **Ears In/min 5 Minutes Ago:** Number of ears that entered 5 minutes ago.

Ears Out Last 5 Minutes

Shows the number of cobs coming out of the machine after 1 minute, the values shift to the right in each minute, for example: 119 ears entered on the chart (Ears In/min 5 Minutes Ago) after 1 minute the value

94 (Ears In/min 4 Minutes Ago) will take the place of 119, and a new value will appear on the chart (Ears In Last Full Minute).

- **Ears Out Last Full Minute:** Number of cobs out in 1 min.
- **Ears Out/min 2 Minutes Ago:** Number of ears that came out 2 minutes ago.
- **Ears Out/min 3 Minutes Ago:** Number of cobs that you leave 3 minutes ago.
- **Ears Out/min 4 Minutes Ago:** Number of ears that came out 4 minutes ago.
- **Ears Out/min 5 Minutes Ago:** Number of ears that came out 5 minutes ago.

Alarms



31/Mar/2025 - 03:52:03 PM
Machine # 001 VER: 1.06A

Active Alarms - Table

Select	Name	State	Value	Time	Description	Severity
☐	StopSignal	Triggered Not Acked	10	03/31/25 - 15:32:17	Machine Stopped due to Stop Signal	1-low

Hide Not Triggered

Toggle selection

Ack

Reset

Save

Alarms History - Table

From: 03/31/25 - 15:46:54

To: 03/31/25 - 15:51:54

Refresh

5 Mins

Filter: Name

X

Timestamp	Name	State	Value	Description
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Home

Login

Params

Data

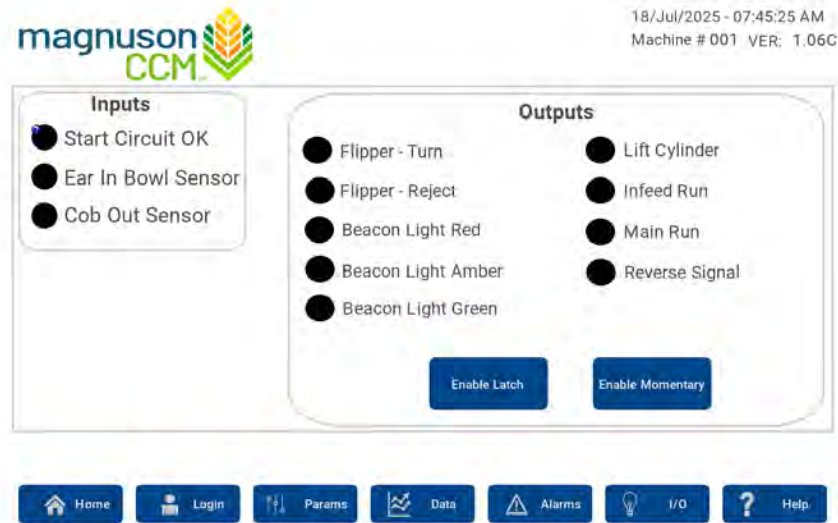
Alarms

I/O

Help

The Alarms Screen shows the detailed faults that occur in the machine during operation or stoppage.

The I/O Screen (Input/Output)



The Input/Output Screen displays the checks or functional tests of the moving parts of the machine, sensors and beacon light.

Inputs and Outputs can be manipulated to assist with troubleshooting in 2 ways:

1. Tap the circles next to each Input or Output.
2. Press and hold the circles next to each Input or Output.

Its function can be changed by selecting **Enable Latch** or **Enable Momentary**.

- **Enable Latch** - Hold the selected output.
- **Enable Momentary** - Change the state of the output when you are pressing the button. Once you let go, it will switch back to the initial state.

Output Parameters

TotalEarsOut - Total count of ears detected exiting cutter box. Represents processed ears.

- **Trigger**: Cob Out Sensor signals each time an ear exits the cutter box. Counts are retained until manually reset.
- **Reset**: Values are retained until "282" is entered in the Special Functions setting.

NubinCycles - Counts ears that are rejected for being too short.

- **Trigger**: Ears that are measured shorter than the Nubbin Length value are rejected and increase the count.
- **Resets** to zero every time the machine is powered off.

Recycles - How many times the machine has gone into recycle since power on.

- The machine counts the number of ears going by the light source (Ears in) and the number of ears exiting the cutter box (Ears out).
- **Trigger:** When Ears in – Ears out = Recycle Ear Count setting, the machine goes in to a recycle and adds to the “Recycles” counter.
- **Resets** to zero every time the machine is powered off.

Running - 1 when the machine is running. 0 when the machine is not running.

- **Trigger:** Turning power on puts machine in 0 state. Pushing start button puts machine in 1 state. Pushing stop button puts machine in 0 state.
- **Trigger:** Pushing start and stop buttons.

RunningState - 1 = Ready, 2 = Starting, 3 = Running, 4 = Running as Special Function, 5 = Stopped from Board Logic, 6 = Stopped from Machine Interrupt, 10-15 = Recycle States, 20 = Blocked Eye.

- Serves as a status message. 1 is powered and idle. 2 is motors running. 3 is machine running and corn detected. 4 is running using a Special Function. 5 is stopped due to parameter setting violation (i.e. recycle limit reached), 6 is software stopped, 10-15 indicate machine is performing a recycle, 20 = Blocked eye count measured is greater than Min Blocked Eye setting.
- **Trigger:** Updates automatically by software.

FlippedEars - Number of ears that were tail first - Count from when the power goes on.

- Number of ears that passed the light source that were determined to be husk end first.
- **Trigger:** Photoeyes on PCB scan the profile of the corn. When the profile is determined to be husk side first, the software initiates a flip command and adds to the counter.
- **Resets** to zero every time the machine is powered off.

ThinEars - Number of Thin Ears - Count from when the power goes on.

- Ears that fall below the Min Height setting.
- **Trigger:** Photoeyes on the PCB scan the profile of the corn. When the profile is determined to be too narrow (below Min Height value), the software rejects the ear and adds to the counter.
- **Resets** to zero every time the machine is powered off.

TrackSpeed - Machine speed in feet per minute.

CutterSpeed - Speed of the cutter head in revolutions per minute.

BlockedEyeCount - Counts the number of photoeyes on PCB that don't change state after a set amount of time. If number of blocked eyes counted exceeds Blocked Eye Count value, the machine goes in to a faulted stop until blocked eyes are cleared.

TipTailStrength - How confident is the tip or tail decision algorithm? (higher number = more confident)

- Algorithm evaluates the profile of the corn to determine which end is the tip and which is the husk end. This value decides whether the corn will be oriented based on the profile (tip/tail evaluation) or using the stalk detect logic. Higher number will lead to more corn evaluated using stalk logic, lower number will evaluate more corn based on change in profile.

- **Trigger:** Corn passing by light source is scanned a “TT” number is reported by software. If “TT” number is less than setting, stalk detect algorithm is used.
- **Reset:** Each piece of corn provides a new number.

EarLength - Length of corn measured as it passes the light source. Numbers represent .044" (1.1mm) lengths measured on an ear.

- **Trigger:** Corn passing by light source.
- **Reset:** Each piece of corn provides a new number.

EarWidth - Width (height) of corn is measured as it passes by light source. Maximum width measured is displayed.

- **Trigger:** Corn passing by light source.
- **Reset:** Each piece of corn provides a new number.

SortCategory - 0 = Turned, 1 = flipped, 2 = Length, 3 = Width, 4 = init.

- This is the decision made by the software for each piece of corn. 0 = Tip first profile algorithm, 1 = Husk first profile algorithm, 2 = Reject for short length (Nubbin), 3 = Reject for small width (narrow), 4 = Tip first stalk algorithm, 5 = Tail first stalk algorithm.
- **Trigger:** Corn passing by light source. Software to take a length and width measurements to determine how to orient the corn.
- **Reset:** Each piece of corn provides a new number.

EyeValue - This is the total number of photoeyes that are currently being blocked. This includes broken photoeyes (always showing blocked) and working photoeyes.

- **Trigger:** Corn passes by the light source and creates shadows on the photoeyes. Software reports the number of photoeyes that are not receiving light.
- **Reset:** Each piece of corn provides a new number as it passes the light source. When no corn is in front of the light source the number goes to zero (unless a photoeye is broken or debris is blocking it).

MachineErrorStatus - Last status of the board that caused it to stop. 1 = Blocked Eye 2 = Too many recycles, 10 = MIO_RUN became low (stop button pushed).

- **Trigger:** When blocked eye count exceeds sets number. When number of recycles reaches set number within a small amount of time (less than 1 minute). When stop button pushed.
- **Resets** when fault condition is no longer met.

BeaconState - 1 = red, 2 = yellow, 3 = green.

- **Trigger:** 1 = Stopped due to blocked photo eye or other software parameter fault or stop button pushed, 2 = Recycle in process, 3 = Running.
- **Reset:** Changes when machine condition changes.

Clear Blockages



WARNING

LOCKOUT/TAGOUT MACHINE. Failure to do so may result in personal injury.

In the event that ears of corn block or jam equipment assemblies, sensors that are built into the machine signal the condition to the computer for action.

Blockage at Cutter Head Assembly

If the computer senses a jam at the cutter head by monitoring the Cob Out sensor, it signals for a recycle condition to clear the jam. The recycle gate shifts, and the motors reverse the action of the upper and lower feed troughs and the cob drive. After four attempts to clear the blockage by recycling, the machine shuts down.

To manually clear a blockage from the cutter head:

1. Turn the machine off.
2. Open the feed trough guard.
3. Lift the upper feed trough to the OPEN position.
4. While the feed trough is raised, open the cutter head cover.
 - a. Open the cutter cover latch.
 - b. Pull the cutter cover toward you until it rests on the Stop.
5. Safely remove blockage. Use caution when working around the cutter knives.
6. Close and lock the cutter head cover.
7. Lower the feed trough and close the feed trough guard.

Blockage of the Infeed

During normal operation, the infeed conveyor will start and stop periodically. If the infeed wheel overfills with corn, the infeed sensor blade will raise and the ear in sensor will turn off causing the infeed conveyor to stop. The machine will continue processing the ears of corn that are present. No more corn enters the machine until the infeed sensor blade drops down to normal position causing the ear in sensor to turn on, then the infeed conveyor starts again. If the infeed stops and does not restart, check for a blockage and clear it.

To manually clear a blockage from the infeed conveyor:

1. Stop the EACC.
2. Remove the blockage.
3. Restart.

Seasonal Operations

During the corn processing season, plant personnel operate, maintain, monitor, repair, sanitize, and lubricate the Electric Automatic Corn Cutter (EACC).

While individual plant operations will differ to some degree, regularly scheduled maintenance and cleaning programs are essential. The procedures presented in this Operations Manual will help you promote safe and cost-effective equipment use. Follow these procedures closely.



WARNING

Read and understand the **Safety Guidelines** chapter of this manual before you attempt to operate or maintain the Electric Automatic Corn Cutter (EACC). Failure to do so may result in personal injury.

Start of Shift Procedures

This section describes the procedures you need to complete before you start your shift.

Visual Inspection

To maintain mechanical efficiency and prevent costly damage to the EACC, the manufacturer recommends performing a visual inspection of each of the machines in line at the start of each shift. During the visual inspection, check each machine for adequate function:

- Test the Emergency Stop and interlock circuit for proper operation.
- Ensure that all guards and covers are in place.
- Inspect tubes for wear and leaks.
- Inspect the user-installed air dryer and drain when required.
- Daily, or more often as necessary to prevent water build-up, inspect the air filter/regulator gauge in the Utility Box for contamination. For example, water in the bottom of and air filter/regulator gauge. Check the air line for the presence of oil or water and remove excess from the air line.

Additional Checks

Once a week, perform these additional checks in the visual inspection routine:

1. General check of nuts, bolts, and screws to ensure that they are tight.
2. The tension of the Infeed Conveyor Belt.
3. Adjustment of the Metering Belt.
4. The tension of the Blue Chain.
5. The Cob Drive Chain.
6. The tension of the Cutter Drive Belt.
7. Alignment of the Upper and Lower Feed Troughs and Cob Rolls using the cutter alignment fixture.

Assigning Maintenance Tasks

Schedule maintenance in a way that maintains high production. Do not use abrasive materials or cleaners when cleaning the light source lens and computer box lens.

Sanitation Routines

- Schedule sanitation crews so that all machines receive regular service:
 - **Hourly** – Rinse machine with special attention to the light source and computer box lens.
 - **Daily** – Wash machine completely. Drain water from the air regulator.

Machine Repair Priority

- If there is more than one machine in need of repair, first repair the machine that needs the least amount of work. This ensures that a maximum number of machines are in operation at all times.

Preventive Maintenance

- Develop and implement schedules for oiling and lubricating machines to minimize wear on parts and to keep machines running efficiently.
 - **Every Four Hours** – Grease all zerk points/grease fittings. See [Lubrication \(page 157\)](#).

Parts Availability

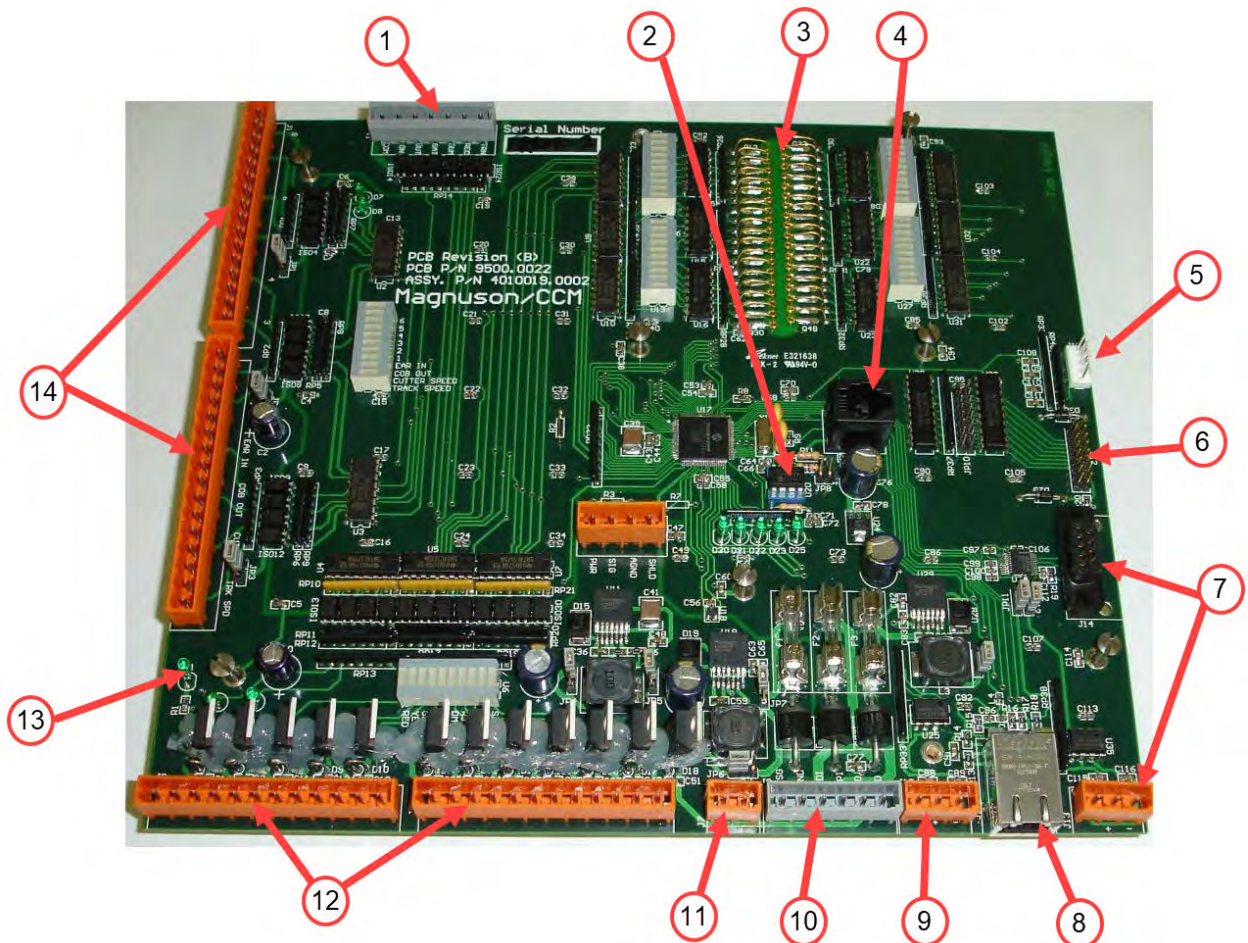
- Ensure that adequate spare parts are available by recording the part numbers and quantities of spares used. Place spare parts orders in a timely manner. For more details, see [Recommended Replacement Parts \(page 162\)](#).

Profile Board

The Profile Board (4010019.0002) is a stand-alone computer board used to run and control the Electric Automatic Corn Cutter (EACC). Some of the features include:

- Compatible with the currently installed sensors and solenoids.
- Redesigned software that will:
 - Orient cobs with stalk.
 - Send nubbins or short ears and thin (immature) ears to reject/recycle lane. Short ear sorting will directly benefit cob saw machines.
- Better user control of recycle operation.
- Three-Color Beacon Light. See [Beacon Light Information \(page 140\)](#).
- Additional I/O for future use.
- Less flipper movement – lower air usage.
- More control over timing functions.

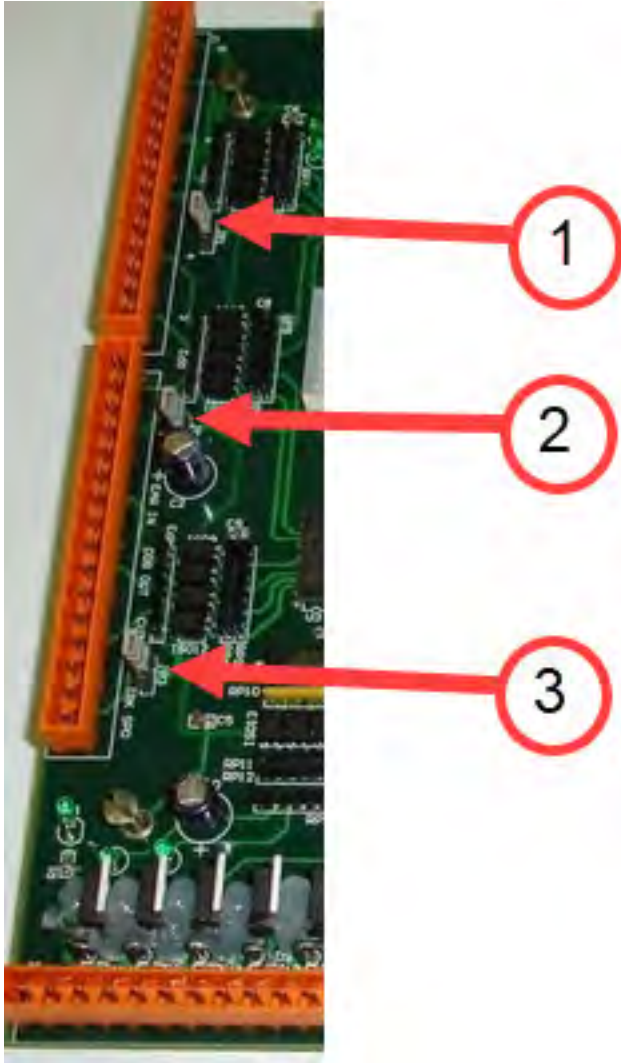
Profile Board Features



Item	Description
1	To Customer Designed Monitor
2	Non Volatile Memory
3	Photo Sensor Array
4	Programming Port
5	To Keypad
6	To LCD Display
7	HMI Interface
8	Ethernet Port
9	To Host PC
10	Incoming Power
11	To Light Source
12	Output Connectors
13	IO Power Status LED
14	Input Connectors

Board Jumpers

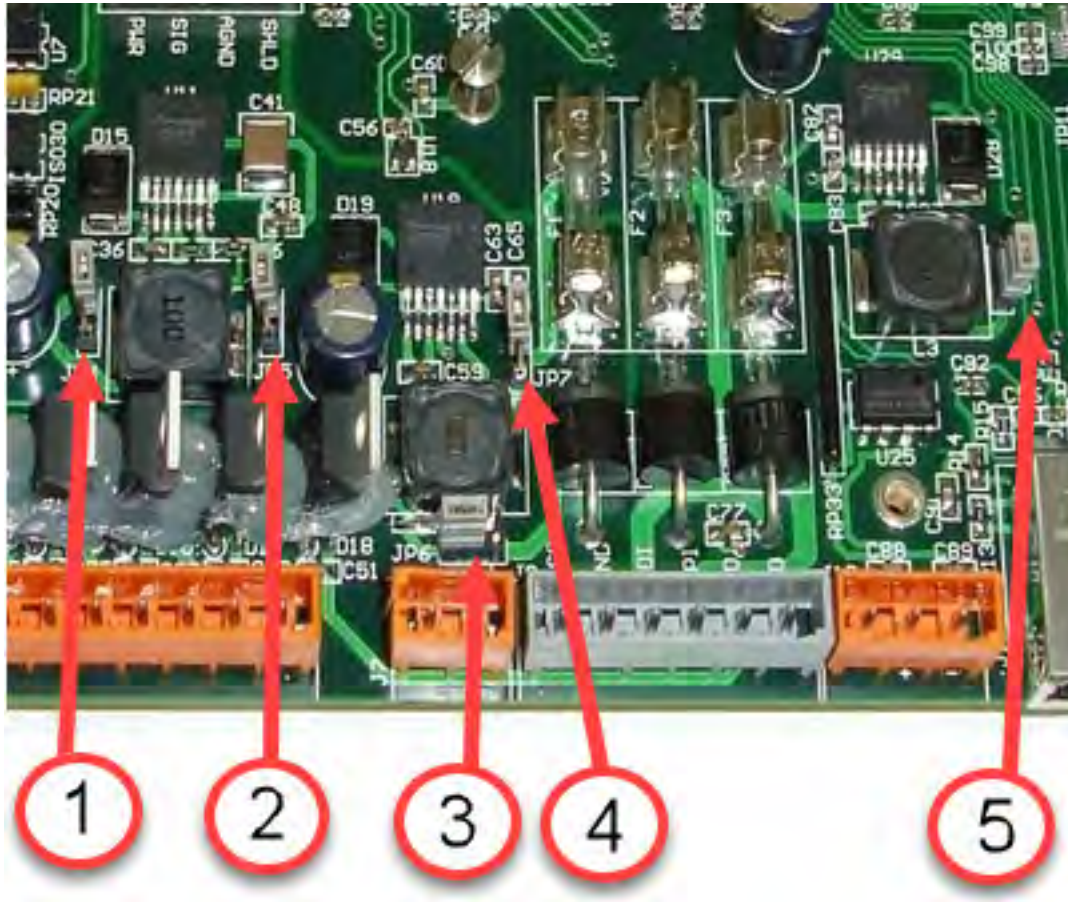
Profile PCB Jumper Settings JP1 - JP3



Item	Description
1	JP1 - J1 Spare Inputs: 5-8. Not currently used.
2	JP2 - J2 Spare Inputs: 1-4. Jumper the top 2 pins.
3	JP3 - J2 Inputs: Track speed, cutter speed, cob out, ear in. Jumper the top 2 pins.

—

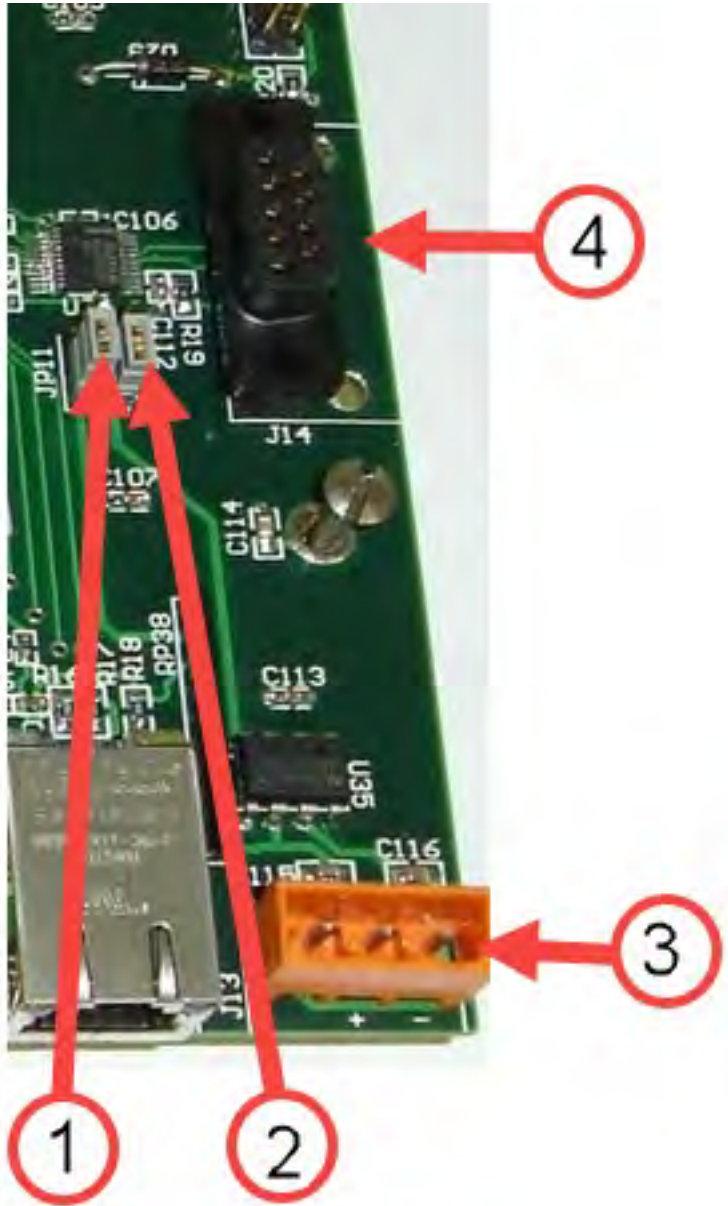
Profile PCB Jumper Settings JP4 - JP9



Item	Description
1	JP4 - I/O Power. 24VDC. Jumper the bottom 2 pins.
2	JP5 - I/O Power. 24VDC. Jumper the bottom 2 pins.
3	JP6 - Not currently used, no jumper required.
4	JP7 - Not currently used, no jumper required.
5	JP9 - Troubleshooting only. Jumper the bottom 2 pins.

Profile PCB Jumper Settings J10 - J12

One of the important new features of this circuit board design is the ability of the board to accept a wide DC voltage range (12 VDC to 24 VDC).



Item	Description
	JP10 - Not currently used. No jumper required.
1	JP11 - For RS232, select the top 2 pins. For RS485, jumper the bottom 2 pins.
2	JP12 - For RS232, select the top 2 pins. For RS485, jumper the bottom 2 pins.



WARNING

If the power configuration jumpers are not properly installed for the input voltage, components may be damaged!

Beacon Light Information

Item	Part Number	Description	Quantity
1	9502.5030.004	BCN, GRY 24VDC 50MM LED CLM QD	1
2	9502.5030.003	COVER, BEACON	1



Beacon Light Codes

Color	Code #	Meaning
Green	None	Running normally
Green	1	Running, low feed
Yellow	None	Recycle
Yellow	1	Running with a problem detected, typically blocked photo eye(s). See the display for more information.
Red	None	Software stop. See the display for more information.
Red	1	Stopped due to blocked photo eyes (maximum count exceeded). Is there an ear stuck in front of the eyes?
Red	2	Manual Stop – This flash code is not possible yet!

**NOTE**

Code 1 = The light is on for one second then stays off for 3 seconds in a repeating pattern.

Code 2 = The light blinks on for one second and off for one second in two equal cycles and then remains off for 3 seconds. This pattern repeats itself.

Profile Board Software

The software has been enhanced with new features. These features are controlled through parameters that can be viewed and changed using the HMI.

Special Function Parameter

This value can be modified to perform service functions.

Value	Purpose	Default
82	Reset the Machine Run Hours AND Total Ears Out to 0.	
Ear Out Debounce Cnt	Used to reduce double counts from the Cob Out sensor.	5
Flip Normal		
Flip Numerator, Flip Denominator	Used to determine where to flip the ear of corn. Typically set to 1/2 of the full length of the ear of corn.	Numerator =1; Denominator =2
Flip Delay	Set the number of samples between the sensor and the flipper. (FIFO length). Note: There are 24" between the sensor array and the end of the flipper. This would mean that the distance between samples is currently about .25". Note: Determine the Flip Delay using a nubbin or a tip first ear. Watch when the gate returns to neutral AFTER the nubbin passes the flipper. The flipper should just miss the nubbin. The stalk is ignored when determining the flipper action.	95
Nubbin Length	Sets max. reject length of nubbins – must be this number of samples long. See Length Table (page 125).	14
Network Address	RS485 network address for communication to a host PC.	0
Power Off Delay?	When set to ON, this will delay the electrical shutdown of the Profile Board for 60 seconds. The mechanical functions of the machine will still shut down normally.	NO
RS485 HMI Station #	This sets the address of an HMI for communication to the Profile Board when connected to it.	1

Infeed Parameters

All of these parameters may be modified. They control the functionality of the infeed belt and low feed warning beacon light.

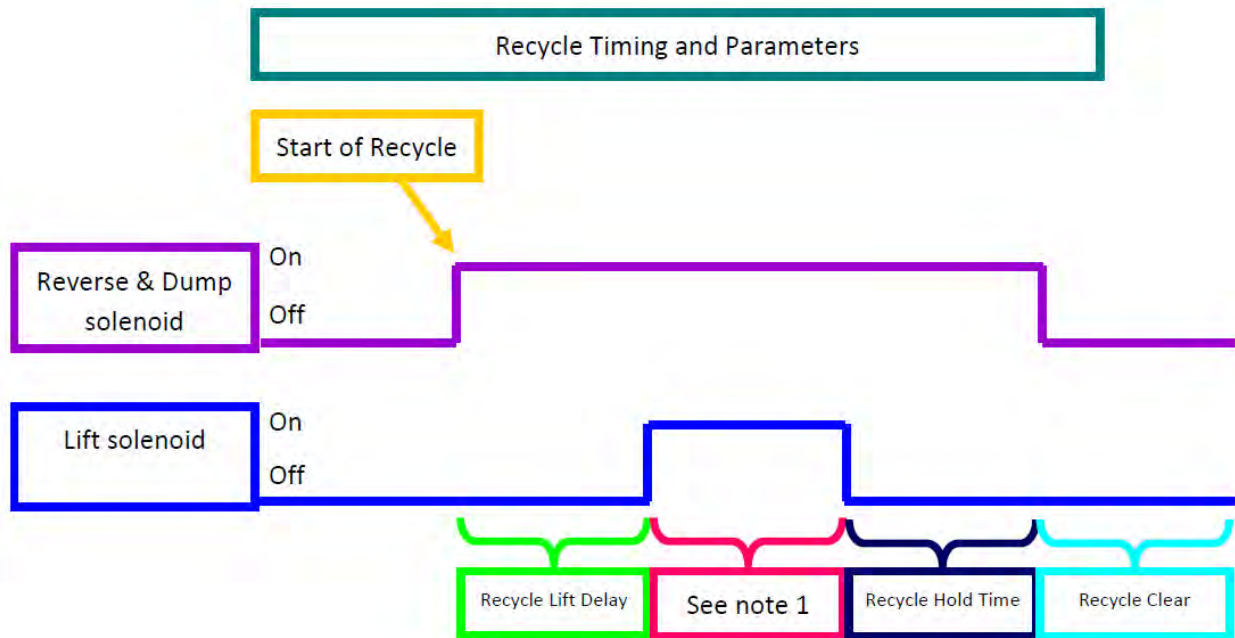
Parameter	Time	Purpose	Default
Low Feed Timeout	Seconds	Time with no ears detected until turning on the warning beacon.	10
In Off Bump	0.1sec (See "In On Delay (0.1sec)	For a continuous infeed conveyor feeding when the infeed bowl needs corn, set this parameter to zero (0).	0
In On Bump	0.1sec (units in 1/10ths of seconds)	When the infeed bowl needs corn (see "In On Delay (0.1sec)" and "In Off Delay (0.1sec)"), the infeed conveyor will turn on for the time set by this parameter before turning off for "In Off Bump (0.1sec)". This cycle will continue until either the bowl has enough corn or 10 seconds have expired. After the 10 second period, the infeed conveyor will stay on until the bowl has enough corn.	25
In Off Delay	0.1sec (1/10 seconds)	Minimum sensor OFF time before stopping the conveyor.	2
In On Delay	0.1sec (1/10 seconds)	Minimum sensor ON time before starting the conveyor.	20

Recycle Parameters

All of these parameters may be modified. These parameters are used to control the timing during machine recycle. Most orange belt blockages can be cleared quickly. Some require a bit more time. These parameters allow the user to start with quick recycles and slowly increase the duration if the blockage has not cleared. Recycling involves 5 steps:

1. Reverse the orange belts and extend the dump gate. The orange belts can help pull the cob out of the cutter box (see Recycle Lift Delay in the table below).
2. Lift the upper orange belt assembly. This will allow the ears on the belt to back up and be deflected into the recycle chute by the dump gate. This part of the cycle can be varied in length as back-to-back recycles occur without clearing the blockage (see Recycle Lift Dwell and Recycle Increment in the table below).
3. Drop the upper orange belt assembly back into its' normal operating position. The orange belts continue to rotate backward (see Recycle Hold Time in the table below).
4. The orange belts start to rotate forward and the Dump gate is retracted.
5. Sometimes one or two ears pass through the cutter but another jam follows. Allow any initial cobs to clear out of the cutter box without monitoring. The intent is not to clear the jam count too soon (See Recycle Clr Time in the table below).

Following is a graphical representation of the above steps:



NOTE

Time = Recycle Lift Dwell + (Recycle Count * Recycle Increment). This time increases with the number of consecutive recycles.

Parameter	Time	Purpose	Default
Recycle Clr Time	1/10 (1/10ths of a second)	After a reverse cycle, do NOT check for ears out for this amount of time. If only one or two ears go through, do not reset the Recycle Stop Count counter.	9
Recycle Stop Count	N/A	How many times to attempt a reverse cycle before stopping the machine.	4
Recycle Hold	(0.1 seconds)	After the lift cylinder is lowered, how much time before the orange belts rotate forward again. (Default 2)	2
Recycle Increment	(0.1 seconds)	Recycle time adder for consecutive reverse cycles. We want the lift cylinder to remain on longer if we continue to recycle.	5
Recycle Lift Dwell	(0.1 seconds)	Lift cylinder on base time. The minimum time the lift cylinder is on.	4
Recycle Lift Delay	(0.1 seconds)	How long should the orange belt be reversed BEFORE the lift cylinder is raised? (Default 5) Note: we want to pull the cob out from the cutter box before opening the orange belts.	5
Recycle Ear Count	N/A	Number of ears IN with no ears OUT before a Recycle cycle starts.	6

Stalk Detect Parameters

All of these parameters may be modified. They are used for determining Tip/Tail orientation of the ears.

Parameter	Purpose	Default	Comments
IP Address 1 (MSB)	Sets the IP Address of the Profile Board when connected to a remote monitoring system.	172	

Parameter	Purpose	Default	Comments
IP Address 2	Sets the IP Address of the Profile Board when connected to a remote monitoring system.	16	
IP Address 3	Sets the IP Address of the Profile Board when connected to a remote monitoring system.	20	
IP Address 4 (LSB)	Sets the IP Address of the Profile Board when connected to a remote monitoring system.	1	Change this value to represent the machine number. Value of 1 = Corn Machine #1.
Strong Tip/Tail Level	The averaging algorithm is first used to determine cob orientation (tip or tail). This algorithm typically does a very good job of determining orientation. The algorithm will return a Tip/Tail strength number based on the shape of the ear. If it falls below this "Strong Tip/Tail Level", the stalk algorithm is applied to see if attached stalk can give a better indication of cob orientation (Default 3). The stalk algorithm is only applied to a small number of ears and typically these ears are short or nubbin ears. A setting of 2 or 3 should be good.	3	See Length Table (page 125)
Minimum Stalk Diff	The number of samples considered as stalk at the tip of the corn is compared to the number of samples at the tail of the corn. The count of stalk samples from each side is subtracted and the difference must be at least "Minimum Stalk Diff" before a stalk sort is applied (Default 3).	3	N/A
Minimum Corn Samples	Samples that exceed the "Stalk Width" for less than this number of samples will not be considered as corn but wide stalk. Note: 5 is a good number! Do not change it unless you know what this does!	4	See Length Table (page 125)
Minimum Height	Sets the reject minimum Height (in blocked photo eyes) of an ear. The photo eyes are spaced .075 inches apart. This can be used to reject immature ears or reject thin ears on a cob saw.	12	See Eye Count vs. Width or Diameter (page 124)
Stalk Width	Any samples LESS THAN this value but GREATER THAN OR EQUAL to "Min Eye Count" will be considered potential corn stalk. Note: If the stalk is extra thick, this number MAY require increasing but 12 is typically a good number.	13	
Minimum Eye Count	Anything less than or equal to this number of eyes off, the scan is not considered an ear but may cause a block eye warning if blocked too long. If more than this number of eyes are off for too long, the machine will stop.	3	

Additional Information

Error Codes

Following is a list of error codes and what the issue may be:

Error Code	Message	Meaning
E001	NVM Initialize	The NVM is corrupt and initialize – for when Non-Volatile Memory is initialized typically after power is first applied to the PCB or when the Non Volatile Memory is bad.
E002	Watchdog Reset	Typically a software corruption issue but it could be hardware related.
E003	Brown Out	Reset due to Brown Out – Power issues.
E004	Low Volts	Reset due to Low Voltage Detect – Power issues.
E005	NVM No Write	The software had trouble writing to the Non Volatile Memory – this is typically not a big problem and can be ignored. This normally occurs when the software is trying to save the machine run time. The value will be saved the next time the software updates the machine run time.
E006	Blocked Eye	A warning for the operator that at least one photo eye is blocked.
E016	Blocked Eye Stop	Stopped due to eye blocked.

Fuses



Item	Description
F1	Photo eye Light source: 9502.0106 – FUSE, 2.5A 250VAC GMA FA
F2	I/O Ports: 9502.0091 – FUSE, 4A 125V GMA FAST
F3	Control Circuit: 9502.0062 – FUSE, 2.00A 50V GMA FAST

Eye Count vs. Width or Diameter

This table provides a general guideline for setting/viewing width parameters:

- Last Cob Width – (TT L W C) – For viewing only.
- Minimum Eye Count
- Stalk Width
- Minimum Height

The table below is a general guideline for setting values, the actual values can vary depending on how the cobs are presented by the photo eyes.

Eyes Blocked Count	Approximate Width	Eyes Blocked Count	Approximate Width
36	3.08" (78.2 mm)	19	1.80" (45.7 mm)
35	3.00" (76.2 mm)	18	1.73" (43.9 mm)
34	2.93" (74.4 mm)	17	1.65" (41.9 mm)
33	2.85" (72.4 mm)	16	1.58" (40.1 mm)
32	2.78" (70.6 mm)	15	1.50" (38.1 mm)
31	2.70" (68.6 mm)	14	1.43" (36.3 mm)
30	2.63" (66.8 mm)	13	1.35" (34.3 mm)
29	2.55" (64.8 mm)	12	1.28" (32.5 mm)
28	2.48" (63.0 mm)	11	1.20" (30.5 mm)
27	2.40" (61.0 mm)	10	1.13" (28.7 mm)
26	2.33" (59.2 mm)	9	1.05" (26.7 mm)
25	2.25" (57.2 mm)	8	0.98" (24.9 mm)
24	2.18" (55.4 mm)	7	0.90" (22.9 mm)
23	2.10" (53.3 mm)	6	0.83" (21.1 mm)
22	2.03" (51.6 mm)	5	0.75" (19.1 mm)
21	1.95" (49.5 mm)	4	0.68" (17.3 mm)
20	1.88" (47.8 mm)		

Length Table

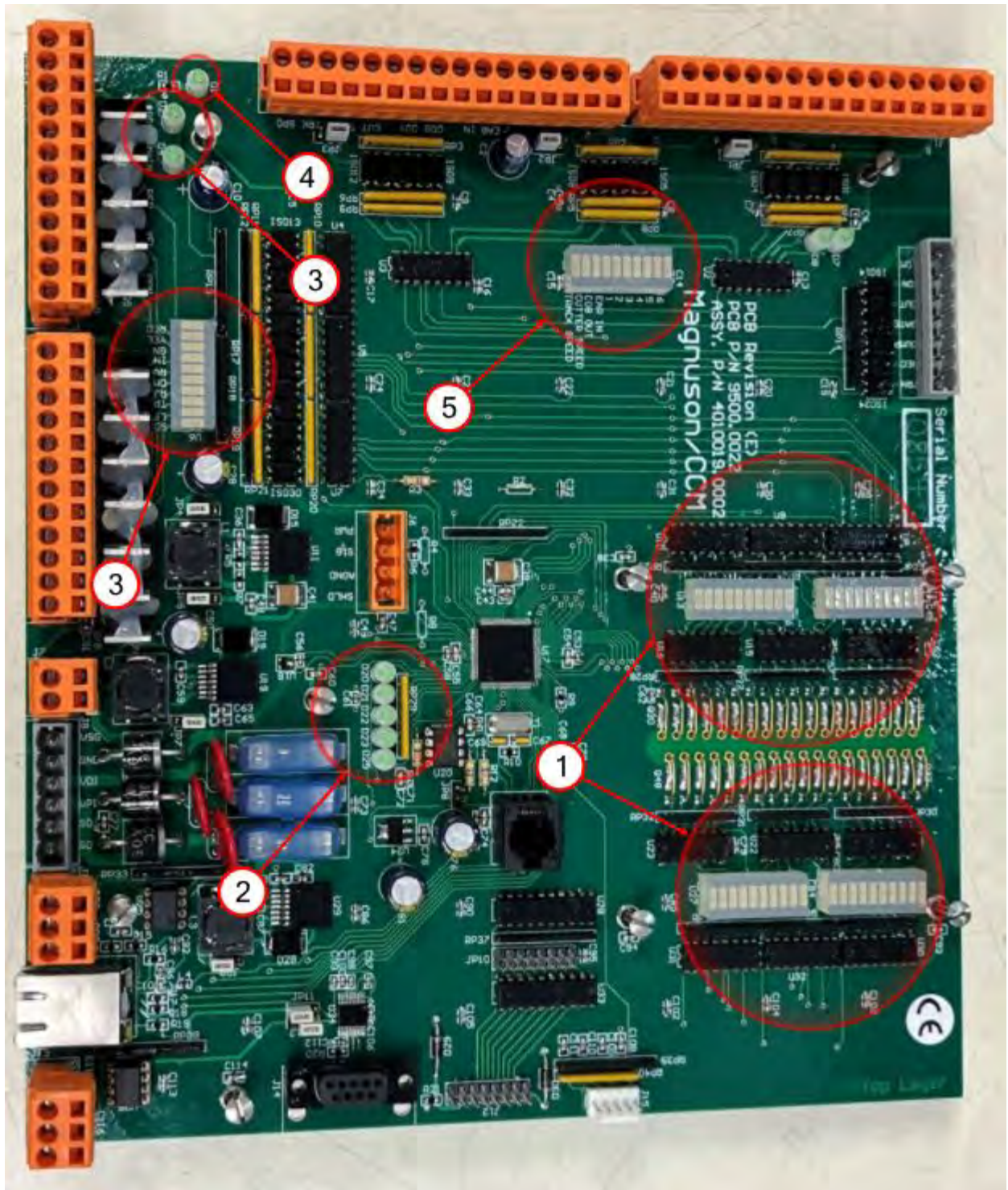
Use this table as a general guideline for setting/viewing the following parameters.

- Nubbin Length
- Maximum Length

The actual length of the cob depends on many factors. Consider the below table as a general guideline for length variables.

Length in Samples	Approximate Length of Cob	Length in Samples	Approximate Length of Cob
1	0.25" (6.4 mm)	21	5.25" (133.4 mm)
2	0.50" (12.7 mm)	22	5.50" (139.7 mm)
3	0.75" (19.1 mm)	23	5.75" (146.1 mm)
4	1.00" (25.4 mm)	24	6.00" (152.4 mm)
5	1.25" (31.8 mm)	25	6.25" (158.8 mm)
6	1.50" (38.1 mm)	26	6.50" (165.1 mm)
7	1.75" (44.5 mm)	27	6.75" (171.5 mm)
8	2.00" (50.8 mm)	28	7.00" (177.8 mm)
9	2.25" (57.2 mm)	29	7.25" (184.2 mm)
10	2.50" (63.5 mm)	30	7.50" (190.5 mm)
11	2.75" (69.9 mm)	31	7.75" (196.9 mm)
12	3.00" (76.2 mm)	32	8.00" (203.2 mm)
13	3.25" (82.6 mm)	33	8.25" (209.6 mm)
14	3.50" (88.9 mm)	34	8.50" (215.9 mm)
15	3.75" (95.3 mm)	35	8.75" (222.3 mm)
16	4.00" (101.6 mm)	36	9.00" (228.6 mm)
17	4.25" (108.0 mm)	37	9.25" (235.0 mm)
18	4.50" (114.3 mm)	38	9.50" (241.3 mm)
19	4.75" (120.7 mm)	39	9.75" (247.7 mm)
20	5.00" (127.0 mm)	40	10.00" (254.0 mm)

Profile PCB LED Definitions



Item	Description
1	Photo Sensor Array LEDs
2	Status LEDs

Item	Description
3	Output LEDs
4	IO Power Status
5	Input LEDs

LED	Definition
IO Power Status	D1 illuminates when there is +24VDC available to power the sensors and drive the solenoids and other outputs.
Photo Sensor Array LEDs	These LEDs light up when the light from the light source is blocked and undetected by the photoeye. There is one LED for each photo-eye.
Status LEDs	Status lights provide info regarding what the CPU is doing. • D20 – Net Watchdog – Unused. • D21 – Toggles on and off every one second – indicates that the CPU is alive. • D22 – Network LED – lights up when communication with the network – dim when Host talks to the network, brighter flash when the Profile Board replies back to the host. • D23 - Unused • D25 – 3.3VDC power – used to power the CPU
Input LEDs	• D7 – Spare 8 – J1 pin 16 • D8 – Spare 7 – J1 pin 14 • 6 – Spare 6 – J1 pin 11 • 5 – Spare 5 – J1 pin 8 • 4 – Spare 4 – J1 pin 5 • 3 – Spare 3 – J1 pin 2 • 2 – Spare 2 – J2 pin 16 • 1 Run – J2 pin 14 • EAR IN – In-feed bowl sensor – J2 pin 11 • COB OUT – Ear out a sensor – J2 pin 8 • TRACK SPEED – Pulse stream from U7 drive, blue chain - J2 pin 2
Output LEDs	• D2 Not Shutdown – J3 pin 10 • D4 – Main Drive - J3 pin • RED – Beacon Red – J3 pin 6 • YEL – Beacon Yellow - J3 pin 4 • GN – Beacon Green - J3 pin 2 • IN – Infeed drive – J5 pin 12 • RV – Reverse/Recycle – J5 pin 10 • DM – Dump – J5 pin 8 • RJ – Reject (flipper to nubbins) – J5 pin 6 • TR – Turn (flipper to turn in) – J5 pin 4 • LF – Lift arm – J5 pin 2

Maintenance

During the visual inspection and ongoing monitoring of operations, certain parts and assemblies may show signs of wear. Some of the parts that require more frequent attention are discussed below with procedures for removal, adjustment, or repair.

In-Season

Removing and Replacing Cutter Head



WARNING

Do not perform maintenance on this machine unless you have been trained in the maintenance and safety procedures.

Cutter heads and knives accumulate starch during normal operations, causing parts to freeze or stick. When this occurs, remove and clean the assembly.

At other times, you remove this assembly to replace or sharpen knives or adjust clearances. Normally, cutter knives need sharpening every four to eight hours.

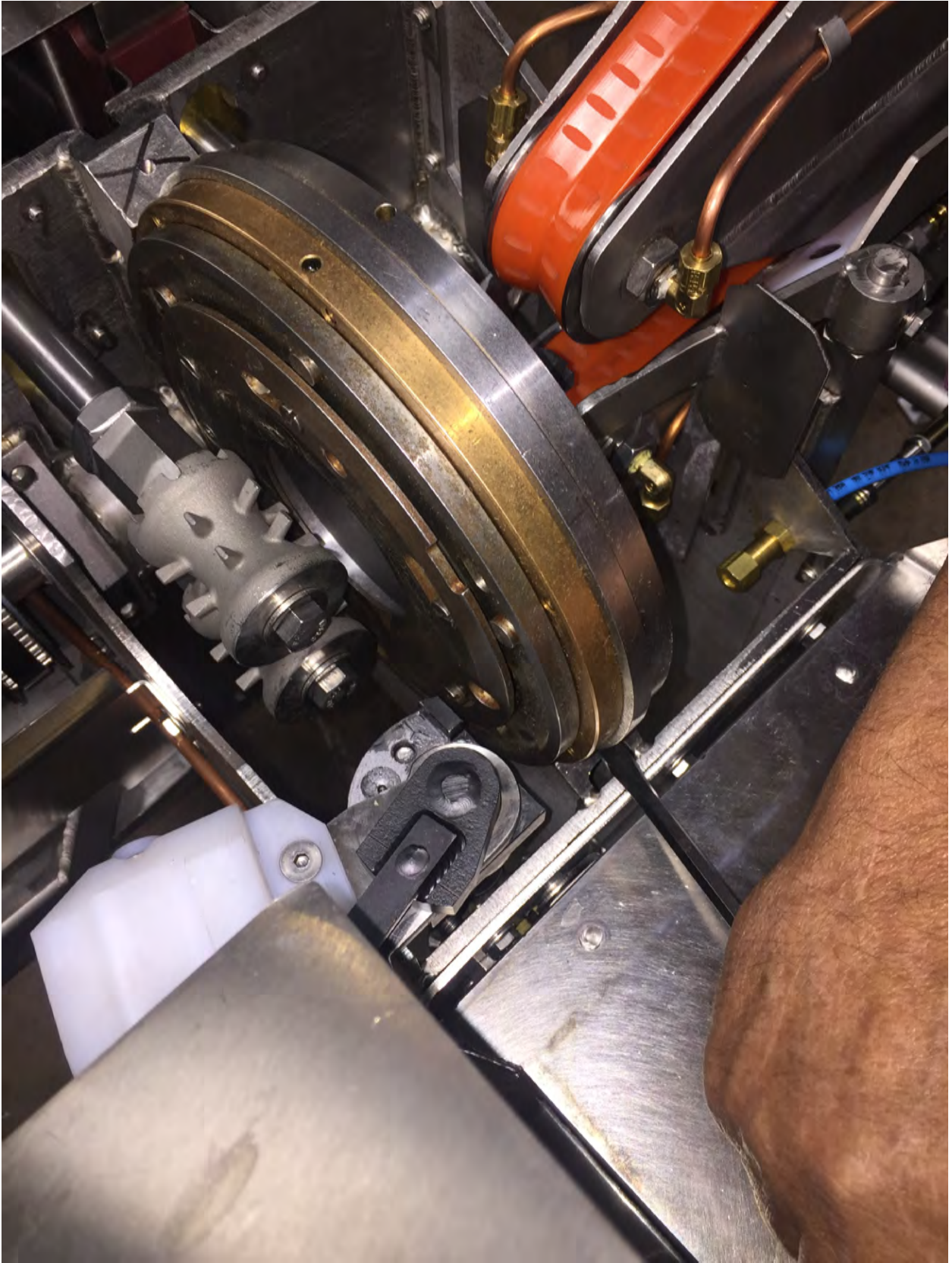
Remove the Cutter Head



WARNING

LOCKOUT/TAGOUT MACHINE. Failure to do so may result in personal injury.

This procedure describes how to remove the Model 2 cutter head.

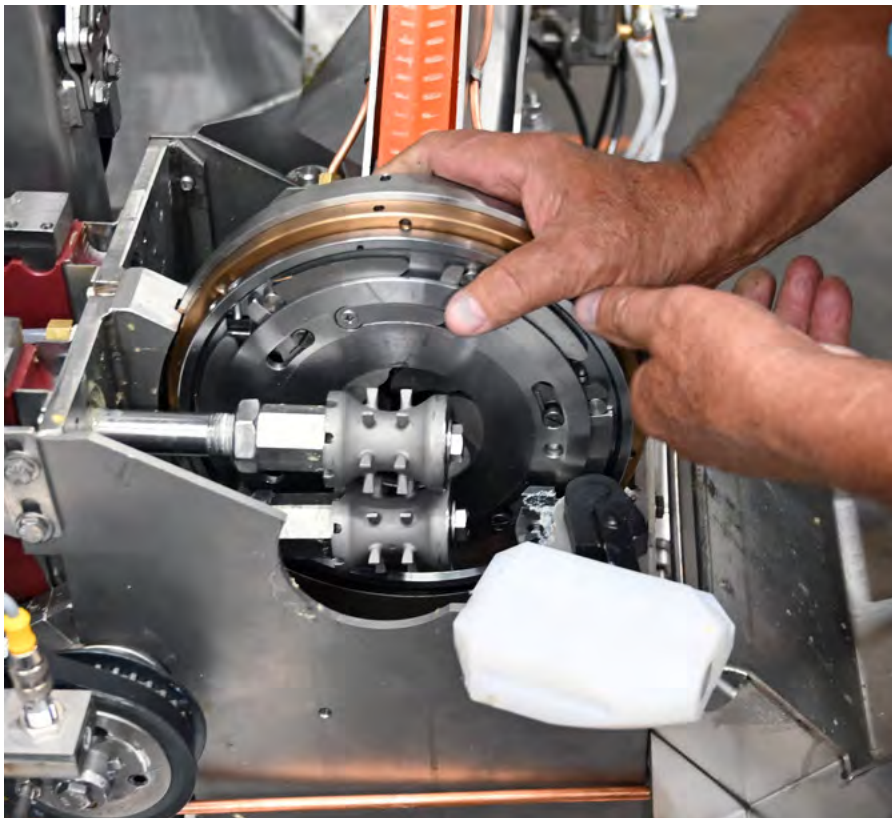


1. Open the feed trough guard.
2. Lift the upper feed trough to the OPEN position.
3. While the feed trough is raised, open the cutter head cover.
 - a. Open the cutter cover latch.
 - b. Pull the cutter cover toward you until it rests on the Stop.
4. Lift and pull the cutter head assembly up. Be careful – the assembly weighs nearly 10 pounds (4.5 kilograms) and can be wet and slippery.

**TIP**

New cutter heads may fit tightly. Insert a flat screwdriver at the notch in the front of the cutter head housing to assist in lifting the assembly.

5. Set the cutter head on the work surface and remove knives. For Cutter Head Mod 2 CCM Assembly Drawing, see [AY,CUTTER HEAD MOD 2 CCM \(4010106.0006\) \(page 250\)](#).
 - a. Remove one 8-32 x 3/16 flat head machine screw, Item 3.
 - b. Remove the lock spring, Item 5.
 - c. Twist and pull up on the knife retaining plate, Item 12.
 - d. CAREFULLY remove the six knives, Item 14.
6. Clean with water from a pressure hose.
7. Reassemble and replace.

Lifting the Cutter Head

Reassemble the Cutter Head

This procedure describes how to reassemble the Model 2 Cutter Head. Refer to [AY,CUTTER HEAD MOD 2 CCM \(4010106.0006\) \(page 250\)](#).



CAUTION

Be sure that all cutter head parts are properly cleaned and free of starch and grit. Failure to do so may result in ineffective machine operation.

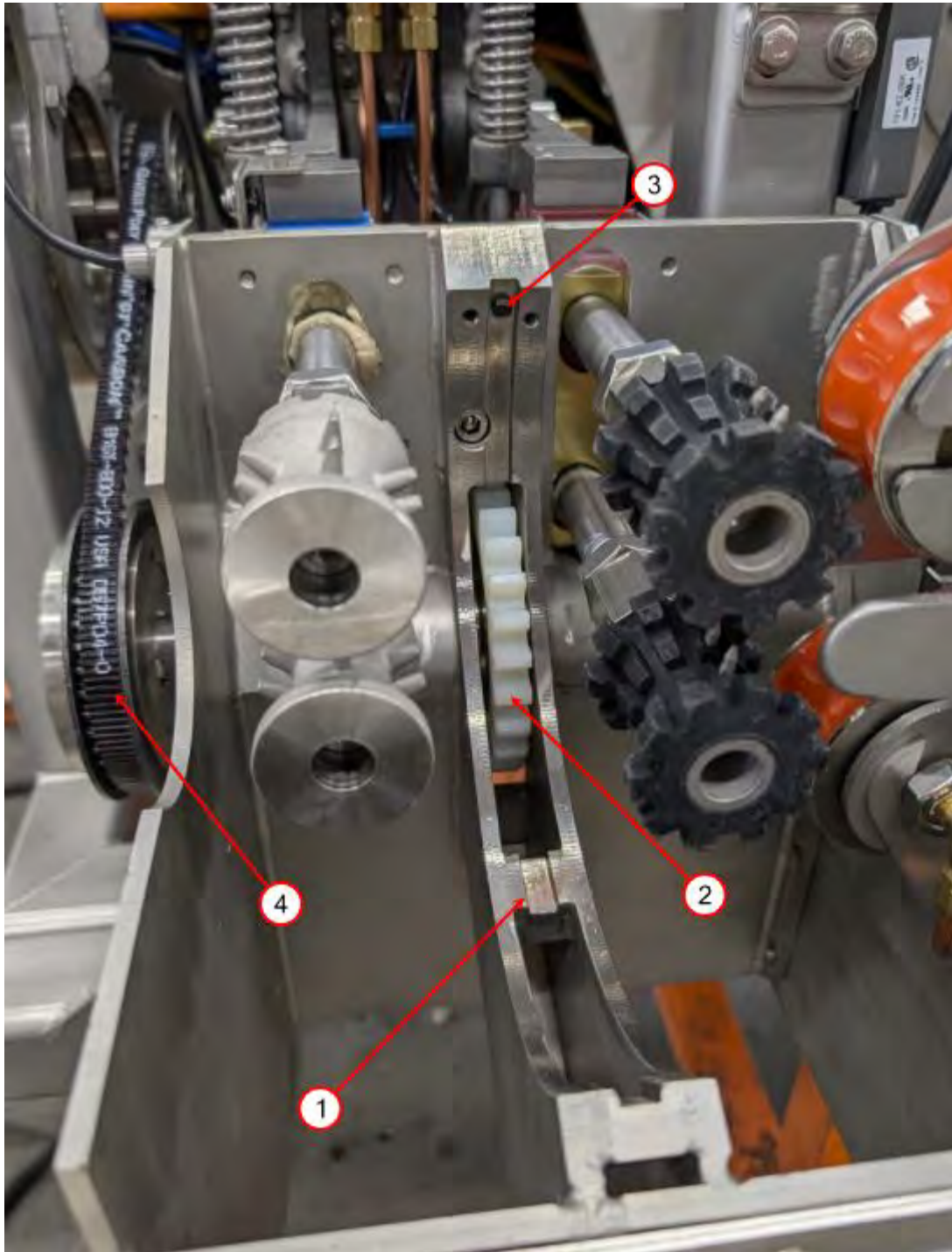
1. Place the head bearing (Item 7) into the front half head bearing (Item 17).
2. Lubricate the inside of the front half head bearing (Item 17)/head bearing (Item 7) assembly with food-grade oil.
3. Insert the three (3) 10-32 x 5/32 brass flat head machine screws (Item 4) into the bottom of the front half head bearing (Item 17)/head bearing assembly (Item 7).
4. Assemble the cutter head gear (Item 13) using the six (6) cutter head gear studs (Item 11) and insert into the front half head bearing (Item 17). Ensure that the gear turns freely at this step.
5. Attach the tension ring (Item 19) and install the tension ring gear (Item 6) using the 6-32 x 3/8 socket head cap screw (Item 1).
6. Place the rear half head bearing (Item 15) onto the assembly and install the seven (7) 12-24 x 1.0 brass flat head machine screws (Item 18) and the seven (7) 12-24 x 11/16 brass set screws (Item 2).
 - a. Tighten the seven (7) brass flat head machine screws (Item 18).
 - b. Lightly tighten the seven (7) brass set screws (Item 2).
 - c. Loosen the brass flat head machine screws (Item 18) 1/4 to 1/2 turn.
 - d. Tighten brass set screws (Item 2) 1/8 turn.
 - e. Fully tighten the brass flat head machine screws (Item 18).
7. Insert the compression springs (Item 10) into the slots in the tension ring (Item 19). Lubricate again.
8. Oil the adjusting finger (Item 9) and insert into the equalizing ring (Item 16).
9. Attach the equalizing ring (Item 16) aligning the equalizing ring studs (Item 11) with the end of the compression spring slot openings and the finger (Item 9). Ensure that the finger (Item 9) is correctly in place between the ring (Item 16) and gear (Item 13).
10. Use the spring tension tool (Part Number 4011588) to turn the gear tension ring and tighten the 6-32 x 3/8 socket head cap screw (Item 1).
11. Install a set of clean, sharpened knives (Item 14).
12. Attach the knife retaining plate (Item 12) and install the lock spring (Item 5) using the 8-32 x 3/16 flat head machine screw (Item 3).
13. Verify correct tension and complete return of knives at the iris opening.
14. Insert the 10-32 x 5/8 set screw into the equalizer ring (Item 16.1) and adjust the iris opening to a minimum of 1-1/16" (27 mm).
15. Insert the 10-32 x 1/2 nylon tip set screw (Item 16.2).

Replace the Cutter Head

This procedure describes how to replace the cutter head.

1. Lift the cutter head with the teeth facing out and the beveled side facing the feed troughs.

2. Align the notch in the cutter head with the locating pin in the cutter saddle and lower the cutter head into the saddle.
3. Manually turn the drive pulley at the left, to align the teeth on the cutter head drive gear with the teeth on the cutter head.



Item	Description
1	Cutter Saddle

Item	Description
2	Cutter Head Drive Gear
3	Locating Pin
4	Drive Pulley

4. Ensure that the cutter head seats completely into the saddle. Look for a smooth fit with no gaps.
5. Close and latch the cutter cover.
 - a. Lift the cutter cover from the Stop and close.
 - b. Lock the cutter cover latch.
6. Move the upper feed trough to the CLOSED position.
7. Replace the feed trough guard.
8. Untag/unlock the Start mechanism.
9. Start the machine using normal start-up procedures.

Sharpening the Knives

Proper sharpening of cutter knives produces the most efficient and cost-effective operation of the corn cutter. Improperly sharpened knives not only cause irregular cutting, but waste valuable hours in corn cutter adjustment. No adjustment will compensate for a badly sharpened knife.



NOTE

Knives and sharpening stones should be kept clean at all times when sharpening.

Magnuson CCM Corporation recommends the use of the CCM Knife Sharpener for sharpening knives. When used properly, the CCM Knife Sharpener provides a consistently sharper knife while maintaining the correct cutting angles of the knife.

Knives cannot be sharpened indefinitely. There is a minimum knife length which will give satisfactory results. Inspect the length of the knife to ensure that it is more than ¾-inch (19 mm) long and replace as necessary.

Using the instructions provided with the Knife Sharpener, set the adjustable jigs and stops for the correct sharpening angles. After the CCM Sharpener has been set up, regular use ensures consistent sharpening of the knives at correct angles.

Cleaning the EACC

Materials used in construction of the EACC are stainless steel or food-grade plastic. Machine parts are accessible for ease of cleaning.

• Hourly Rinse

Every hour, rinse each EACC using cold or lukewarm water. Ensure that the light source and computer box lens are clean and able to function.



CAUTION

Do not use abrasive cleansers to clean the Computer Box lens. It may result in damage to the Computer Box lens.

Rinse and Change the Cutter Head

Following each shift, or as soon as a run is finished, rinse each EACC immediately. Do this cleaning procedure at least every four to eight hours.

- **Daily Major Sanitation**

Once each day, wash each EACC thoroughly using suitable commercially available compounds.

Clean the EACC



WARNING

LOCKOUT/TAGOUT MACHINE. Failure to do so may result in personal injury.

This procedure describes how to clean the EACC. Clean the EACC once a day.

1. Remove the cutter head from the machine and place it on the work surface. See [Remove the Cutter Head \(page 151\)](#).
 - a. Remove the knives from the cutter head.
 - b. Clean the cutter head and knives thoroughly to remove starch.



TIP

Some packing plants submerge the cutter head in a tank of water until the beginning of the next shift or run.

- c. Sharpen the knives as required. See [Sharpening the Knives \(page 156\)](#).
 - d. Oil the cutter head and reassemble. See [Reassemble the Cutter Head \(page 154\)](#).
2. Using a suitable cleaning compound, wash down the EACC until all corn debris and starch have been removed.
 3. Install the cutter head. See [Replace the Cutter Head \(page 154\)](#).
 4. Close and latch the cutter cover.
 5. Remove any tags and unlock the machine.
 6. Start the EACC according to procedures. See [Off-Season \(page 159\)](#) for end-of-season sanitation procedures.

Lubrication

Recommended lubricant is NLGI #0, #1 or #2 food-grade grease. The EACC uses a annual, multiple-point method for the application of lubrication. This method require the application of lubrication:

- Every four hours for zerk points/grease fittings
- After each major wash down for zerk points/grease fittings
- Daily for specified assemblies on the installation of specified assemblies

Other Lubricant Requirements

- Upper and Lower Feed Trough Subassembly Belts
- When replacing these belts, apply grease on the underside before operating the corn cutter

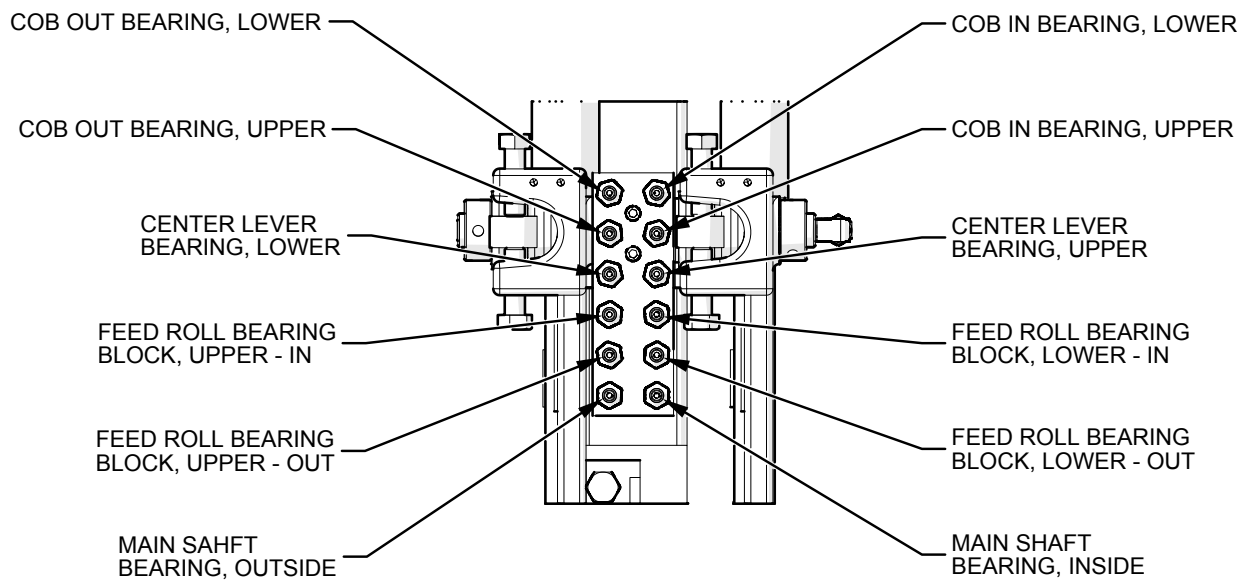
Lubrication is not required after the rinses. See [Off-Season \(page 159\)](#) for end-of-season lubrication procedures.

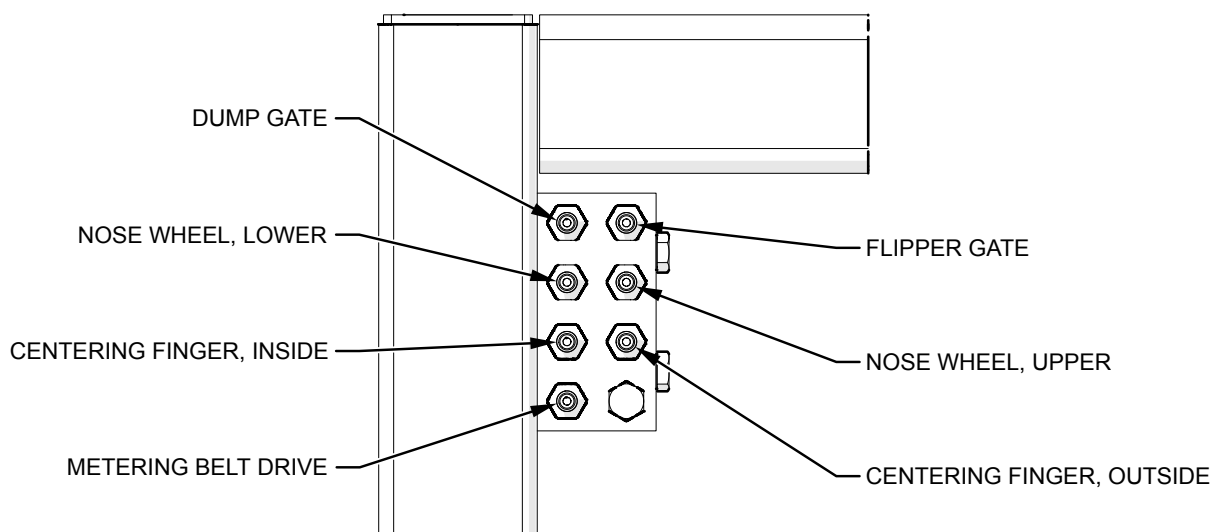
Manually Lubricating the EACC

The manual lubrication system requires the application of lubricants to multiple points of the machine.

- Grease all zerk points/grease fittings every four hours and after each major washdown.
- Daily, lubricate the cob roll drive chain. Chain should be snug.
- Daily, monitor the oil in the optional cutter head reservoir. Maintain the oil level at a minimum of 2" (51 mm) of oil visible in the reservoir located above the cutter cover.

Grease Fitting Locations





Off-Season

Maintenance, Off-Season

The EACC requires cleaning and preventive maintenance immediately after shut down at the end of each season. Off-season maintenance is conducted in four states:

1. [Cleaning and Lubricating \(page 159\)](#)
2. [Inspecting and Ordering Parts \(page 160\)](#)
3. [Preparing for Storage \(page 160\)](#)
4. [Pre-Season Set-Up \(page 161\)](#)

Correct off-season maintenance and storage ensures that the EACC is ready for start-up at the beginning of the next corn packing season and that an adequate supply of spare parts is on hand.



WARNING

Read and understand the **Safety Guidelines** chapter of this manual before performing maintenance or repairs.

Cleaning and Lubricating

To minimize maintenance and prevent operating problems, clean and dry the EACC according to normal sanitation and lubrication routines; then apply lubricants as specified in this section.

Cleaning and Lubricating the Cutter Heads

Before cleaning, turn the machine OFF and lockout/tagout. Remove and take apart the cutter heads and clean thoroughly. See [Removing and Replacing Cutter Head \(page 151\)](#) for cutter head removal, handling, and reassembly procedures. Reassemble using white Vaseline instead of oil. Wrap each cutter head carefully in non-porous paper and store in a dry place.

**WARNING**

Read and understand the **Safety Guidelines** chapter of this manual before performing maintenance or repairs.

Cleaning

Remove the center lever cover and turn the wheel and wash the machine as described in [Cleaning the EACC \(page 156\)](#).

Clean out the inside of the Utility Box and the Electrical Control Box by hand. Do not use high-pressure washing.

Lubricating

After the EACC has been thoroughly cleaned, run each EACC for four hours to remove all moisture. During this time, apply grease to all fittings every hour to ensure that moisture is removed completely.

1. Apply a heavy oil or light grease to the points where the motor shafts enter the motor housing, (nine (9) motors per machine). Then run the machine for a short period.
2. Apply a fresh coat of grease to all unpainted and machined parts.
3. Using a good food-grade lubricant such as Jax Magna Plate 1/0 or 2/0, coat chains and sprockets to prevent rust from developing during the off-season.

Inspecting and Ordering Parts

Inspect each Corn Cutter

Carefully inspect and list any parts that need to be replaced prior to the next season. Order these parts promptly using the procedures in [Contacting Magnuson CCM \(page 9\)](#). Orders placed immediately after the corn packing season will be shipped prior to the next processing season, or at a time specified by the customer. For more information, see [Recommended Replacement Parts \(page 162\)](#).

Inspect the Electronics Boards and Cutter Heads

If required, return the boards and cutter heads to Magnuson CCM Corporation for refurbishing.

Inspect the Cutter Head Knives

Inspect the cutter head knives and sharpen them as required. Remember, knives cannot be resharpened indefinitely. Measure the length of the cutter head knives. If the blade length is less than 3/4" (19 mm), order new knives and replace them before the start of the next season.

Preparing for Storage

To obtain long life and efficient operation of the EACC, carefully prepare each machine for storage.

To prevent damage during off-season storage:

1. Mark all parts that will be removed from each machine and record the markings. This ensures that parts will be reinstalled on the correct unit.
2. Turn off the water supply to the EACC.
3. Disconnect all water lines.
4. Drain water from the air filter.

5. Drain water from the water valve.
6. Turn off power to the power supply.
7. Remove the tension from the feed trough belts.

**NOTE**

Prior to the next season's corn pack, you must replace the air filters and flush the air line headers and water lines as described in [Pre-Season Set-Up \(page 161\)](#).

Pre-Season Set-Up

Prior to the corn packing season, ensure that the machines are reassembled and ready for operation. See [Mechanical Adjustments \(page 60\)](#) and [Electrical Adjustments \(page 101\)](#).

1. Receive and inventory the new parts.
2. Receive, inspect, and install refurbished electronics boards and cutter heads.
3. Flush the water lines and hook up to the EACC.
4. Remove the main airline and flush the airline heads.
5. Replace the air filters.
6. Using the parts marking lists prepared at the end of the season, reinstall parts that were removed and stored:
 - Reinstall the guards, shields, and turn wheels.
7. Readjust tension on the feed trough belts.

Rebuild Programs

Magnuson CCM offers post-season rebuild programs to assist in rebuilding and maintenance of the Electric Automatic Corn Cutters. Pre-season start-up programs are also available. Consult your local sales and service representative for more details.

Replacing Parts

This section describes how to order replacement parts and how to replace certain parts of the Electric Automatic Corn Cutter (EACC).



WARNING

Lockout/tagout (LOTO) procedures must be followed before performing any work, cleaning, or removal of plugged product in this machine.

Ordering Replacement Parts

Order replacement parts for your Magnuson CCM equipment by contacting your authorized Magnuson CCM agent or distributor. Be prepared to provide the following information:

- Equipment name, model, and serial number
- Date of purchase
- Part number and description
- Quantity of parts required and your purchase order number

Recommended Replacement Parts

The following list of recommended spare parts is the minimum that should be kept on hand at all times. Experience will indicate where more or less or different parts should be on hand. Magnuson CCM makes every effort to keep in inventory all parts that are expected to wear or break. Depending on recent sales of parts, some parts may be out of inventory at any given time.

Part Number	Description	Quantity
TOOLS		
4011662	CUTTER ALIGNMENT TOOL SET	1
4011588	TENSION ADJUSTMENT TOOL	1
INFEED CONVEYOR ASSEMBLY		
7560.3010.2.1	SPIDER, URETHANE	1
0002.8134.3	BRG, 3/4 BORE 2BOLT FLG W/INSRT	4
4011412.0001	BELT, INFEED CONV BLUE	1
INFEED WHEEL ASSEMBLY		
4011310.0002	CARRIER, INFEED WHEEL SLOPED	2
4011309.0004	CARRIER, INFEED WHEEL W/SLOTS	2
PRESSURE ARM / METERING BELT (LIVE WALL) ASSEMBLIES		
0002.8134.1	BRG, 3/4 BORE 2 BOLT FLANGE	2
4011287.2	BELT, LIVEWALL REINFORCED	1
4010000.8110.1	AY,PRESSURE ARM ELECTRIC	1

Part Number	Description	Quantity
4011313	DAMPER, ISOLATION-MOD	1
4011315	BLOCK, PRESSURE ARM SPAC	1
ELECTRICAL ENCLOSURE ASSEMBLY		
4010019.0002	CNTRL, PCB CORN PROFILE	1
9502.0062	FUSE, 2.00A 50V GMA FAST	5
9502.0106	FUSE, 2.5A 250VAC GMA FAST	5
9502.0091	FUSE, 4A 125V GMA FAST	5
9502.0065	FUSE, 0.12A 600V CC FAST	5
9502.6035	SWITCH, PUSH - PULL	1
9502.6004	NEMA STYLE PUSH BUTTON 30.5MM	1
0005.1083.200	DRIVE,200W 200-240VAC 1-3PH	1
0005.1083.400	DRIVE,400W 200-240VAC 3PH	1
9502.9281.010		
9502.1031.501		
LIGHT SOURCE ASSEMBLY		
4011335	COVER, LUCITE LENS	2
4011336	GASKET, 1/32 LENS COVER	2
4011587	LENS, FRESNEL-MACHINED	2
9501.9057.001	BULB, 12 VDC LED	1
FLIPPER GATE ASSEMBLY		
0009.0518.1	SPRING, FLIPPER CENTERING	1
TURN WHEEL ASSEMBLY		
4011259.0001	HUB,22mm FLANGED	1
4011196.0001	CHAIN,GROOVED,BLUE	1
UTILITY BOX ASSEMBLY		
0007.4438	REGULATOR, 1/8 NPT 125 PSI	1
7574.2007.1	VALVE,5/3E 24VDC	1
7574.2007.2	VALVE,5/2 24VDC	2
7574.2008	VALVE,WATER ON/OFF 24VDC	1
4121035.0006	AIR PREP,EACC W/ DUMP VLV	1
9502.8242	CABLE,M12 90°-OPEN,2.5m	1
9502.8243	CABLE,M8 90°-OPEN,2.5m	1
FEED TROUGHS / DUMP GATE / LOWER TURN SHIELD ASSEMBLIES		
4011178	BELT, UPPER FEED TROUGH-V	1
4011183	BELT, LOWER FEED TROUGH V	1
4011174	NOSE WHEEL AY	1
4011186	BLOCK, ROCKER	1

Part Number	Description	Quantity
0002.0010	RODEND, 1/4 x F1/4-28 BK	1
0002.0200	RODEND, 5/16 x F5/16-24 BK LH	1
0002.0210	RODEND, 5/16 x F5/16-24 BK	1
0993.0051	O-RING CORD-3125 DIA	2"
0001.3992.002	SCR, EYE 3/8-16 x 3" LG 303 SS	1
CUTTER BOX ASSEMBLY		
4011061	BRG, MODIFIED ER-12 BALL	8
4011038.0003	SHAFT, FEED ROLL DRIVE STUB	4
0006.1105.1	SPRKT,40B20 x 22mm	4
4011034	U-JOINT AY, COB SHAFT	4
0006.1108	SPRKT, 40B20 x 1.000	1
4011028	LEVER, UPPER CENTERING	2
4011029	LEVER, LOWER CENTERING	2
4011032	LEVER PIVOT	2
0006.0041.5	CHAIN,RC40 28.5 LG W/ML	1
4011049	BRG BLK, COB ROLL SHAFT-OUT	2
4011050	BRG BLK, COB ROLL SHAFT-IN	2
4011040	SPRING, LIGHT FEED ROLL	3
4011030	SPRING FEED ROLL HEAVY	2
4011027	SHAFT, COB ROLL	2
4011393	STEEL COB OUT ROLLER	2
4011051	SLIDE, FEED ROLL	2
4011033	SLIDE, FEED ROLL	2
4011391	COB ROLL, MOLDED	2
4011001	PIN, LOCATING	2
4011437	BRONZE THRUST WASHER	2
4011020	BEARING CUTTER SHAFT	1
4011019	BEARING CUTTER SHAFT - FEED	1
4011445	GEAR, CUTTER HEAD DRIVE-NYLON	1
4011021	SHAFT AY CUTTER HEAD	1
4011052	HOLDER GEAR	1
0006.3234	TIMING BELT, 8MM PITCH 12MM WD	1
4011399	FLAP, CTR COVER COB IN	2
NUBBIN KNOCKER		
4011381	NUBBIN KNOCKER ASSEMBLY	1
4011382	SPRDR, COB OUT ROLL (NK)	1
4011384	PLUNGER, SUBASSY	1
4011385	CAM,NUBBIN KNOCKER	1

Part Number	Description	Quantity
4011386	SHAFT, CAM-SUBASSY	1
0002.9040	BEARING, BALL	1
4621024	1 WASHER 100 x 1/2 ID x .010	1
4621025	1 WASHER 100 x 1/2 ID x .005	1
AIR CYLINDERS		
0007.4328	CYLINDER, AIR - 4"	1
0007.4328.1	CYLINDER, AIR - 1/2"	1
0007.4328.2	CYLINDER, AIR - 1"	1
MOTORS		
0005.1082.01	GMTR,200W 15:1 IP67	3
0005.1082.02	GMTR,200W 50:1 IP67	1
0005.1082.03	GMTR,400W 5:1 IP67	1
0007.0037.1		1
SENSORS		
9502.7032	CABLE AY, Q.D. 7/8-16UN FEMALE	1
9502.8000	SWITCH, INFEEED PROXIMITY	1
9502.8002	SENSOR, HALL-EFFECT	1
9502.8003	SWITCH, MAGNETIC SAFETY AL	1

Troubleshooting

When packing plant personnel conduct ongoing inspection and monitoring of the Electric Automatic Corn Cutters (EACC), they learn from experience to detect problems with the machines. They do this by reading the digital display, observing the condition of the finished product, watching the process flow, or listening to operational sounds. Continuous monitoring of operations provides benefits in increased production, less downtime, longer machine life, and a safe working environment.

Many problems observed during operations can be categorized as “cut quality defects”; that is, the condition of the finished product shows that certain assemblies need readjustment or replacement.

Often, cut quality indicates that the cutter knives are improperly sharpened or too short. The poor condition of knives not only causes irregular cutting but wastes valuable hours in machine adjustment. Make regular checks of knife condition a part of your maintenance routine.

With experience comes the ability to distinguish between defects that warrant immediate machine shut down and those whose correction can be postponed until a more convenient time. Note that many corrections, if quickly carried out, reduce machine downtime and losses in product yield. This section is designed to help you recognize and correct the most common operating problems.

If a problem occurs that affects personnel safety, immediately notify the Supervisor or Mechanic who will try to locate the cause of the problem using troubleshooting techniques.

If troubleshooting requires the presence of electrical supply at the machine, see ??? for use of the By-Pass Mode to lock out air supply.

If assistance is required for troubleshooting or repair of the machine, contact your local Magnuson CCM Service Representative. See [Contacting Magnuson CCM \(page 9\)](#).

Observe Product Condition

Monitor EACC input and output to check for product defects that indicate the need for adjustment or repairs. First observe the ears of corn as they enter the machine to determine if they can be cut. For example:

- Banana-shaped, oval, or other irregularly shaped ears cannot be cut on center.
- Damaged ears yield ragged cuts.
- Broken ears yield broken cobs.

Then observe cut cobs for misalignment of cut.

Common Product Defects

Symptom	Definition	Cause
Deep Cut	The knife cuts too deeply into the corn cob.	The knife iris (knife opening) may be set too small. The cutter head may be starching-up and causing knives to stick.

Symptom	Definition	Cause
		Knives may be improperly sharpened.
		Knives may be too dull or short to cut the corn properly.
		The spring tension may be set too high
Deep Cut on One Side	Indicates that the ear of corn is crooked as it enters the cutter.	The feed trough may be out of line.
		Feed roll shaft may be out of vertical alignment with the cutting head.
		The feed rolls may be out of horizontal alignment with the cutting head.
Broken Cobs	Cobs are breaking.	The feed roll tension springs may be adjusted too tightly, especially for tender corn.
		The feed roll shafts are not centered with the cutter head.
Ragged Cuts	Ragged cuts may occur because the corn was damaged on one side before entering the corn cutter for processing. Mechanical reasons include:	Cutter head knives may be dull or broken.
		One or more cutter head knives may be sprung.
Chaff in Corn	If you find many hulls or chaff in the corn, the corn may be damaged before entering the corn cutter. The cutter trims the damaged corn as well as the good corn, causing a substantial amount of chaff in addition to a ragged looking cut.	Check the knives to ensure that they are sharp. Dull knives cause the feed roll to spin on the ears and crush kernels.
		Check the knife iris opening to see if it is too large or too small.

Two-Minute Check

When troubleshooting, first perform the two-minute check. This check can provide clues for a quick solution to the problem. With the machine shut down:

1. Check the light source area. If objects block the light source the machine will start but stop after about two seconds.
2. Ensure that the cutter cover is CLOSED and LOCKED. If the cutter cover is open, the machine will not start because of the safety switch.
3. Ensure that the feed trough guard (if equipped) is CLOSED. If the feed trough guard is open, the machine will not start because of the safety switch.
4. Check the Stop and Emergency Stop buttons. When the Stop buttons are pressed in, someone may be working on the machine.

If you do not find the cause of a problem by using the two-minute check, use more advanced troubleshooting techniques to locate the source of the malfunction.

Troubleshooting Techniques

Use troubleshooting to narrow the range of possible causes of problems in the electrical or air supply systems. Also, observe the condition of the finished product to detect defects caused by improper cleaning, lubrication, or maintenance of mechanical subassemblies.

The tables in this section describe problems you may have with the Electric Automatic Corn Cutter and corrective actions you can take to fix the problem.

When troubleshooting, verify the following machine settings are within the baseline range.

1. Input "TRACK SPEED" LED steady blink.
2. Input "COB OUT" LED is ON, goes OFF when cob exits the machine.
3. Input "EAR IN" LED is ON, goes OFF when the sensor blade goes up.
4. Main Air Pressure: 80-85 PSI
5. Flipper Air Pressure: 30-40 PSI
6. Downfeed Air Pressure: 35-40 PSI
7. Infeed Wheel: 72-74 FT/MIN
8. Blue Chain: 235-240 FT/MIN
9. TS (Track Speed) = 63-66
10. Orange Belts: 225-230 FT/MIN



WARNING

All electrical troubleshooting and repairs should be performed by trained personnel who qualify under local, state and Federal or International regulations.



WARNING

Never reach into a machine to clear a blockage if the machine is ON or running. Such action can result in severe injury.

Machine Does Not Start

Possible Cause	Inspection Procedure	Corrective Action
Cutter cover or feed trough guard is open. E-stop or Stop buttons are engaged.	Visually check guards, covers, and Stop buttons.	Close and lock the cutter cover and feed the trough guard to engage the interlock safety device.
		Reset the Stop and Emergency Stop buttons as required.
There is a lack of air pressure.	Check air pressure for 80 psi (5.5 bar).	Adjust settings. See operations and service documentation for air pressure and hydraulic adjustment and repair.
	Check Air Pressure Switch for proper operation. Switch should be 'closed' when pressure is supplied, and 'open' when pressure is removed.	Replace if faulty.

Possible Cause	Inspection Procedure	Corrective Action
There is no input power to the machine.	Check the Start button. If the contact does not close when the button is pressed, the machine will not start. Use an ohmmeter to verify contact.	Replace the contact block if necessary. See operations and service documentation for the procedure.
There is a blown fuse.	Check fuses on the DIN rail and profile board.	Replace blown fuses as required. See service documentation for procedures.
There is a faulty air or hydraulic pressure switch.	If adequate air pressure and hydraulic pressure, pressure switches should be closed.	Readjust pressure switch settings, or replace if bad.

Machine Starts but Shuts Down Immediately

Possible Cause	Inspection Procedure	Corrective Action
The power supply may be receiving a shutdown signal.	While turning the machine ON, observe the light source eye indicator LEDs on the profile board to see if they illuminate. If the LED is ON, objects such as corn stalks or cobs may be blocking the light source. Five or more blocked eyes on the right vertical row will cause the machine to shut down.	If the LEDs are ON, locate and clear the blockage of the light source. If the LEDs are not lit, proceed to the next possible cause.
	Inspect the light source beam for correct alignment. Also inspect the profile board for proper alignment with holes behind the photo eyes.	See operations and service documentation for procedures related to centering the beam on the computer box and adjusting the bulb and socket.
	Check the power supply for low voltage.	Adjust voltage. See ??? for voltage adjustments at the power supply enclosure.
The machine will not run because the light source does not turn on.	Check the light source cable connection.	See service documentation for procedures and drawings related to electrical cable connections.
	Check the light source for a faulty light bulb.	Change light bulb if required.

Dump Gate Malfunctions

Possible Cause	Inspection Procedure	Corrective Action
There is insufficient air supply to the cylinder.	Check air line connection.	Reconnect the air line.
	Check air flow control valves for breakage.	Adjust or replace flow control valves.
Cylinder malfunction.	Check the mechanical adjustment of the assembly for loose jam nuts or set screws.	Tighten and adjust to correct setting.

Possible Cause	Inspection Procedure	Corrective Action
	Check the air cylinder for leakage or air by-pass.	Change the air cylinder if required.

Upper Feed Trough Malfunctions

Possible Cause	Inspection Procedure	Corrective Action
There is insufficient air supply to the cylinder.	Check the air regulator "downfeed" in the hydraulic box.	Adjust to a lower or higher setting as required.
	Check the flow control on the cylinders.	Adjust the flow controls.
	Check the air line connections.	If required, reconnect the air line.
	Check the lift air valve by manually operating the valve.	If the feed trough does not function, replace the air cylinder.
There is no electrical signal received at the lift air valve.	Check for an electrical signal at the air valve of 11 VDC or greater and that LED is on.	If the LED is on and an electrical signal is not preset, check cable connections and or change air valve.

Machine Will Not Recycle

Possible Cause	Inspection Procedure	Corrective Action
The cob out sensor is not counting the cobs out.	Check the cob out sensor on the profile board. The input 'COB OUT' LED on the profile board should be on and will go off when a cob goes out.	Adjust or replace the sensor.

Too Many Ears of Corn in the Infeed Wheel

Possible Cause	Inspection Procedure	Corrective Action
The Infeed Ear In Sensor is malfunctioning.	Check the infeed sensor blade for correct adjustment. The Ear In sensor LED should be on when the sensor blade is down, and go off when the sensor blade lifts up.	Adjust the sensor blade/Ear In sensor.
The infeed conveyor speed is set too high.	Check the conveyor speed.	Depending on the level of corn on the conveyor belt, adjust the speed.

Flipper Gate Does not Turn Ears Correctly

Possible Cause	Inspection Procedure	Corrective Action
Incorrect manual flipper gate settings.	Check the flipper gate for freedom of movement and correct clearances and striking force.	Adjust flipper settings per the procedures in Adjust the Flipper Gate (page 71) Adjust the Flipper Gate (page 66).

Possible Cause	Inspection Procedure	Corrective Action
	Check the 1/2" (12.7 mm) air cylinder and rod end for wear.	Replace as necessary.
	Check flipper gate air regulator setting.	Increase or decrease as required.
The track speed setting is incorrect.	Verify consistent reading of track speed at 63 to 66.	Adjust or replace the track speed sensor.
No electrical signal is received at turn valve.	Check the output 'TR' LED on the control board.	If the LED is on and electrical signal is not present, change the solenoid cable.
		If ON and electrical signal is present, change the air valve.

Flipper Gate Will Not Reject Nubbins

Possible Cause	Inspection Procedure	Corrective Action
The manual flipper settings are incorrect.	Check the flipper gate for freedom of movement and correct clearances and striking force.	Adjust the flipper settings per the procedures in Adjust the Flipper Gate (page 71) .
	Check the 1/2" (12.7 mm) air cylinder and rod end for wear.	Replace as necessary.
	Check flipper gate air regulator setting.	Increase or decrease as required.
The track speed setting is incorrect.	Verify consistent reading of track speed at 63 to 66.	Adjust or replace the track speed sensor.
No electrical signal is received at the reject air valve.	Check the output 'RJ' LED on the control board.	If the LED is on and electrical signal is not present, change the control cable.
		If on and electrical signal is present, change the air valve.

Too Small a Gap Between Ears Entering the Gray Track

Possible Cause	Inspection Procedure	Corrective Action
The infeed wheel setting is too high.	Use a linear tachometer to verify the speed of 70 to 75 ft/min.	Adjust the speed.
The pressure arm is too loose.	Verify pressure arm settings.	Adjust the settings per the procedures in Adjust the Pressure Arm (page 68) .
The track speed settings are too low.	Verify that the speed of the gray chain is 235 to 250 ft/min.	Increase or decrease the track speed as required.

Ears Bounce on the Lower Feed Trough Belt

Possible Cause	Inspection Procedure	Corrective Action
The incorrect transition from turn wheel to lower feed trough (Orange) belt.	Visually monitor the movement of ears on the turn ramp.	Increase or decrease air pressure on the flipper gate.
	Check adjustment of wraparound ear shield.	Adjust the shield so that ear is placed on the center of the lower feed trough belt.
	Check the speed of the lower feed trough belt. Should be 225 ft/min.	Adjust the speed. Cutter Speed (CS) should read 78 to 80.

Ears Jam at the Nose Wheel

Possible Cause	Inspection Procedure	Corrective Action
Poor transition of ears through the cutter head area.	Check the condition of the knives.	Change the knives.
	Check the setting of the iris.	Adjust the knife iris.
	Check the alignment of the nose wheels, actuating finger, center lever arms, and cob rolls.	See Mechanical Adjustments (page 60) for adjustment procedures.
	Check the downfeed pressure on the upper feed trough.	If too high, adjust air regulator to lower the downfeed pressure.

Infeed Conveyor Runs Continuously

Possible Cause	Inspection Procedure	Corrective Action
The infeed sensor blade is malfunctioning.	Check the infeed sensor blade to see if it is blocked CLOSED.	Remove the blockage.
Constant electrical signal present at the Infeed ON/OFF valve.	Check the output 'IN' LED on the control board.	If the LED stays ON when the infeed flapper is activated, change the sensor or cable.
		If the LED goes OFF, change the infeed ON/OFF valve.

Infeed Conveyor Does Not Run

Possible Cause	Inspection Procedure	Corrective Action
Infeed flapper malfunction.	Check infeed flapper to see if it is blocked "OPEN."	Remove blockage.
No electrical signal received at the control board.	Check the control board to ensure that the input 'EAR IN' LED is ON.	Adjust the screw on the infeed flapper.
No 'EAR IN' sensor signal received at the control board.		Clean the connection between the proximity switch and the cable.

Possible Cause	Inspection Procedure	Corrective Action
No electrical signal received at the infeed ON/OFF valve.		Change the proximity switch.
		Change the cable.
	Check LED on control board.	If LED is OFF, change the control board. If LED is ON, proceed to next check.
	Check the control board to ensure the output 'IN' LED is on.	
	Check the voltage at the terminal strip in the hydraulic box.	If voltage is present, proceed to next check. If voltage is not present, change the control cable.
	Check voltage at infeed ON/OFF valve.	If voltage is present, change the infeed ON/OFF valve. If voltage is not present, change the infeed ON/OFF valve cable.

Machine Keeps Recycling

Possible Cause	Inspection Procedure	Corrective Action
The Cob Out sensor is not working properly.	Check the 'COB OUT' LED on the control board. The LED should normally be on, and will go off when a Cob goes out.	Adjust Cob Out sensor or replace if faulty.

Rejecting Too Many Good or Long Ears

Possible Cause	Inspection Procedure	Corrective Action
Track Speed sensor is not working properly.	Check the 'Track Speed' LED on the control board. There should be a steady blinking rate without interruption.	Adjust Track Speed sensor or replace if faulty.
Nubbin Length Parameter is set too high.	Using the keypad and display, check the Nubbin Length parameter under General Parameters. Typical value is 14.	Reduce value, then increase to desired reject rate.

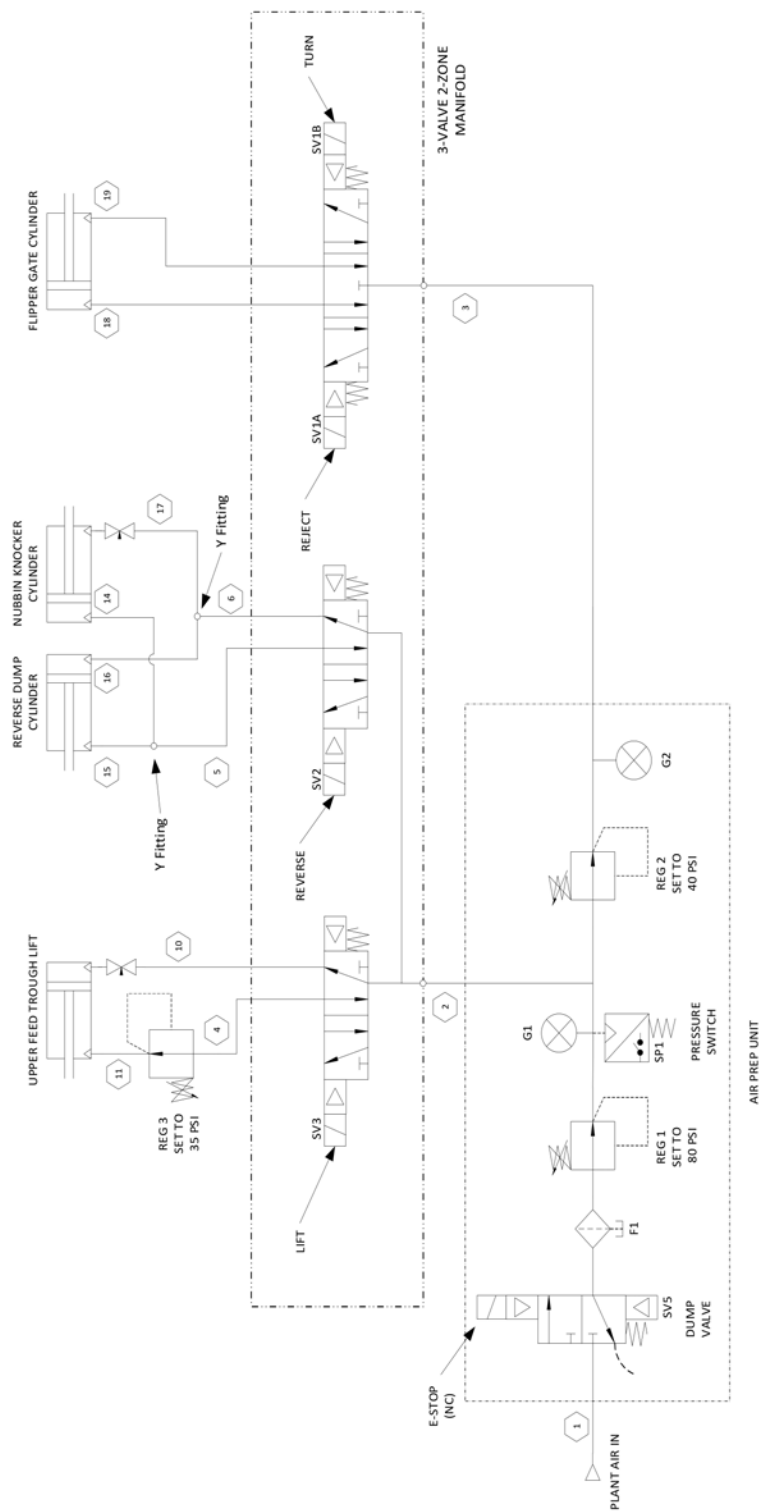
Power Bay Not Supplying Power to One or More Cutters

Possible Cause	Inspection Procedure	Corrective Action
Customer supplied disconnect is off.	Verify the disconnect knob is in the on or "I" position.	Turn the knob to on or "I" position and verify the cutter now has power.
The breaker has been tripped.	Turn customer supplied disconnect to off and open power bay door. Look for any breaker in the down or off position.	Put all breakers in the up position, close power bay door, turn disconnect on and verify power at all cutters.

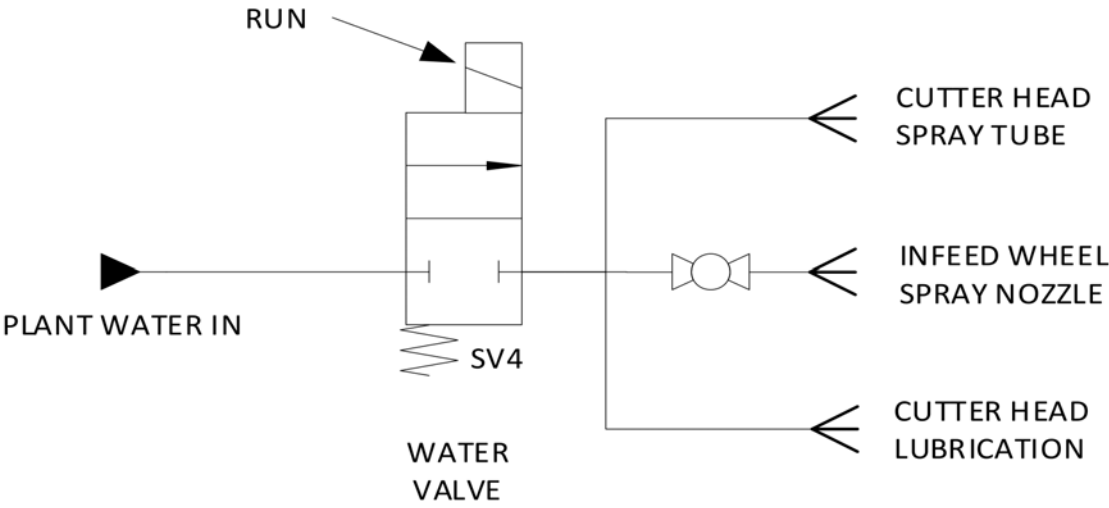
Possible Cause	Inspection Procedure	Corrective Action
Broken power supply.	Put on correct PPE to work with high voltage. Open power bay door. Use a multimeter to verify 220/230VAC power at power supply input and correct DC voltage at power supply output.	To replace a broken power supply, continue to wear PPE to protect against high voltage and turn off the breaker that feeds the broken power supply. Remove the input and output wires from broken power supply, then remove power supply from the DIN rail by lifting a plastic tab on the back of power supply (near the input side) and pivoting the power supply off the DIN rail. Snap the new power supply onto the DIN rail (input side up) and install wires in correct locations on the power supply. Put breaker back to on or up position and adjust voltage using the Adjust Voltage procedure.

Drawings

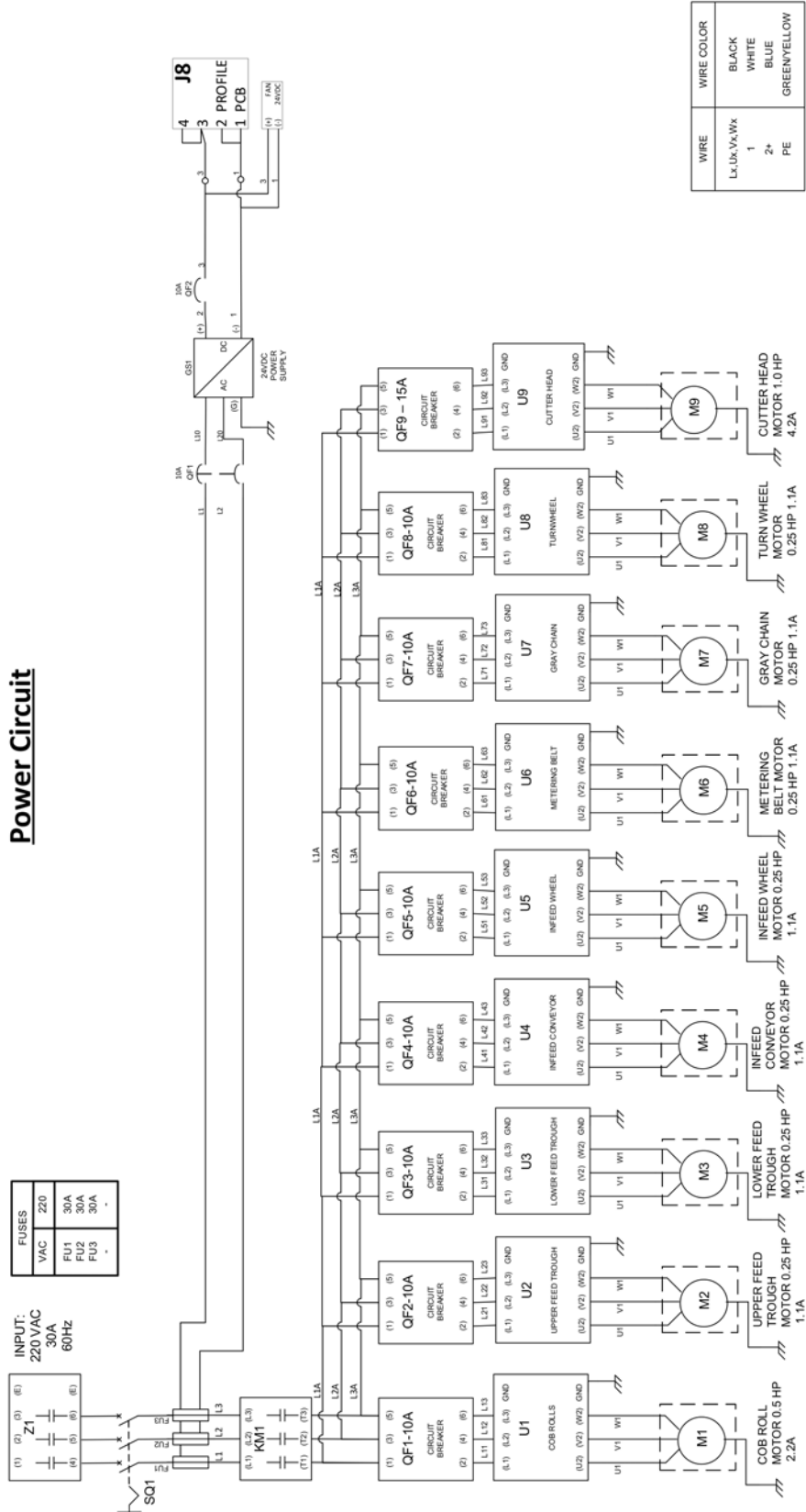
Pneumatic Schematic



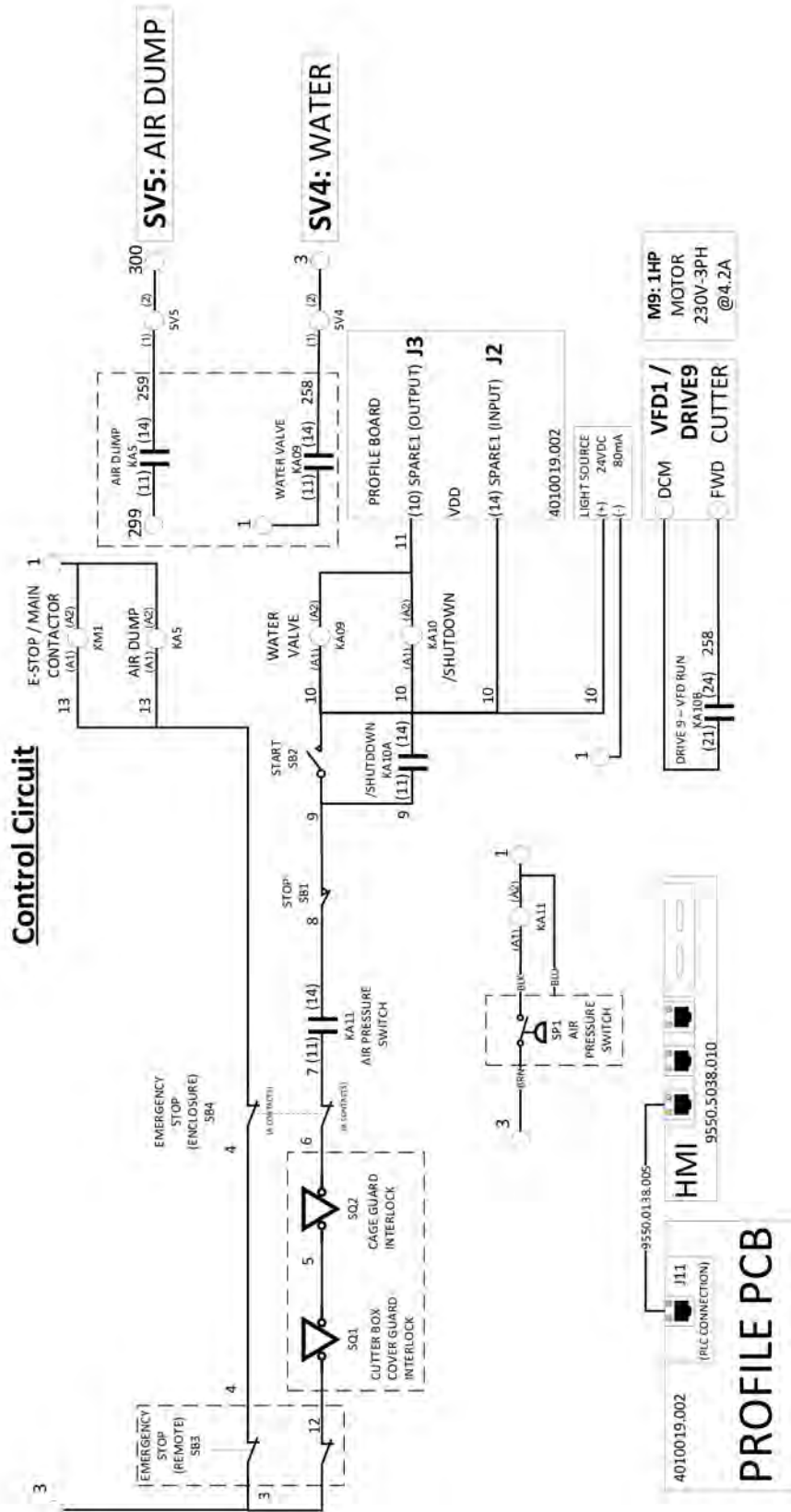
Water Schematic



Power Circuit

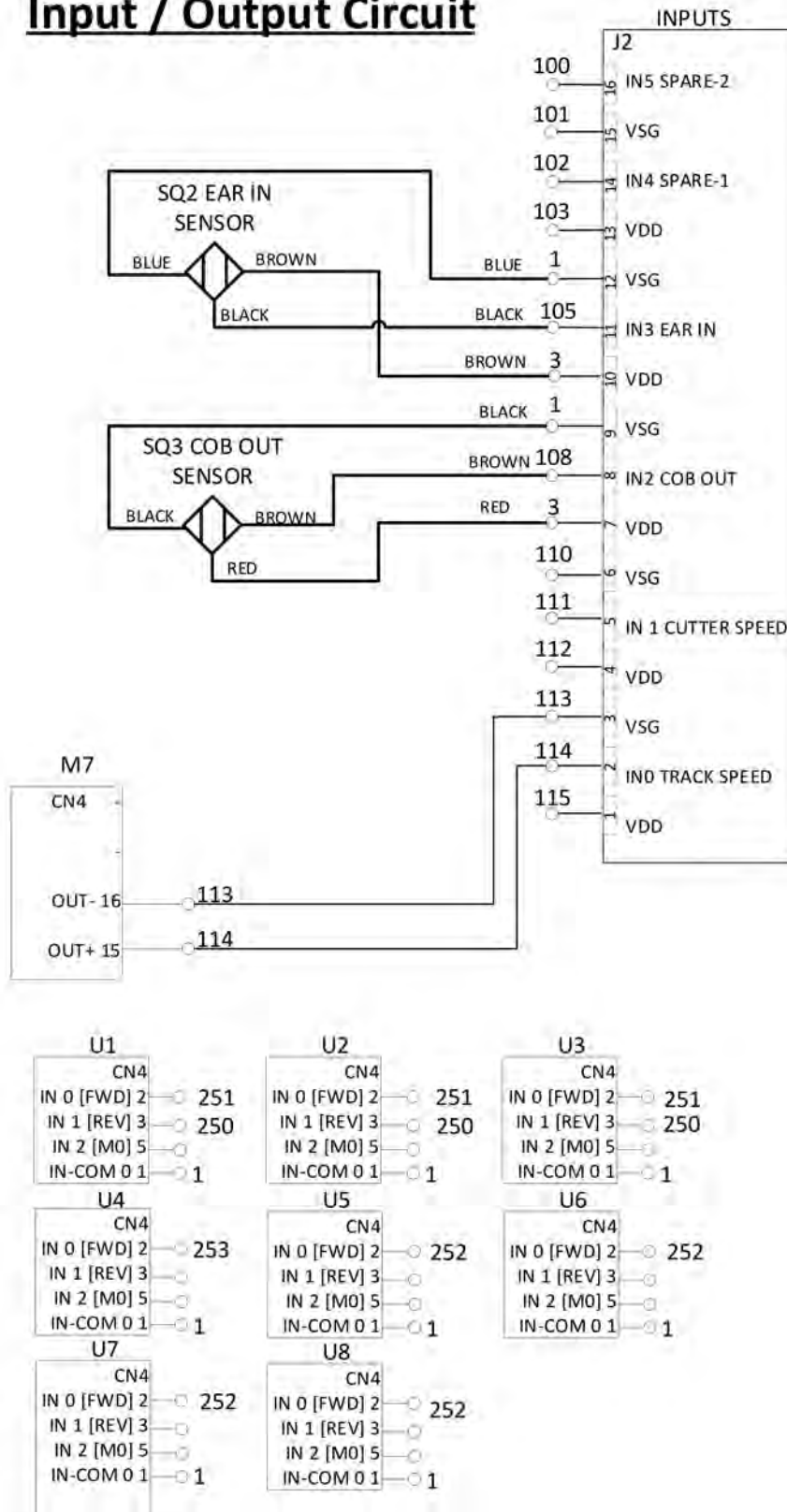


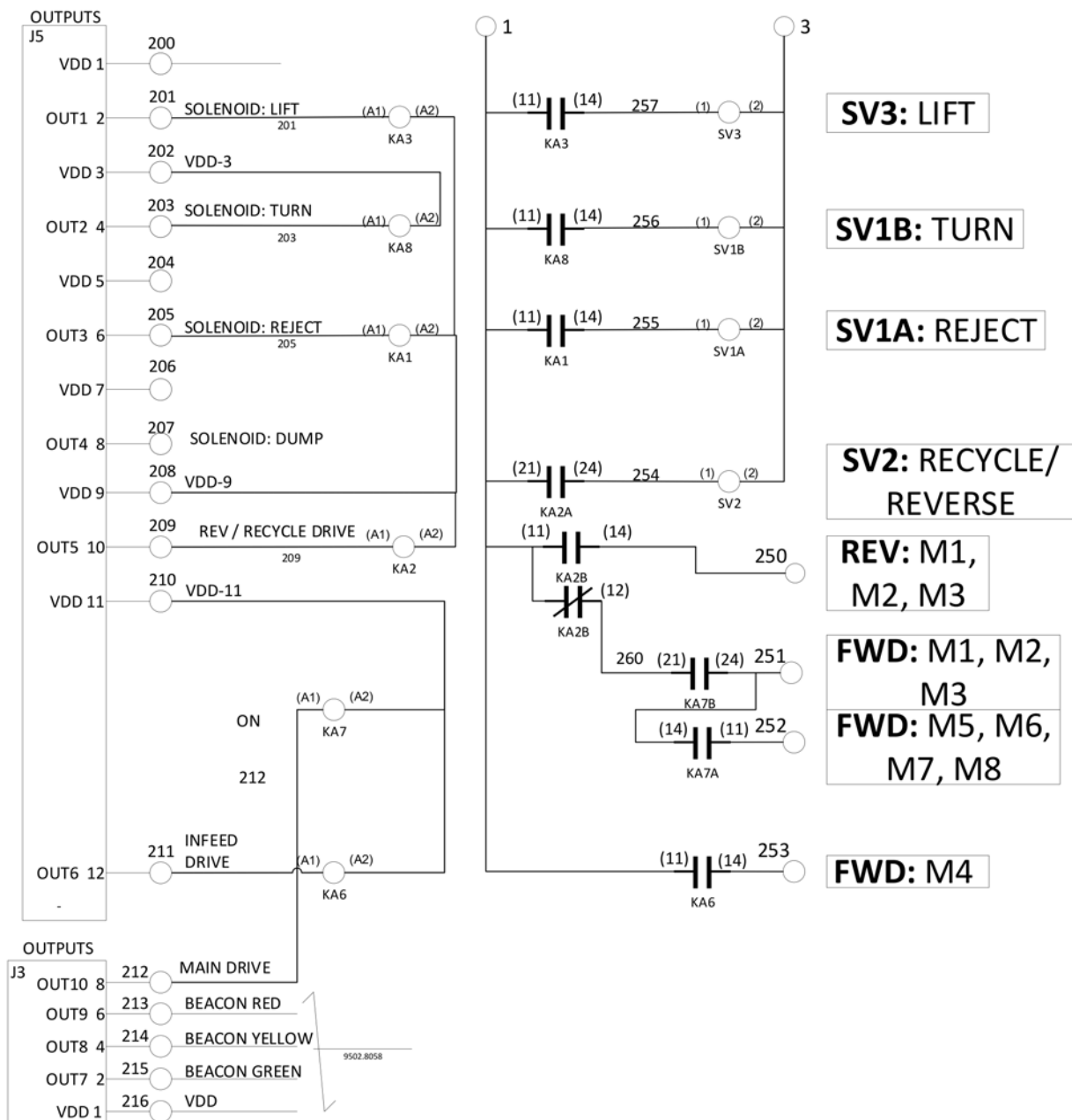
August 3, 2026



Input/Output Circuit

Input / Output Circuit





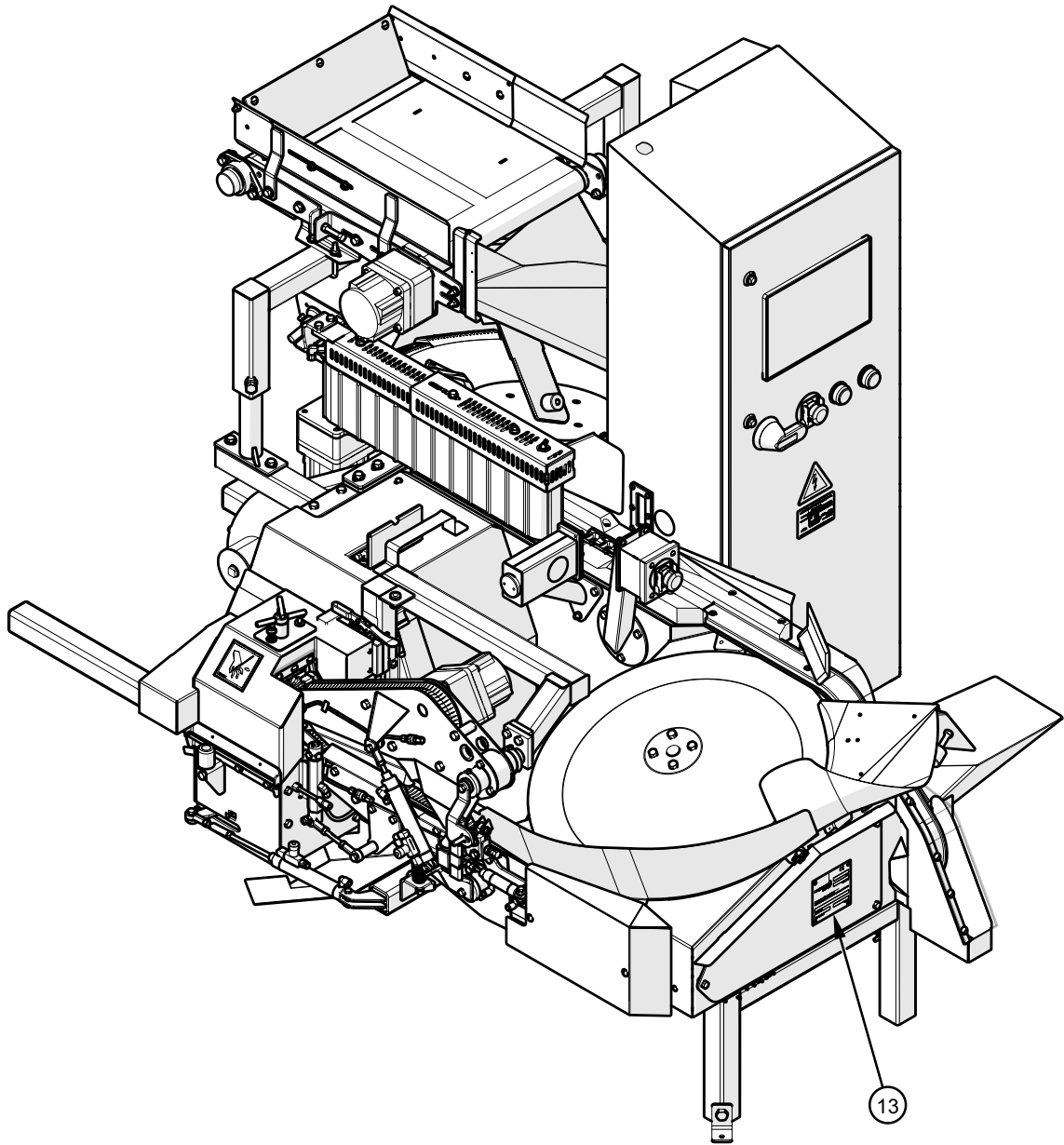
Jumper Setting

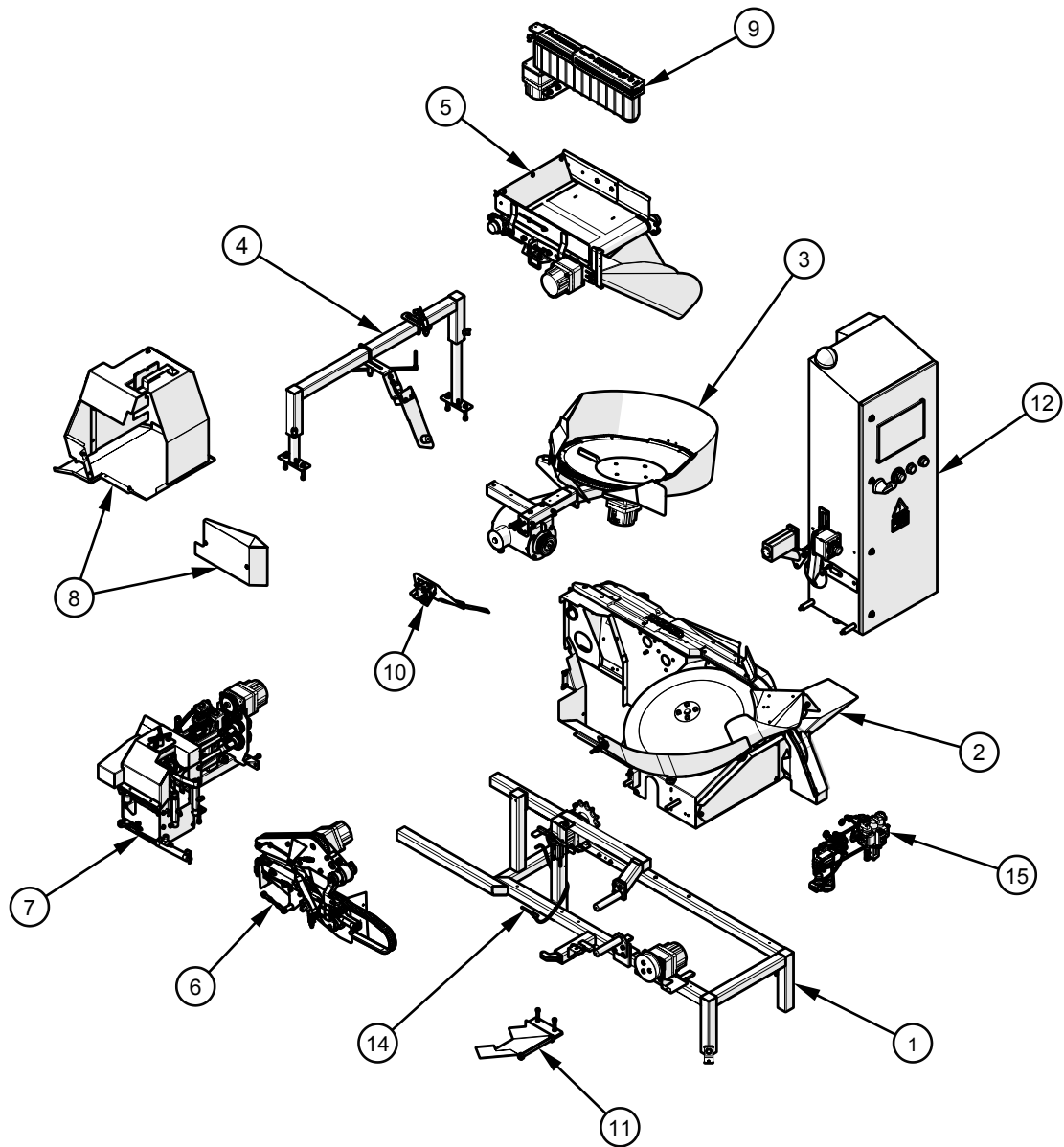
See [Board Jumpers \(page 137\)](#).

JP1	J1 Spare Inputs: 5-8. Not currently used.
JP2	J2 Spare Inputs: 1-4. Jumper the top 2 pins.
JP3	J2 Inputs: Track speed, cutter speed, cob out, ear in. Jumper the top 2 pins.
JP4	I/O Power. 24VDC. Jumper the bottom 2 pins.
JP5	I/O Power. 24VDC. Jumper the bottom 2 pins.

JP6	Not currenty used, no jumper required.
JP7	Not currenty used, no jumper required.
JP8	Not currenty used, no jumper required.
JP9	Troubleshooting only. Jumper the bottom 2 pins.
JP10	Not currenty used, no jumper required.
JP11	For RS232, select the top 2 pins. For RS485, jumper the bottom 2 pins.
JP12	For RS232, select the top 2 pins. For RS485, jumper the bottom 2 pins.

AY,ACC ELECTRIC (4010000.8000.4)

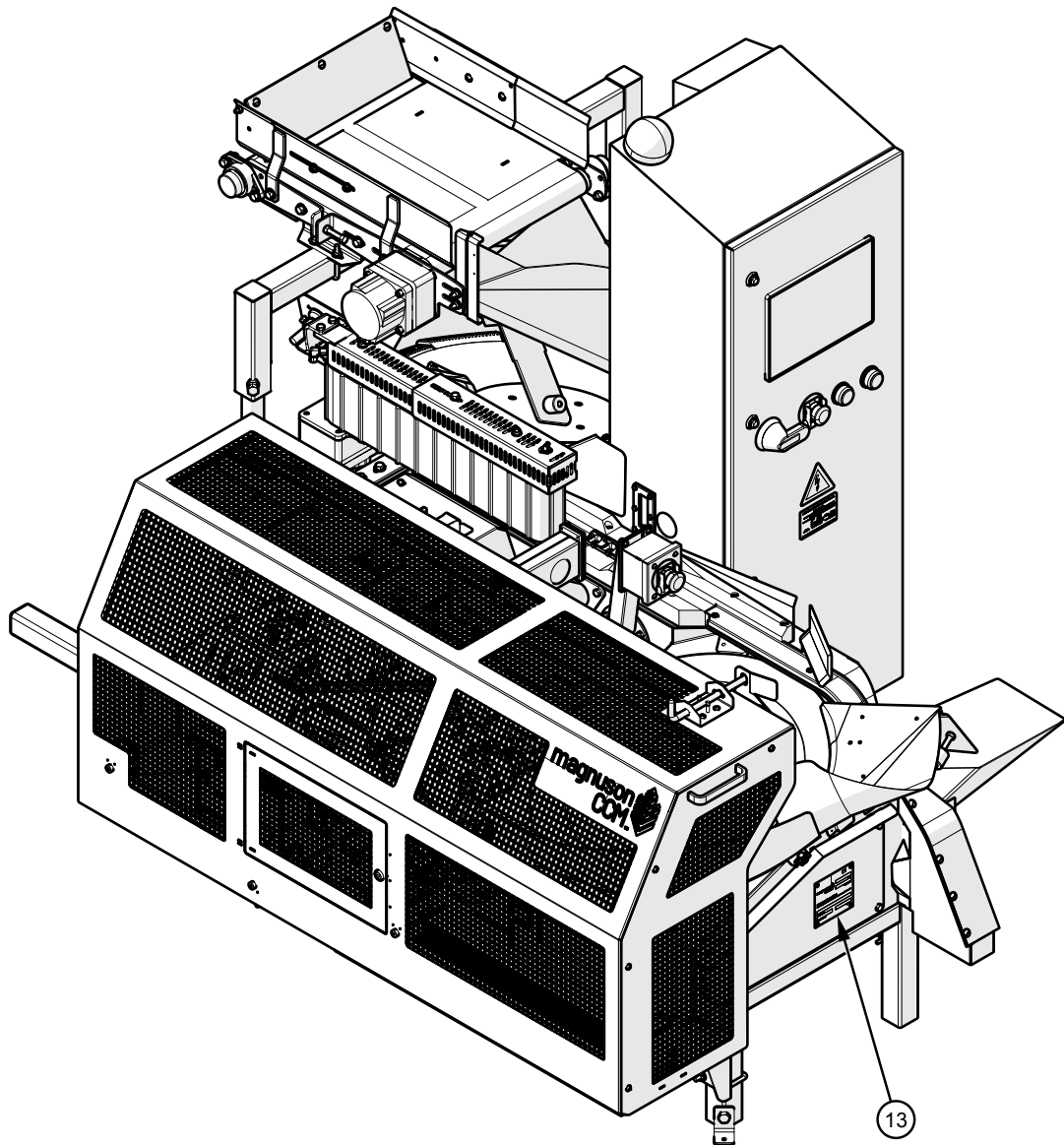


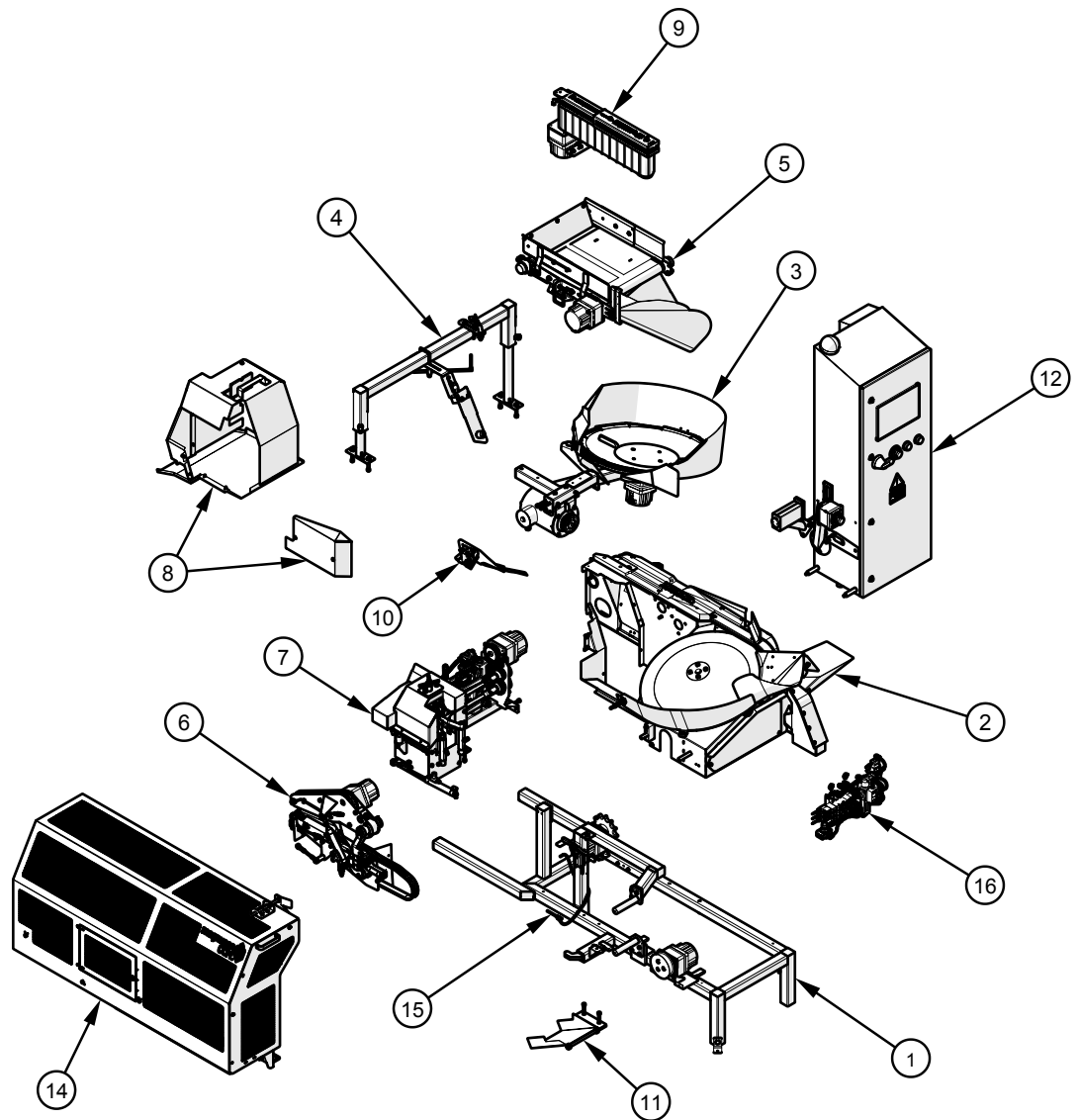


Item	Part Number	Description	Quantity
1	4010000.8100.3	AY,FRAME ELECTRIC	1
2	4010000.8101.2	AY,BODY ELECTRIC	2
3	4010000.8102.1	AY,INFEED WHEEL ELECTRIC	3
4	4010000.8103	AY,INFEED CONVEYOR SUPPORT	4
5	4010000.8104.3	AY,INFEED CONVEYOR ELECTRIC	5
6	4010000.8105.1	AY,FEED TROUGHS ELECTRIC	6
7	4010000.8106.2	AY,ELECTRIC CUTTERBOX	7
8	4010000.8108.3	AY,COVERS ELECTRIC	8

Item	Part Number	Description	Quantity
9	4010000.8109.1	AY,METERING BELT ELECTRIC	9
10	4010000.8110.1	AY,PRESSURE ARM ELECTRIC	10
11	4010000.8112	CHUTE,CUT CORN	11
12	4010000.8113.2	AY,CNTRL ELEC ACC	12
13	4010000.8114.3	AY,LABELS EACC	13
14	4010000.8118	AY,H2O CUTTERHEAD LUBRICATION	14
15	4010000.8119	AY,UTILITY ELECTRIC	15

AY,ACC ELECTRIC W/ CE (4010000.8000.5)

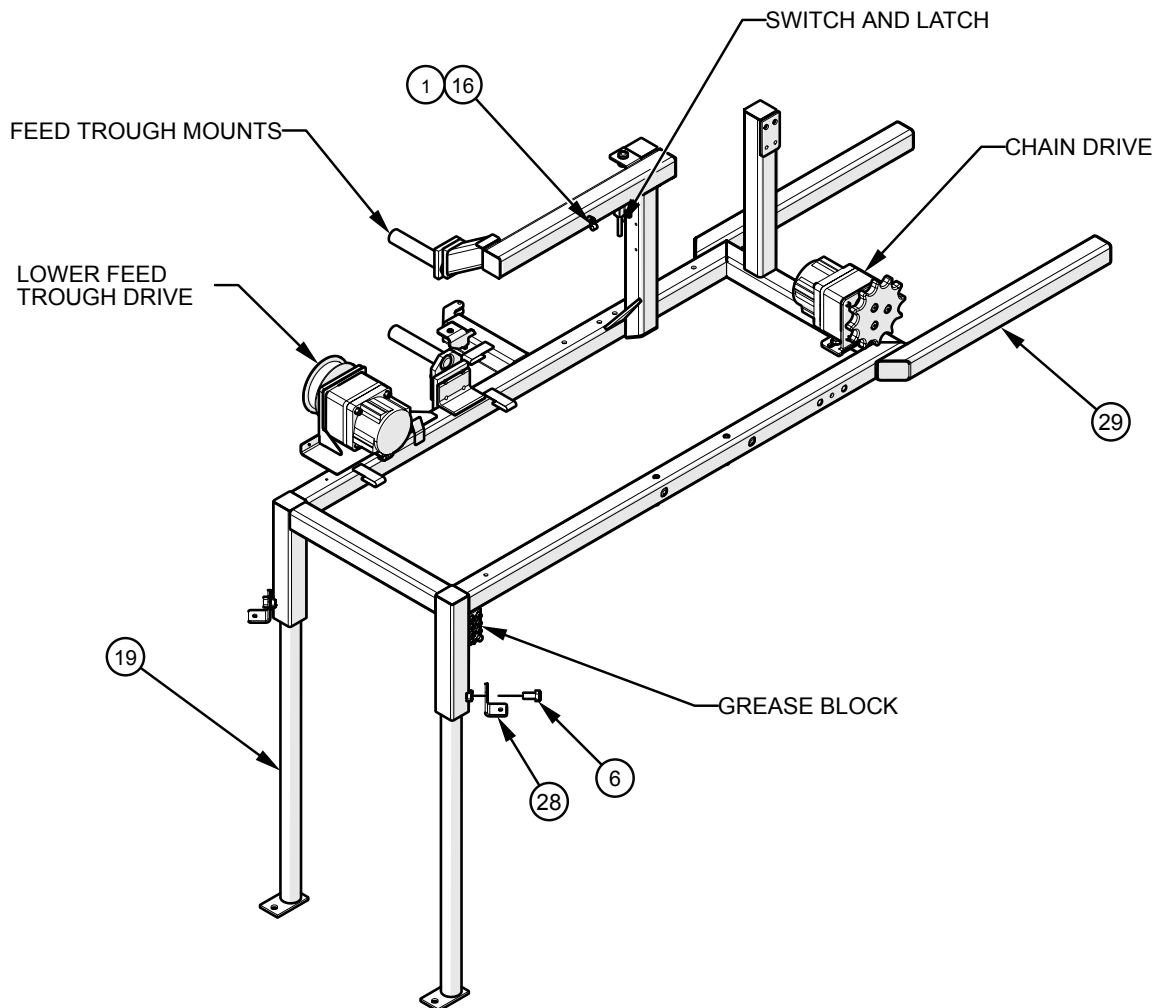


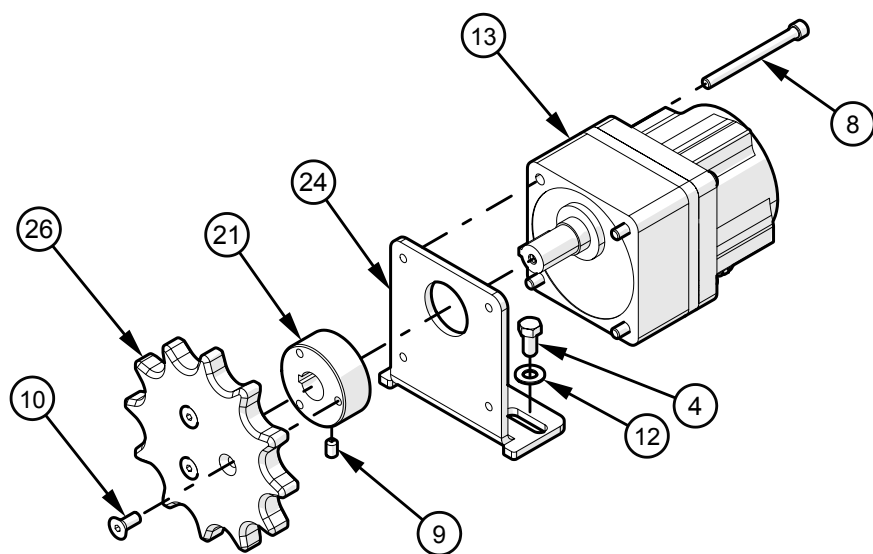


Item	Part Number	Description	Quantity
1	4010000.8100.3	AY,FRAME ELECTRIC	1
2	4010000.8101.2	AY,BODY ELECTRIC	1
3	4010000.8102.1	AY,INFEED WHEEL ELECTRIC	1
4	4010000.8103	AY,INFEED CONVEYOR SUPPORT	1
5	4010000.8104.3	AY,INFEED CONVEYOR ELECTRIC	1
6	4010000.8105.1	AY,FEED TROUGHS ELECTRIC	1
7	4010000.8106.2	AY,ELECTRIC CUTTERBOX	1
8	4010000.8108.3	AY,COVERS ELECTRIC	1
9	4010000.8109.1	AY,METERING BELT ELECTRIC	1

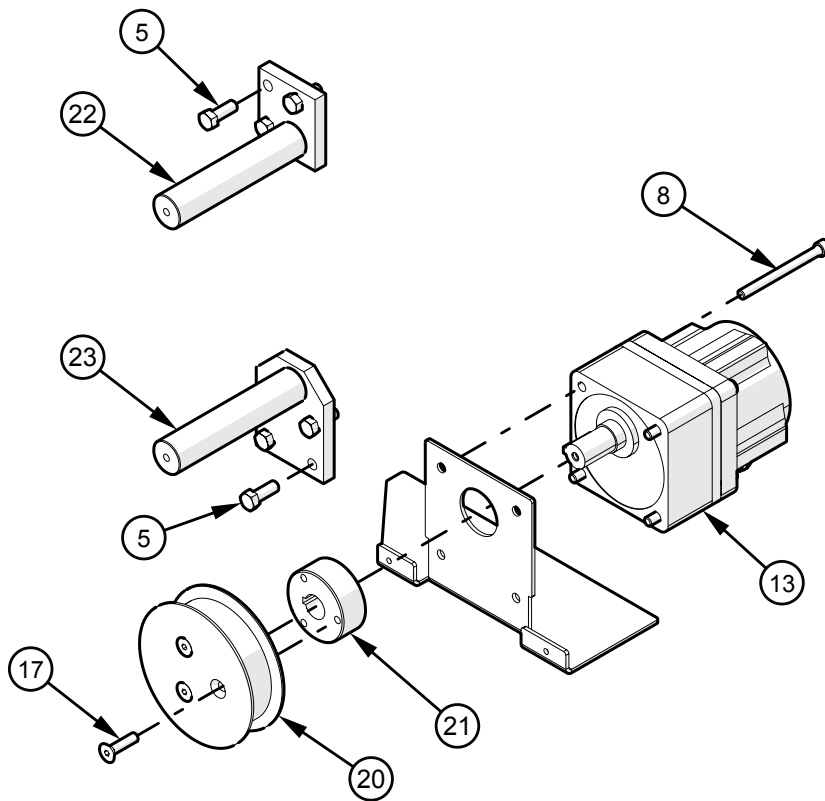
Item	Part Number	Description	Quantity
10	4010000.8110.1	AY,PRESSURE ARM ELECTRIC	1
11	4010000.8112	CHUTE,CUT CORN	1
12	4010000.8113.2	AY,CNTRL ELEC ACC	1
13	4010000.8114.2	AY,LABELS EACC CE	1
14	4010000.8116.2	AY,GUARD,FEED TROUGH ELECTRIC	1
15	4010000.8118	AY,H2O CUTTERHEAD LUBRICATION	1
16	4121037.0005	AY,AIR ELECTRIC MANIFOLD	1

AY,FRAME ELECTRIC (4010000.8100.3)

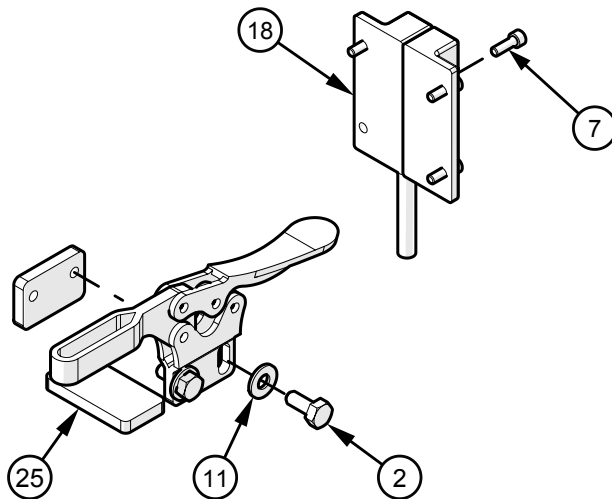




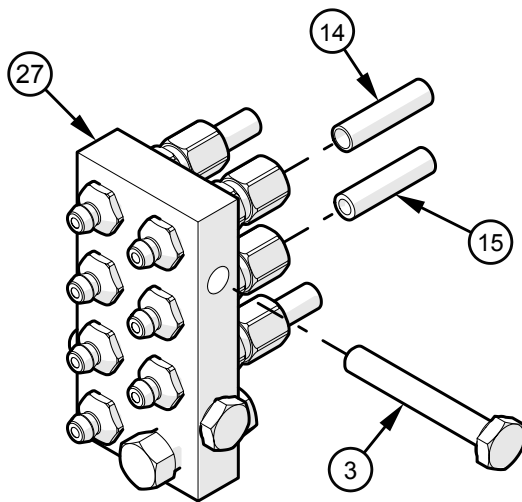
CHAIN DRIVE



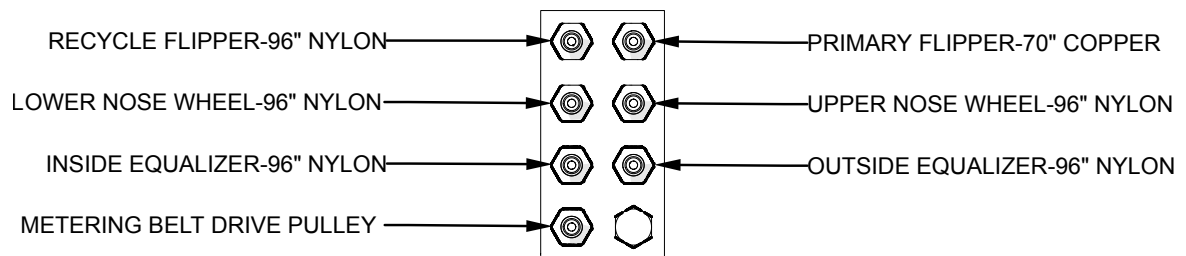
**LOWER FEED TROUGH DRIVE
AND FEED TROUGH MOUNTS**



SWITCH AND LATCH



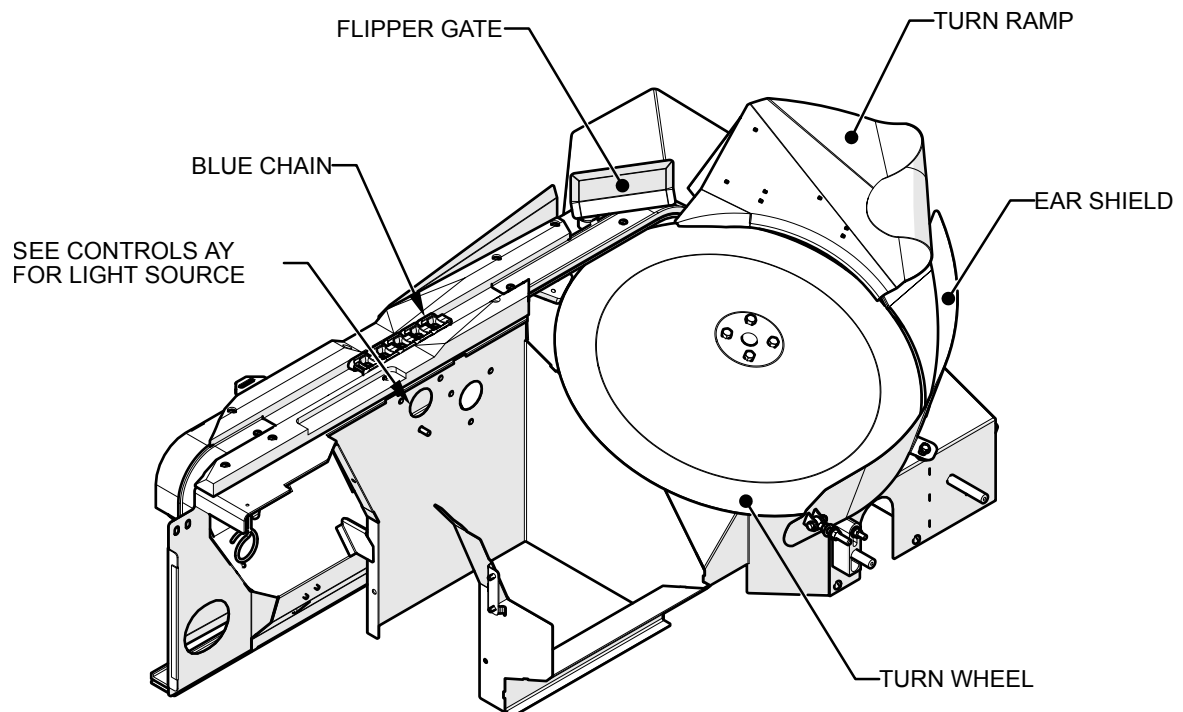
GREASE BLOCK

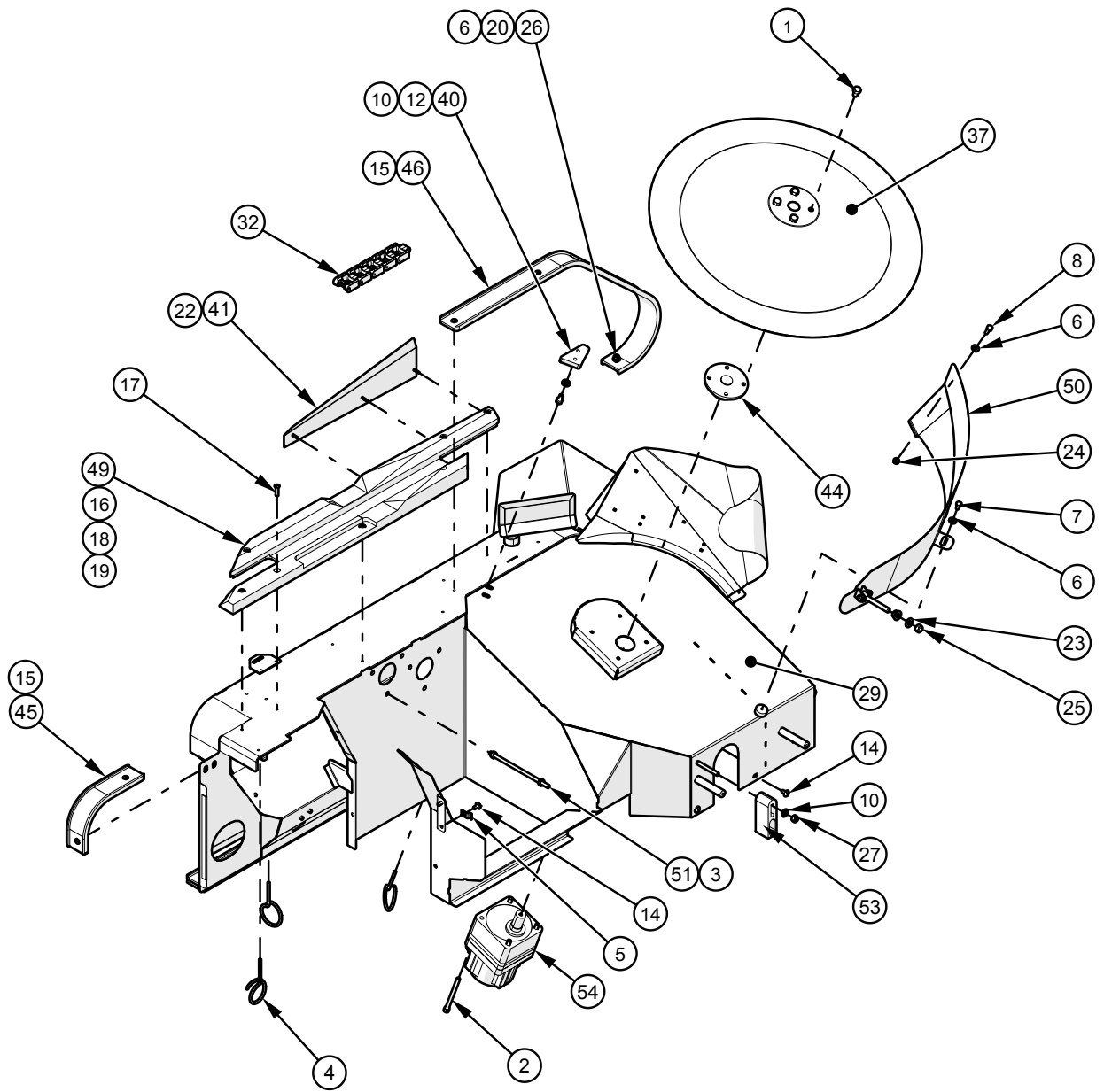


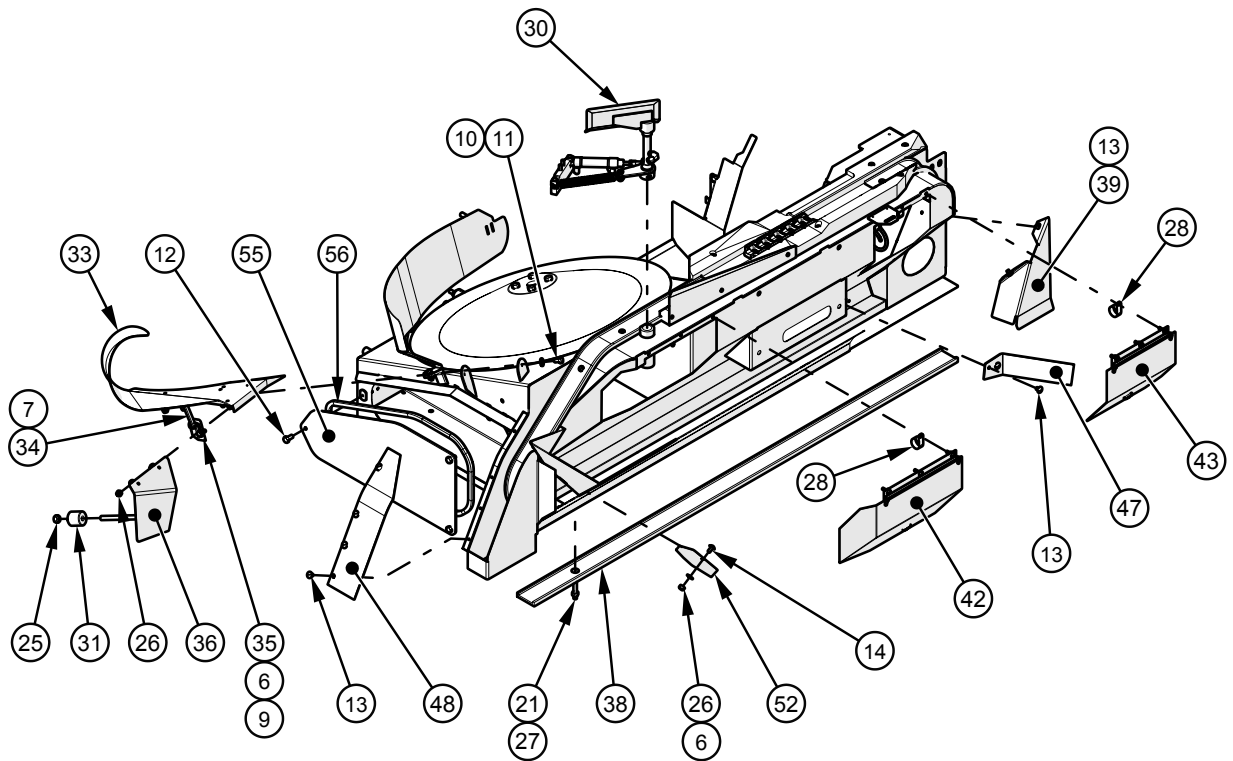
Item	Part Number	Description	Quantity
1	0001.0024	SCR,HCS 10-32 x 3/8 SS	1
2	0001.0080	SCR,HCS 1/4-20 x 5/8 SS	2
3	0001.0190	SCR,HCS 1/4-20 x 1 3/4 SS	2
4	0001.0540	SCR,HCS 3/8-16 x 3/4 SS	2
5	0001.0570	SCR,HCS 3/8-16 x 1 SS	7
6	0001.0780	SCR,HCS 1/2-13 x 1 SS	2
7	0001.1087.1	SCR,SCS 8-32 x 1/2 SS	4
8	0001.1356	SCR,SCS 5/16-18 x 3 1/2 SS	8
9	0001.2539	SCR,SSS 5/16-18 x 1/2 SS CPPT	4
10	0001.3835	SCR,SFHCS 5/16-18 x 3/4 SS	3
11	0001.4350	WSHR,FLT .281 x .625 x .063 SS	2
12	0001.4500	WSHR,FLT .406 x .813 x .063 SS	2
13	0005.1082.01	GMTR,200W 15:1 IP67	2
14	0007.2040	RM,TUBE 1/4 .030W COPPER	70

Item	Part Number	Description	Quantity
15	0007.2125.1	RM,TUBE 1/4 .050W NYLON BLACK	576
16	0007.4048	CLAMP,LOOP	1
17	125.512	SCR,SFHCS 5/16-18 x 1 1/4 SS	3
18	9502.8003	SWITCH, MAGNETIC SAFETY AL	1
19	4011167.0390	LEG,FLOOR-39"	2
20	4011172.0002	PULLEY,FEED TROUGH	1
21	4011195.0003	HUB,22mm	2
22	4011200	SPINDLE AY,UPPER	1
23	4011201	SPINDLE AY,LOWER	1
24	4011202.0003	MOUNT,CHAIN MOTOR ELECTRIC	1
25	4011215	COVER CLAMP	1
26	4011228.0001	SPROCKET,CHAIN DRIVE,ELECTRIC	1
27	4011260.0001	AY,GREASE BLOCK 7 STATION	1
28	4011797	ANGLE,SHIPPING	2
29	4012021.0006	FRAME,ELECTRIC	1

AY,BODY ELECTRIC (4010000.8101.2)



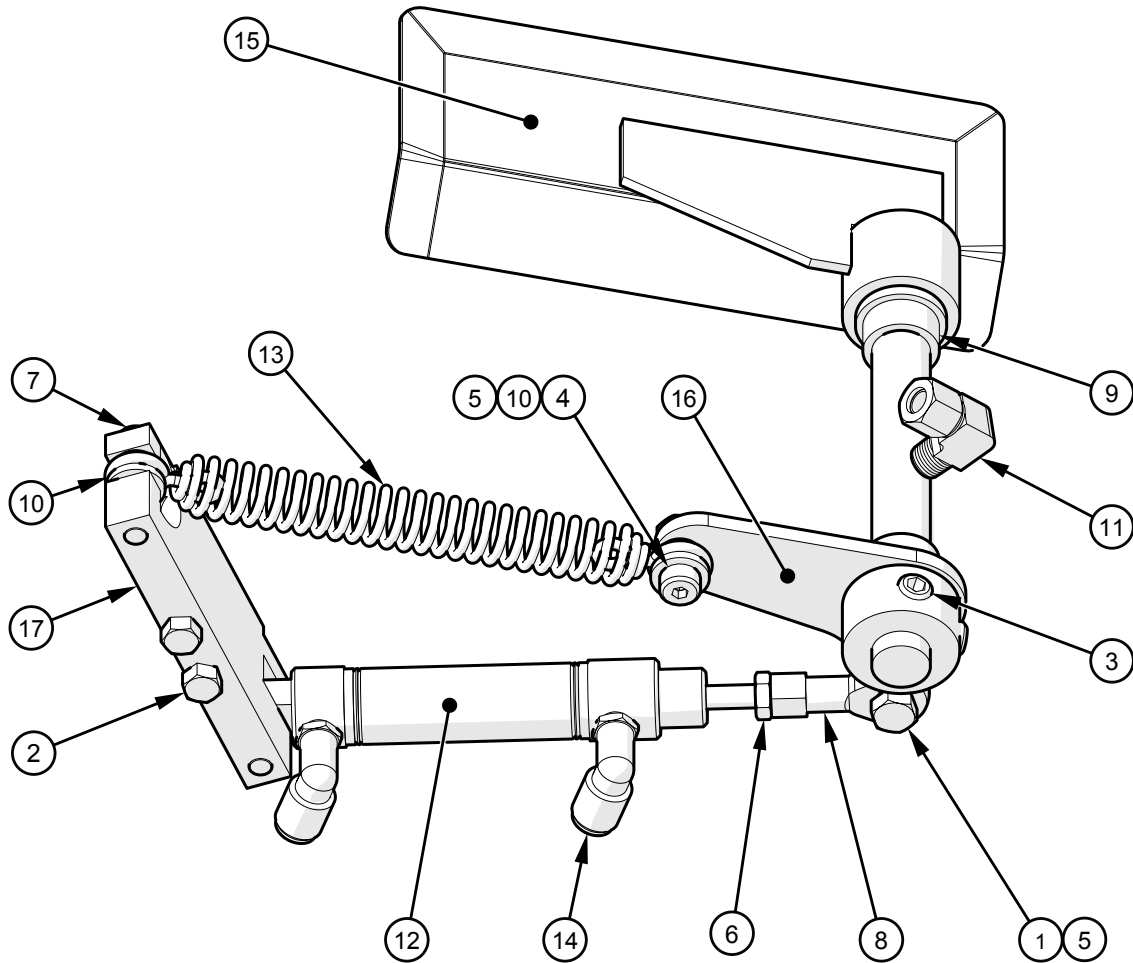




Item	Part Number	Description	Quantity
1	0001.0515	SCR,HCS 3/8-16 x 1/2 SS	4
2	0001.1357	SCR,SCS 5/16-18 x 4 SS	4
3	0001.5200	NUT,HX 5/16-18 x 1/2 SS	2
4	0009.1152	BRIDLE RING 2"ID 1/4-20	3
5	4011198	CLIP,TUBING	1
6	0001.4350	WSHR,FLT .281 x .625 x .063 SS	5
7	0001.0060	SCR,HCS 1/4-20 x 1/2 SS	3
8	0001.0110	SCR,HCS 1/4-20 x 3/4 SS	1
9	0001.0080	SCR,HCS 1/4-20 x 5/8 SS	1
10	0001.4390	WSHR,FLT .344 x .688 x .063 SS	5
11	0001.0240	SCR,HCS 5/16-18 x 1/2 SS	2
12	0001.0260	SCR,HCS 5/16-18 x 5/8 SS	5
13	0001.3251	SCR,RHMS 1/4-20 x 3/8 SS TRSH	8
14	0001.3273	SCR,THMS 1/4-20 x 1/2 SS	5
15	0001.3798	SCR,FHMS 1/4-20 x 1/2 SS	6
16	0001.3811	SCR,FHMS 1/4-20 x 3/4 SS	1
17	0001.3814	SCR,FHMS 1/4-20 x 1 SS	1
18	0001.3816	SCR,FHMS 1/4-20 x 1 1/4 SS	2
19	0001.3824	SCR,FHMS 1/4-20 x 1 3/4 SS	4

Item	Part Number	Description	Quantity
20	0001.3891.2	SCR,SFHCS 1/4-20 x 3/4 SS	1
21	0001.3894.6	SCR,SFHCS 5/16-18 x 3 SS	1
22	0001.3915	SCR,PHSMS 6 x 3/4 SS	3
23	0001.4500	WSHR,FLT .406 x .813 x .063 SS	2
24	0001.5120	NUT,HX 1/4-20 x 7/16 SS	1
25	0001.5220	NUT,HX 3/8-16 x 9/16 SS	3
26	0001.5712	NUT,HXSLFLKG 1/4-20 x 7/16 SS*	4
27	0001.5720.5	NUT,HXSLFLKG 5/16-18 x 9/16 SS	2
28	0007.4053	HDW,CLAMP 12TU PLSTC	4
29	4012000.0002.3	BODY,TRASH CHUTE,ELECTRIC	1
30	4010043.0001	ASSY,FLIPPER GATE CYL	1
31	4011194	WEIGHT, CONV CONTROL	1
32	4011196.0001	CHAIN,GROOVED,BLUE	1
33	4011197	TURN RAMP-WELDMENT	1
34	4011204	BRACE,TURN RAMP	1
35	4011206	BRACKET,TURN RAMP BRACE	1
36	4011207	REJECT DEFLECTOR-WLDMT	1
37	4011208	TURNWHEEL	1
38	4011208	TRACK,LOWER FEED CHAIN	1
39	4011213.0001	SHIELD,PLASTIC SPROCKET	1
40	4011326.0101	GUARD,TURNWHEEL FINGER	1
41	4011331	SHIELD CORN	1
42	4011523	DOOR,FLIPPER	1
43	4011524	DOOR,COB DRIVE ACCESS AY	1
44	4011259.0001	HUB,22mm FLANGED	1
45	4011346	TRACK,LOWER FEED CHAIN	1
46	4011347	TRACK,REAR FEED CHAIN GUIDE	1
47	4011349	DEFLECTOR,FRONT NUBBIN	1
48	4011350.0001	GUARD,FLEX CHAIN-TRASH CHUTE	1
49	4011353	RAIL,CHAIN GUIDE	1
50	4011377.0002	SHIELD,LOWER TURN WHEEL	1
51	4011403	ROD,ADJUSTMENT LIGHT SOURCE	1
52	4011825	COVER,REJECT CHUTE	1
53	4012003	LFT,BELT SUPPORT	1
54	0005.1082.02	GMTR,200W 50:1 IP67	1
55	4011528.0001	COVER PANEL,UTILITY BOX	1
56	0004.1332	SEAL,FOAM 3/8" x 7/16" BLK	-

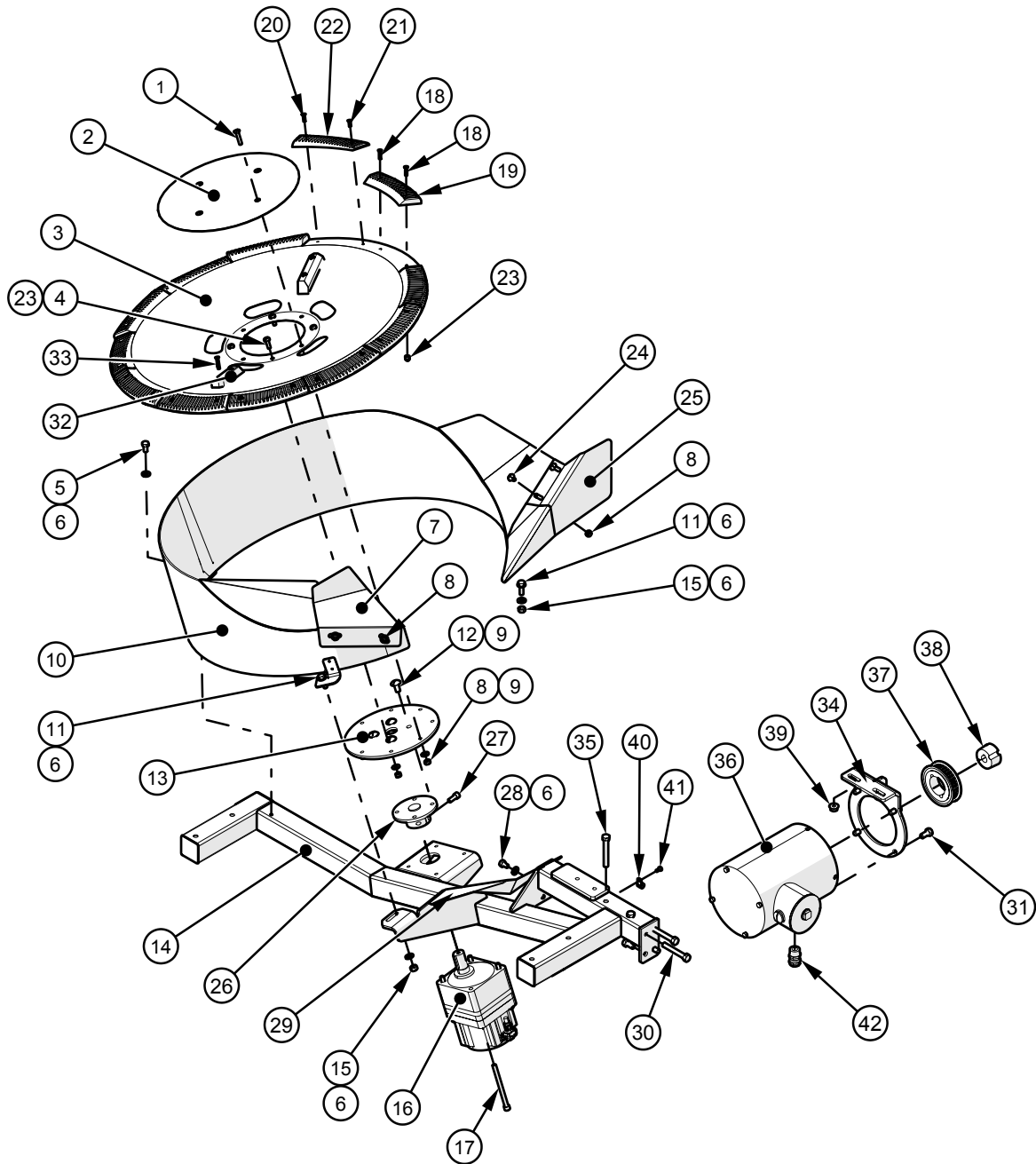
ASSY,FLIPPER GATE CYL (4010043.0001)



ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	0001.0110	SCR,HCS 1/4-20 x 3/4 SS	1
2	0001.0193	SCR,HCS 1/4-20 x 2 SS	2
3	0001.2696	SCR,SSS 3/8-16 x 3/8 BK NYLLK	2
4	0001.3901.1	SCR,SHSCS 5/16x 3/8x 1/4-20 SS	1
5	0001.5410	NUT,HXJ 1/4-20 x 7/16 SS	2
6	0001.5440	NUT,HXJ 1/4-28 x 7/16 SS	1
7	0001.6906	PIN,CLVS 1/4 x 1 3/8 18-8 SS	2
8	0002.0010	RODEND,1/4 x F1/4-28 BK	1
9	0002.8135.2	BEARING,BRONZE	2
10	0003.1009.1	BRG,OILFLG 5/16 x 7/16 x 3/8	2
11	0007.1120	FTG,PAEN 2MPT x 4TU BRS	1
12	0007.4328.2	CYLINDER,AIR	1

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
13	0009.0518.1	SPRING,FLIPPER CENTERING	1
14	0007.4902	FTG,PAEN 2MPT x 4TU	2
15	4011340	FLIPPER GATE	1
16	4011344	ACTUATOR,FLIPPER GATE-WLDMT	1
17	4012002.0105	CYLINDER MOUNT, FLIPPER GATE	1

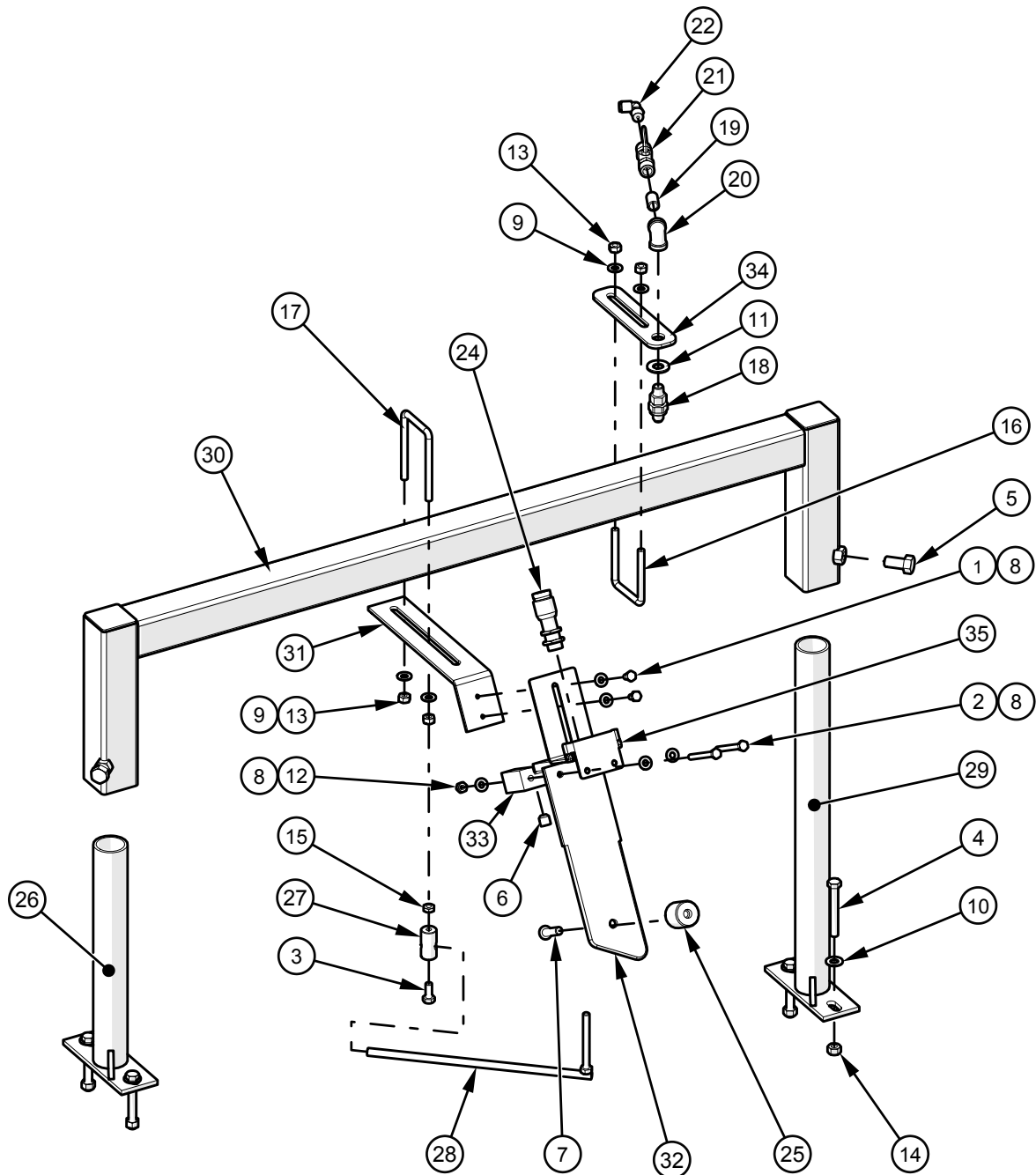
AY,INFEED WHEEL ELECTRIC (4010000.8102.1)



Item	Part Number	Description	Quantity
1	0001.3816	SCR,FHMS 1/4-20 x 1 1/4 SS	4
2	4011265	PLATE,INFEED WHEEL	1
3	4011308	WHEEL,INFEED	1
4	0001.3310.1	SCR,THMS 1/4-20 x 3/4 SS TRSH	4

Item	Part Number	Description	Quantity
5	0001.0260	SCR,HCS 5/16-18 x 5/8 SS	1
6	0001.4390	WSHR,FLT .344 x .688 x .063 SS	7
7	4011258	PLATE,EAR SHIELD	1
8	0001.5120	NUT,HX 1/4-20 x 7/16 SS	12
9	0001.4350	WSHR,FLT .281 x .625 x .063 SS	10
10	4011250.0001	SHIELD,INFEED WHEEL	1
11	0001.0330	SCR,HCS 5/16-18 x 1 SS	2
12	0001.3418	SCR,THMS 3/8-16 x 3/4 SS	4
13	4011307.0001	PLATE,INFEED WHEEL FLEX ELEC	1
14	4011263.0003	FRAME,INFEED WHEEL ACC ELEC	1
15	0001.5200	NUT,HX 5/16-18 x 1/2 SS	2
16	0005.1082.02	GMTR,200W 50:1 IP67	1
17	0001.1357	SCR,SCS 5/16-18 x 4 SS	4
18	0001.3752	SCR,FHMS 10-32 x 3/4 SS	12
19	4011309.0004	CARRIER,INFEED WHEEL W/SLOTS	6
20	0001.3781	SCR,FHMS 10-32 x 5/8 SS	6
21	0001.3771	SCR,FHMS 10-32 x 1/2 SS	6
22	4011310.0002	CARRIER,INFEED WHEEL SLOPED &	6
23	189.006	NUT,ACORN 10-32 x 3/8 SS	28
24	0001.3273	SCR,THMS 1/4-20 x 1/2 SS	2
25	4011251.0001	EAR,GUIDE AY	1
26	0001.134011259.000100	HUB,22mm FLANGED	1
27	0001.1300	SCR,SCS 5/16-18 x 3/4 SS	2
28	0001.0240	SCR,HCS 5/16-18 x 1/2 SS	2
29	4011724	SHIELD,INFEED FRAME CE	1
30	0001.0710	SCR,HCS 3/8-16 x 2 1/2 SS	2
31	0001.0540	SCR,HCS 3/8-16 x 3/4 SS	6
32	4012006	SEGMENT EAR DISRUPTER	2
33	0001.3792	SCR,FHMS 10-32 x 1 SS	4
34	4012041	MOUNT,CUTTER HEAD MOTOR	1
35	0001.0730	SCR,HCS 3/8-16 x 2 3/4 SS	2
36	7560.0037.1	MTR,1HP 230/460/60/3 SS FTLESS	1
37	0006.3238	PULLEY,TIMING BLT 8MM PITCH 32	1
38	0006.1337	BSHG,TLB 1210 x 5/8"	1
39	0001.5688	NUT,FLGLK 3/8-16 x 9/16 SS	2
40	0007.4048.1	CLAMP,LOOP 3/16"	2
41	0001.0024	SCR,HCS 10-32 x 3/8 SS	2
42	9501.4164	CONN,EMC CLAMP .24-.47 IN 1/2*	1

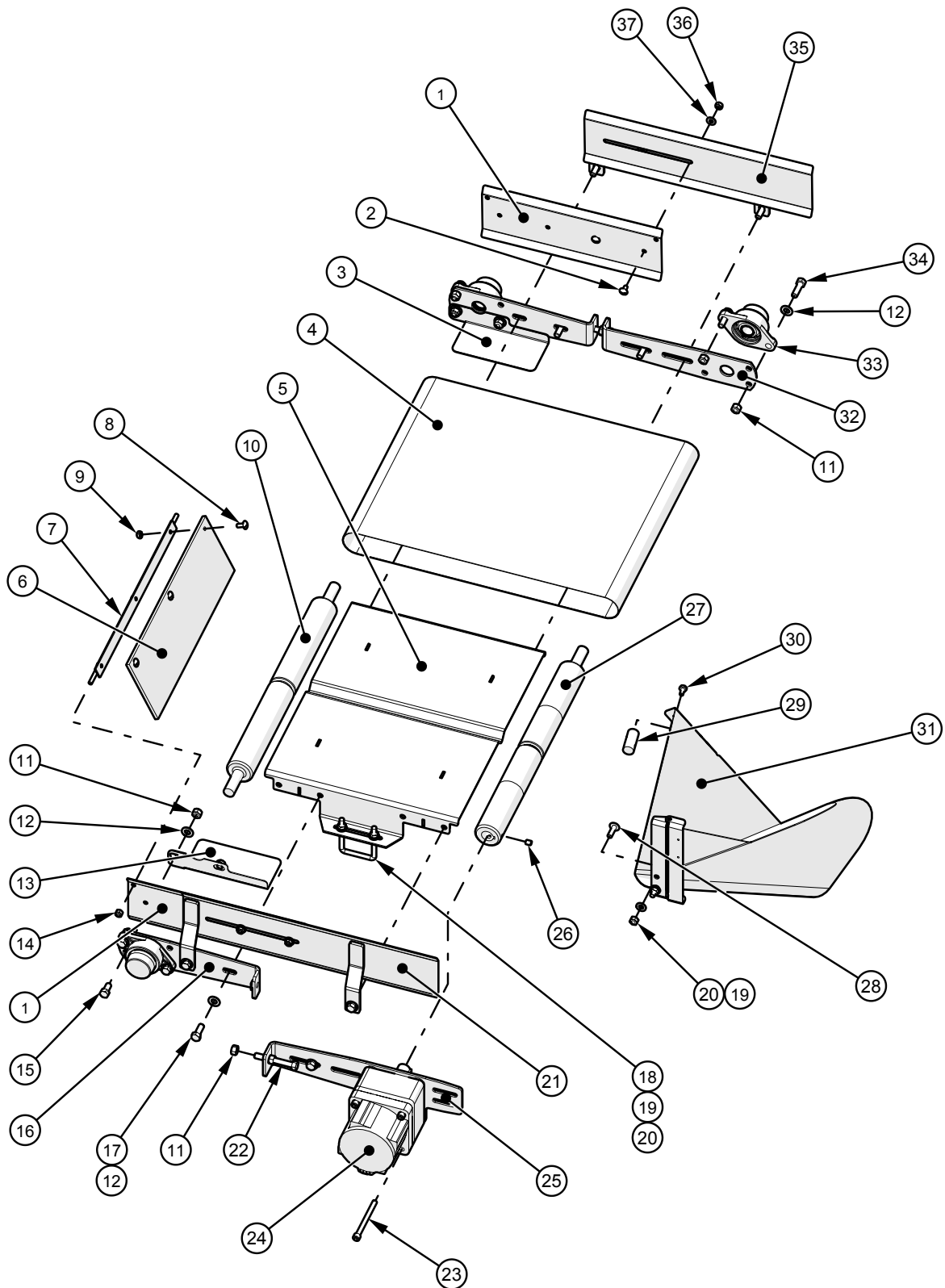
AY,INFEED CONVEYOR SUPPORT (4010000.8103)



Item	Part Number	Description	Quantity
1	0001.0060	SCR,HCS 1/4-20 x 1/2 SS	2
2	0001.0200	SCR,HCS 1/4-20 x 2 3/4 SS	2
3	0001.0280	SCR,HCS 5/16-18 x 3/4 SS	1
4	0001.0730	SCR,HCS 3/8-16 x 2 3/4 SS	4

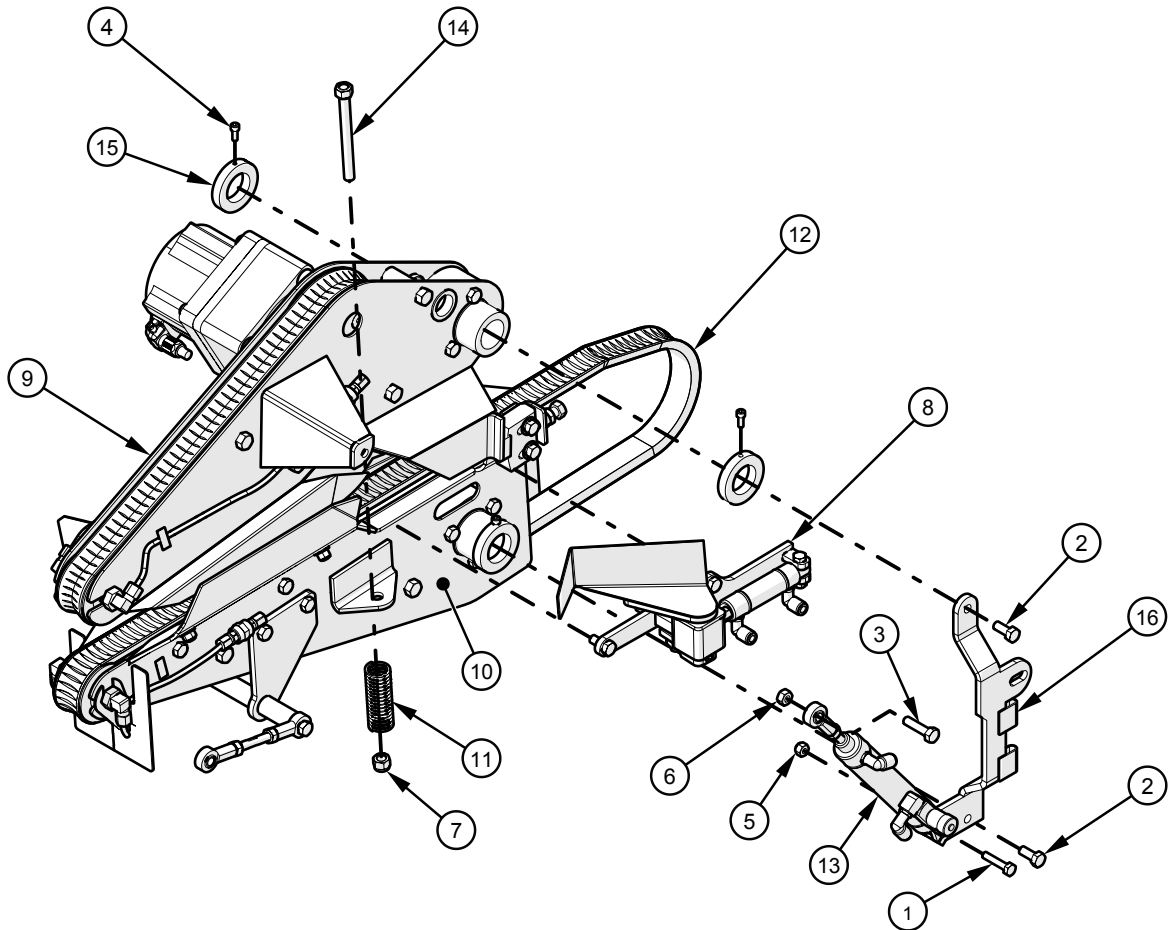
Item	Part Number	Description	Quantity
5	0001.0780	SCR,HCS 1/2-13 x 1 SS	2
6	0001.2840	SCR,SSS 1/2-13 x 1/2 SS	1
7	0001.3625	SCR,SBHCS 3/8-16 x 1 1/2 SS	1
8	0001.4350	WSHR,FLT .281 x .625 x .063 SS	6
9	0001.4390	WSHR,FLT .344 x .688 x .063 SS	4
10	0001.4500	WSHR,FLT .406 x .813 x .063 SS	4
11	0001.4570	WSHR,FLT .531 x 1.063 x .094 SS	1
12	0001.5712	NUT,HXSLFLKG 1/4-20 x 7/16 SS*	2
13	0001.5200	NUT,HX 5/16-18 x 1/2 SS	4
14	0001.5220	NUT,HX 3/8-16 x 9/16 SS	4
15	0001.5460	NUT,HXJ 5/16-18 x 1/2 SS	1
16	0001.9074.1	SCR,U 5/16-18 x 2 x 3 SS SQBND	1
17	0001.9074.2	SCR,U 5/16-18 x 2 x 3.75 SS	1
18	0007.1371.1	NOZZLE,1/4TT + TNG BRS W/OSCN	1
19	0007.3032	FTG,WAPN 4MPT x CLOSE SS	1
20	0007.3357	FTG,PAEN 4FPT x 4FPT BRS	1
21	0553.0040	VLV,AIR SHTOFF2WY .25NPTF-FXF	1
22	7571.2047	FTG,PAN 4TUBELOCK x 4MPT	1
23	9502.7032	CABLE AY, Q.D. 7/8-16UN FEMALE	1
24	9502.8000	SWITCH, INFEED PROXIMITY	1
25	4011194	WEIGHT, CONV CONTROL	1
26	4011252	SUPPORT, LEG WLDMT SHORT	1
27	4011254.0001	SUPPORT, CHUTE ROD	1
28	4011255.0001	ROD, CHUTE ADJ-WLDMT	1
29	4011256	SUPPORT, LEG WLDMT	1
30	4011269.0001	SUPPORT, INFEED CONV WLDMT	1
31	4011319.0001	SUPPORT, SENSOR ANGLE	1
32	4011320	BLADE, SENSOR	1
33	4011322	BLOCK, SENSOR TARGET	1
34	4011379	BRACKET,HINGE	1
35	4011806	MOUNT, WATER SPRAY	1
36	7570.1432	TUBE P4 BLUEPOLY GRADE4 120PSI	-

AY,INFEEED CONVEYOR ELECTRIC (4010000.8104.3)



Item	Part Number	Deascription	Quantity
1	4011304	RAIL,INFEED CONVEYOR SLIDING	2
2	0001.3273	SCR,THMS 1/4-20 x 1/2 SS	4
3	4121107.0002	GUARD,INFEED-LH	1
4	4011412.0001	BELT,INFEED CONV BLUE	1
5	4011303	BASE PLATE,SUB AY:	1
6	4011324.0101	PLATE,BACK STOP	1
7	4011324.0102	SUPPORT ASSY,BACKSTOP	1
8	0001.3291	SCR,THMS 1/4-20 x 5/8 SS	3
9	0001.5738	NUT,HXJSLFLKG 1/4-20 x 7/16 SS*	3
10	4011301	ROLLER,CONVEYOR	1
11	0001.5220	NUT,HX 3/8-16 x 9/16 SS	12
12	0001.4500	WSHR,FLT .406 x .813 x .063 SS	18
13	4121107.0001	GUARD,INFEED-RH	1
14	0001.5712	NUT,HXSLFLKG 1/4-20 x 7/16 SS*	2
15	0001.0540	SCR,HCS 3/8-16 x 3/4 SS	2
16	4011296	FIXED BEARING MOUNT AY:	2
17	0001.0570	SCR,HCS 3/8-16 x 1 SS	8
18	0001.9074.1	SCR,U 5/16-18 x 2 x 3 SS SQBND	2
19	0001.4390	WSHR,FLT .344 x .688 x .063 SS	6
20	0001.5200	NUT,HX 5/16-18 x 1/2 SS	6
21	4011302	EAR GUIDE,FIXED (BELT SYS.)	1
22	0001.0730.1	SCR,HCS 3/8-16 x 2 3/4 SS *	2
23	0001.1356	SCR,SCS 5/16-18 x 3 1/2 SS	4
24	0005.1082.01	GMTR,200W 15:1 IP67	1
25	4011294.0007	MOTOR MOUNT,DIRECT DRIVE	1
26	0001.2406	SCR,SSS 5/16-18 x 3/8 SS NYLOK	2
27	4011300.0002	ROLLER,CONVEYOR DIRECT DRIVE	1
28	0001.3411	SCR,THMS 5/16-18 x 1 SS	2
29	4011253	ROD,PIVOT CHUTE	1
30	0001.0060	SCR,HCS 1/4-20 x 1/2 SS	1
31	4011529	CHUTE,INFEED CONV WLDMT	1
32	4011295	MOUNT,BEARING SUPPORT ADJ.	1
33	0002.8134.3	BRG,3/4 BORE 2BOLT FLG W/INSRT	3
34	0001.0600	SCR,HCS 3/8-16 x 1 1/4 SS	6
35	4011275	EAR GUIDE SUBASSEMBLY	1
36	0001.5120	NUT,HX 1/4-20 x 7/16 SS	4
37	0001.4350	WSHR,FLT .281 x .625 x .063 SS	4

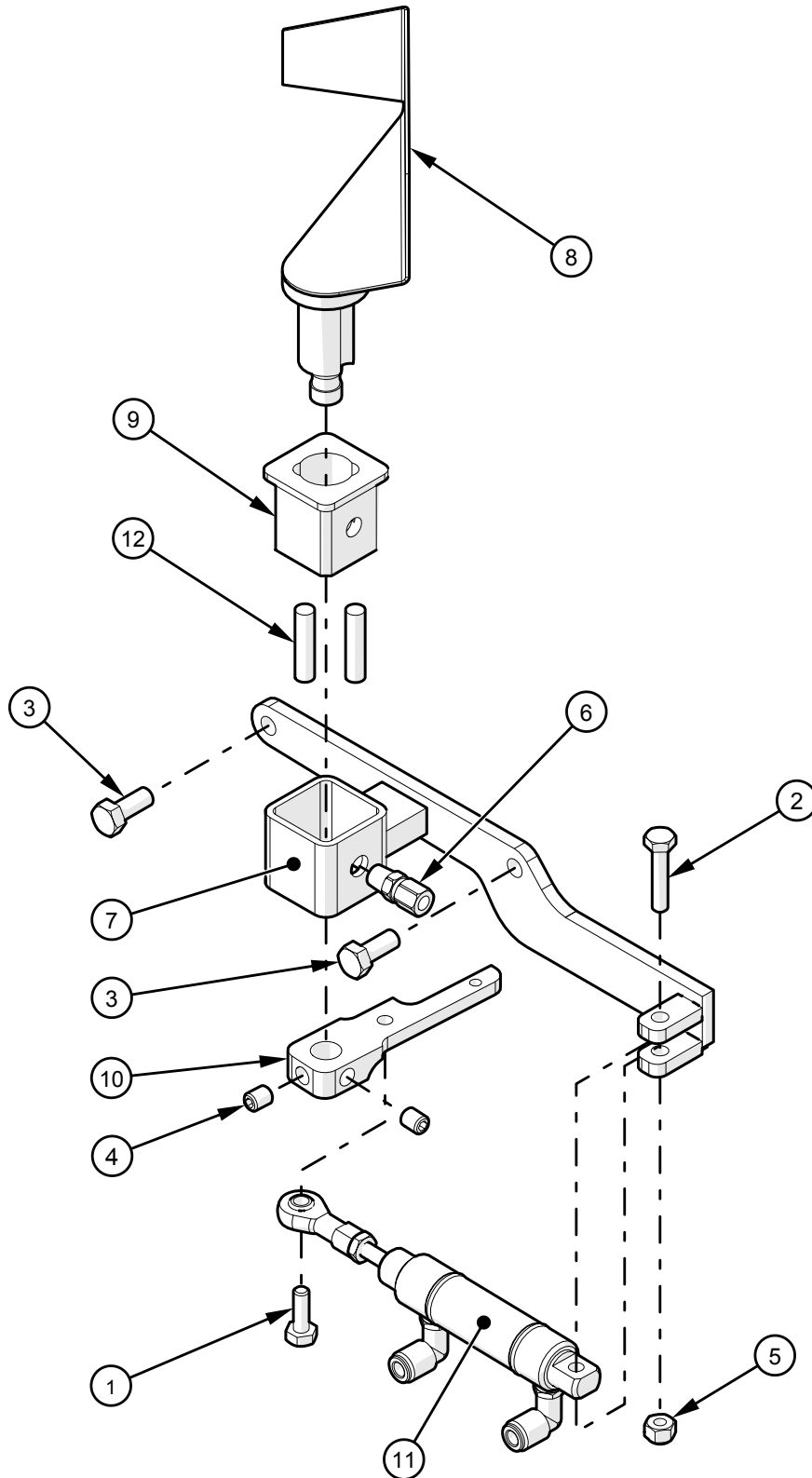
AY,FEED TROUGHS ELECTRIC (4010000.8105.1)



Item	Part Number	Description	Quantity
1	0001.0170	SCR,HCS 1/4-20 x 1 1/4 SS	1
2	0001.0280	SCR,HCS 5/16-18 x 3/4 SS	2
3	0001.0370	SCR,HCS 5/16-18 x 1 1/4 SS	1
4	0001.1101	SCR,SCS 10-32 x 1/2 SS	4
5	0001.5712	NUT,HXSLFLKG 1/4-20 x 7/16 SS*	1
6	0001.5720	NUT,HXJSLFLKG 5/16 X 9/16 SST	1
7	0001.5807	NUT,HXSLFLKG 3/8-16 x 9/16 SS*	1
8	4010046.0001	ASSY,2ND FLIPPER ACTUATING	1
9	4010102.0005	AY,UPPER FEED TRH ELECTRIC	1
10	4010103.0008	AY,LOWER FEED TRH LESS BELT	1
11	4011040	SPRING,LIGHT FEED ROLL	1
12	4011183	BELT,LOWER FEED TROUGH V	1
13	4011203	LIFT CYLINDER AY	1

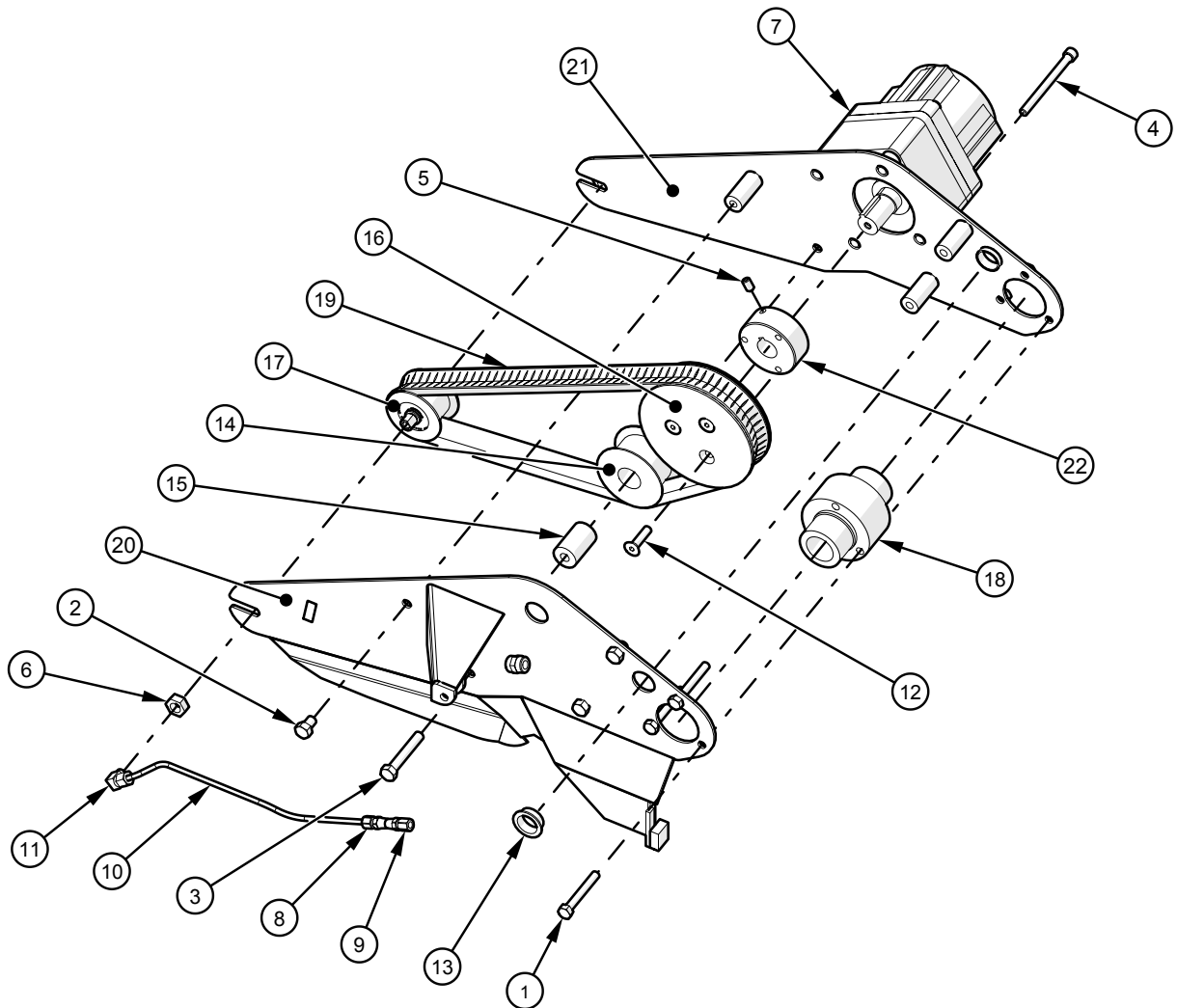
Item	Part Number	Description	Quantity
14	4011212	ROD,SUPPORT ADJUSTMENT	1
15	4011214	COLLAR,SPINDLE	4
16	4011222	SPINDLE CONNECTING ARM AY	1

ASSY,2ND FLIPPER ACTUATING (4010046.0001)



Item	Part Number	Description	Quantity
1	0001.0110	SCR,HCS 1/4-20 x 3/4 SS	1
2	0001.0170	SCR,HCS 1/4-20 x 1 1/4 SS	1
3	0001.0280	SCR,HCS 5/16-18 x 3/4 SS	2
4	0001.2406	SCR,SSS 5/16-18 x 3/8 SS NYLOK	2
5	0001.5712	NUT,HXSLFLKG 1/4-20 x 7/16 SS*	1
6	0007.1030	FTG,PAS 2MPT x 4TU BRS	1
7	4011219	SUPPORT,FLIPPER WLDMT	1
8	4011220	FLIPPER WLDMT	1
9	4011221	BUSHING,2ND FLIPPER	1
10	4011224	LEVER,ARM ACTUATING	1
11	4011225	CYLINDER AY,2ND FLIPPER	1
12	0993.0051	O-RING,CORD-3125 Ø	-

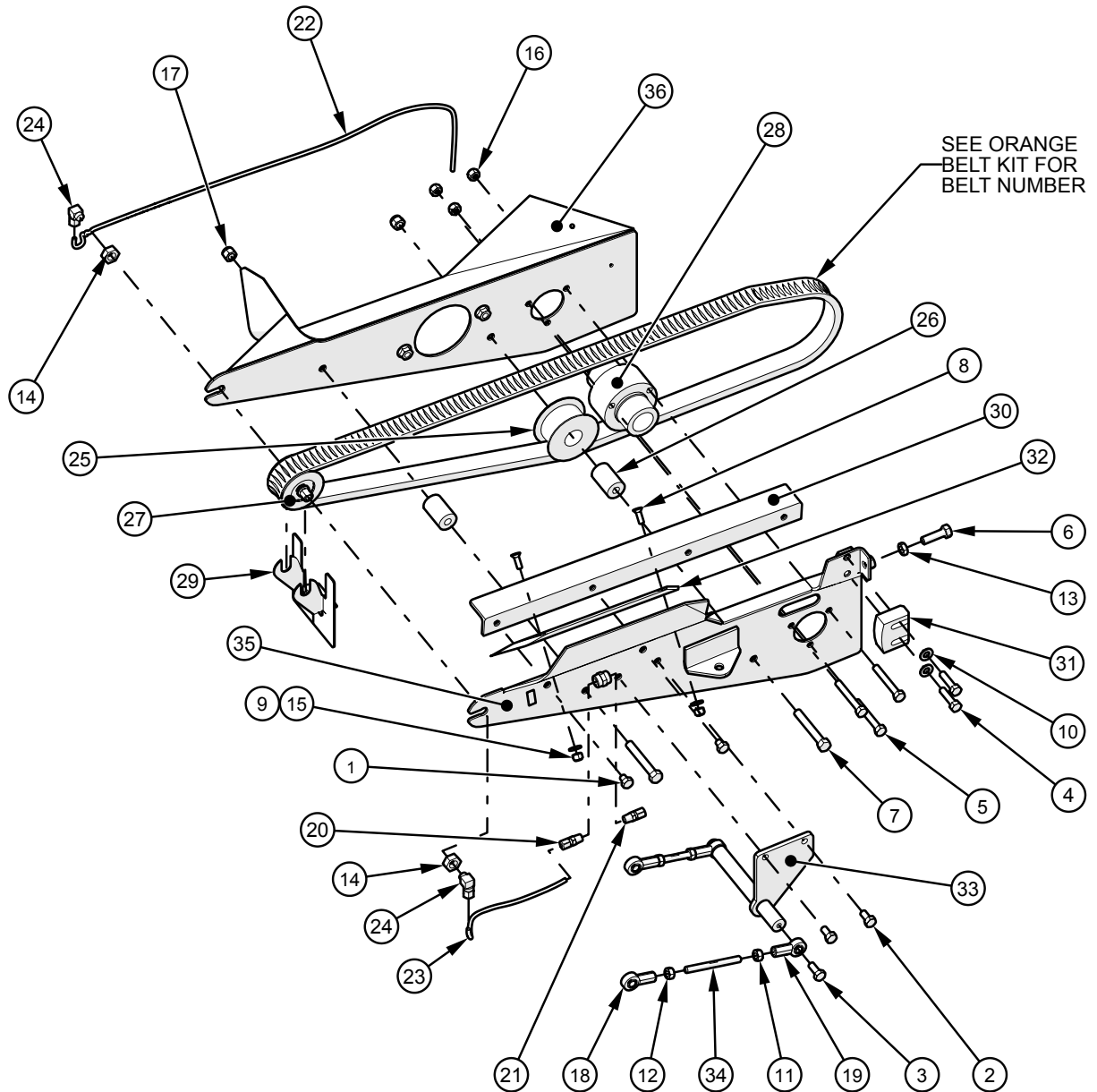
AY,UPPER FEED TRH ELECTRIC (4010102.0005)



Item	Part Number	Description	Quantity
1	0001.0440	SCR,HCS 5/16-18 x 2 1/4 SS	3
2	0001.0515	SCR,HCS 3/8-16 x 1/2 SS	3
3	0001.0690	SCR,HCS 3/8-16 x 2 1/4 SS	1
4	0001.1356	SCR,SCS 5/16-18 x 3 1/2 SS	4
5	0001.2539	SCR,SSS 5/16-18 x 1/2 SS CPPT	2
6	0001.5601	NUT,HXJ 1/2-20 x 3/4 SS	2
7	0005.1082.01	GMTR,200W 15:1 IP67	1
8	0007.1020	FTG,PAS 2MPT x 3TU BRS	2
9	0007.1030	FTG,PAS 2MPT x 4TU BRS	2
10	0007.2030	TUBING COPPER 3/16" x.030/.032	-
11	0007.2700	FTG,PAEN 1MPT x 3TU BRS	2

Item	Part Number	Description	Quantity
12	125.512	SCR,SFHCS 5/16-18 x 1 1/4 SS	3
13	0653.0004	GROMMET	2
14	4011170	PULLEY FEED TROUGH BELT	1
15	4011171	SPACER FEED TROUGH	1
16	4011172.0002	PULLEY,FEED TROUGH	1
17	4011174	NOSE WHEEL AY	1
18	4011177	SPINDLE,FEED TROUGH	1
19	4011178	BELT,UPPER FEED TROUGH-V	1
20	4011180.0001	OUTER PLATE,ELECTRIC	1
21	4011182.0002	INNER PLATE,ELECTRIC	1
22	4011195.0003	HUB,22mm	1

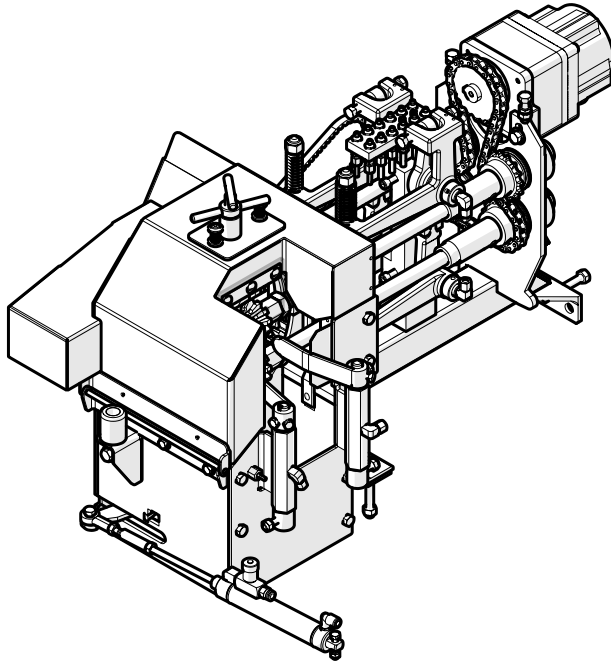
AY,LOWER FEED TRH LESS BELT (4010103.0008)

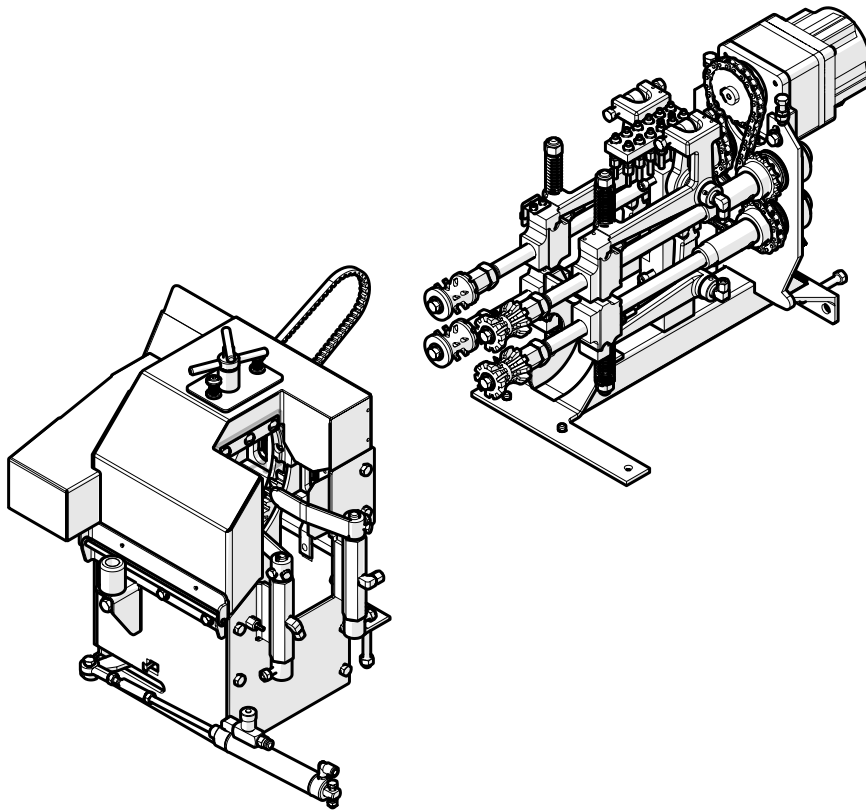


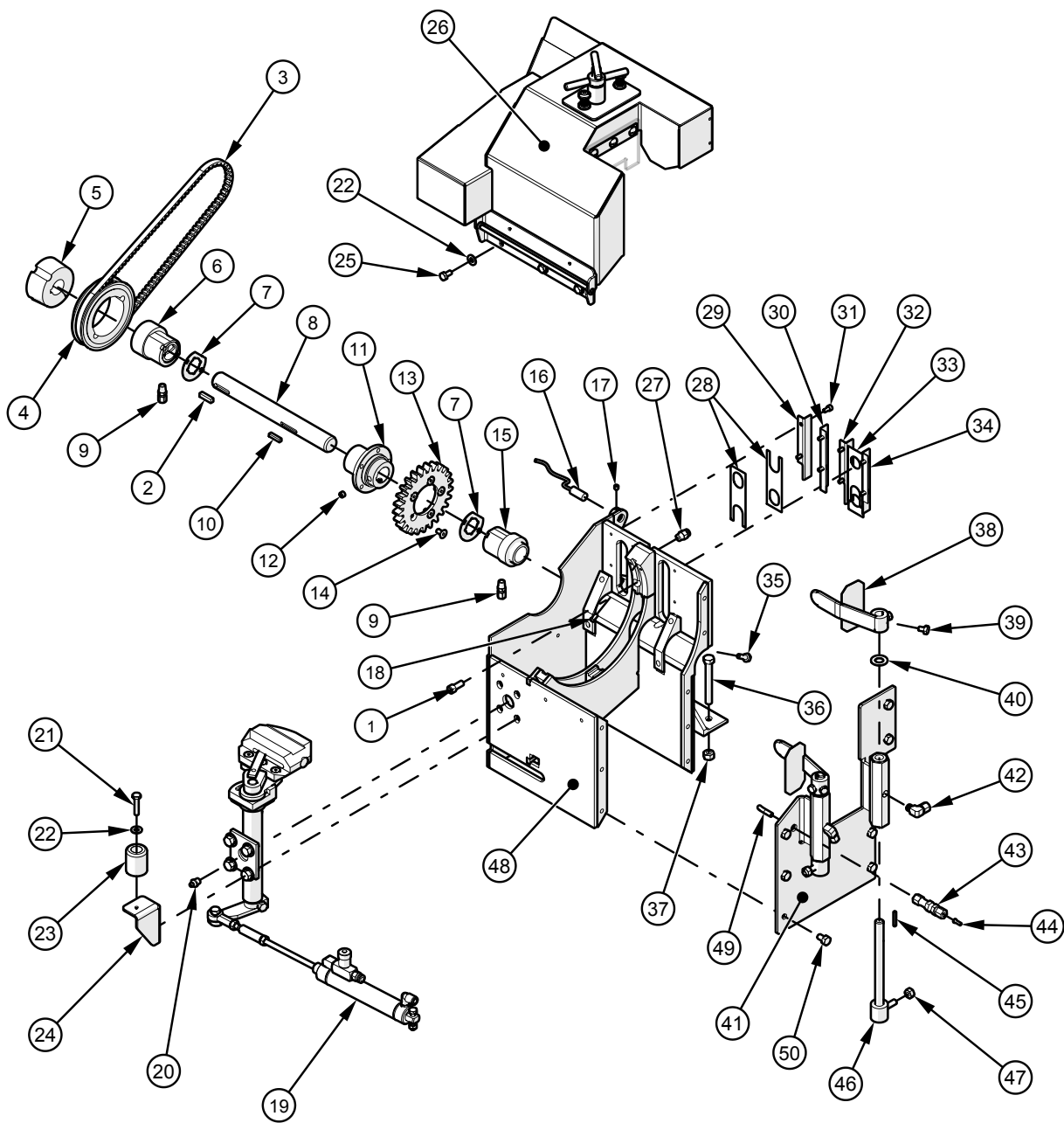
Item	Part Number	Description	Quantity
1	0001.0229	SCR,HCS 5/16-18 x 3/8 SS	2
2	0001.0260	SCR,HCS 5/16-18 x 5/8 SS	2
3	0001.0280	SCR,HCS 5/16-18 x 3/4 SS	2
4	0001.0370	SCR,HCS 5/16-18 x 1 1/4 SS	2
5	0001.0440	SCR,HCS 5/16-18 x 2 1/4 SS	3
6	0001.0670.6	SCR,HCS 3/8-24 x 1 1/4 SS	1
7	0001.0710	SCR,HCS 3/8-16 x 2 1/2 SS	2

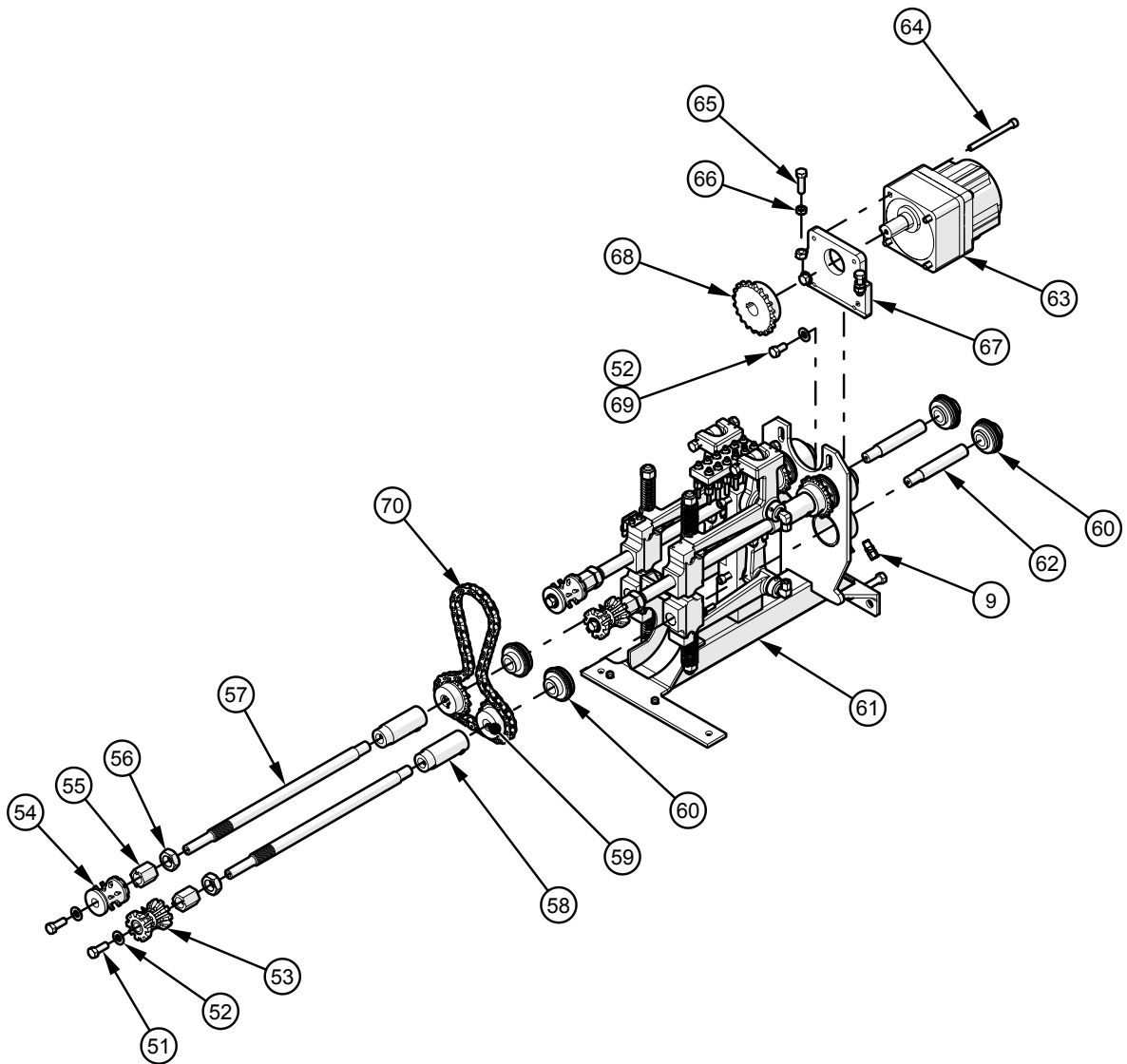
Item	Part Number	Description	Quantity
8	0001.3811	SCR,FHMS 1/4-20 x 3/4 SS	2
9	0001.4350	WSHR,FLT .281 x .625 x .063 SS	2
10	0001.4390	WSHR,FLT .344 x .688 x .063 SS	2
11	0001.5219.1	NUT,HX 5/16-24 x 1/2 SS	2
12	0001.5219.2	NUT, HX 5/16-24 X 1/2 SS LH	2
13	0001.5520	NUT,HXJ 3/8-24 x 9/16 SS	1
14	0001.5601	NUT,HXJ 1/2-20 x 3/4 SS	2
15	0001.5712	NUT,HXSLFLKG 1/4-20 x 7/16 SS*	2
16	0001.5720.5	NUT,HXSLFLKG 5/16-18 x 9/16 SS	3
17	0001.5807	NUT,HXSLFLKG 3/8-16 x 9/16 SS*	2
18	0002.0200	RODEND,5/16 x F5/16-24 BK LH	2
19	0002.0210	RODEND,5/16 x F5/16-24 BK	2
20	0007.1020	FTG,PAS 2MPT x 3TU BRS	1
21	0007.1030	FTG,PAS 2MPT x 4TU BRS	1
22	0007.2030	TUBING COPPER 3/16" x.030/.032	-
23	0007.2030	TUBING COPPER 3/16" x.030/.032	-
24	0007.2700	FTG,PAEN 1MPT x 3TU BRS	2
25	4011170	PULLEY FEED TROUGH BELT	1
26	4011171	SPACER FEED TROUGH	2
27	4011174	NOSE WHEEL AY	1
28	4011177	SPINDLE,FEED TROUGH	1
29	4011184	SHIELD,CUT CORN-WELDMENT	1
30	4011185.0001	SPRT,LFT AY-WIDE	1
31	4011186	BLOCK ROCKER	1
32	4011187	SPACER,PLASTIC RAIL	1
33	4011188	EAR EQUILZER ADJUSTMENT-WLDMT	1
34	4011189	ROD,EAR EQUALIZER ACTUATOR	2
35	4011190	PLATE,LEFT OUTER SIDE	1
36	4011191	PLATE INNER SIDE	1

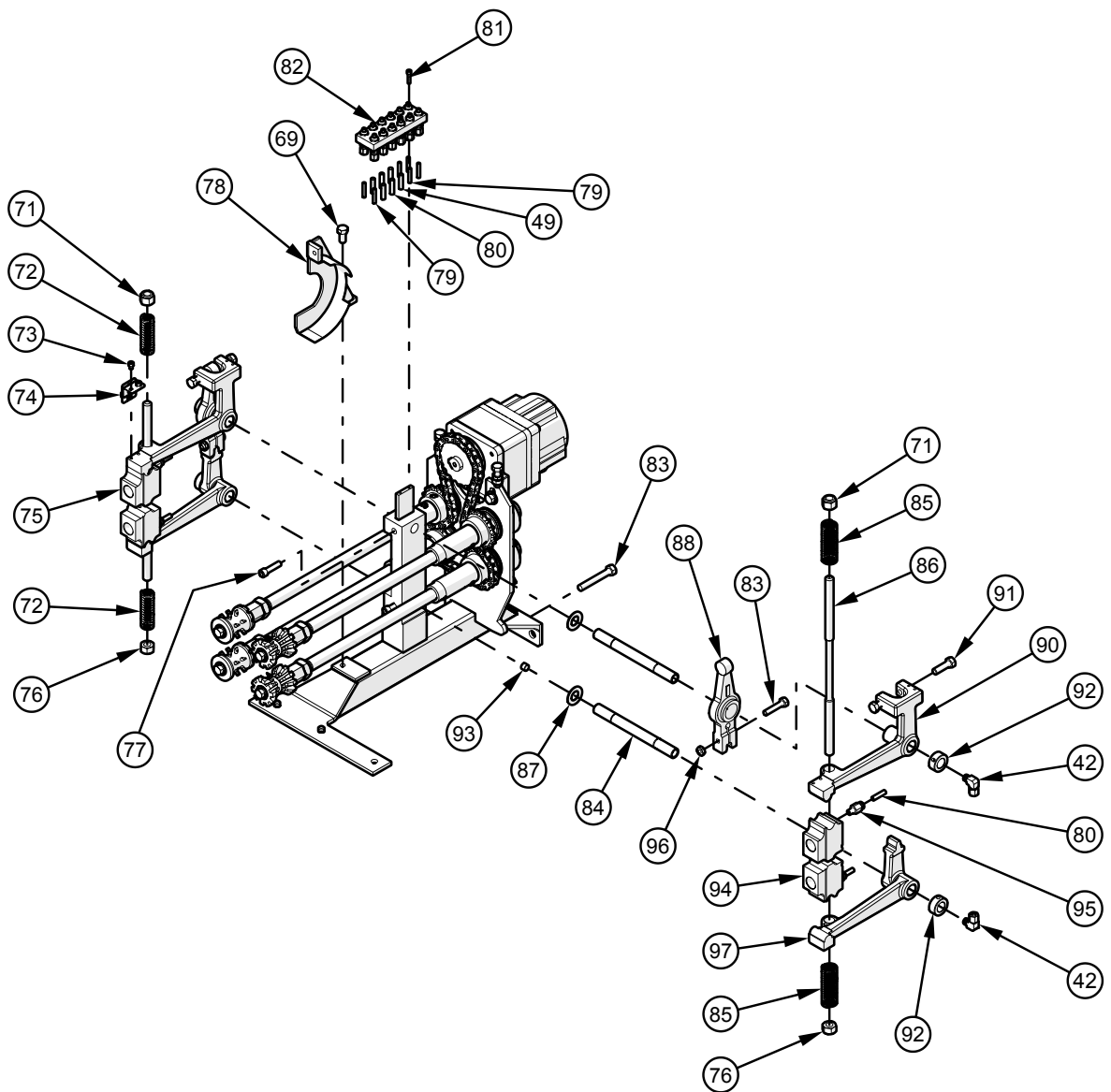
AY,ELECTRIC CUTTERBOX (4010000.8106.2)



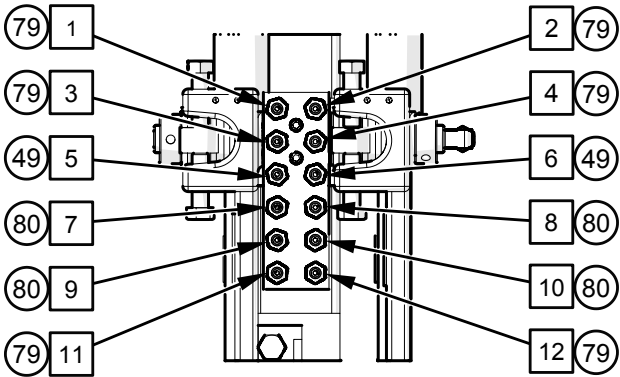
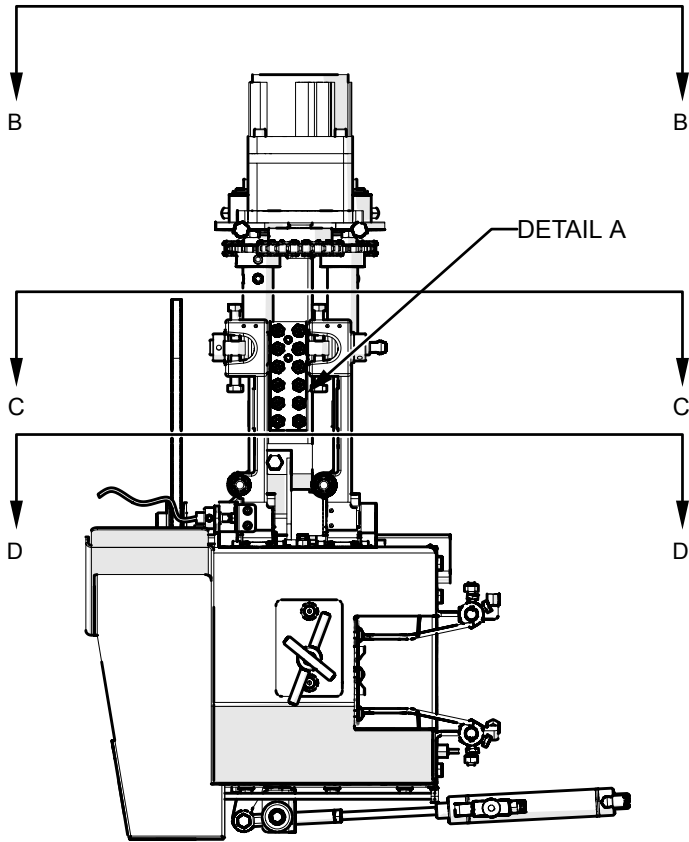




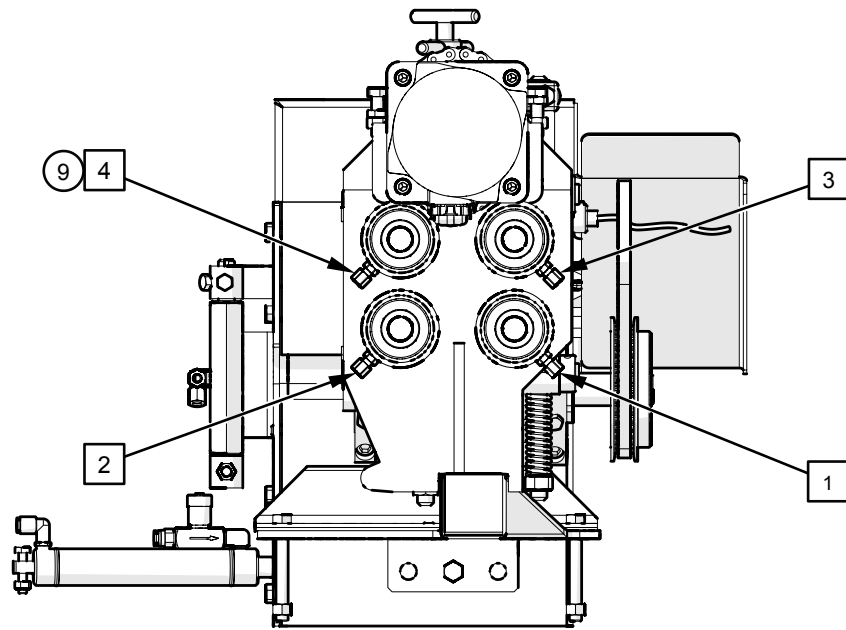




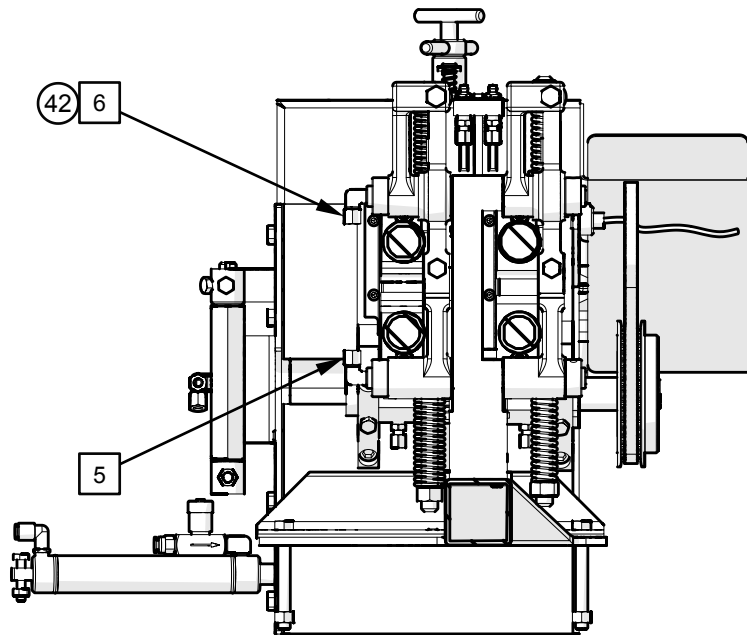
Line Routing



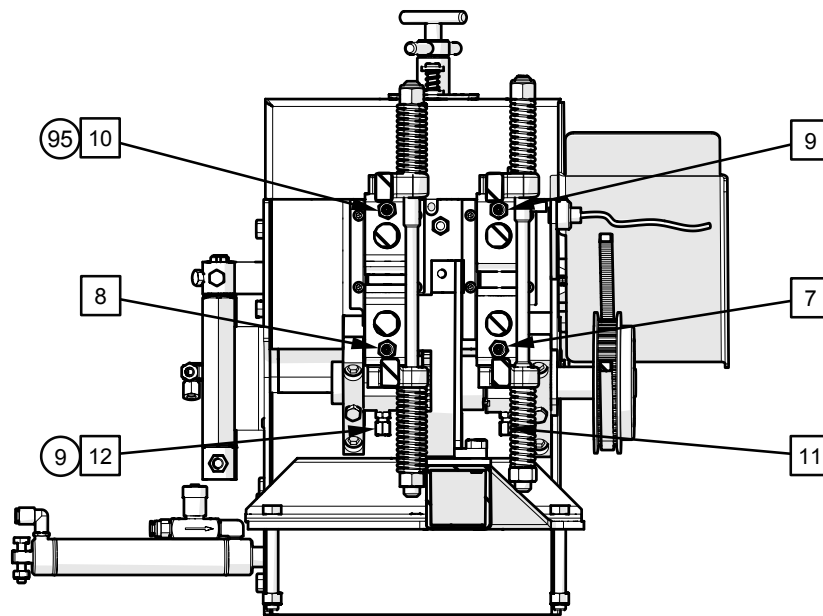
DETAIL A



VIEW B-B



SECTION C-C



SECTION D-D

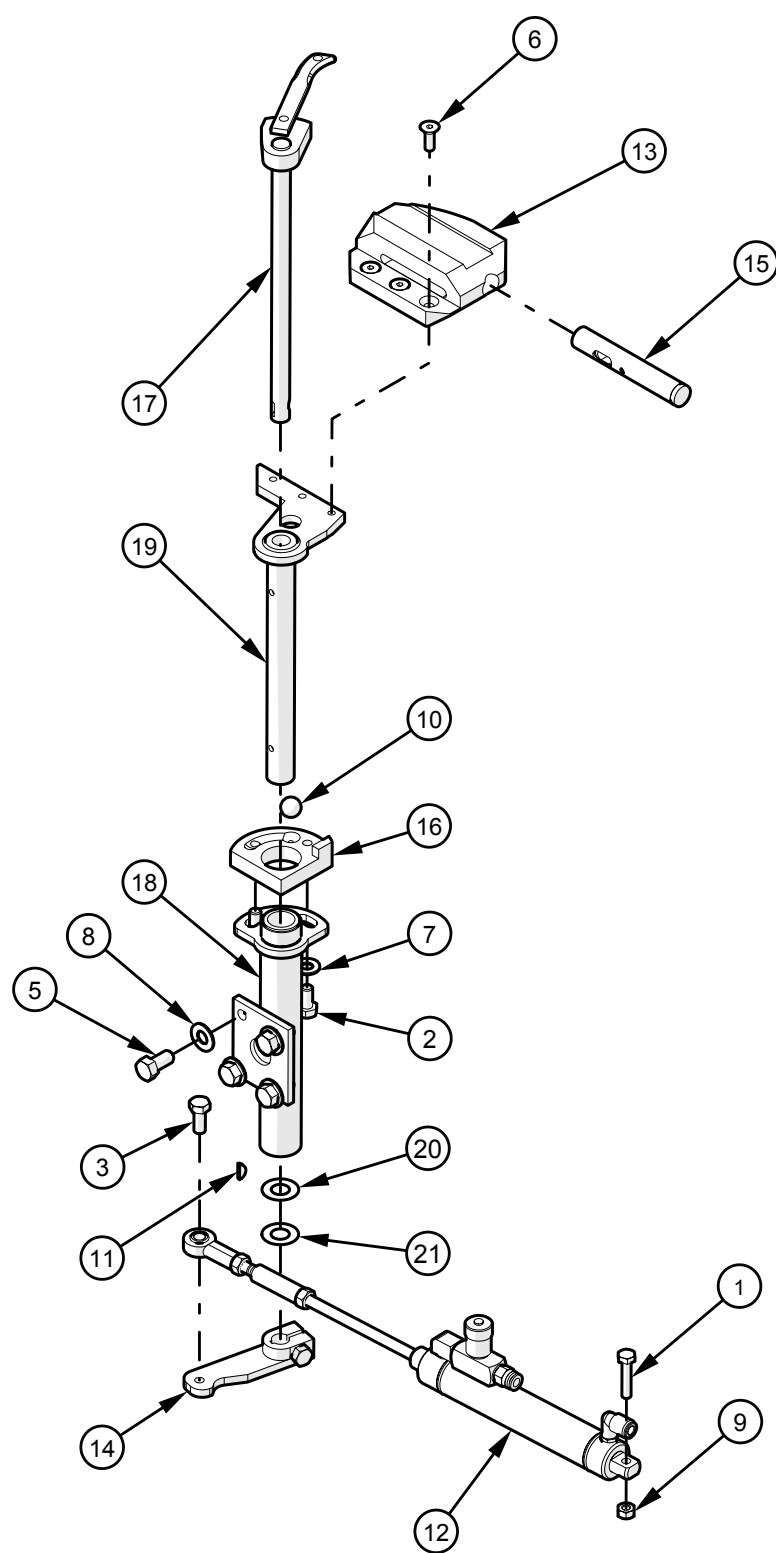
Item	Part Number	Description	Quantity
1	0001.1300	SCR,SCS 5/16-18 x 3/4 SS	1
2	4011065	KEY,1/4 x .94 ± .03 SS	1
3	0006.3251	BELT,TMG 8mm x 12mm x 100T	1
4	0006.3239	PULLEY,TIMING BLT 8MM PITCH 40	1
5	0006.1338	BSHG,TLB 2012 x 1"	1
6	4011020	BEARING CUTTER SHAFT	1
7	4011437	BRONZE THRUST WASHER	2
8	4011021.0102	SHAFT CUTTER HEAD	1
9	0007.1020	FTG,PAS 2MPT x 3TU BRS	6
10	0006.7005.3	KEY,SQ 3/16 x 7/8 SST	5
11	4011052	HOLDER,GEAR	1
12	0001.2411	SCR,SSS 5/16-18 x 1/4 BK	2
13	4011445	GEAR,CUTTER HEAD DRIVE-NYLON	1
14	0001.3891.06	SCR,SFHCS 1/4-20 x 1/2 BK	5
15	4011019	BEARING CUTTER SHAFT - FEED	1
16	9502.8002	SENSOR,HALLEF	1
17	0001.2209	SCR,SSS 1/4-20 x 1/4 SS NYLTP	1
18	4011001	PIN, LOCATING	1
19	4011381	NUBBIN KNOCKER-SUBASSY	1
20	0001.0170	FTG,GLSZ 2MPT x 11/16LNG *	1

Item	Part Number	Description	Quantity
21	0001.0170	SCR,HCS 1/4-20 x 1 1/4 SS	1
22	0001.4350	WSHR,FLT .281 x .625 x .063 SS	4
23	0007.4357	BUMPER,1.25ODX1.50LG PUR	1
24	4011798	REST,CUTTER GUARD	1
25	0001.0060	SCR,HCS 1/4-20 x 1/2 SS	3
26	4011760.0002	AY,CUTTER COVER	1
27	7571.2011.001	FTG,PAST 2MPT x 4TUQR SS	1
28	4011033	SLIDE,FEED ROLL	2
29	4011025	GUIDE,BEARING BLOCK	1
30	4011024	GUIDE,BEARING BLOCK	1
31	0001.1018	SCR,SCS 10-24 x 3/8 SS	8
32	4011023	GUIDE,BEARING BLOCK	1
33	4011051	SLIDE,FEED ROLL	2
34	4011026	GUIDE,BEARING BLOCK	1
35	0001.0110	SCR,HCS 1/4-20 x 3/4 SS	2
36	0001.0732	SCR,HCS 3/8-16 x 3 SS	2
37	0001.5220	NUT,HX 3/8-16 x 9/16 SS	2
38	4011003	GUIDE,EAR EQUALIZER	2
39	0001.0039	SCR,HCS 1/4-20 x 3/8 SS	4
40	0001.4654	WSHR,FLT .510 x .968 x .060 SS	2
41	4011022	PLATE,EAR EQUALIZER MACHINE	1
42	0007.1120	FTG,PAEN 2MPT x 4TU BRS	4
43	0007.1094.1	FTG,WAS 4TU x 4TU BULKHEAD	1
44	0007.4677.1	FTG,TU INS 4TU x .040W	1
45	0009.1172	KEY,SQ 1/8 x 1 SS	2
46	4011002	SHAFT,EAR EQUILIZER WELDMENT	2
47	0001.5200	NUT,HX 5/16-18 x 1/2 SS	2
48	4010101.0006	CUTTER BOX,ELECTRIC	1
49	0007.2040	RM,TUBE 1/4 .030W COPPER	-
50	0001.0240	SCR,HCS 5/16-18 x 1/2 SS	8
51	0001.0570	SCR,HCS 3/8-16 x 1 SS	4
52	0001.4500	WSHR,FLT .406 x .813 x .063 SS	6
53	4011391	COB ROLL,MOLDED	2
54	4011393	STEEL COB OUT ROLLER	2
55	4011618	NUT,FEED ROLL (1.25)	4
56	0001.5641.1	USE UP THEN 0001.5640	4
57	4011027	SHAFT,COB ROLL	4
58	4011034	U-JOINT AY,COB SHAFT	4

Item	Part Number	Description	Quantity
59	4011062	SPRK,40B15 x .75 MOD	4
60	4011061	BRG,MODIFIED ER-12 BALL	8
61	4011056	SUPPORT,CENTER LEVER	1
62	4011038.0003	SHAFT,FEED ROLL DRIVE STUB	4
63	0005.1082.03	GMTR,400W 5:1 IP67	1
64	0001.1356	SCR,SCS 5/16-18 x 3 1/2 SS	4
65	0001.0600	SCR,HCS 3/8-16 x 1 1/4 SS	2
66	0001.5500	NUT,HXJ 3/8-16 x 9/16 SS	2
67	4011053.0002	MOUNT,COB MOTOR ELECTRIC	1
68	0006.1105.1	SPRKT,40B20 x 22mm	1
69	0001.0540	SCR,HCS 3/8-16 x 3/4 SS	3
70	0006.0041.5	CHAIN,RC40 28.5 LG W/ML	1
71	0001.5919	NUT,HXSLFLKG 1/2-13 x 3/4 SS *	2
72	4011030	SPRING FEED ROLL HEAVY	2
73	0001.1098	SCR,SCS 10-32 x 1/4 SS	2
74	4011044.0003	EAR OUT SENSOR BRACKET - ECC	1
75	4011049	BRG BLK,COB ROLL SHAFT-OUT	2
76	0001.5310	NUT,HX 1/2-13 x 3/4 SS	2
77	0001.1322	SCR,SCS 5/16-18 x 1 1/4 SS	2
78	4011041	GEAR SHIELD WELDMENT	1
79	0007.2030	TUBING COPPER 3/16" x.030/.032	-
80	0007.2125.1	RM,TUBE 1/4 .050W NYLON BLACK	-
81	0001.1088	SCR,SCS 8-32 x 3/4 SS	2
82	4011059	GREASE BLOCK AY	1
83	0001.0710	SCR,HCS 3/8-16 x 2 1/2 SS	1
84	4011039	SHAFT,CENTER LEVER	2
85	4011040	SPRING,LIGHT FEED ROLL	2
86	4011037	ROD,CENTER LEVER ADJ.	2
87	4011043	WSHR,SHIM-BRASS	2
88	4011032	LEVER PIVOT	2
89	0001.0500	SCR,HCS 5/16-24 x 1 1/2 SS	2
90	4011028	LEVER,UPPER CENTERING	2
91	0001.0670.6	SCR,HCS 3/8-24 x 1 1/4 SS	4
92	0001.7551	CLR,SLD 5/8 x 1 1/8 SS	4
93	0007.3432	FTG,PAP 2MPT BRS HXSCKTH	2
94	4011050	BRG BLK,COB ROLL SHAFT-IN	2
95	7571.2009	FTG,PAS 1 MPT x 4 TU BRS	4
96	0001.5484	NUT,HXJ 5/16-24 x 1/2 SS	2

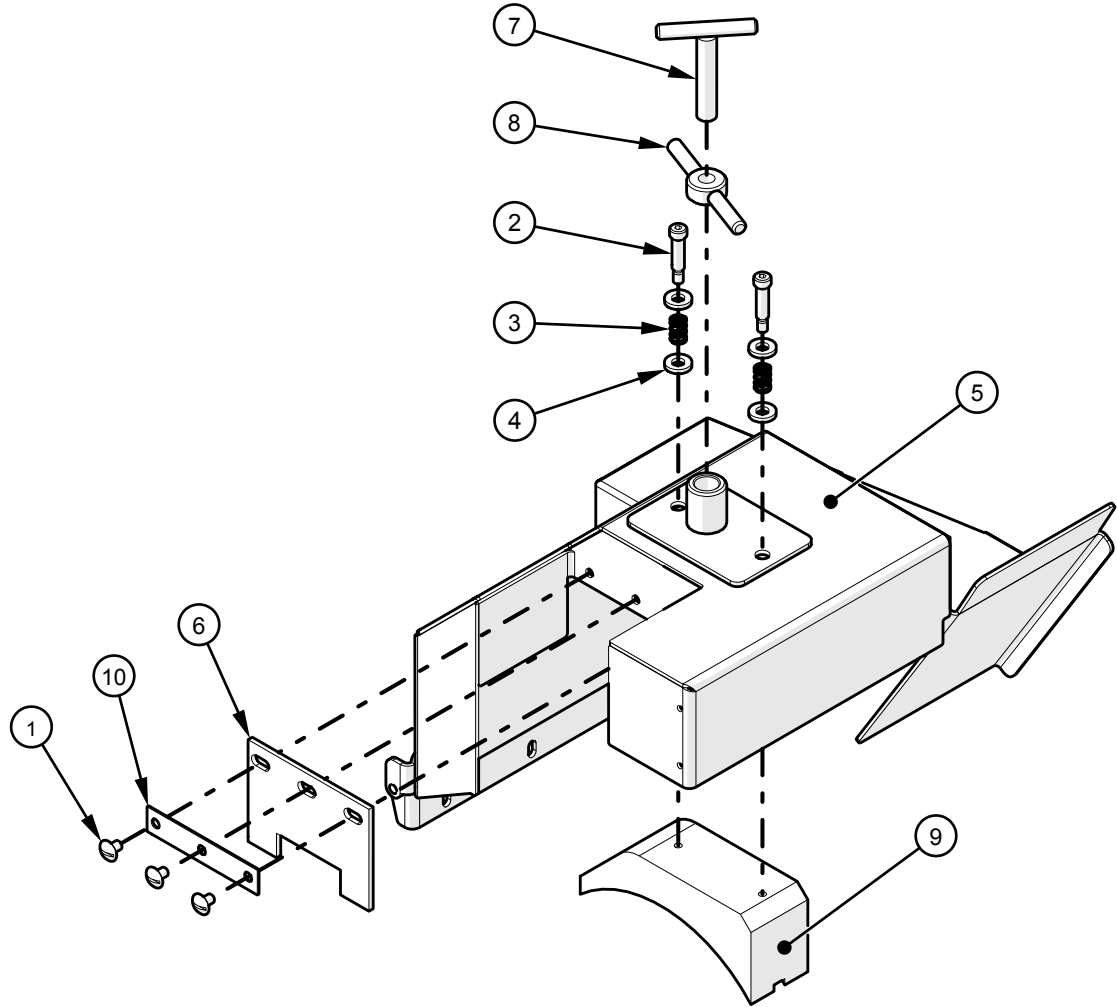
Item	Part Number	Description	Quantity
97	4011029	LEVER,LOWER CENTERING	2

NUBBIN KNOCKER-SUBASSY (4011381)



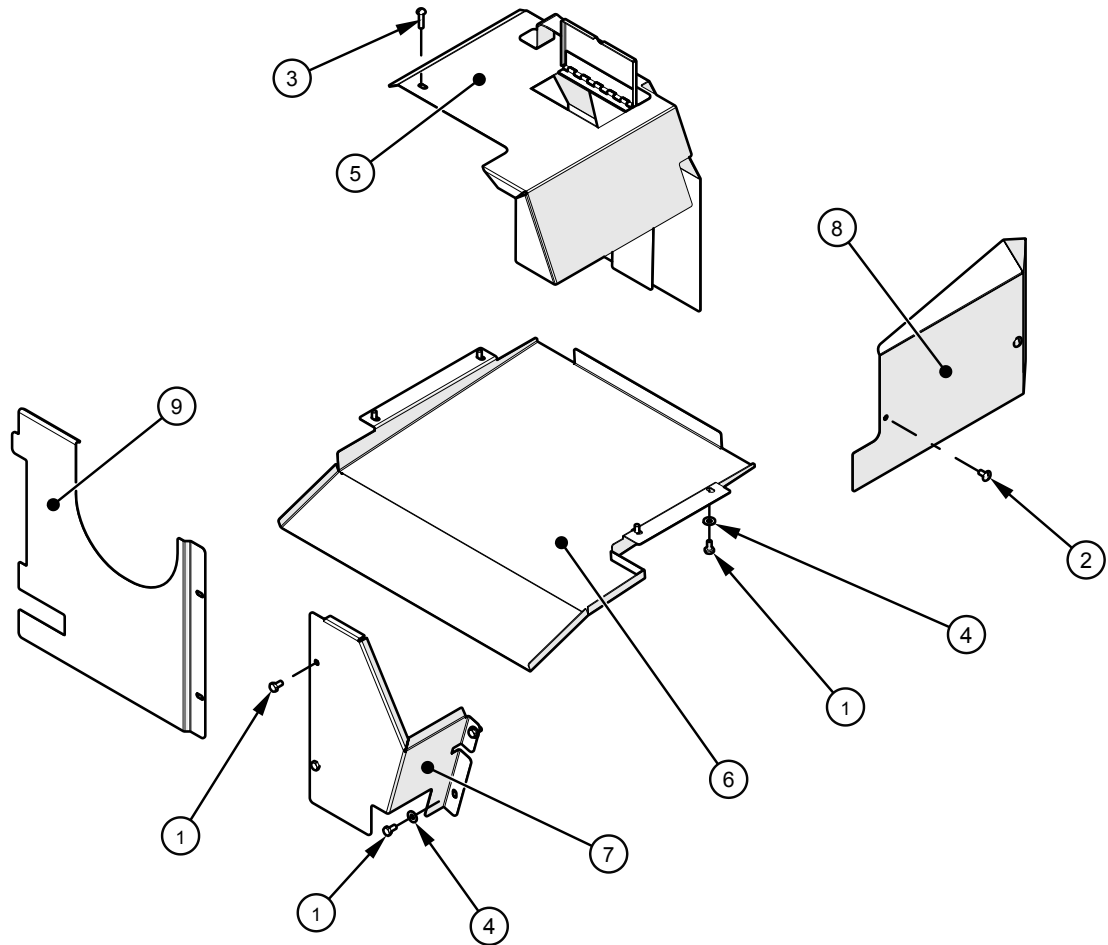
Item	Part Number	Description	Quantity1
1	0001.0170	SCR,HCS 1/4-20 x 1 1/4 SS	1
2	0001.0260	SCR,HCS 5/16-18 x 5/8 SS	2
3	0001.0280	SCR,HCS 5/16-18 x 3/4 SS	1
4	0001.0330	SCR,HCS 5/16-18 x 1 SS	1
5	0001.0540	SCR,HCS 3/8-16 x 3/4 SS	4
6	0001.3891.2	SCR,SFHCS 1/4-20 x 3/4 SS	3
7	0001.4390	WSHR,FLT .344 x .688 x .063 SS	2
8	0001.4500	WSHR,FLT .406 x .813 x .063 SS	4
9	0001.5120	NUT,HX 1/4-20 x 7/16 SS	1
10	0002.9040	BEARING,BALL	1
11	0009.1179	KEY,WDRF 1/8 x 1/2	1
12	4011192	CYLINDER AY	1
13	4011382	SPRDR,COB OUT ROLL (NK)	1
14	4011383	ARM,CYLINDER (NK)	1
15	4011384	PLUNGER,SUBASSY	1
16	4011385	CAM,NUBBIN KNOCKER	1
17	4011386	SHAFT,CAM-SUBASSY	1
18	4011387	HOUSING,CAM-SUBASSY	1
19	4011389	BUSHING,HOUSING SUBASSY	1
20	4621024	1 WASHER 100 x 1/2 ID x .010	1
21	4621025	1 WASHER 100 x 1/2 ID x .005	1

AY,CUTTER COVER (4011760.0002)



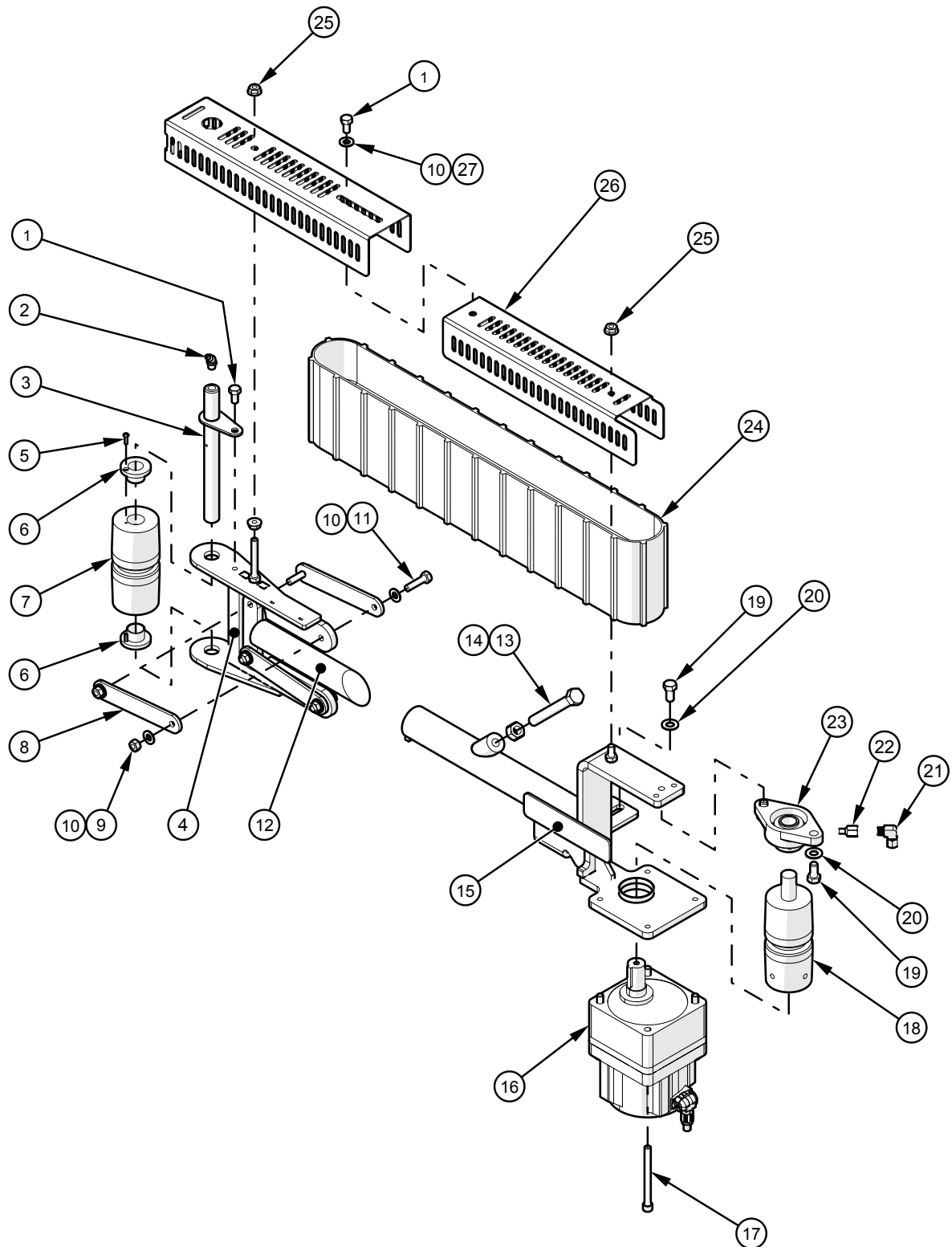
Item	Part Number	Description	Quantity
1	129.014	SCR,THMS 1/4-20 x 3/8 SS	3
2	0001.3902	SCR,SHSCS 5/16 x 1 x 1/4-20 SS	2
3	0009.0601	SPRNG,COMP .420 OD .625 LG	2
4	0213.0079	WSHR,FLT .328 x .687 x .125 SS	4
5	4011070	WLDMNT,CUTTER HEAD COVER	1
6	4011399	FLAP. CTTR COVER COB IN	1
7	4011750	SCREW,ADJUSTMENT	1
8	4011751	LOCK,HEAD RETAINER	1
9	4011755.0001	RETAINER,MOD2 CUTTER HEAD	1
10	4011827	RETAINER,COB IN FLAP	1

AY,COVERS ELECTRIC (4010000.8108.3)



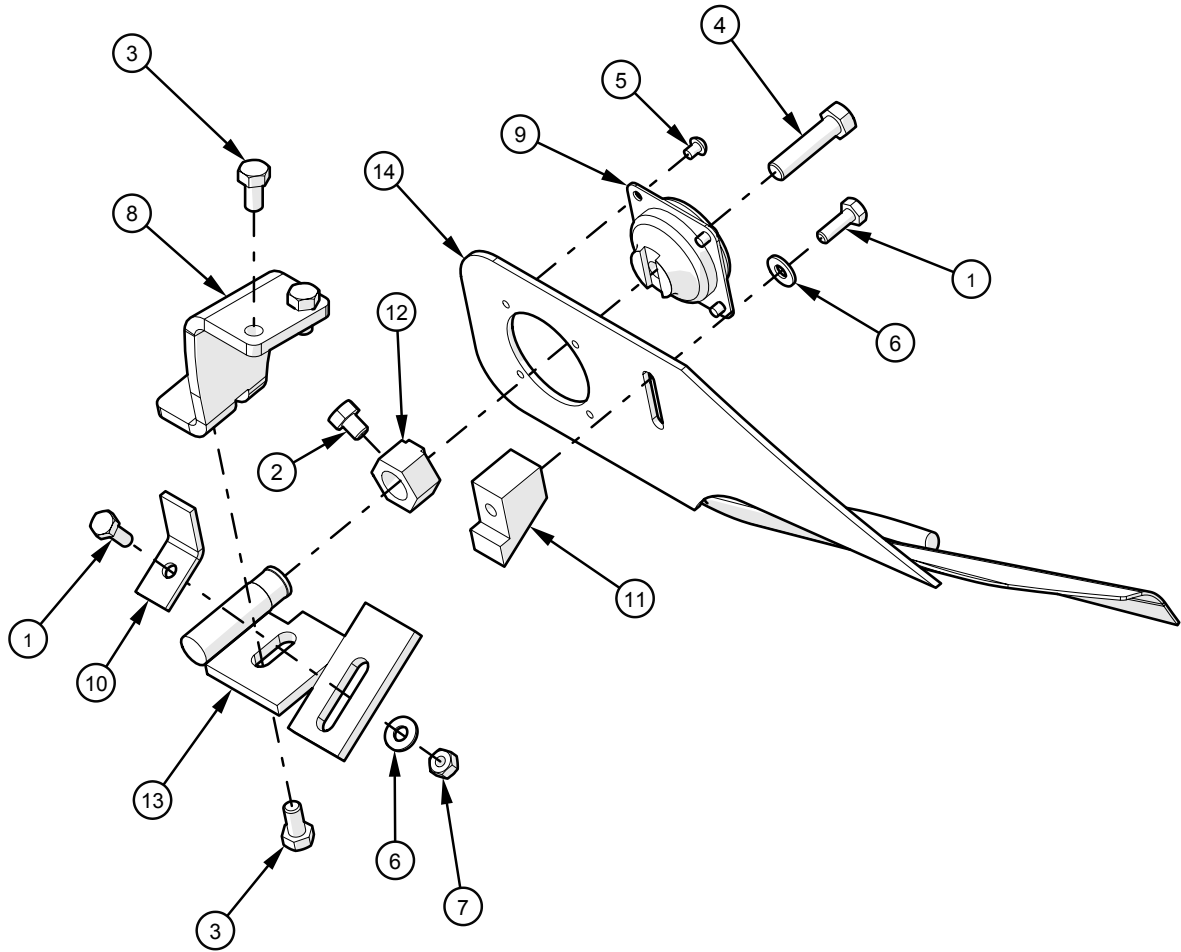
Item	Part Number	Description	Quantity
1	0001.0060	SCR,HCS 1/4-20 x 1/2 SS	8
2	0001.3002	SCR,THMS 1/4-20 x 1/2 SS	2
3	0001.3333	SCR,THMS 1/4-20 x 1 SS	1
4	0001.4350	WSHR,FLT .281 x .625 x .063 SS	6
5	4011380	COVER,SERETRAM CUTTER	1
6	4011395	CUTTER DRIP PAN (WELDT)	1
7	4011398	SHIELD,CUTTER PU, CAM (MO)	1
8	4011400	SHIELD RECYCLE	1
9	4011726.0001	PANEL,ELECTRIC END	1

AY,METERING BELT ELECTRIC (4010000.8109.1)



Item	Part Number	Description	Quantity
1	0001.0260	SCR,HCS 5/16-18 x 5/8 SS	2
2	0007.0110	FTG,GLZF 2MPT x 57/64LNG	1
3	4011791	WLDMT,ROLLER SHAFT,EXTENDED	1
4	4011284	LINKAGE PLATE, WLDMT	1
5	0001.3041.1	SCR,RHMS 6-32 x 1/2 SS SLFTAP	2
6	4011289	BEARING ROLLER	2
7	4011282	ROLLER, BELT BRIVE	1
8	4011281	LINK, ADJ METERING	4
9	0001.5720	NUT,HXJSLFLKG 5/16 X 9/16 SST	4
10	0001.4390	WSHR,FLT .344 x .688 x .063 SS	9
11	4011325	SCREW,LINKAGE PLATE	4
12	4011283	ROD, TENSION WLDMT	1
13	0001.0962.5	SCR,HCS 1/2-13 x 4 SS FLTHD	1
14	0001.5310	NUT,HX 1/2-13 x 3/4 SS	1
15	4011720.0001	METERING BELT SUPPORT ELECTRIC	1
16	0005.1082.01	GMTR,200W 15:1 IP67	1
17	0001.1356	SCR,SCS 5/16-18 x 3 1/2 SS	4
18	4011280.0001	PULLEY,DRIVE ELECTRIC	1
19	0001.0540	SCR,HCS 3/8-16 x 3/4 SS	4
20	0001.4500	WSHR,FLT .406 x .813 x .063 SS	4
21	0007.1120	FTG,PAEN 2MPT x 4TU BRS	1
22	0007.1320	FTG,GAS 4-28MPT x 2FPT BK LT	1
23	0002.8134.1	BRG,3/4 BORE 2 BOLT FLANGE	1
24	4011287.1	BELT,LIVWALL INFEED-BLUE	1
25	0001.5680	NUT,FLGLK 5/16-18 x 1/2 SS	3
26	4011790	GUARD,METERING BELT, FIXED	1
27	4011792	GUARD,METERING BELT, ADJ	1

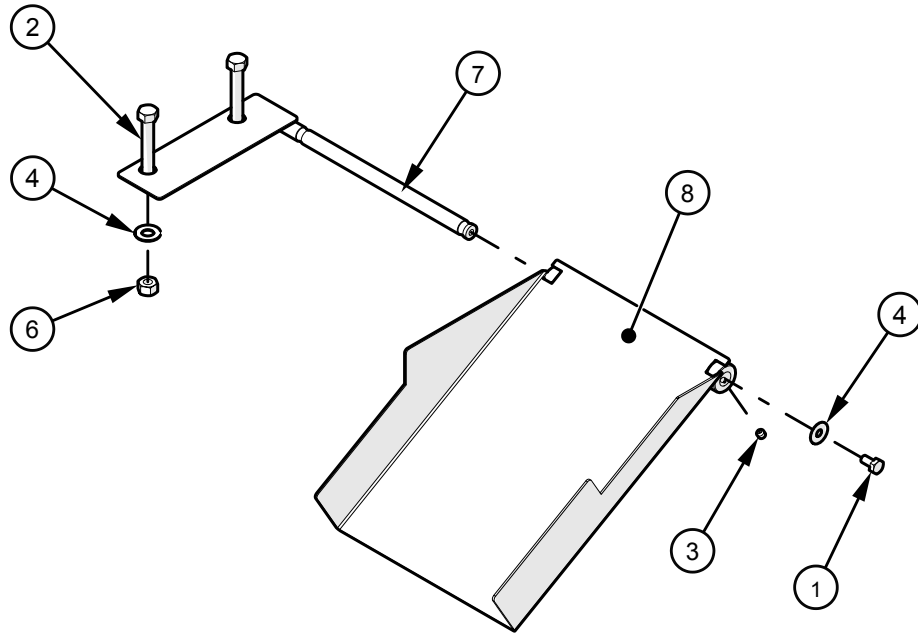
AY,PRESSURE ARM ELECTRIC (4010000.8110.1)



Item	Part Number	Description	Quantity
1	0001.0110	SCR,HCS 1/4-20 x 3/4 SS	2
2	0001.0229	SCR,HCS 5/16-18 x 3/8 SS	1
3	0001.0260	SCR,HCS 5/16-18 x 5/8 SS	3
4	0001.0630	SCR,HCS 3/8-16 x 1 1/2 SS	1
5	0001.3163	SCR,RHMS 10-32 x 1/4 SS	4
6	0001.4350	WSHR,FLT .281 x .625 x .063 SS	2
7	0001.5712	NUT,HXSFLKLG 1/4-20 x 7/16 SS*	1
8	4011311.0002	BRACKET,PRESSURE ARM MOUNT	1
9	4011313	DAMPER,ISOLATION-MOD	1
10	4011314	BLOCK,PRESSURE ARM ADJ	1
11	4011315	BLOCK,PRESSURE ARM SPAC	1
12	4011316	NUT,ADJUSTMENT-PRESS ARM	1
13	4011317	WLDMT,PRESSURE ARM MOUNT	1

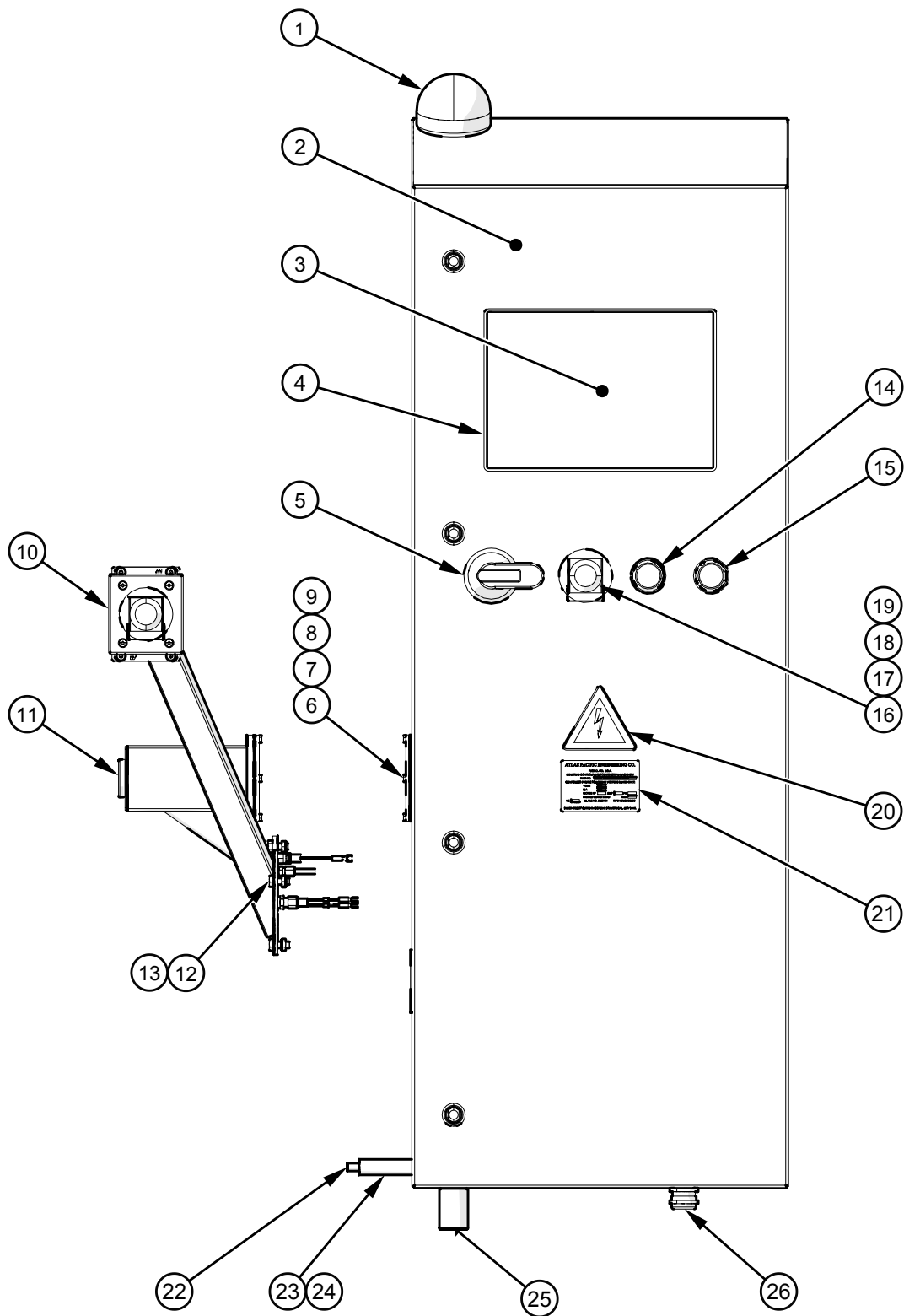
Item	Part Number	Description	Quantity
14	4011318	WLDMT,PRESSURE ARM	1

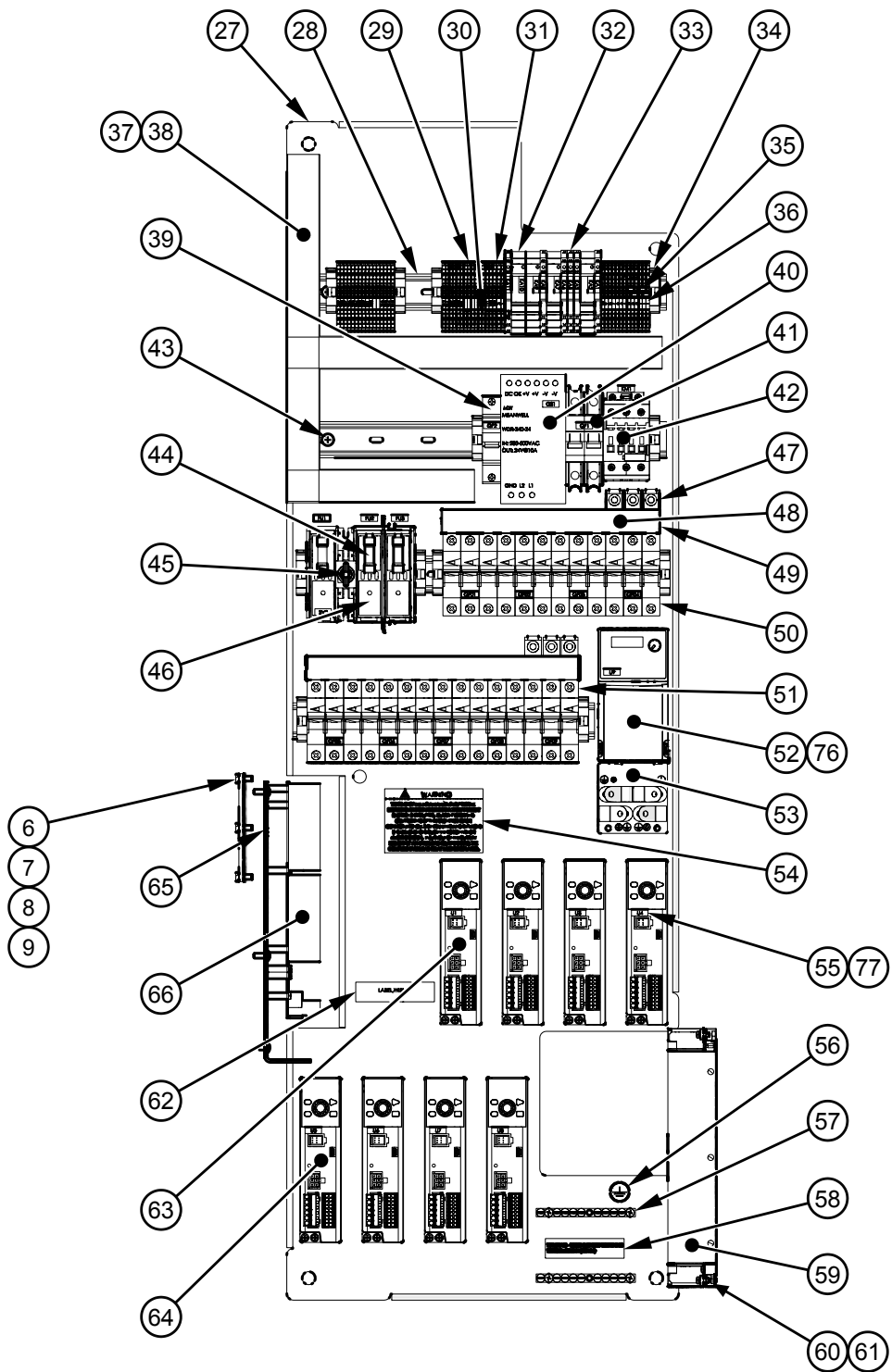
CHUTE,CUT CORN (4010000.8112)

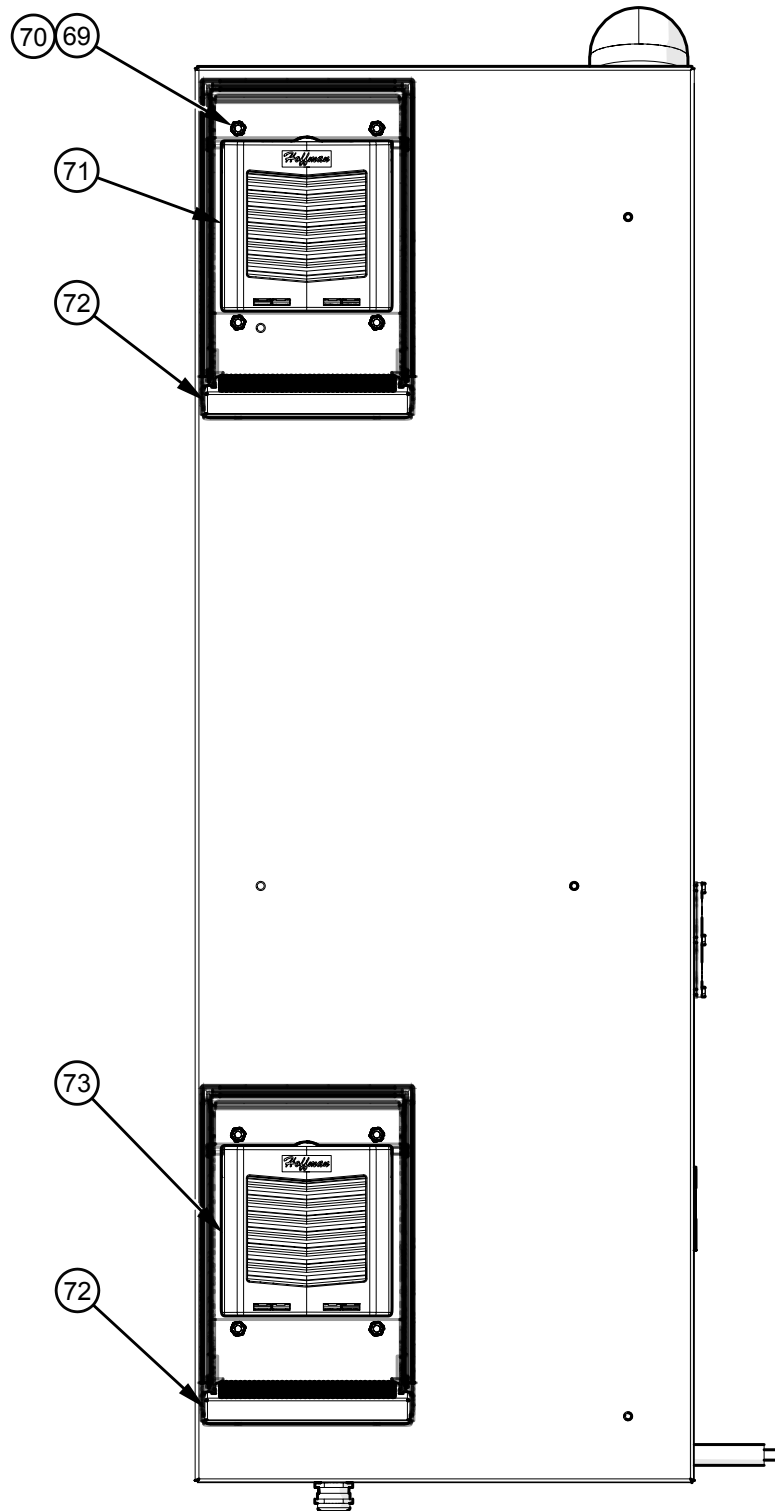


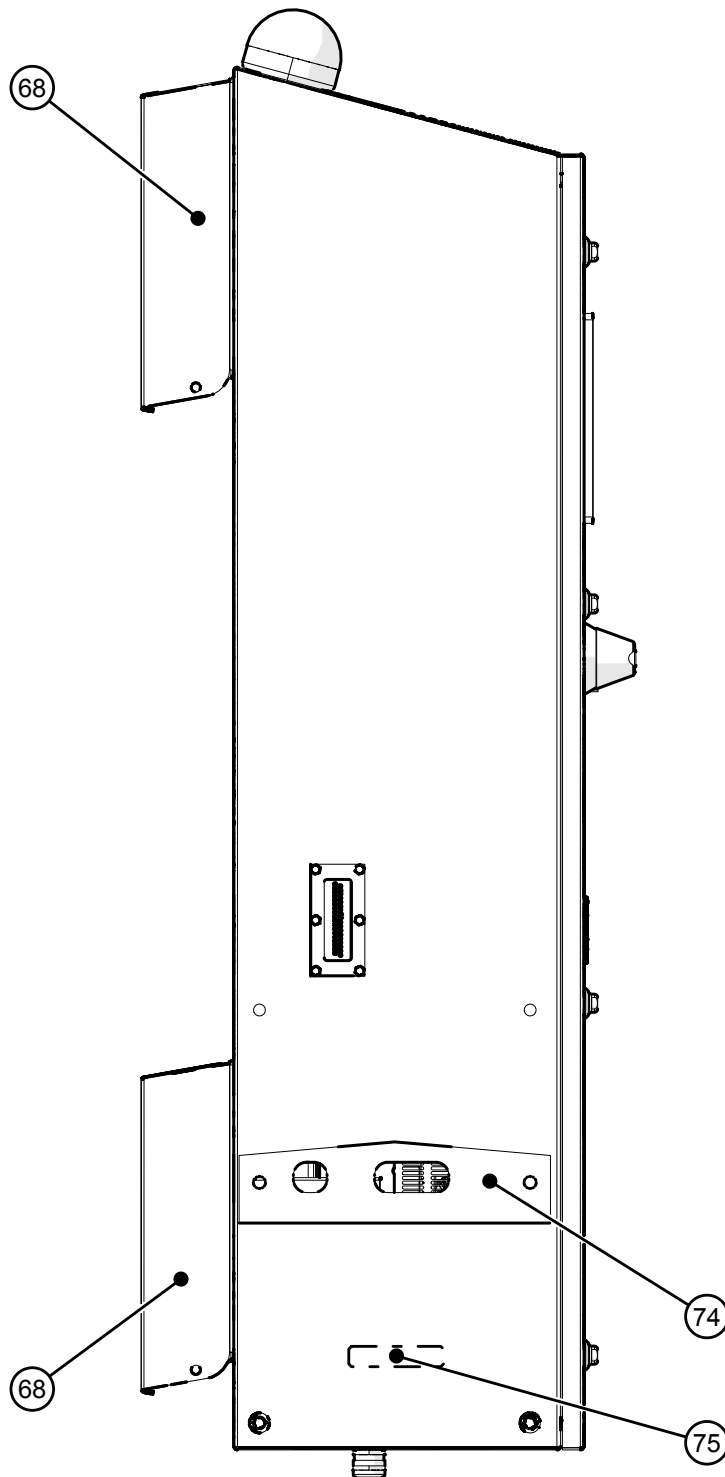
Item	Part Number	Description	Quantity
1	0001.0060	SCR,HCS 1/4-20 x 1/2 SS	1
2	0001.0730.1	SCR,HCS 3/8-16 x 2 3/4 SS *	2
3	0001.2210	SCR,SSS 1/4-20 x 1/4 SS	2
4	0001.4500	WSHR,FLT .406 x .813 x .063 SS	2
5	0001.4687	WSHR,FLT .254 x .750 x .030 SS	1
6	0001.5220	NUT,HX 3/8-16 x 9/16 SS	2
7	4011401.0101	PLATE,MTG WLDMT	1
8	4011401.0102	CHUTE,CUTCORN WLDMT	1

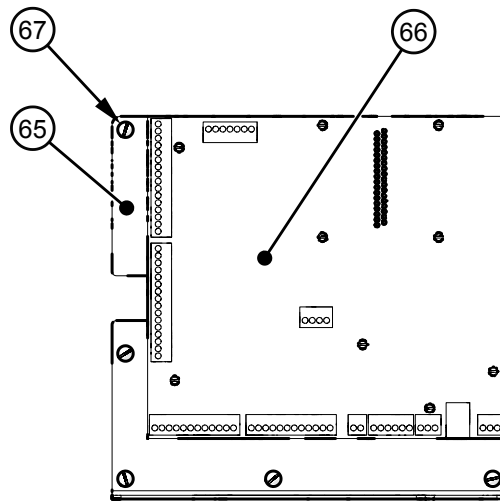
AY,CNTRL ELEC ACC (4010000.8113.2)











Item	Part Number	Description	Quantity
1	9502.5092.001	LIGHT BCN 90MM GYR 12-30V NPN	1
2	4011356.0004	ENCL,E-ACC 48 x 18 x 12	1
3	9550.5037.002	FILM,EX710 SCREEN PROTECT	1
4	9550.5038.010	HMI,10.1" IP66 TOUCH PNL MNT	1
5	9502.6411.201	SWITCH HANDLE	1
6	0001.0025	SCR,HCS 10-32 x 1/2 SS	6
7	4011334	FRAME,LENS COVER	1
8	4011335	COVER,LUCITE LENS	1
9	4011336	GASKET,1/32 LENS COVER	1
10	4011728.0001	AY,EACC E-STOP	1
11	4011332.0002	LIGHT SOURCE,LED PROFILE	1
12	0001.0280	SCR,HCS 5/16-18 x 3/4 SS	2
13	0001.5460	NUT,HXJ 5/16-18 x 1/2 SS	3
14	9502.6005	BUTTON,PUSH-BOOTED GREEN	1
15	9502.6004	NEMA STYLE PUSH BUTTON 30.5MM	1
16	9502.6035	SWITCH,PUSH - PULL	1
17	0005.0255	BLOCK AB 800T-XD2	1
18	9501.6036	PAD LOCKING ATTACH., PUSH-PULL	1
19	9501.9178	LEGEND,NEMA YELLOW BLANK	1
20	9501.9132.2	LABEL,WARNING ELECTRICAL 3.9"	1
21	0009.0014	NAMEPLATE,ELEC-ACC 230V	1
22	0001.0741	SCR,HCS 3/8-16 x 3 1/4 SS	2
23	4012038	SPACER	2
24	0001.4161	WSHR,LK 3/8 SS	2

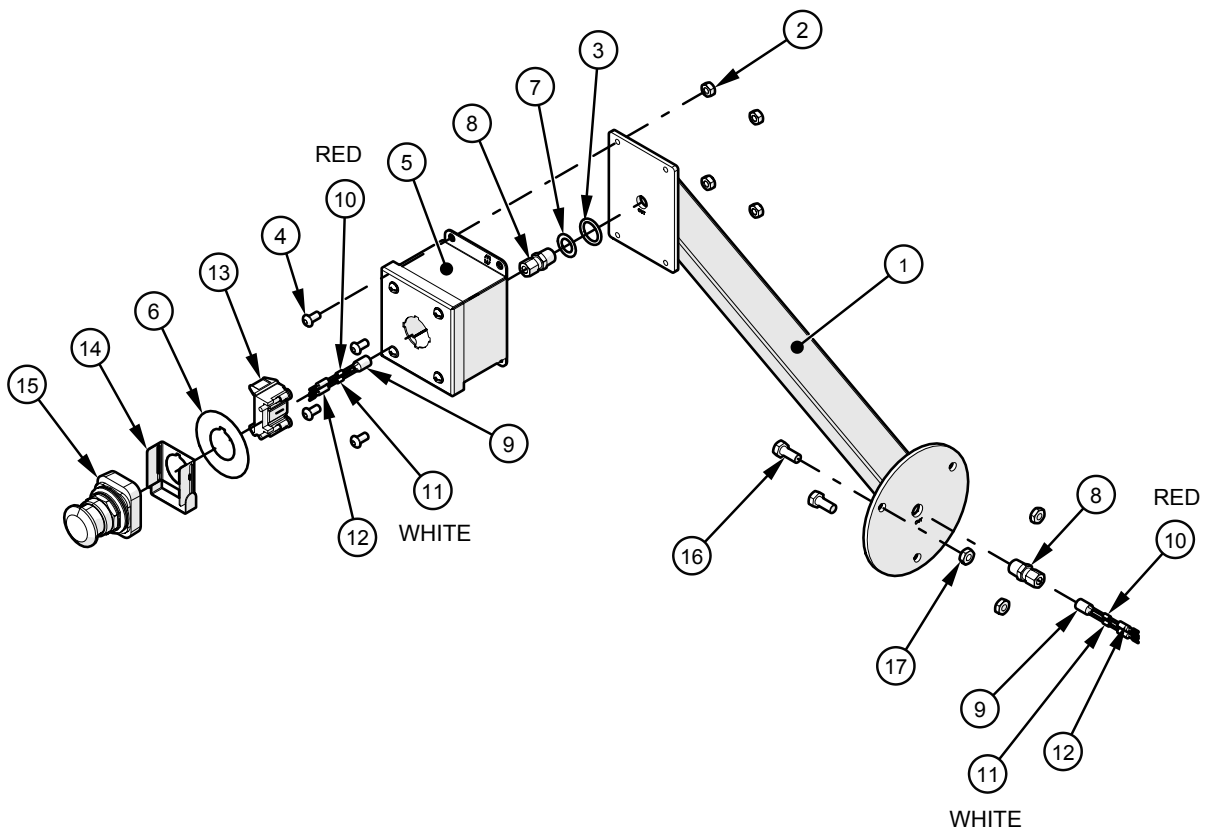
Item	Part Number	Description	Quantity
25	9540.0156	DRAIN VENT SS	1
26	9501.4165	CONN,EMC CLAMP .51-.71 3/4 NPT	1
27	4011355.0003	BACKPANEL,ELECTRIC - ACC	1
28	0005.0202	RM,DIN RAIL AB#199DR1	-
29	9501.7100.140	TERM BLK (4) 16-24 GRY	46
30	9502.3035.7	RELAY,TERM BLK,JUMPER,GRAY	1
31	9501.7100.101	TERM BLK (4) 16-24 ORG END PLT	5
32	9502.3035.2	RELAY,TERM BLK,24VAC/DC DPDT	4
33	9502.3035	RELAY,TERM BLK,24VAC/DC SPDT	6
34	0005.0273	WAGO END STOP 249-117	12
35	9501.7100.100	TERM BLK (4) 16-24 ADJ JMPR	4
36	9501.7100.900	LABEL,TERM BLK PRINTER	-
37	9501.9033.1	WIRE DUCT,1" WIDE X 2" HIGH	-
38	9501.9034	COVER WIRE DUCT 1"	-
39	9540.3114.110	BREAKER,UL 1077 1 POLE 10A	1
40	9502.1031.501	PWRSPLY,24DC 180-550AC 240W UL	1
41	9540.3110.210	BRKR,UL489 2POLE 10A C/K	1
42	9502.9158.938	CONTACTOR,3P 24VDC AC/DC 38A	1
43	0001.3182	SCR,THMS 10-32 x 3/8 SS	12
44	9502.0100.300	FUSE,30.00A 600V CC SLOW ARC	3
45	9502.6411.301	SWITCH SHAFT EXTENSION	1
46	9502.6241.102	SWITCH,DISCONNECT,FUSED 30A 3P	1
47	9540.3115.902	BUSBAR,WIRING LUG EATON	6
48	9540.3115.900	BUSBAR, 3PH 480V 100A	.5
49	9540.3115.901	BUSBAR,END CAP EATON	4
50	9540.3115.310	BREAKER,UL 1077 3POLE 10A	8
51	9540.3115.315	BREAKER,UL 1077 3POLE 15A	1
52	9502.9281.010	VFD,0.5HP-1PH, 1HP-3PH, 230V	1
53	9502.9281.999	PLATE,EMC SHIELD - VFD	1
54	9501.9258	LABEL,CIRCUIT BRKR BRANCH	1
55	9501.9240	LABEL,COMPONENT GENERIC	1
56	9501.9209	LABEL,GRND SYMBOL 300 COUNT	1
57	9501.8020	GROUNDING BAR, 9 POSITION	2
58	9501.9252	LABEL,TERM TORQUE 20LB-IN EN	1
59	9550.1033	FILTER,EMI RFI 3 WIRE 30A	1
60	0001.5100	NUT,HX 10-32 x 3/8 SS	4
61	0001.4290	WSHR,FLT .218 x .437 x .031 SS	2
62	9501.9154	LABEL,WIRING - ENGLISH	1

Item	Part Number	Description	Quantity
63	0005.1083.400	DRIVE,400W 200-240VAC 3PH	1
64	0005.1083.200	DRIVE,200W 200-240VAC 1-3PH	7
65	4011355.0002	PLATE,PROFILE BRD MNT ELECTRIC	1
66	4010019.0002	CNTRL,PCB CORN PROFILE	1
67	0001.3191.1	SCR,THMS 10-32 x 1/2 SS	9
68	9540.1026.001	FAN SHROUD, FILTER, SS HH05	2
69	0001.5120	NUT,HX 1/4-20 x 7/16 SS	8
70	0001.0060	SCR,HCS 1/4-20 x 1/2 SS	8
71	9540.1026.003	VENT, EXHAUST GRILLE 5"	1
72	9540.1026.005	SCREEN,FAN SHROUD PEST	2
73	9540.1026.002	FAN, SIDE MOUNT 5" 24V 35SCFM	1
74	4011356.0004.7	GASKET,ELECTRICAL ENCLOSURE	1
75	9501.9163.0	LABEL,CONDUIT/BUSHING LOC	1
76	0001.3525	SCR,SBHCS 10-32 x 3/8 SS	2
77	0001.3521	SCR,SBHCS 8-32 x 3/8 SS	16
78	9501.9056	CABLE TIE MOUNT	20
79	9501.7100.950	RIBBON,LABEL TERM BLK PRINT	-
80	9502.7023.4	WIRE,16 GA DK BLUE MTW	-
81	9502.7100.02	WIRE,14 GA GRN/YEL MTW	-
82	9502.7133	WIRE,14 GA BLK MTW	-
83	9502.7134	WIRE,16 GA WHT MTW	-
84	0005.3026	CABLE,12 COND 18 AWG SHIELDED	-
85	0005.1084.01	CABLE,3M OPPOSITE SHAFT OUTLET	5
86	0005.1084.02	CABLE,3M TOWARD SHAFT OUTLET	4
87	9502.8058	CABLE,5-PIN STRAIGHT 2M LONG*	1
88	0005.3243	DESICCANT PACKET	1
89	4010000.8113.2.01	LABEL,POWER CIRCUIT SCHEMATIC	1
90	4010000.8113.2.02	LABEL,CTRL CIRCUIT SCHEMATIC	1
91	4010000.8113.2.03	LABEL,I/O CIRCUIT SCHEMATIC	1
92	4010000.8113.2.04	LABEL,DRIVE ID & SPEED	1

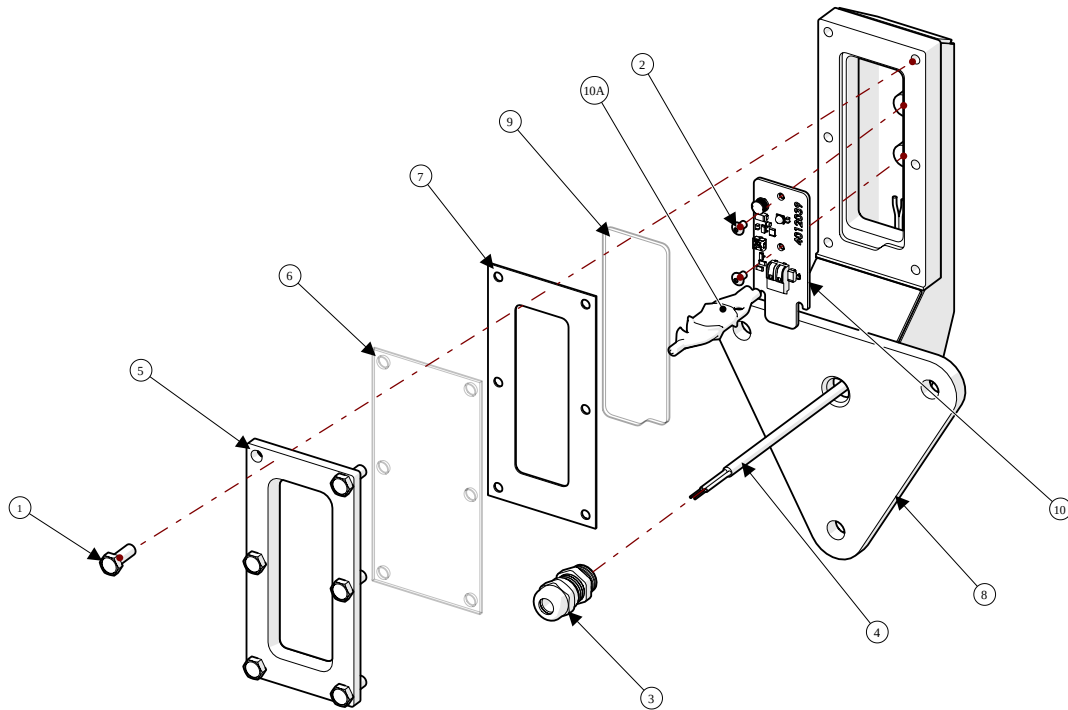
AY,EACC E-STOP (4011728.0001)

Item	Part Number	Description	Quantity
1	4011725	E-STOP MOUNTING BRACKET WLDMNT	1
2	0001.5120	NUT,HX 1/4-20 x 7/16 SS	4
3	0004.1060	O-RING,3/4 x 1 x 1/8 NATIONAL	1
4	0001.3531.2	SCR,SBHCS 1/4-20 x 1/2 SS *	4

Item	Part Number	Description	Quantity
5	4011800	MODIFIED ENCLOSURE	1
6	9501.9178	LEGEND,NEMA YELLOW BLANK	1
7	0001.4533.3	WSHR,FLT .531 x .875 x .019 SS	1
8	4011801	FTG,MODIFIED 7571.2012	2
9	9502.7014	CABLE, 3 CONDUCTOR TEFLON	-
10	9501.9092.3	WIRE LABEL,#3 BRADY	2
11	9501.9092.2	WIRE LABEL,#2 BRADY	2
12	9501.9009	TERMINAL,#6 SPADE/18-22AWG RED	4
13	0005.0255	BLOCK AB 800T-XD2	1
14	9501.6036	PAD LOCKING ATTACH., PUSH-PULL	1
15	9502.6035	SWITCH,PUSH - PULL	1
16	0001.0280	SCR,HCS 5/16-18 x 3/4 SS	3
17	0001.5460	NUT,HXJ 5/16-18 x 1/2 SS	3

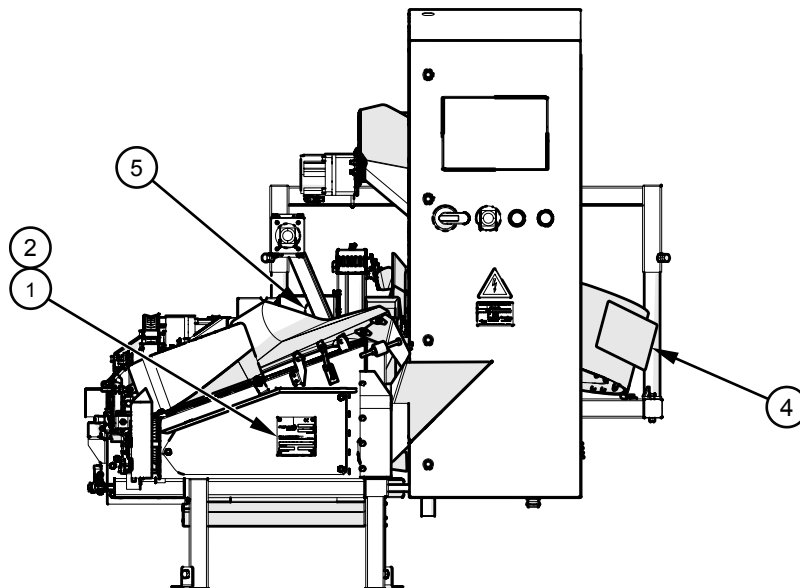
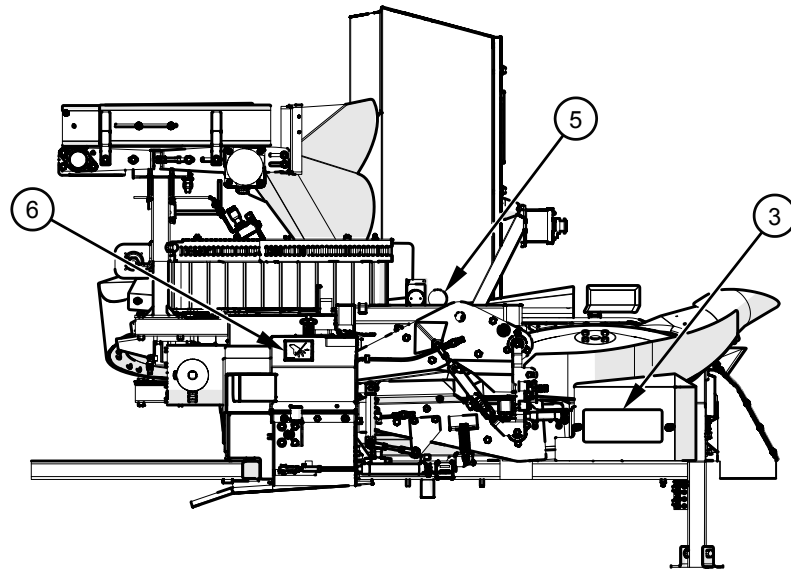


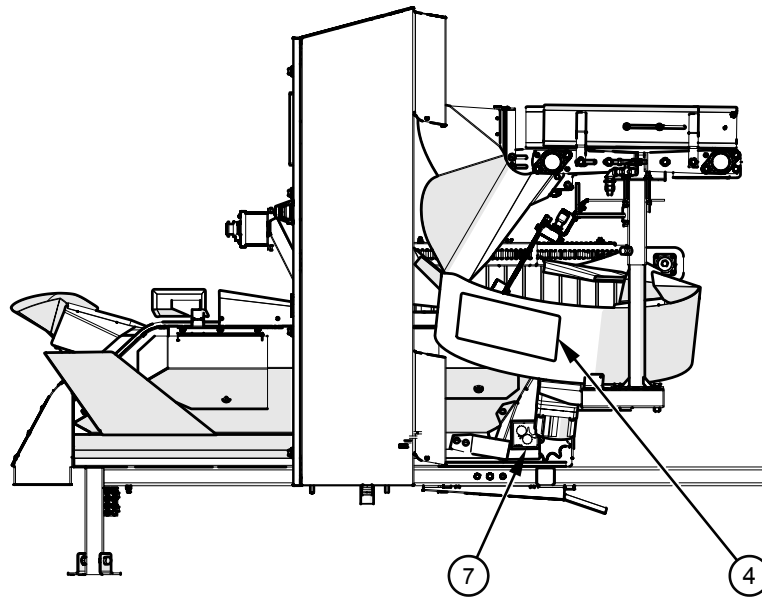
LIGHT SOURCE,LED PROFILE (4011332.0002)



Item	Part Number	Description	Quantity
1	0001.0025	SCR,HCS 10-32 x 1/2 SS	6
2	0001.3510.1	SCR,SBHCS 4-40 x 3/16 SS	2
3	9501.9336	CORD,GRIP 3-6.5mm m=M12 BRSNKL	1
4	9502.7017.2	CABLE,2 COND 22AWG	5
5	4011334.0002	FRAME,LENS COVER BEVELED	1
6	4011335	COVER,LUCITE LENS	1
7	4011336	GASKET,1/32 LENS COVER	1
8	4011338.0001	ENCLOSURE,LED LIGHT SOURCE	1
9	4011587.0001	LENS,MACHINED	1
10	4012039	PCBA,LED LIGHT SOURCE	1
10A	4012039.T	TOOL, LIGHT SOURCE WIRE INSTL (for reference only)	1

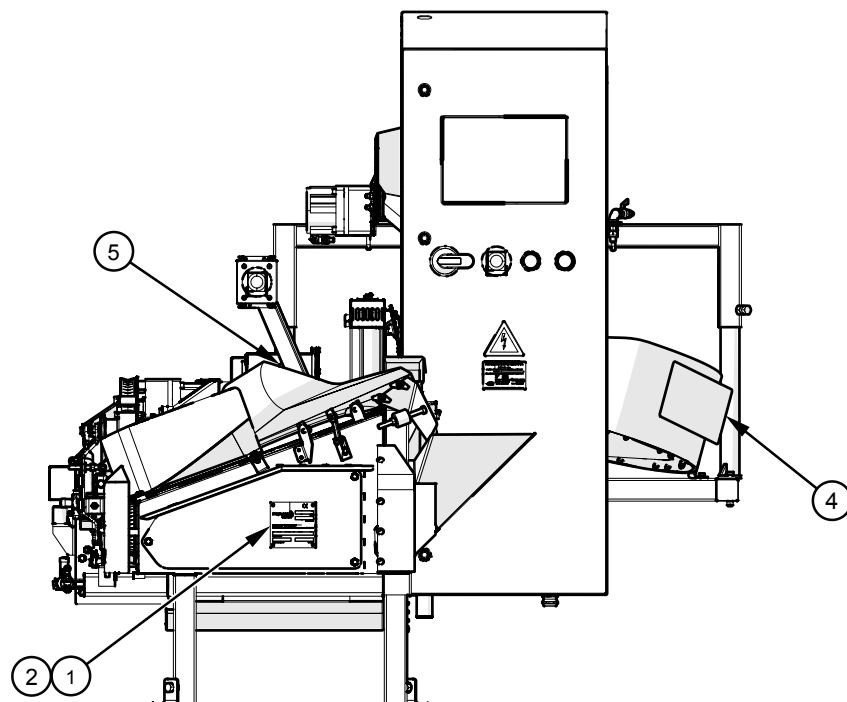
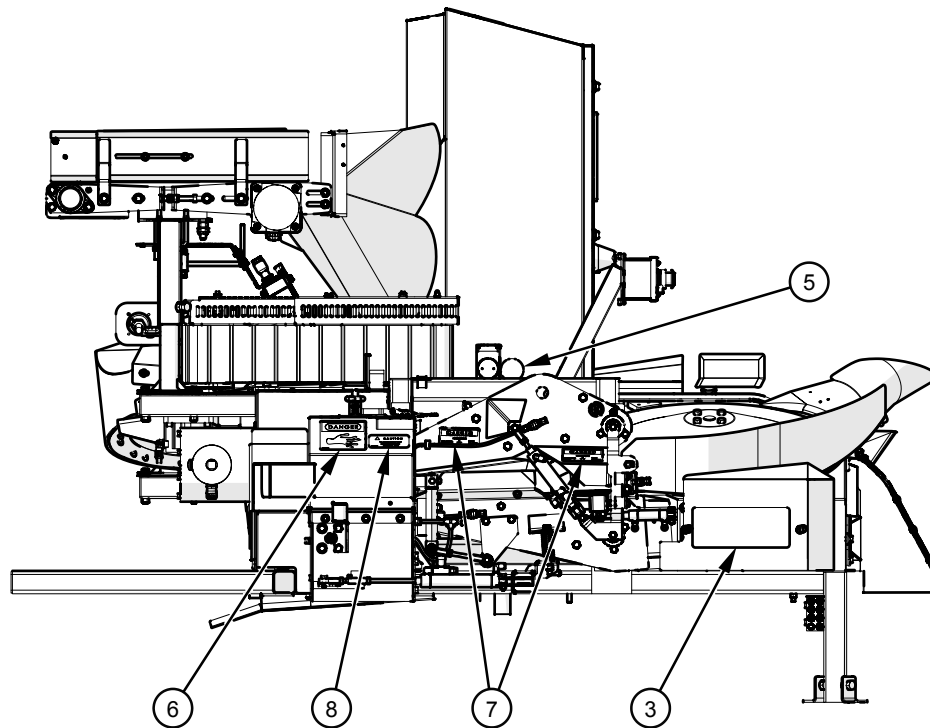
AY,LABELS EACC CE (4010000.8114.2)

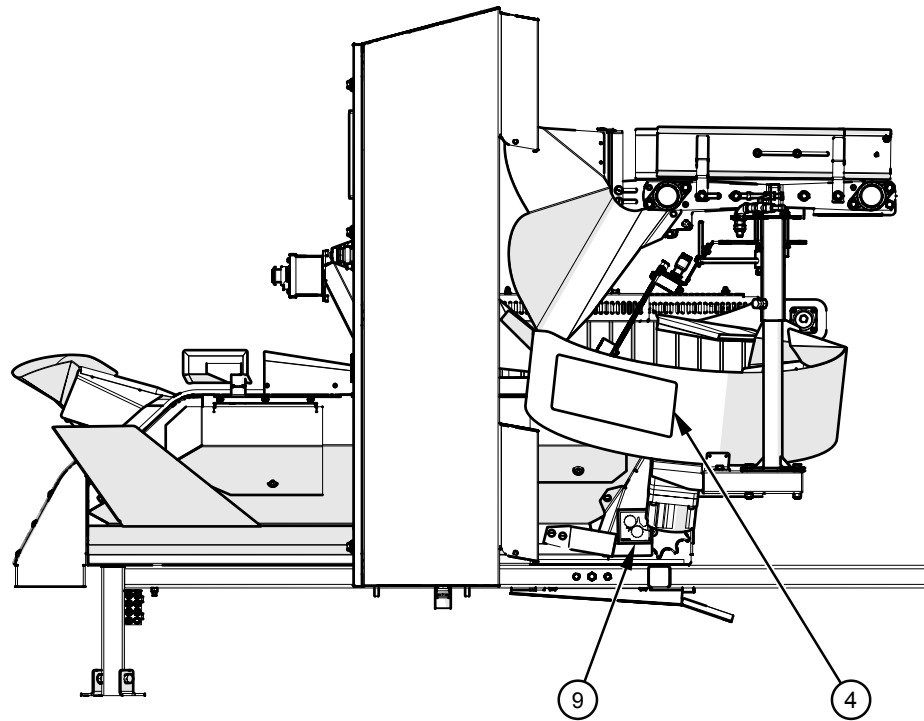




Item	Part Number	Description	Quantity
1	0009.0013	MAG/CCM NAMEPLATE,CE	1
2	224.006	RIVET,BLND 1/8 x 3/16-1/4 SS	4
3	7590.0500	LABEL,MAG/CCM-SMALL	1
4	7590.0502	LABEL,MAG/CCM-LARGE	1
5	7590.0603.003	LABEL,NO ABRASIVES GRAPHIC	2
6	7590.0614	LABEL,WARNING "CUT/SEVER" CE	1
7	7590.0616	LABEL "CAUTION ENTANGLEMENT"CE	1

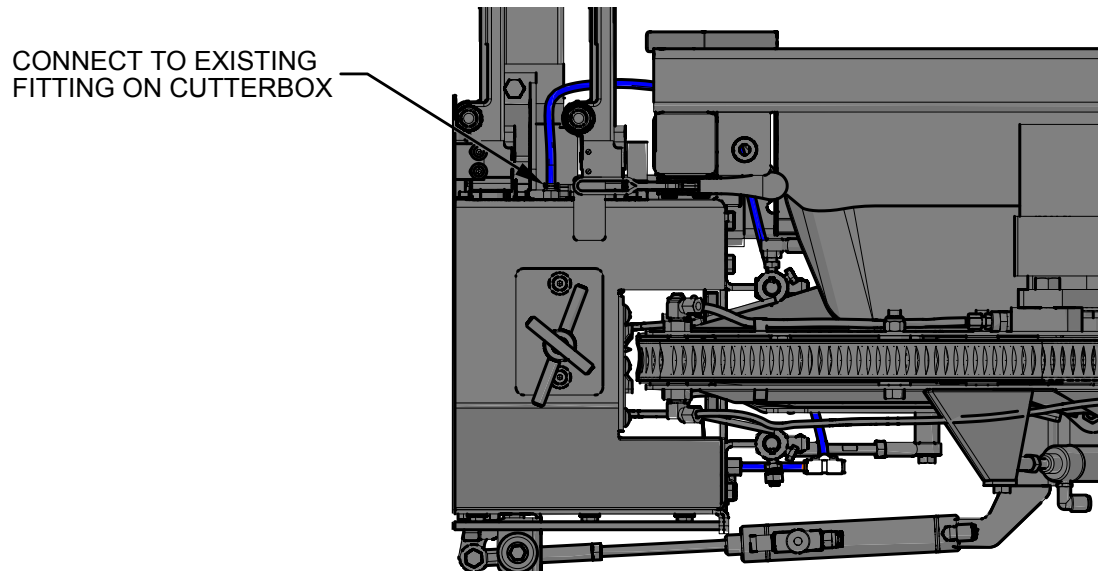
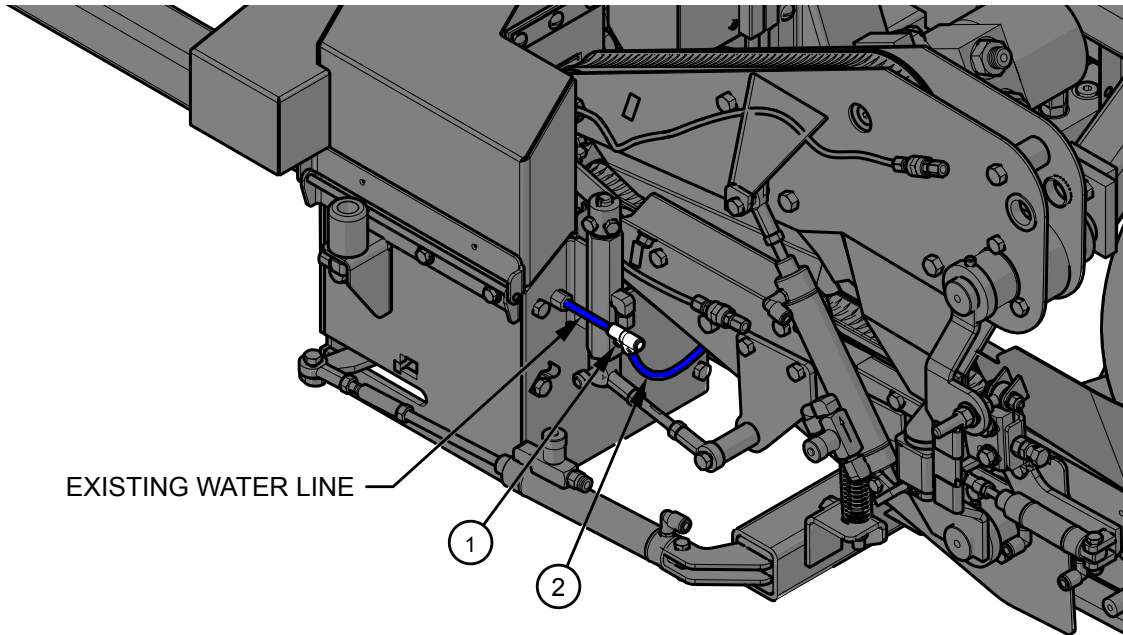
AY,LABELS EACC (4010000.8114.3)





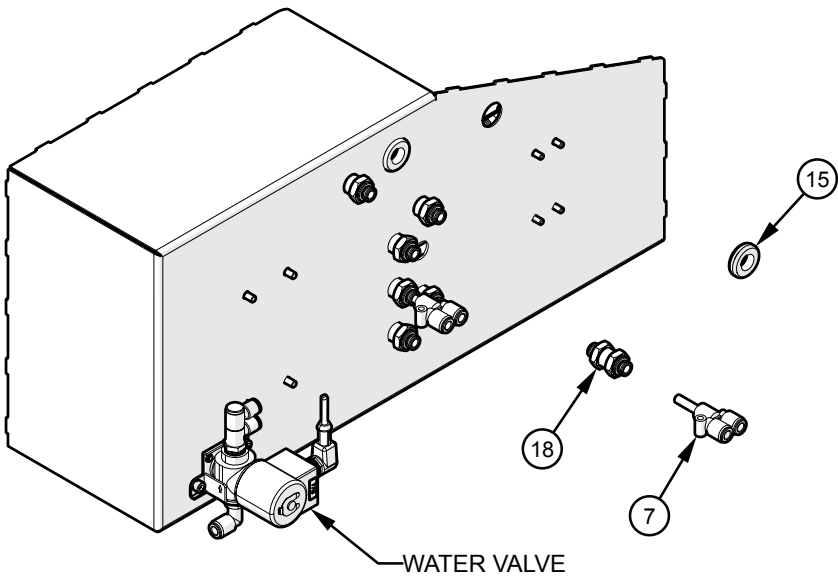
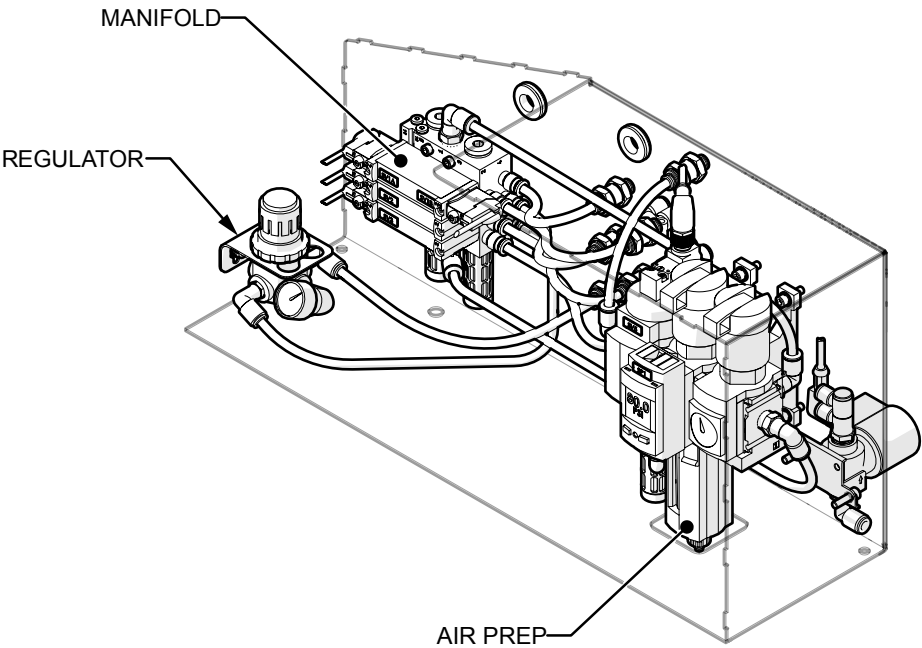
Item	Part Number	Description	Quantity
1	0009.0013	MAG/CCM NAMEPLATE,CE	1
2	224.006	RIVET,BLND 1/8 x 3/16-1/4 SS	4
3	7590.0500	LABEL,MAG/CCM-SMALL	1
4	7590.0502	LABEL,MAG/CCM-LARGE	1
5	7590.0603.003	LABEL,NO ABRASIVES GRAPHIC	2
6	7590.0605	LABEL,DANGER	1
7	7590.0608	LABEL,DANGER-PINCH POINT	2
8	7590.0609	LABEL,CAUTION CLEARING	1
9	7590.0616	LABEL "CAUTION ENTANGLEMENT"CE	1

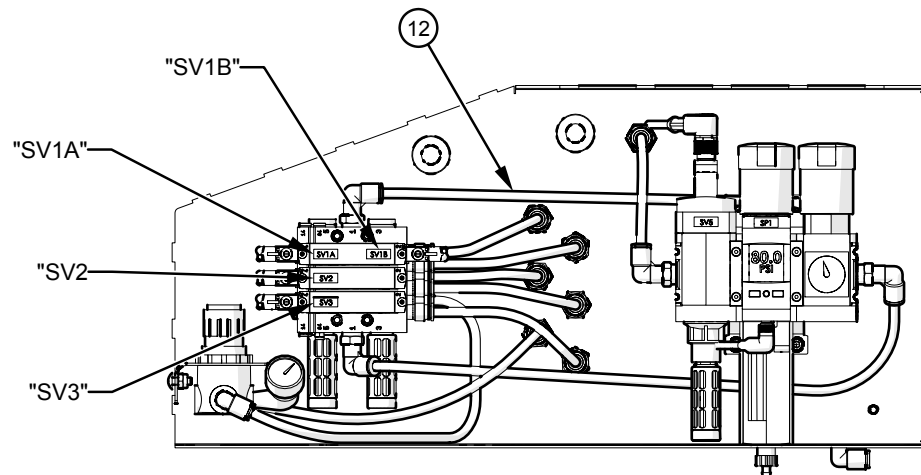
AY,H2O CUTTERHEAD LUBRICATION (4010000.8118)



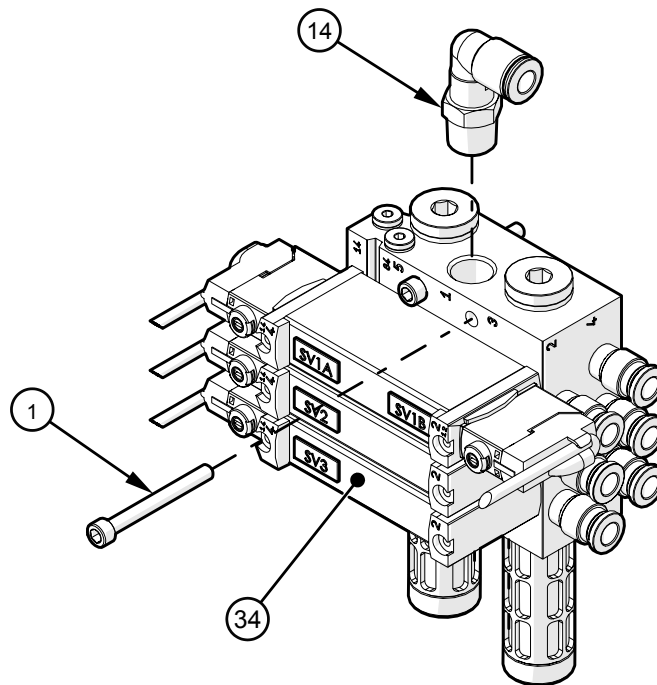
Item	Part Number	Description	Quantity
1	0007.1095	FTG,PAT 4TUQR x 4TUQR x 4TUQR	1
2	7570.1432	TUBE P4 BLUEPOLY GRADE4 120PSI	-

AY,UTILITY ELECTRIC (4010000.8119)

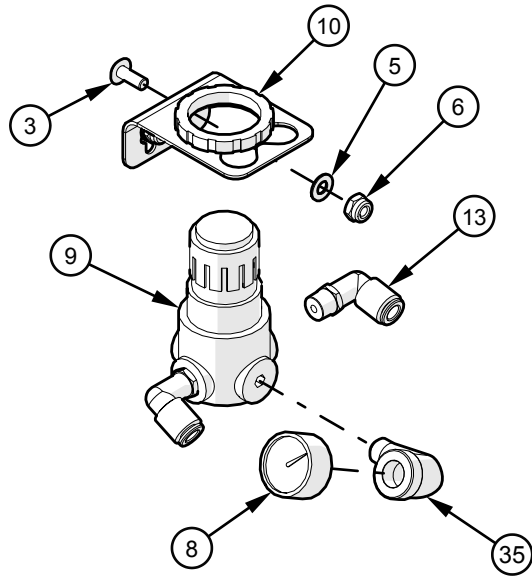




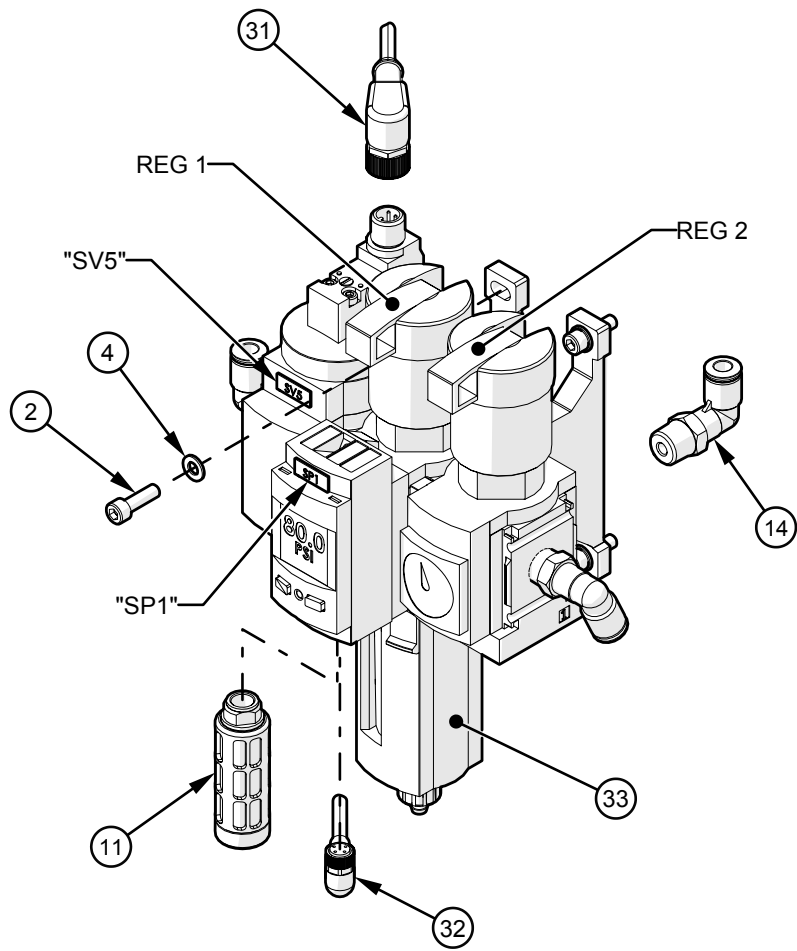
TUBE ROUTING DETAIL



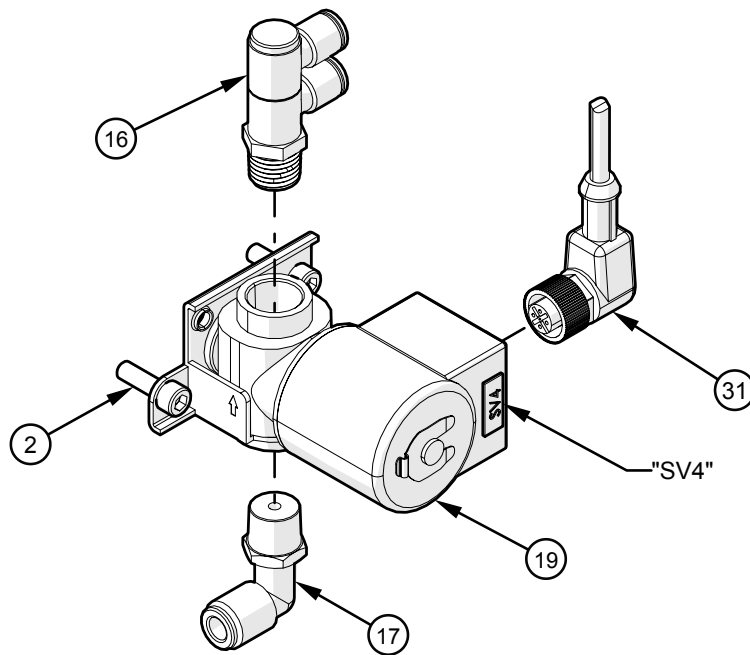
MANIFOLD



REGULATOR



AIR PREP

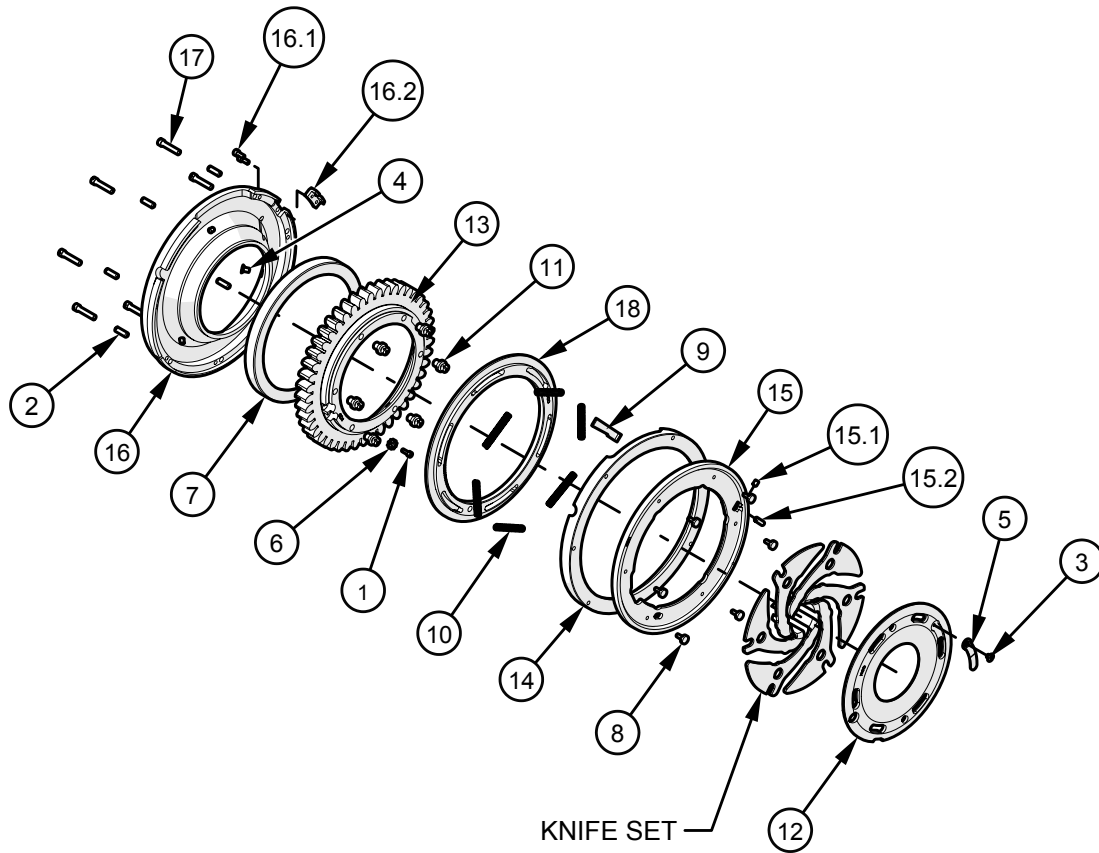


WATER VALVE

Item	Part Number	Description	Quantity
1	0001.1088.1	SCR,SCS 8-32 x 1-1/2 SS	4
2	0001.1100	SCR,SCS 10-32 x 5/8 SS	6
3	0001.3191.1	SCR,THMS 10-32 x 1/2 SS	2
4	0001.4259	WSHR,FLT .195 x .375 x .040 SS	4
5	0001.4290	WSHR,FLT .218 x .437 x .031 SS	2
6	0001.5710	NUT,HXSLFLKG 10-32 x 3/8 SS *	2
7	0007.2011.1	FTG,PAY 4MTU x 4TUQR(2) PLSTC	2
8	0007.4429	GAUGE,PRESS AIR 0-16OPSIG.75FC	1
9	0007.4438	REGULATOR, 1/8 NPT 125 PSI	1
10	0007.4438.1	MOUNT,AIR REGULATOR 1/8" NPT	1
11	0007.4674.002	MUFFLER,G1/4 PLSTC	1
12	0007.4901	RM,TUBE 1/4 .166 GRAY PU	-
13	0007.4902	FTG,PAEN 2MPT x 4TU	2
14	0007.6126	FTG,PAEN 4R x 4TUQR	5
15	0653.0009	GROMMET,1/2"ID x 1"OD BUNA	2
16	7571.2041	FTG,DBLPAEN 4TUQR x 4MPT	1
17	7571.2047	FTG,PAN 4TUBELOCK x 4MPT	1
18	7571.2123	FTG PAS 4TUBELOK(2) BLKHD	7
19	7574.2008	VALVE,WATER ON/OFF 24VDC	1

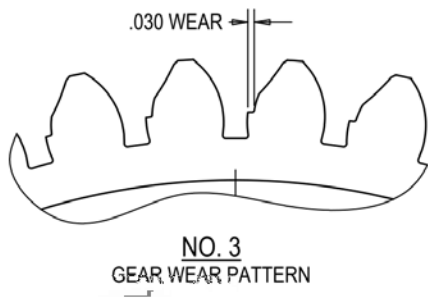
Item	Part Number	Description	Quantity
20	9501.9104.0	LABEL,#0 SLEEVE MARKER	3
21	9501.9104.1	LABEL,#1 SLEEVE MARKER	24
22	9501.9104.2	LABEL,#2 SLEEVE MARKER	1
23	9501.9104.3	LABEL,#3 SLEEVE MARKER	1
24	9501.9104.4	LABEL,#4 SLEEVE MARKER	3
25	9501.9104.5	LABEL,#5 SLEEVE MARKER	3
26	9501.9104.6	LABEL,#6 SLEEVE MARKER	3
27	9501.9104.7	LABEL,#7 SLEEVE MARKER	2
28	9501.9104.8	LABEL,#8 SLEEVE MARKER	3
29	9501.9104.9	LABEL,#9 SLEEVE MARKER	3
30	9501.9240	LABEL,COMPONENT GENERIC	1
31	9502.8242	CABLE,M12 90°-OPEN,2.5m	2
32	9502.8243	CABLE,M8 90°-OPEN,2.5m	1
33	4121035.0006	AIR PREP,EACC W/ DUMP VLV	1
34	4121036.0006	MANIFOLD,EACC	1
35	514.093	FTG,WAEN 2FPT x 2MPT SS	1

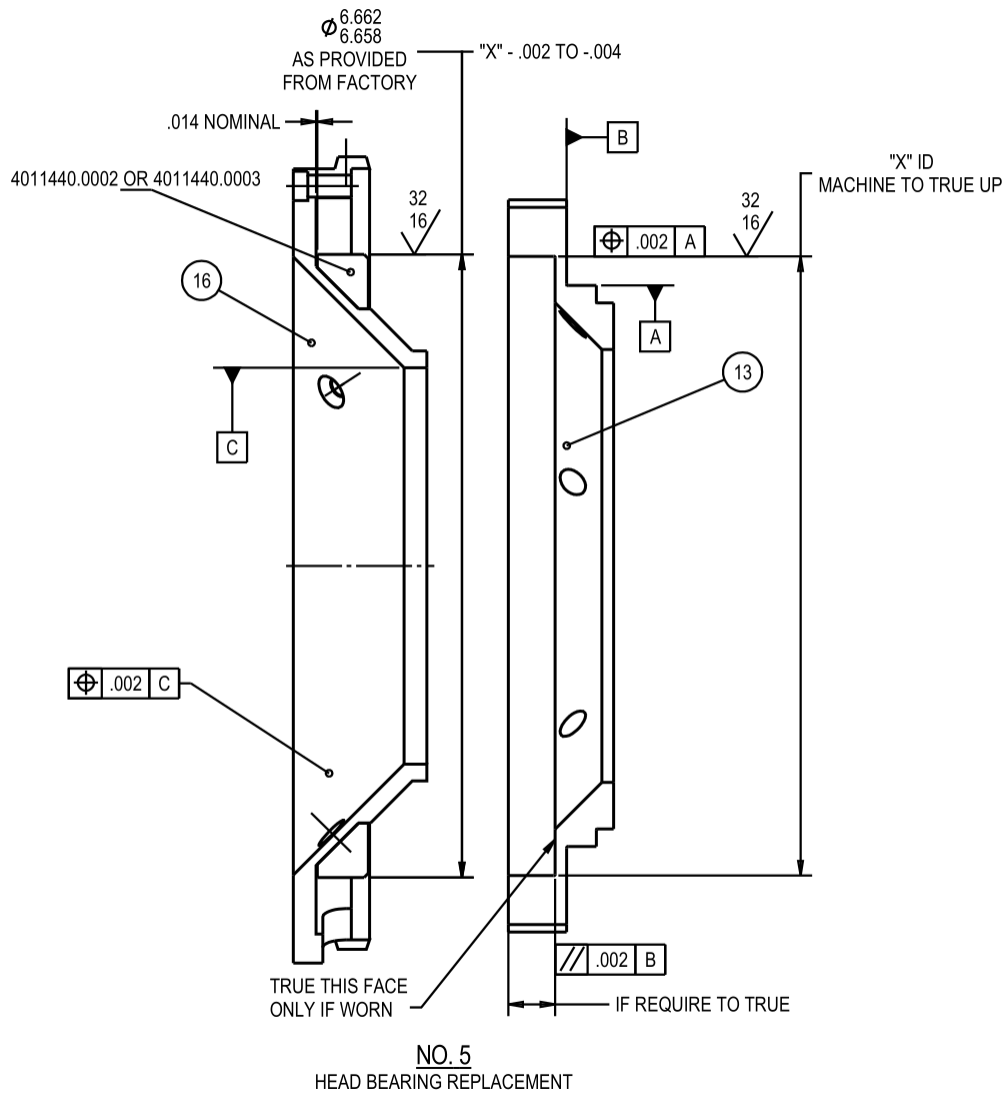
AY,CUTTER HEAD MOD 2 CCM (4010106.0006)



Item	Part Number	Description	Quantity1
1	0001.1086.8	SCR,SCS 6-32 x 3/8 SS	1
2	0001.2155	SCR,SSS 12-24 x 11/16 SS	7
3	0001.3650.5	SCR,FHMS 8-32 x 3/16 SS SLTD	1
4	0001.3765	SCR,FHMS 10-32 x 5/16 BRS	3
5	4011438.0001	LOCK,SPRING	1
6	4011439.0001	GEAR,TENSION RING	1
7	4011440.0001	BRG,HEAD	1
8	4011441.0001	STUD,EQUALIZING RING	6
9	4011442.0002	FINGER,ADJUSTING	1
10	4011443.0001	SPRG,CMPRSH	6
11	4011444.0001	STUD,KNIFE PIVOT	6
12	4011450.0001	PLT,KNIFE RETANG	1
13	4011482.0002	GEAR,CUTTER HEAD	1
14	4011502.0001	BRG,REAR HALF HEAD	1

Item	Part Number	Description	Quantity1
15	4011564.0003	RING,EQUALIZING	1
15.1	0001.2100.5	SCR,SSS 10-32 x 1/4 SS NYLTP	
15.2	0001.2140.5	SCR,SSS 10-32 x 5/8 SS	
16	4011565.0003	BRG,FRONT HALF HEAD 2 GROOVE	1
16.1	0001.1089.1	SCR,SCS 8-32 x 3/8 SS	
16.2	4011565.0101	REPAIR INSERT FOR BRG,FRONT*	
17	4011572	SCREW,MODEL 2 CTR HD	7
18	4011619.0001	RING,TENSION	1
19	4011378	BOX,CUTTER HEAD	1

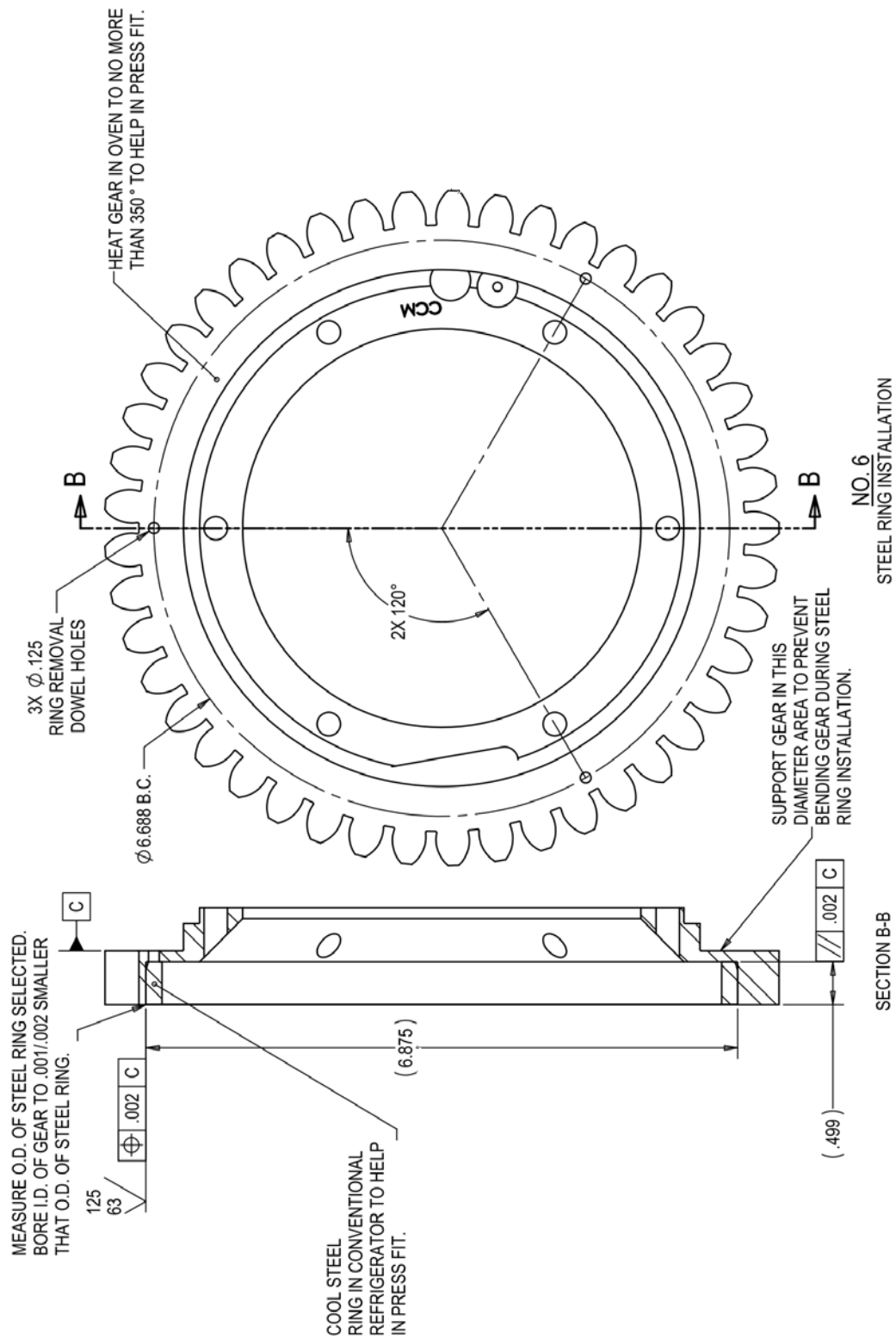




Steel Ring Selection Chart

Order of Rebuild	Part Number	I.D.
1	4011504.0001	6.627"
2	4011522.0001	6.612"
3	4011452.0001	6.595"
4	4011503.0001	6.500"*

* Most often used installation in the order of rebuild will maximize life of Item 7.1



Cutter Head Rebuilding

The rebuilding of the cutter heads is done with instructions to reuse as many of the old parts as possible. Clean old parts. Remove burrs and dings. The following guidelines should help define wear limits and parts replacement on future rebuilds of Model 2 Cutter Heads.

1. Replace all knife pivot studs (Item 11). If the equalizing ring studs (Item 8) are worn, replace them; if loose, replace the equalizing ring (Item 15) and the studs. Do not attempt to resize stud holes or use Loctite to correct loose studs. Replace all compression springs (Item 10) and all hardware. Use blue Loctite on Item 11 (#242). Use green Loctite on Item 8 (#680). Remove excess Loctite.
2. Wear from the knives on the knife retaining plate (Item 12) appears as a star-shaped pattern around the I.D. If this wear area is bigger than 3/4 inch square, replace Item 12. If the six slots show more than .010" wear from Item 11, replace Item 12. Excessive clearance will affect yield.
3. Wear on the cutter headgear (Item 13) will appear on the driven gear face. If this wear exceeds .030", replace the gear. Remove burrs, etc., from gears that do not show .030" of wear (see No. 3 Gear Wear Pattern).
4. A location pin on the cutter box saddle (not shown) is used to clock the cutter head to the cutter head drive gear at the back of the cutter box. If this pin in the cutter box saddle is worn or the replaceable groove (Item 16.2) in the front half head bearing (Item 16) is worn, the entire cutter head can rotate in the cutter box allowing the drive gear to wear into the front and rear half head bearing (Items 14 and 16). If this wear extends to the screw holes on either side of the gear opening, replace Items 14 and 16. This wear can be avoided by maintaining the pin and replaceable groove (see No. 6 below).
5. Replace the head bearing (Item 7) with an oversized head bearing (4011440.0002 or 4011440.0003). See No. 5 Head Bearing Replacement for machining detail to fit new head bearing to cutter headgear (Item 13).
6. If the cutter headgear (Item 13) has been rebuilt in the past to the point the I.D. is too big to obtain the proper bearing clearance, a hardened steel ring may be installed to squeeze a little more life out of the gear if the gear wear is noted in No. 3 Gear Wear Pattern has not been exceeded. See No. 6 Steel Ring Installation for parts and procedure. Once installed, follow machining instructions noted on No. 5 Head Bearing Replacement.
7. Check the width of the location groove in Item 16 (or groove in insert Item 16.2). If the groove is wider than 5/16" either replace the insert or modify the front half head bearing as shown on No. 5 Head Bearing Replacement to accept a new cutter head insert.
8. The tension ring gear (Item 6) will, over time, wear the face of the cutter headgear (Item 13). If the edge of Item 6 develops burrs, replace it. To adjust the tension ring (Item 18), install a complete set of knives (4011493.0003, 4011493.0005, or 4011493.0005.1), as shown. Using a head tensioning wrench (Part No. 4011588.0001) rotate the tension ring (Item 18) to align the 1/4 x 1/2 slot in the equalizing ring (Item 15) with the 1/4 hole in the tension ring (Item 18). The 1/4 hole in the tension ring should align with the left end of the slot in the equalizing ring. Tightened the screw (Item 1) to lock the tension ring gear (Item 6). This process preloads the compression springs (Item 10).
9. The adjusting finger (Item 9) is used to set the minimum cob diameter. Insert a 1-1/8" plug inside the knife blades. Loosen the short set screw (Item 15.1) to unlock the adjusting finger set screw (Item 15.2). Turn the adjusting finger set screw (Item 15.2) in and out until all knife blades touch and hold the plug in place. Snug both screws to hold the adjusting finger in place.
10. Lubricate the cutter head with food-grade oil (mineral oil) before assembly. Install a set of knives to assure they move freely. Test run the cutter head assembly (**without knives**) to assure all parts rotate freely and do not overheat. If the cutter head assembly does not rotate freely or does overheat, disassemble, check all mating surfaces and rework as required to obtain a proper fit.

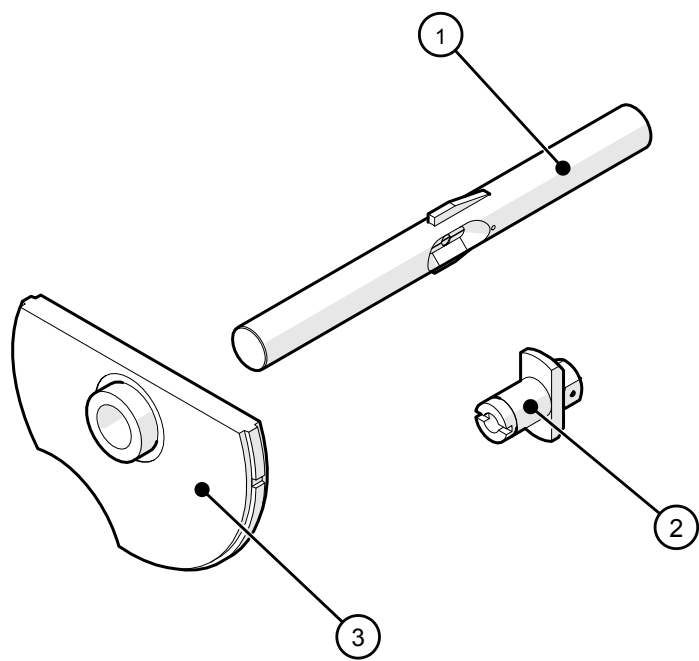
11. Bearing clearance adjustment: before installing Items 12 and 15 or the knives, install and snug Items 14 and 17. This should "lock the gear" (Item 13) so that it will not rotate. Loosen Items 17 one half turn and tighten Items 2 to take up the clearance created by Items 17 being loosened. Turn the gear (Item 13). The gear should turn freely, if not loosen Items 17 one quarter turn and retighten Items 2 to take up the slack. Lay the assembly flat on a table, with Item 14 up. Place a flat head screwdriver under the head of Item 11 and gently pry up on the screw to check for slack. Mark the screws with slack and adjust Items 2 and 17 at these locations until there is no slack and the gear rotates freely.

Notes:

1. Follow the directions noted in No. 10 above.
2. Use Loctite 242 (Blue) on Item 11. Use Loctite 271 (Red) on Item 16.1. Use Loctite 609 (green) on Item 8. Remove excess Loctite. Apply food grade anti-seize to Items 2 and Item 17.
3. Part Number 4011440.0002 and 4011440.0003 are oversized versions of Item 7 used to rebuild the cutter head assembly. See No. 5 above.
4. Knife set selection list:
 - a. 4011493.0003
 - b. 4011493.0005
 - c. 4011493.0005.1

TOOL,ALIGNMENT (4011662)

Item	Part Number	Description	Quantity
1	4011573	TOOL,CUTTER GAUGE	1
2	4011582	ALIGNMENT DISC AY	1
3	4011578	GAUGE AY,COB ROLL	1



Warranty

STANDARD TERMS AND CONDITIONS OF SALE OF MAGNUSON CCM CORPORATION

The provisions hereof, all drawings, specifications, descriptions, and other documents attached hereto and these Standard Terms and Conditions of Sale constitute the entire contract between Magnuson CCM and Buyer and supersede all prior quotations, purchase orders, correspondence and other communications whether written or oral, between Magnuson CCM and Buyer. No quotation, order or acknowledgment, and no provision of Magnuson CCM's Standard Terms and Conditions of Sale shall be subject to change in any respect, except by a writing signed by an authorized representative of Magnuson CCM at its main office at Centennial, Colorado. The failure of Magnuson CCM to object to any provision in conflict herein, whether contained on Buyer's purchase order or otherwise, shall not be construed as a waiver of the provisions hereof nor as an acceptance thereof. No statement, representation or warranty not contained herein shall be binding on Magnuson CCM, unless made in writing by an official of Magnuson CCM. Failure to object to the provisions of this acknowledgment or our Standard Terms and Conditions of Sale within 15 days from the date of this acknowledgment shall constitute an acceptance thereof, and Magnuson CCM will process your order at once.

ORDERS

1. All orders are received subject to acceptance and may be accepted only on Magnuson CCM's printed acknowledgment form. Typographical and clerical errors in quotations, orders and acknowledgments are subject to correction. At seller's option, acknowledgment may be declared void with no force absent the simultaneous execution of security agreements of paragraph 6.

QUOTATIONS AND PUBLISHED PRICES

2. Until acceptance, all written quotations are subject to change upon written notice to Buyer and are void after 30 days, unless a shorter or longer period is expressly specified. The prices shown on any published price lists and other published literature issued by Magnuson CCM are offers to sell and are subject to confirmation by specific quotation and acknowledgment. All published prices and discounts are subject to change without notice.

"MACHINERY" DEFINED

3. Buyer agrees to pay in United States funds to Magnuson CCM the amount designated on the reverse hereof as the purchase price of the described machinery. The price of such described machinery does not include conveyors, tables, tubing, or other equipment or supplies, including, without limiting the generality of the foregoing, films and product used in the initial operation and required in the operation of the machine.

TAXES

4. Magnuson CCM's prices do not include any applicable sales, use, excise or similar taxes and, except in states requiring by applicable law that Magnuson CCM collect and pay any such tax, the Buyer shall pay all such applicable taxes; provided, however, that if in connection with the sale Magnuson CCM is required by applicable laws of any state to collect and pay any such tax, then the amount of any such tax shall be added to the price and Buyer shall remit the price and such tax to Magnuson CCM.

TERMS

5. The terms of sale shown on the face hereof shall apply from the date of shipment by Magnuson CCM, if Magnuson CCM, in its judgment at any time deems that, by reason of Buyer's financial condition

or otherwise, the continuance of production or shipment on the terms specified herein is not justified. Magnuson CCM may require full or partial payment in advance. Payments on account received beyond the stated terms of sale will be subject to an interest charge of 1.5% per month on the unpaid balance.

SECURITY AGREEMENT

6. As a condition precedent to Seller's obligation to ship the equipment to Buyer, and unless otherwise agreed, Buyer shall execute a security agreement and financing statement in form and substance satisfactory to Seller, which shall provide for and secure to Seller the payment of the full purchase price for the equipment sold hereunder.

SPECIAL PACKING

7. The Buyer will be charged for export packing or other special packing required, the cost of which will be quoted upon request.

DELIVERY

8. All shipping dates are approximate and are based on prompt receipt of all necessary information regarding the order. Magnuson CCM will use its best efforts to meet the scheduled delivery date shown on the face hereof, if Buyer supplies all necessary information and data promptly, but is not responsible for failure to do so for causes beyond its reasonable control.

DELAYS OR NON-PERFORMANCE

9. Anything herein to the contrary notwithstanding, Magnuson CCM shall not be liable for any delays or failure in the performance of any of its obligations hereunder when such delay or failure is caused by fire, flood, drought, storm, accident, act of God, war, strike, lockout, labor difficulties, riots, sabotage, interference by civil or military authorities, oil or fuel shortages, embargo, inability to obtain suitable or sufficient labor, machinery, supplies or materials, as and when required, transportation difficulties, orders or directions by any public authority or any other cause beyond its reasonable control whether of a similar or different nature.

POINT OF SHIPMENT, SHIPPING COSTS, AND PASSAGE OF TITLE

10. All new and repaired apparatus will be shipped F.O.B. Magnuson CCM's plant, Pueblo, Colorado, unless some other point of shipment is expressly agreed to in writing by Magnuson CCM. Passage of title shall occur upon Magnuson CCM's delivery to Buyer's carrier at such designated point of shipment. If Buyer desires to procure insurance to cover its risk at loss, it shall do so at its expense.

CHANGES IN ORDER BEFORE COMPLETION

11. The Buyer may from time to time (but only with Magnuson CCM's written consent) make any change in the apparatus covered by any order, in which event, Buyer shall pay to Magnuson CCM the reasonable costs and other expenses (including engineering expenses and all commitments to its suppliers and subcontractors) incurred by Magnuson CCM prior to receipt of notice of such change for all work rendered unnecessary by such change or incurred by Magnuson CCM thereafter for all work required to effect such change, plus in either case an amount determined by Magnuson CCM in its discretion by applying to the amount of such costs and other expenses Magnuson CCM's usual rate of profit for similar work. Also, in the event of any such change, Magnuson CCM shall be entitled to revise its price and delivery schedules to reflect such change.

CANCELLATION

12. All undelivered parts of any order may be canceled by the Buyer at any time but only with Magnuson CCM's written approval. In the event the Buyer makes an assignment for the benefit of creditors, if a

voluntary or involuntary petition or other action in bankruptcy or for reorganization or under any other insolvency law shall be filed by or against the Buyer, if the Buyer shall admit its inability to pay its debts, if a trustee, receiver or liquidator is appointed for any part of the assets of the Buyer, or if the Buyer fails to make payments to Magnuson CCM in accordance with the terms hereof, Magnuson CCM may at its option, cancel all undelivered parts of any order by written notice to Buyer. In the event of any cancellation of this order, Buyer shall pay to Magnuson CCM the reasonable costs and expenses (including engineering expenses and all commitments to its suppliers and subcontractors) incurred by Magnuson CCM prior to receipt of notice of such cancellation plus an amount determined by Magnuson CCM in its discretion, by applying to the amount of such costs and expenses Magnuson CCM's usual rate of profit for similar work.

WARRANTY

13. Magnuson CCM warrants the machine and parts furnished by Buyer (but not supplies procured or used by Buyer of Buyer's ultimate product) against defects in material and workmanship under normal use and with proper servicing adjustment and maintenance, for a period of ninety (90) days after date of installation, subject to the following limitations:

First: As to parts manufactured or processed by Magnuson CCM, Magnuson CCM's obligation hereunder is limited to furnishing or repairing without charge F.O.B. its Pueblo plant, any such part proven defective within such warranty period, provided Buyer shall have given Magnuson CCM immediate written notice upon discovery of such defect. At Magnuson CCM's request, Buyer shall return the defective part or parts, transportation costs collect. Buyer is responsible for all costs for the installation of any replacement parts.

Second: Magnuson CCM makes no warranty whatever as to parts purchased by Magnuson CCM but transfers, to the extent transferable, the original manufacturer's warranty, if any, to Buyer. It is Buyer's responsibility to enforce the manufacturer's warranty.

Third: THERE IS NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND NO FURTHER WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, IN CONNECTION WITH THE DESIGN, SALE OR USE OF ANY OF Magnuson CCM's PRODUCTS EXCEPT AS TO TITLE; and Magnuson CCM's liability on its warranty shall in no event exceed the costs of correcting defects in the machinery and/or part(s) sold.

INSTALLATION

14. Magnuson CCM shall supervise Buyer's personnel in the proper installation of machinery, at the rate per hour designated on the reverse hereof, plus travel expense for an eight-hour working day. During this visit and in conjunction with installation, Magnuson CCM shall train Buyer's qualified operator in the machinery. Buyer agrees to have its qualified operator available for such instruction. If installation or training time in excess of one eight-hour day is requested by Buyer, Buyer shall pay Magnuson CCM therefore at Magnuson CCM's normal service rates then in effect plus expenses.

TRAINING PROGRAM

15. Magnuson CCM agrees to offer a training program to the qualified personnel, in the installation, care, maintenance and operation of the machine. Buyer agrees that its qualified personnel will be made available for such instruction. Buyer is responsible to provide personnel capable of taking full advantage of Magnuson CCM's training program. Buyer shall pay the salary, transportation and living expenses of Magnuson CCM's representative during the training program.

SERVICE

16. After installation and completion of the training program, Magnuson CCM shall have no obligation to service such machine unless Buyer, in writing, requests it to do so and agrees to pay Magnuson CCM

at a specified per diem rate for labor of its employees and all other sums necessary to fully reimburse Magnuson CCM for such servicing (including the reasonable travel and living expenses of its required employees). Magnuson CCM as soon as practical after receipt of such request and commitment from Buyer, shall cause its employees or agents to undertake the requested servicing.

PATENT INDEMNITY

17. Magnuson CCM agrees to its own expenses to defend any suit or proceeding brought against Buyer insofar as such suit or proceeding is based on a claim that said machine, or any part thereof, hereby sold to Buyer, infringes any Letters Patent of the United States or Canada in force at the date hereof and to indemnify and hold harmless Buyer from all damages and costs based on such infringement awarded against Buyer by the judgment or decree of the court in such suit or proceeding excluding, however, any part of such damages or costs so awarded which is based on profits arising from the use of such machine, or from products resulting from the use thereof provided, however, that the foregoing obligations of Magnuson CCM are subject to the condition that Buyer shall give Magnuson CCM timely notice in writing of the institution of such suit or proceeding, shall permit Magnuson CCM through its counsel to defend the same in Buyer's name and shall give Magnuson CCM all needed authority and reasonable aid at the expense of Magnuson CCM to enable Magnuson CCM to do so.

RELEASE AND INDEMNITY BY BUYER

18. Magnuson CCM shall not be liable to Buyer, its agents or employees, or to anyone else, for loss, damage or injury to persons (including death) or to product or to property caused by or arising out of the installation, condition, maintenance, operation, use or non-use of said machines, or the methods or processes employed thereby, nor for damages of any kind sustained or alleged to have been sustained by Buyer as the result of such installation, condition, maintenance, operation, use or non-use; and the Buyer agrees to, and shall exonerate, indemnify and save harmless Magnuson CCM from and against any and all liability, damage, loss, cost or expense of every kind whatsoever which may accrue to or be sustained by or asserted against Magnuson CCM on account of any such loss, damage or injury, or on account of liens, attachments or claims levied upon or assessed against said machines in any action brought or claim made against Buyer or anyone claiming through Buyer. Buyer shall defend, and shall pay all costs and attorneys' fees incurred in, and all judgments resulting from any such action.

CONSTRUCTION

19. All quotations made and all orders accepted by Magnuson CCM are subject to the laws of the State of Colorado and the right and duties of all persons and construction and effect of all provisions hereof shall be governed by and construed according to the laws of that state. The contract shall not be modified, supplemented, qualified or interpreted by any other usage of trade or customs not made a part of the contract by its express terms. The captions herein are for convenience only and shall not be considered in the construction of the provisions of this contract.

ARBITRATION

20. A. Any and all disputes under this Agreement shall be determined by good faith negotiation between the parties of their personal representatives. If the parties are unable to resolve their dispute within five (5) days after commencement of negotiations, either party may terminate the negotiations and require that the dispute be settled in Pueblo, Colorado.

B. To commence arbitration under this Agreement, the party initiating arbitration shall deliver written notice to the other party, naming an arbitrator. The other party shall have the right to name an additional arbitrator by serving notice on the first party within five (5) days of the original notice. In the event that a second arbitrator is not so appointed, the arbitrator first selected shall proceed as the sole arbitrator; if an additional arbitrator is selected, the two arbitrators so named shall select a third arbitrator. The

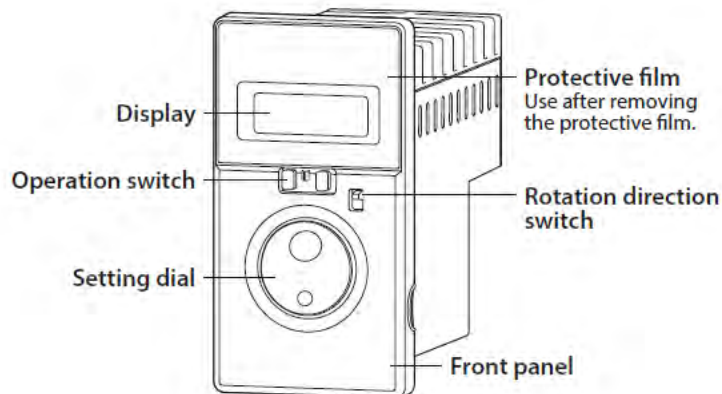
arbitrator or arbitrators so named shall proceed in accordance with the Rules of the American Arbitration Association in effect on the date of the dispute, and the parties agree that a judgment may be entered in any court of competent jurisdiction based on a decision of the arbitrator or arbitrators. The determination of the arbitrators shall be final and binding on the parties.

ATTORNEY'S FEES

21. In the event of the commencement of any proceeding to compel performance of this contract or for damages, whether by suit for its breach, the prevailing party shall be entitled to reasonable attorney's fees and costs fixed by the court.

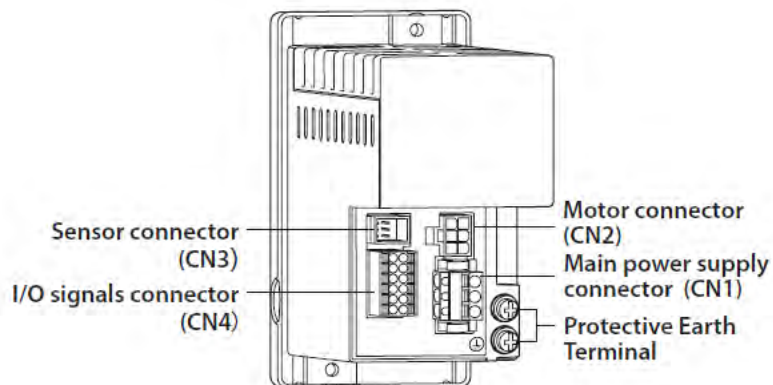
Appendix

Drive BMU Series



Front side: When the front panel is attached

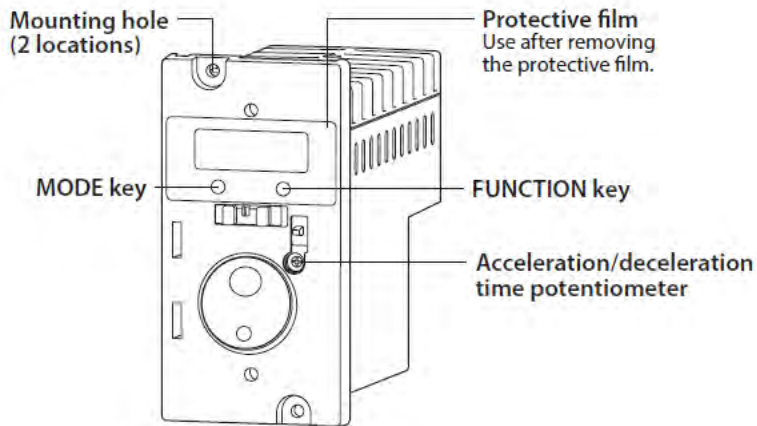
Display	This display shows the monitor item, alarms, etc.
Operation switch	Setting the operation switch to the "RUN" side causes the motor to start running. Setting the operation switch to the "STAND-BY" side causes the motor to stop.
Setting dial	This setting dial is used to change the rotation speed or parameters. After changing, the new value is determined by pressing the setting dial.
Rotation direction switch	This switch is used to change the motor rotation direction.



Rear side

Sensor connector (CN3)	Connects the sensor connector (black) of the motor cable or the connection cable.
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I/O signals connector (CN4)	Connects the I/O signals.
Motor connector (CN2)	Connects the power connector (white) of the motor cable or the connection cable.
Main power supply connector (CN1)	Connects the main power supply.
Protective Earth Terminal	Connects the ground terminal of the connection cable and the grounding wire. Be sure to ground the driver using either of the Protective Earth Terminals.



Front side: When the front panel is removed

MODE key	This key is used to change the operation mode.
FUNCTION key	This key is used to change the display of the operation mode or the function.
Acceleration/ deceleration time potentiometer	This potentiometer is used to set the acceleration/deceleration time.
Mounting hole (2 locations)	Installs the driver with screws (M4 or No.8-32UNC).

Operating

After turning on the power, operate the product as follows.

- To start running the motor:** Setting the operation switch to the RUN side causes the motor to start rotating.
- To adjust the motor rotation speed:** When turning the setting dial to the right slowly, the rotation speed accelerates by 1 r/min increments. When turning the setting dial to the left slowly, the rotation speed decelerates by 1 r/min increments. When turning the setting dial quickly, the amount of the rotation speed change increases.
- To determine the setting of the motor rotation speed:**
When the display is blinking, the rotation speed has not set yet. Determine it by pressing the setting dial.
Set: When pressing the setting dial, the rotation speed is determined.
Confirmation: If the setting dial is pressed while the motor stops, the set speed is displayed blinking (several times).
- To decelerate and stop the motor:** Setting the operation switch to the STAND-BY side causes the motor to decelerate to a stop.

Setting the operation switch again to the RUN side causes the motor to start rotating at the set rotation speed.

Changing the rotation direction:

Change the rotation direction of the motor and gearhead using the rotation direction switch. The rotation direction can be changed while operating. In the case of the gearhead output shaft, the rotation direction varies depending on the gear ratio of the gearhead. Check the operating manual of the motor for the rotation direction of the gearhead output shaft.



NOTE

For additional information, visit <http://www.orientalmotor.com> for full technical specification and user manual.

Notes

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