



EyeConic Seed Corn Sorter Manual

Installation, Operation, and Maintenance

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Section 1: About this Manual

In this manual, you will find all the information you need to install, start up, and operate your Magnuson CCM EyeConic Seed Corn Sorter. This manual includes engineering drawings and lists for part numbers for each assembly. You will also learn about:

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

Read this manual carefully and keep it to get the most out of the EyeConic.



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 \(page 8\)](#) chapter of this manual before you attempt to operate or maintain the EyeConic. Failure to do so may result in personal injury.

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/>.

Intended Use

The EyeConic is a high-speed optical sorter designed to follow a husker in an industrial seed corn production environment.

Machine Features

- Engineered to be a drop-in replacement for existing optical sorters
- High-resolution digital cameras capture images of entire ears of corn
- Advanced texture-sorting algorithm identifies husk regardless of the color of the kernels or cobs
- 3-way sorting allows sorting of rogue ears
- Self-adjusting cushioned air cylinders result in smooth, quiet operation with reduced maintenance
- Easy to use touch screen interface shows process data in real time.
- 3"-wide lanes and integral conveyor belt guides prevent incorrect sorting or jams
- Optional communications package allows existing plant SCADA system to acquire data

Contacting Magnuson CCM

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 questions
- To get help with troubleshooting
- To report missing or damaged parts
- To order 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 & Support

Magnuson CCM sells the EyeConic Seed Corn Sorter machine. As 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 \(page 8\)](#) chapter of this manual before you attempt to operate or maintain the EyeConic. Failure to do so may result in personal injury.

Training

The service representative can assist in training operators and plant personnel who work on the EyeConic equipment.

Shift Mechanic

The shift mechanic performs maintenance and repair of the EyeConic that may include:

- Providing troubleshooting and required repairs, maintenance, or adjustments
- Refurbishing parts
- 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 EyeConic should be conducted only by trained mechanics or a Magnuson CCM Service Representative.

**WARNING**

Read and understand the [Safety Guidelines \(page 8\)](#) chapter of this manual before you attempt to operate or maintain the EyeConic. Failure to do so may result in personal injury.

Shift Operator

The shift operator must be trained to monitor operations of the EyeConic 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:

- Familiarity of navigating the HMI (navigate pages, power on/off)
- Correct and reset Error notifications
- Make minor/necessary adjustments to the pre-set parameters for evaluating corn
- Make focusing adjustments on cameras (if necessary)
- Monitor flippers to assure in working order and operating correctly



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.**

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 other include:

- Any electrical repairs or adjustments
- Computer malfunction

The shift operator also supports the sanitation and lubrication crews by ensuring proper start-up and shut-down status during their operations.

Section 2: 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**

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. Refer to the [Contacting Magnuson CCM \(page 5\)](#) chapter.

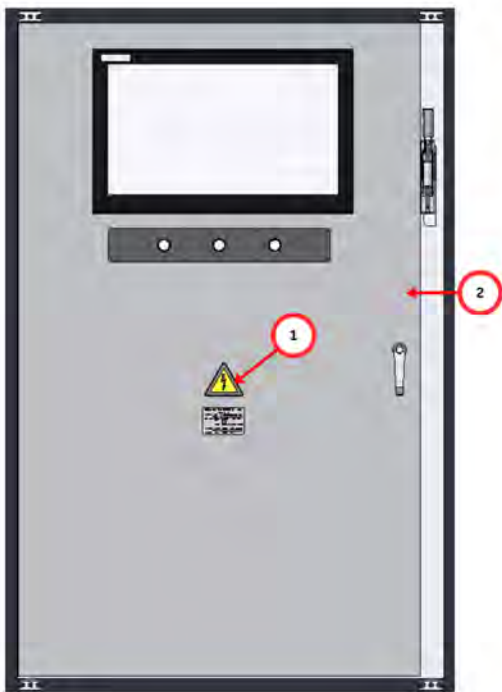
Warning Labels

The Magnuson CCM EyeConic has one warning label located on the front cover of the electrical enclosure [4150000.8005.3].

Figure 1.



Figure 2.

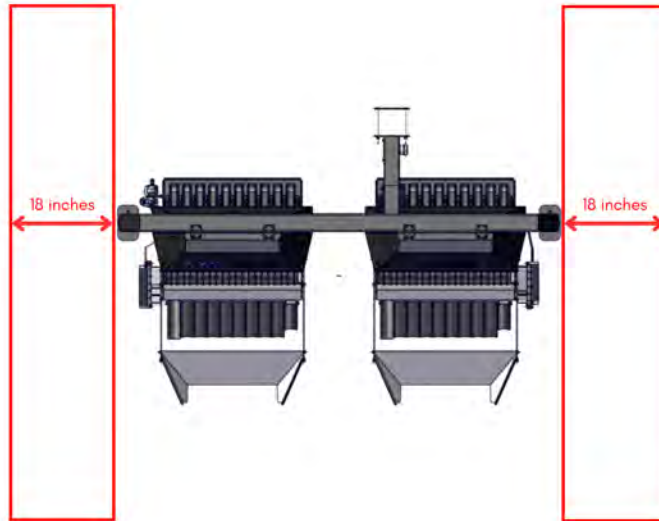


Item	Part Number	Description
1	9501.3132.2	LABEL,WARNING ELECTRICAL 3.9"
2	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P

Work Zone Clearances

It is required to stand approximately 18 inches on each side of the EyeConic. Access to the front and back of the machine will be limited to machine operators.

Figure 3.



Safety Information

This safety section of the operations manual contains information about potential hazards encountered when operating the EyeConic and provides measures to reduce such hazards. Understanding this information is important for personnel who work with the EyeConic:

- Trainers
- Supervisors
- Operators
- Mechanics
- Sanitation
- Lubrication crews

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.

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.

Hazards

As with all operations using moving parts and electrical supplies potential hazards exist when operating the EyeConic. 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 EyeConic 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 Zone Clearances \(page 13\)](#) and [Facility Requirements](#) sections of this manual. If you cannot install the machine using the recommended layout, it is your responsibility to install additional guards and warnings and provide personal protection as required by local codes and regulations. If you need more information regarding safe operation or maintenance of the EyeConic, see your service manual or contact Magnuson CCM Corporation or your authorized distributor.

Electrical Hazard

The EyeConic runs off of 24 volts DC. The EyeConic camera runs off of 48 volts DC. High voltage potential exists within the EyeConic. The main electrical enclosure of the machine is designed per customer base. Setting the voltage of the purchased machine can be adjusted per customers preferences. Areas marked with a lightning bolt symbol house electrical wiring of 110 to 600 volts AC, or other voltages as specified by the customer.



WARNING

All electrical repairs on the EyeConic equipment should be performed by trained personnel who qualify under local, state, and federal or international regulations.

Pinch Hazard

Pinch hazards exist in areas where moving components, such as rollers, belts, chains, and rotating assemblies, interact with fixed surfaces. These areas can catch, draw in, or compress fingers, hands, or clothing, resulting in serious personal injury.

Potential Consequences

Pinch hazards can lead to injuries such as:

- Crushing injuries to fingers or hands
- Amputation in severe cases

Preventive Measures

To prevent potential risk of hard, measure to take are as follows:

- Keep hands and body clear of all moving parts during operation.
- Never reach into the machine while it is running.
- Shut down all power sources before performing maintenance, cleaning, or adjustments.
- Do not bypass safety devices.
- Wear properly fitted clothing and avoid loose garments, jewelry, or long hair that could be caught in moving parts.

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.
- NEVER attempt to clear blockages, repair or adjust parts, or remove material while the machine is running.
- 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.



WARNING

The EyeConic machine is ran off of compressed air. It is imperative that before any service is performed to turn off compressed/de-energized air.

Protective Gear

Magnuson CCM strongly advises the use of protective eyewear, such as safety glasses or goggles, while operating the EyeConic.



WARNING

Magnuson CCM cannot be held liable for any misuse or injury resulting from unauthorized use or misuse of this equipment.

Recommended Safety Procedures

Recommended safety procedures when operating the EyeConic are listed as such:

- Do not reach into the machine while it is on/operating
- Disconnect electrical power before performing any services
- Turn off compressed air before performing any cleaning procedures or services

Section 3: Overview

This section covers the overview specifications of the EyeConic.

Advantages of Using the Initial EyeConic

The purpose of the EyeConic is to eliminate the use of manual labor and allow ears of corn to run through a conveyor belt to be picked off for inspection by the machine. An advantage the EyeConic has to properly sort corn is called the texture sorting algorithm. Before this feature, seed corn sorter machines previously relied on the color of the husk, which would lead to a lot of false positives.

Today, the EyeConic uses texture and color diagnostics with optional 3-way sorting to eliminate rogue ears. The optional 3-way sorting helps get rid of different ears that are not wanted in their genetic seed batch.

3-Way Sort [Optional]

A 3-way sorting function used for the EyeConic is a classification process that separates cobs into three distinct groups based on an ear's physical or quality characteristics. This function is used to improve uniformity, plant performance, and overall product quality for the EyeConic machine. Each kernel on an ear of corn is analyzed and is then processed through the EyeConic based on its genetic characteristics.

Below is a simple breakdown of the EyeConic's decision logic evaluating each ear/kernel of corn running through the machine:

Seed	Notes
Good Seed	Ears of corn that passed EyeConic inspection due to size, shape, color, density
Rogue Ears	Ears of corn that did not pass EyeConic inspection due to size, shape, color, or density
Re-husk	Husk is still intact on corn kernels & needs to be de-husked

**NOTE**

Reference [Figs. 4 & 5] on the following page for more 3-way function information.

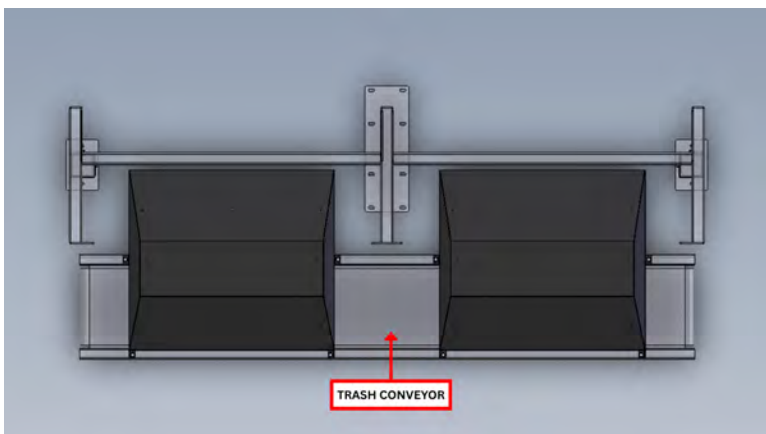
[Fig 4] is an example of a good seed versus rogue seed. The kernels on the left ear of corn are round and bright in colors. The kernels of the right ear of corn are not as round, lacks in number of kernels, and are dull in color.

Figure 4.



By using the 3-way sort function, the flippers will change their position of trajectory if there are cobs passing through the EyeConic that are genetically not accepted. When the EyeConic scans the kernels on each cob and finds physical deformities in the corn, the flipper will descend its angle straight down in a trash conveyor where the ear of corn will be discarded of.

Figure 5.



Specifications

The specifications of the EyeConic include:

- | | |
|------------|--|
| Dimensions | <ul style="list-style-type: none">• Complete System w/ Shaker(s) & Belt(s): 125 ½"l x 100"w x 75" +/- 5"h• EyeConic (sorter only): 38"l x 100"w x 75" +/- 5"h• EyeConic Control Box: 38.5"w x 61.25"h x 16"d |
|------------|--|
- Customer supplied: (2) 10 lane aligning shakers with 3" wide lanes that is fed by (1) 16 lane husker
 - (2) Ribbed acceleration belts to create cob separation
 - EyeConic Sorter (gantry with two hoods containing two cameras each) to identify husk and/or 3-way sort
 - Directional flippers

Utility Requirements

The power requirements of each EyeConic machine are as follows:

EyeConic	• 460VAC, 3 Phase, 50/60Hz, 15a
Air	• 5scfm @ 45psi

- Customer supplied: (4) total shaker motors, 1/3hp each
- Customer supplied: (2) total belt roll motors, 1/2hp each

Capacity

- 2,000 ears per minute
- 120,000 ears per hour

Electrical Specifications

The electrical specifications of the EyeConic include:

Each EyeConic sorter requires electrical connection to an EyeConic control box. Cabling kits with lengths from 15M to 30M are available from Magnuson CCM to electrically connect each sorter to a control box.

Magnuson CCM provides multiple configurations of control boxes that allow the customer to run up to three EyeConic units from a single control box.

Machine Set-Up Requirements

Set-up requirements for customer's facility should be in place prior to delivery.

Facility Requirements

In order to start the EyeConic, the set up requires compressed air and electricity. The EyeConic should start running from these key components.

Machine set-up or facility requirements include:

- 16 lane husker
- Compressed air
- Takeaway conveyors
- NEC compliant high voltage supply

Optional: Ethernet connection to plant network

- Allows for Magnuson CCM to provide remote troubleshooting and software updates
- Provides communication and data from EyeConic units to plant software

**IMPORTANT**

The EyeConic is designed to run entirely on it's own.

**NOTE**

For further information, reference your VFD manual at customer's facility.

Section 4: Installation

This section details the installation process of the EyeConic machine.

Accepting Delivery

Your Magnuson CCM EyeConic has received a careful final inspection and dry run in the Gulfco Manufacturing 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 to 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 free on board (F.O.B.), Gulfco Manufacturing 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.

Lifting Points

Magnuson CCM recommends lifting the EyeConic by crane. However, it is light enough in weight to be lifted by two people. Refer to **[Figs. 6 & 7]** below.

Figure 6.

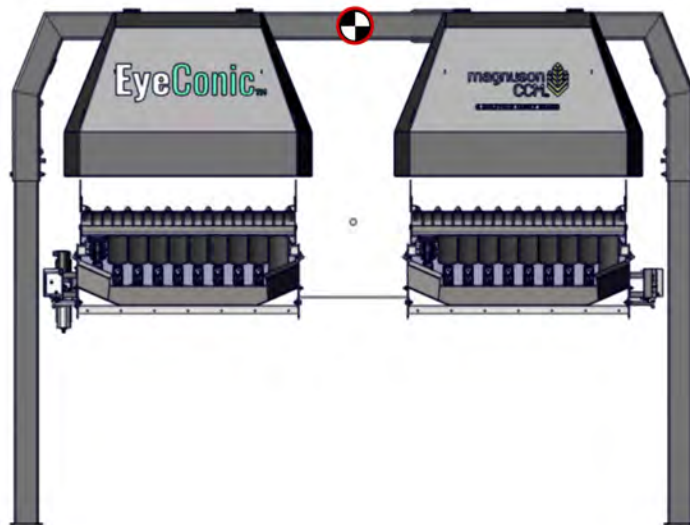


Figure 7.



Center of Gravity

Figure 8.



Machine Installation

Mounting the EyeConic Machine

It is imperative to anchor the EyeConic machine once the frame is in place. It is recommended to mount the EyeConic with brackets to a solid concrete floor. Optionally, machine can be mounted to wooden floors but must be anchored down properly.



WARNING

Bolt down frame legs **FIRST** before drilling any holes to fit specific dimensions.

Frame Installation

EyeConic installation starts with the camera and frame assembly.

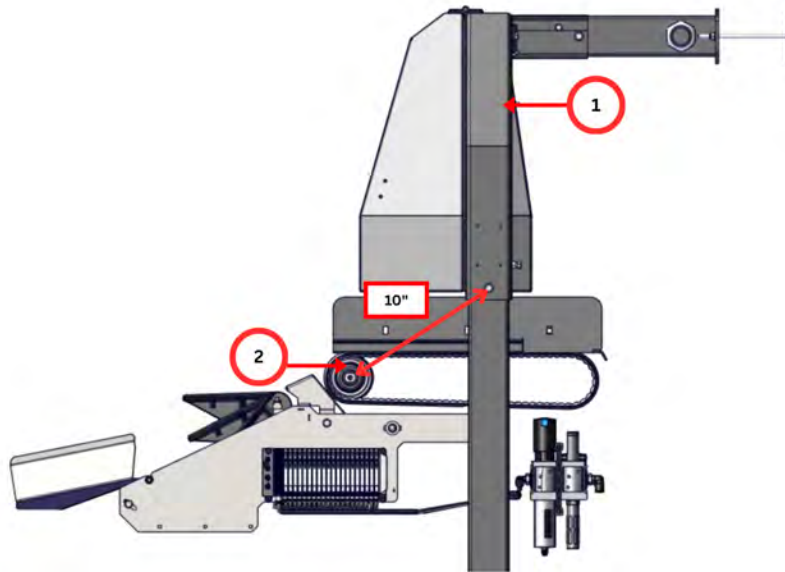


NOTE

Refer to original [EyeConic Installation drawing \(page 96\)](#) [4150000.8000 Installation] Notes 1-3 on page 77.

There must be a 10-inch dimension from the nose pulley conveyor idler [4151005] to the top frame/gantry [4151001]. The face of the gantry should be 10-inches back from the center of the nose pulley conveyor idler.

Figure 9.

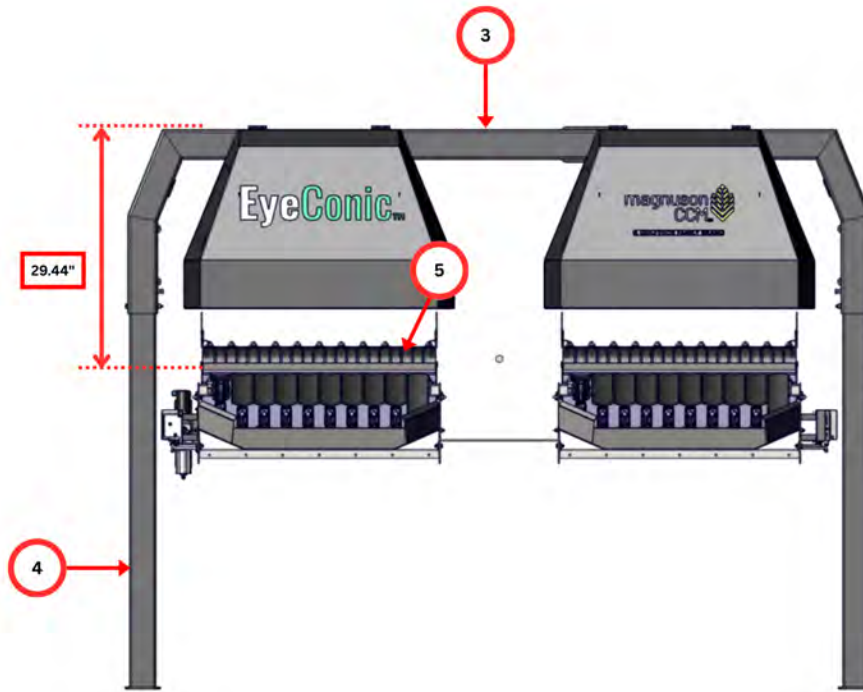


10-inch dimension

Item	Part Number	Description
1	4151001	GANTRY,20-LANE
2	4151005	NOSE ROLLER,4"

Match drill a precise hole (1/2") into the outer sides of the frame legs [4151002] and set at 29.44-inch dimension. This dimension goes from the top of the belt [4151003] to the top of the gantry [4151001]. With this dimension, it allows the camera to stay in place correctly at the top of the outer frame.

Figure 10.

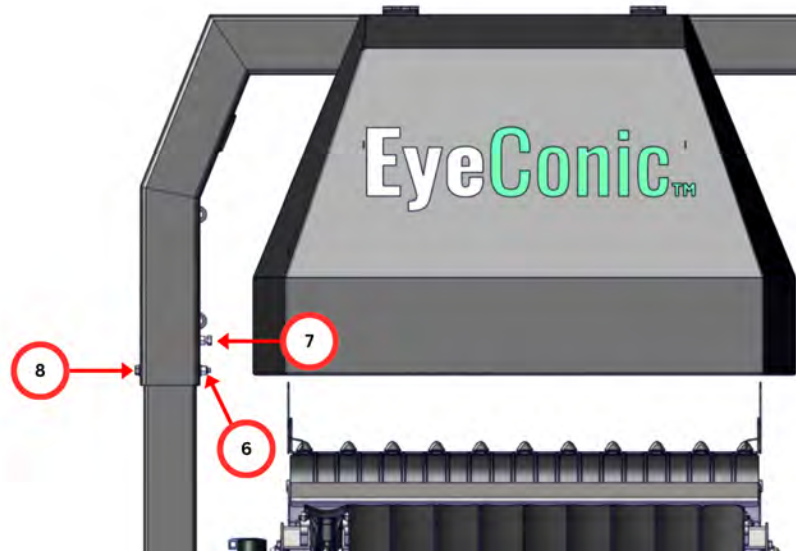


29.44-inch dimension

Item	Part Number	Description
3	4151001	GANTRY,20-LANE
4	4151002	INNER LEG,60"
5	4151003	INSPECTION BELT,RIBBED

The hex cap screws [0001.0540] on the inner and outer legs on the EyeConic frame are used to set the location of the height. These screws are used to set the location of the frame and to adjust the height of the EyeConic machine. To adjust the height of the EyeConic, loosen these screws to raise or lower the height of the frame. This will essentially lock the frame in place. Match drill a hole on both of the inner/outer legs, then install screw [0001.0752 & 0001.5805] to set the height.

Figure 11.



Item	Part Number	Description
6	0001.0540	SCR,HCS 3/8-16 x 3/4 SS
7	0001.0752	SCR,HCS 3/8-16x 4 3/4 SS
8	0001.5805	NUT,HXJSLFLKG 3/8-16x9/16 SS*

Nose Pulley Conveyor Idler

The nose roller **[4151005]** is wrapped underneath the conveyor belt **[4151003]** of the EyeConic. Dimensions are located on the [EyeConic Installation drawing \(page 96\)](#) **[4150000.8000 Installation]** that indicate the conveyor requires four 1/2" holes must be drilled according to the drawing directions.

Figure 12.



Item	Part Number	Description
1	4151005	NOSE ROLLER,4"



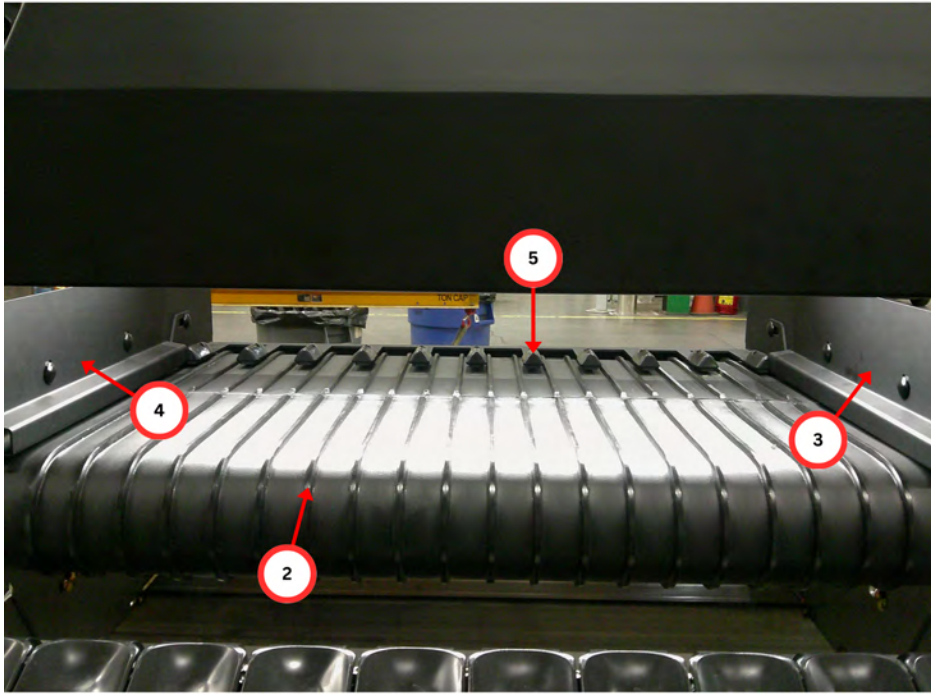
NOTE

Install the guide bars first before installing the conveyor belt.

Edge covers [4151034 & 4151035] will then be added to both side of the conveyor belt and nose pulley assembly. From here, stainless-steel edge covers will need to be installed correctly against the guide bar for stabilization.

The guide bar [4151037] consists of "fingers" that aid to guide each husk of corn into their proper lanes in the EyeConic onto the conveyor belt.

Figure 13.



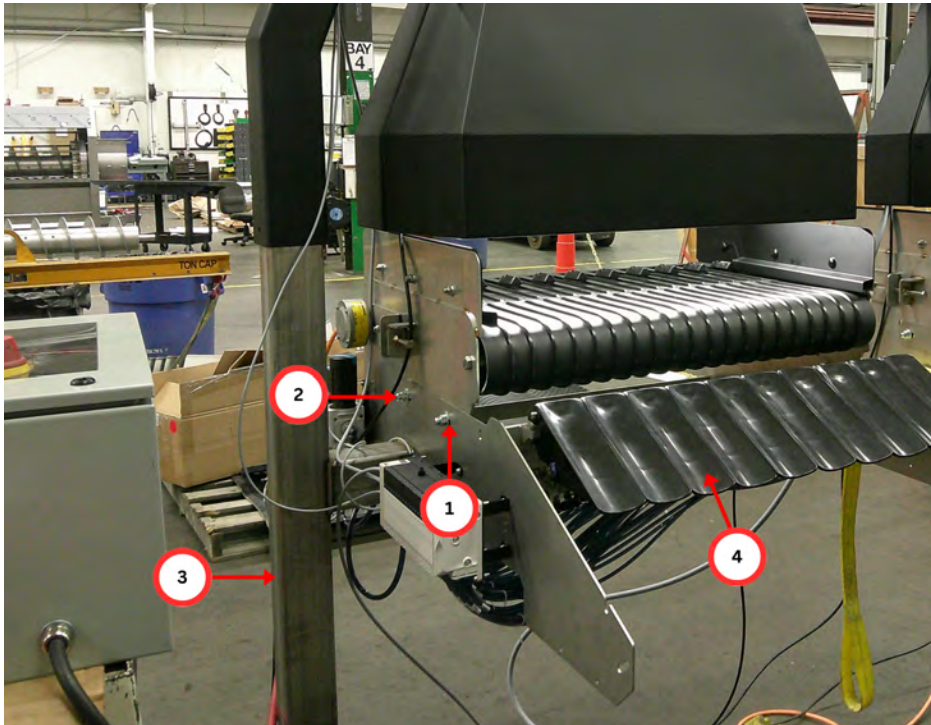
Item	Part Number	Description
2	4151003	INSPECTION BELT,RIBBED
3	4151034	EDGE COVER,RH
4	4151035	EDGE COVER,LH
5	4151037	AY,GUIDE BAR

Flipper Assembly

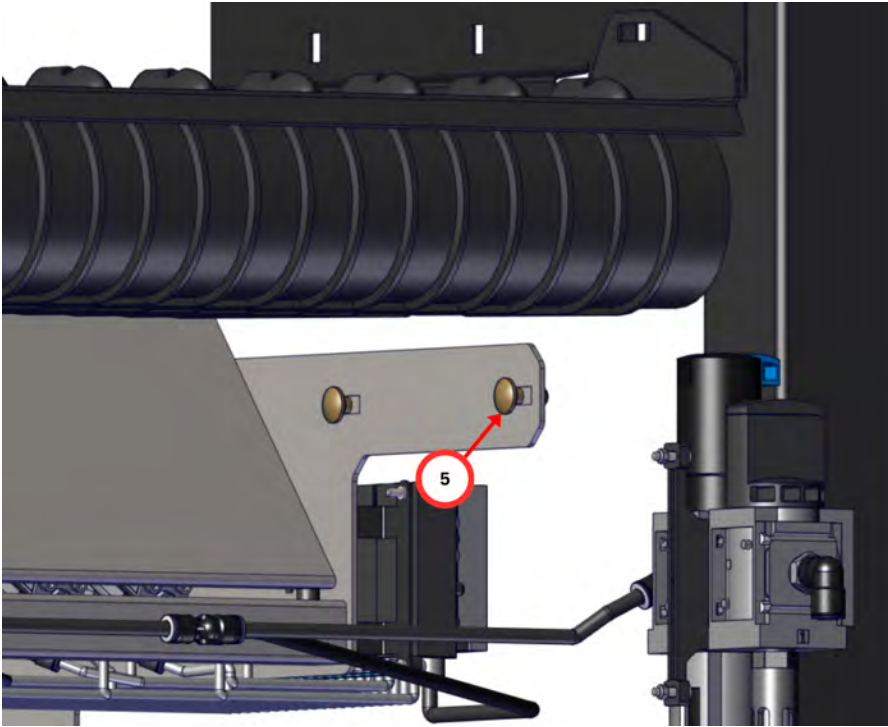
Next step in the installation process is to install the flipper assembly [4150000.8002]. The flippers are installed onto the existing leg [4151002] of the EyeConic frame with carriage bolts, acorn nuts, and flat washers [0001.3934, 0001.5118.1, 0001.4657.3].

These parts are all included with the machine.

Figure 14.



Item	Part Number	Description
1	0001.4657.3	WSHR,FLT M10 X 30 X 2.5 ZNC
2	0001.5118.1	NUT,ACORN M10 ZNC
3	4151002	INNER LEG,60"
4	4021028.0004	FLIPPER,WIDE

Figure 15.

Item	Part Number	Description
5	0001.3934	SCR,CRGB M10 X 20 ZNC

**NOTE**

Parts for the flipper assembly are included with the machine.

The flippers are controlled by the air cylinders [4151010], which are controlled through the air prep unit. The air cylinders allow the flippers to move in 3 different positions that control the trajectory of the corn.

Figure 16.



Item	Part Number	Description
6	4151010	AY,CYL 3-WAY SORT

The air prep unit **[4151021]** has a filter and also contains the air filter, air regulator, pressure switch, and on/off switch. The unit also contains a runoff valve that must be located on the unit.

Drill holes to its existing structure to install on the left-hand side of the EyeConic machine.

Figure 17.

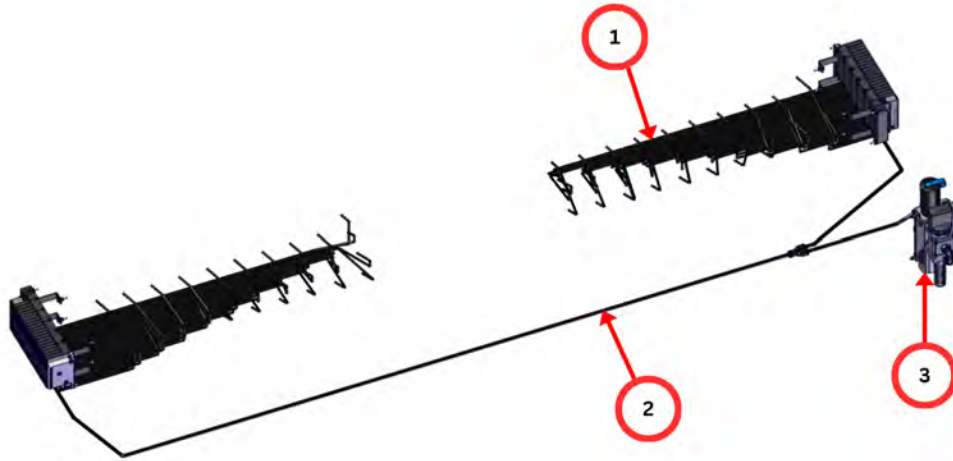


Items	Part Number	Description
7	4151021	AIR PREP,EYECONIC

Air Prep Unit and Air Line

Once the air prep unit **[4151021]** is set, the next step in the installation process is to install the airlines to the manifolds. This set up consists of a 3/8" airline **[0007.2125.3]**, along with an additional 1/4" airline **[0007.2125.2]**.

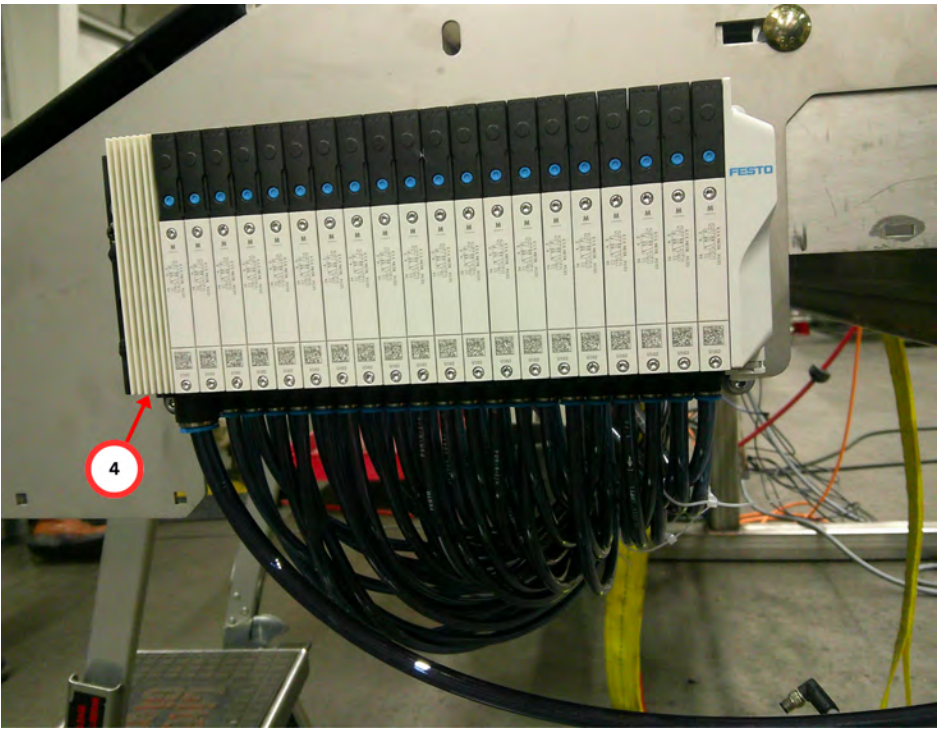
Figure 18.



Item	Part Number	Description
1	0007.2125.2	RM,TUBE 1/4 OD CLRBLK (FT)
2	0007.2125.3	RM,TUBE 3/8 OD CLRBLK (FT)
3	4151021	AIR PREP,EYECONIC

Once the air prep unit is set, the next step in the installation process is to install the airlines to the manifolds and air prep unit **[4151021]**.

Figure 19.



Item	Part Number	Description
4	4151018	MANIFOLD,20-VALVE

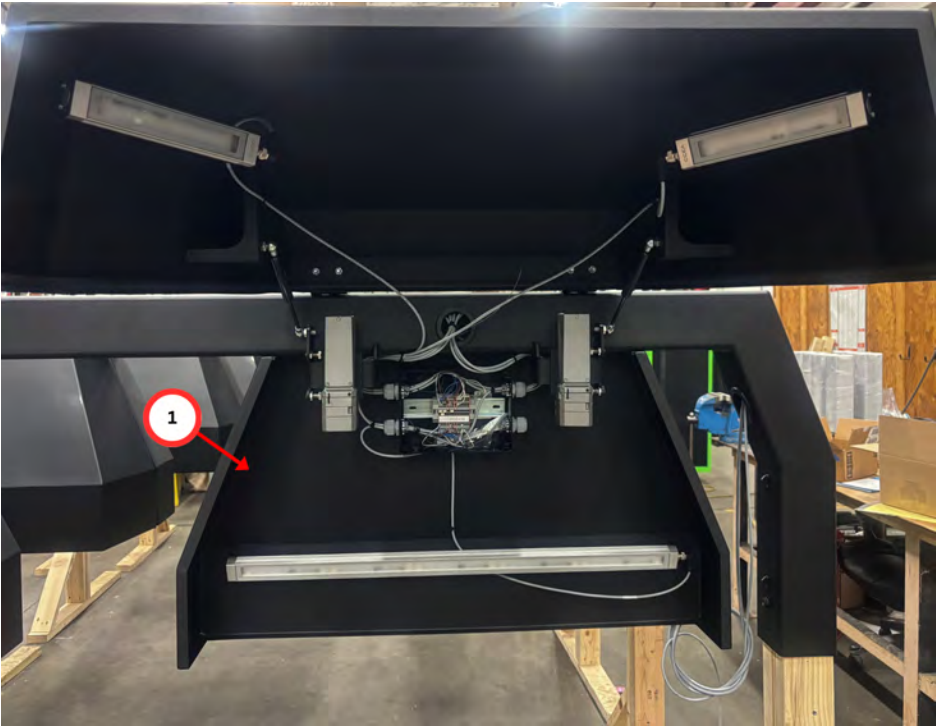


NOTE
There are exactly two identical manifolds on each side of the EyeConic.

Electrical Junction

Within the left rear electrical shroud [4151030.0001] is the electrical junction box.

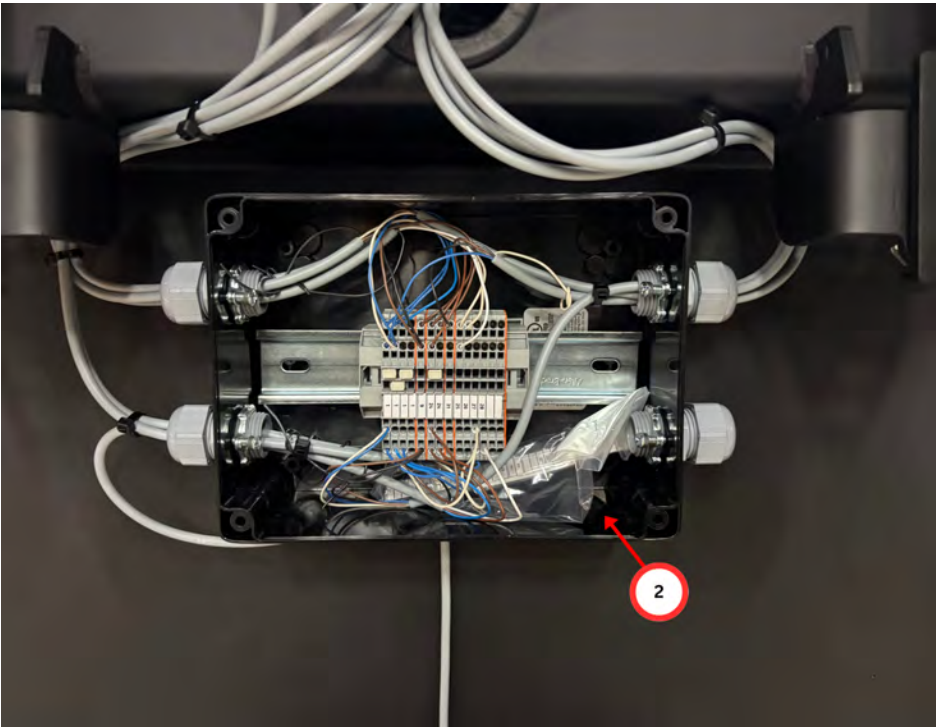
Figure 20.



Item	Part Number	Description
1	4151030.0001	SHROUD,REAR

The electrical junction box **[4150000.8009]** box is the heart of the shrouds. The box controls the lights, manifold, and air prep switch to the EyeConic machine.

Figure 21.



Item	Part Number	Description
2	4150000.8009	JUNCTION BOX,EYECONIC GANTRY



NOTE

Connection from these junction boxes to the control box needs to be made at the customer plant using various length "cable kits" **[415K001*]**.

Cable kit part numbers listed below:

Part Number	Description
415K001.015	KIT,CAM CABLE 15M EYECONIC
415K001.020	KIT,CAM CABLE 20M EYECONIC
415K001.025	KIT,CAM CABLE 25M EYECONIC
415K001.030	KIT,CAM CABLE 30M EYECONIC

Electrical Installation

Control Box Installation

Secure the EyeConic control enclosure **[4150000.8005.X]** to a wall or other sturdy vertical structure using the four attachment points located at each corner of the box.

Cut two different holes in the enclosure; one for high voltage service and one for low voltage connections between the EyeConic control box and EyeConic sorter.

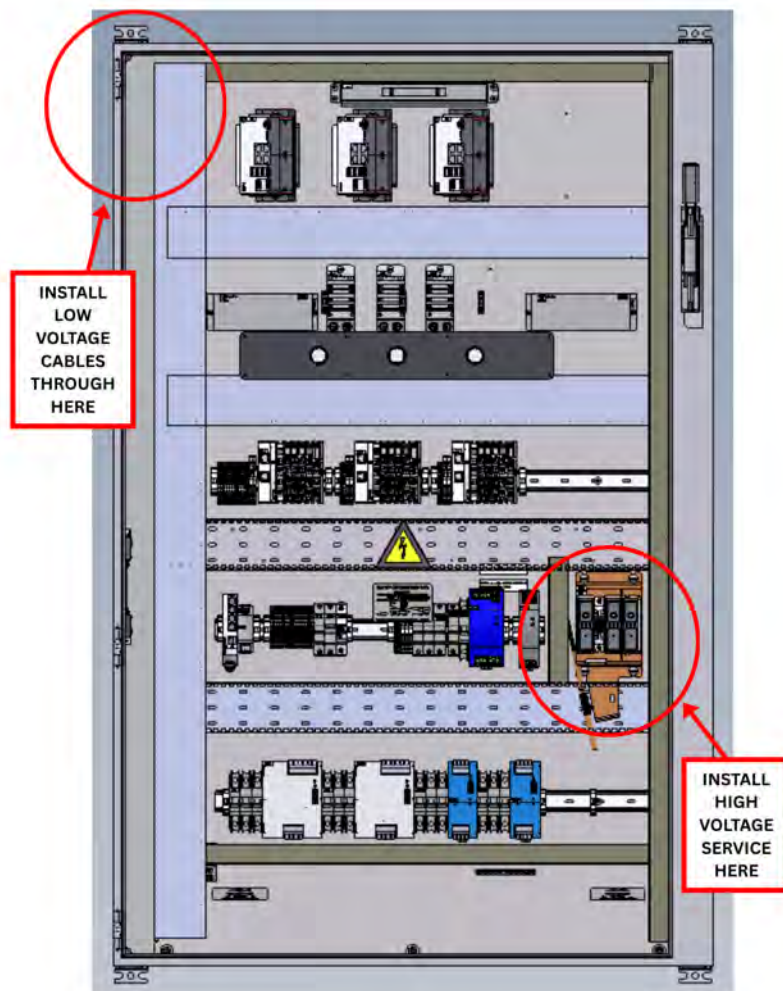
**IMPORTANT**

Keep low voltage cables and high voltages wires separate or EyeConic performance may be negatively impacted.

Connect each phase of the high voltage service to the disconnect switch **[9502.6241.102]** inside the EyeConic control enclosure **[4150000.8005.X]**. Service should be connected through the bottom or right side of the control box using NEC approved methods.

Install the cables in the cable kit **[415K001.XXX]** to connect the control box to each EyeConic sorter. Connect the M8 4-Pin **[9502.722X]** cable to the XF20 port on the I/O block **[4151019]** for each machine as indicated. Connect the four Gige camera cables **[9502.722X]** to the POE injectors **[9550.5059]** for each machine as indicated.

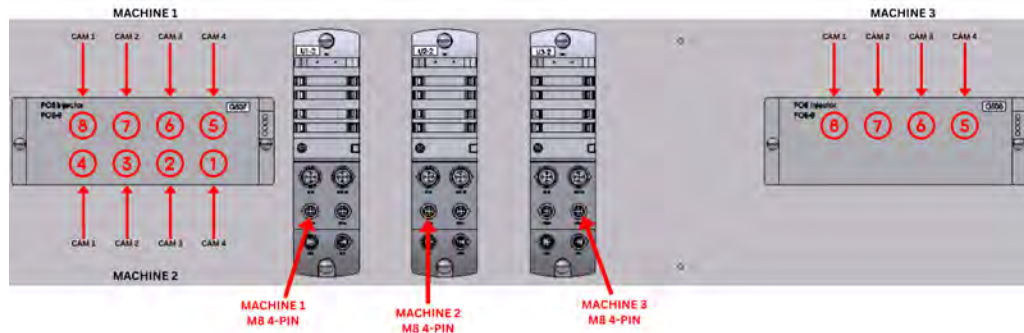
Figure 22.



**NOTE**

Install brackets **[415044]** are located on each corner of the EyeConic control box.

Next, install the 12-conductor cable **[9502.712X]** into the terminal blocks as indicated by the table and diagram.

Figure 23.**Figure 24.**

GANTRY 1			
NODE#	WIRE COLOR	WIRE#	DESCRIPTION
-	BLACK	1	-
1	WHITE	2	GND
24	RED	3	LED CONTROL
25	GREEN	4	LED 1A & 1C ANALOG
26	ORANGE	5	LED 1B ANALOG
9	BLUE	6	+24VDC (REGULATOR & MANIFOLDS)
27	WHITE/BLACK	7	LED 1D & 1F ANALOG
28	RED/BLACK	8	LED 1E ANALOG
29	GREEN/BLACK	9	-
30	ORANGE/BLACK	10	-
31	BLUE/BLACK	11	REGULATOR 1 IN
-	BLACK/WHITE	12	-

Figure 25.

GANTRY 2			
NODE#	WIRE COLOR	WIRE#	DESCRIPTION
-	BLACK	1	-
1	WHITE	2	GND
44	RED	3	LED CONTROL
45	GREEN	4	LED 2A & 2C ANALOG
46	ORANGE	5	LED 2B ANALOG
9	BLUE	6	+24VDC (REGULATOR & MANIFOLDS)
47	WHITE/BLACK	7	LED 2D & 2F ANALOG
48	RED/BLACK	8	LED 2E ANALOG
49	GREEN/BLACK	9	-
50	ORANGE/BLACK	10	-
51	BLUE/BLACK	11	REGULATOR 2 IN
-	BLACK/WHITE	12	-

Figure 26.

GANTRY 3			
NODE#	WIRE COLOR	WIRE#	DESCRIPTION
-	BLACK	1	-
1	WHITE	2	GND
64	RED	3	LED CONTROL
65	GREEN	4	LED 3A & 3C ANALOG
66	ORANGE	5	LED 3B ANALOG
9	BLUE	6	+24VDC (REGULATOR & MANIFOLDS)
67	WHITE/BLACK	7	LED 3D & 3F ANALOG
68	RED/BLACK	8	LED 3E ANALOG
69	GREEN/BLACK	9	-
70	ORANGE/BLACK	10	-
71	BLUE/BLACK	11	REGULATOR 3 IN
-	BLACK/WHITE	12	-

**IMPORTANT**

Machine #1 cable goes to Nodes 24-31, Machine #2 goes to Nodes 44-51, Machine #3 goes to Nodes 64-71.

Electrical Connections as Sorter

Insert the 12-conductor cable [9502.712X] through the rear cable gland on the support beam of the sorter. Route the cable through the hood opening and through an open cable gland in the junction box [4150000.8009] of each sorter. Wire into the terminal blocks as indicated by the table and diagram.

Figure 27.

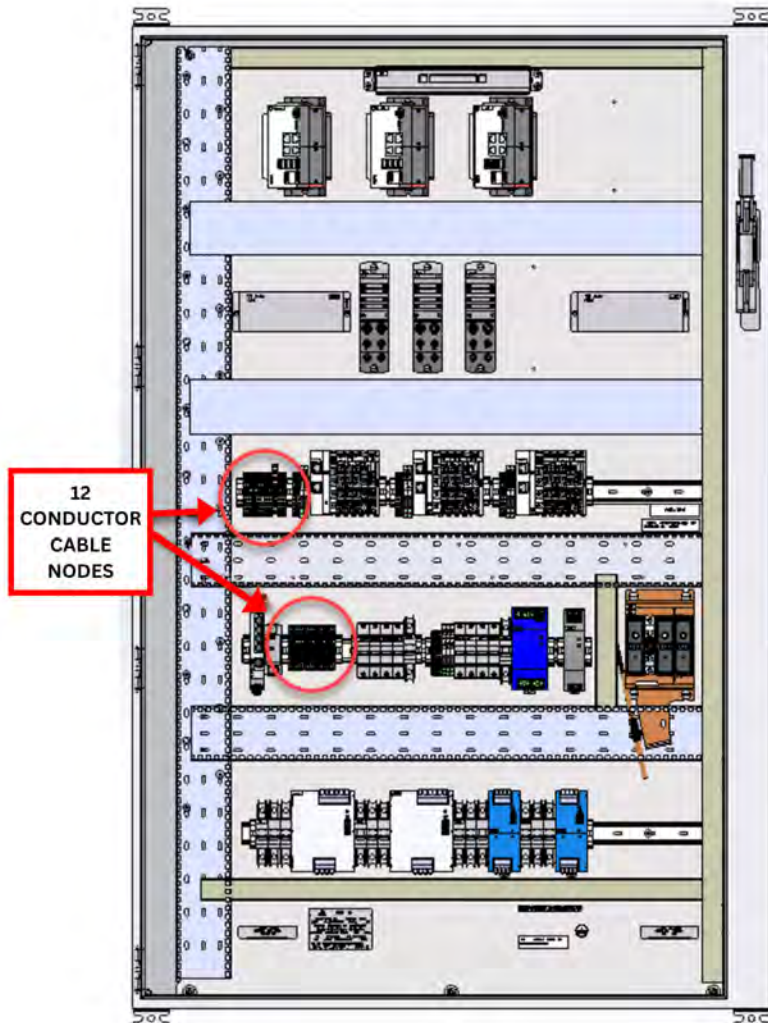
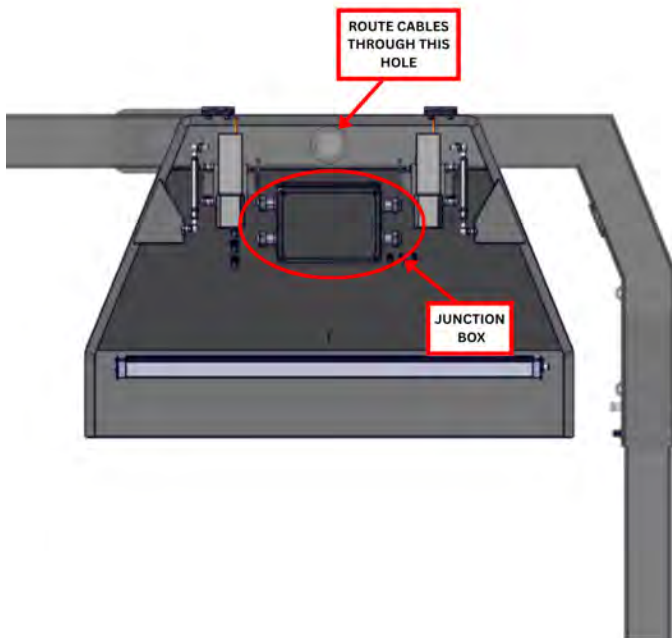


Figure 28.**IMPORTANT**

Machine #1 cable goes to Nodes 24-31

Machine #2 goes to Nodes 44-51

Machine #3 goes to Nodes 64-71

Connect the four Gige camera cables [9502.722X] to the cameras in each camera enclosure [9550.2019] in each hood as indicated below [Figs. 29 & 30].

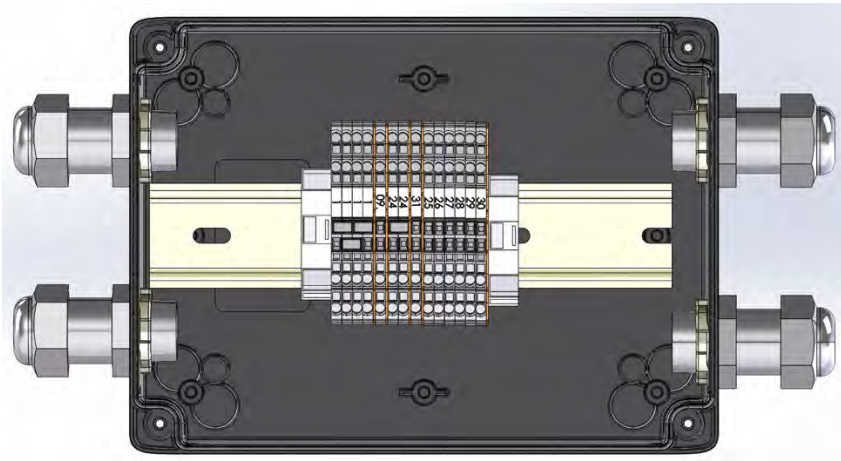
Figure 29.

Figure 30.

NODE#	WIRE COLOR	WIRE#	DESCRIPTION
-	BLACK	1	-
1	WHITE	2	GND
24/44/64	RED	3	LED CONTROL
25/45/65	GREEN	4	LED XA ANALOG
26/46/66	ORANGE	5	LED XB ANALOG
9	BLUE	6	+24VDC (REGULATOR & MANIFOLDS)
27/47/67	WHITE/BLACK	7	LED XC ANALOG
28/48/68	RED/BLACK	8	LED XD ANALOG
29/49/69	GREEN/BLACK	9	LED XE ANALOG
30/50/70	ORANGE/BLACK	10	LED XF ANALOG
31/51/71	BLUE/BLACK	11	REGULATOR X IN
-	BLACK/WHITE	12	-

Connect the M8 4-Pin [9502.722X] cable to the XF10 port on the air manifold [4151018] for each machine as indicated.

Figure 31.

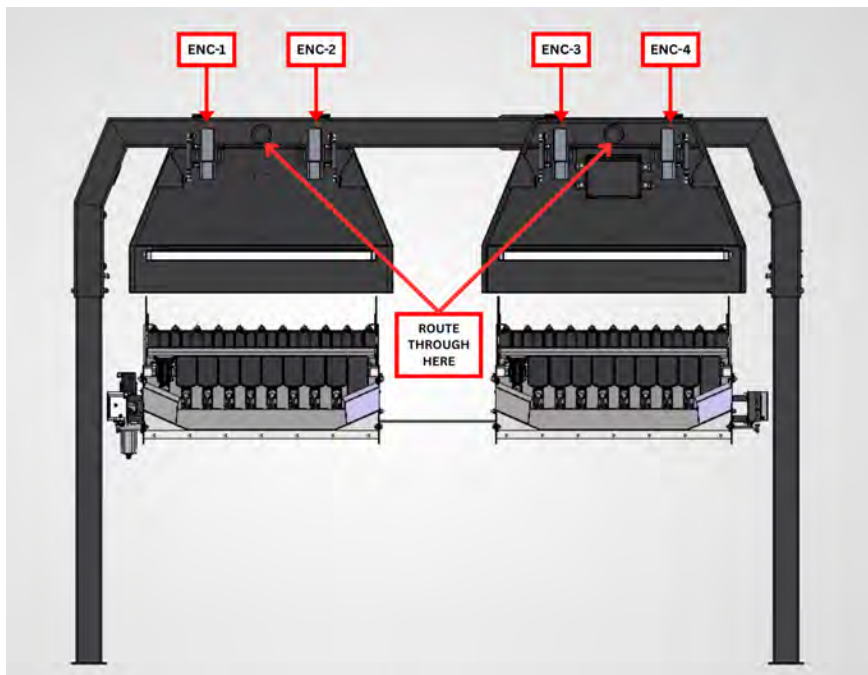
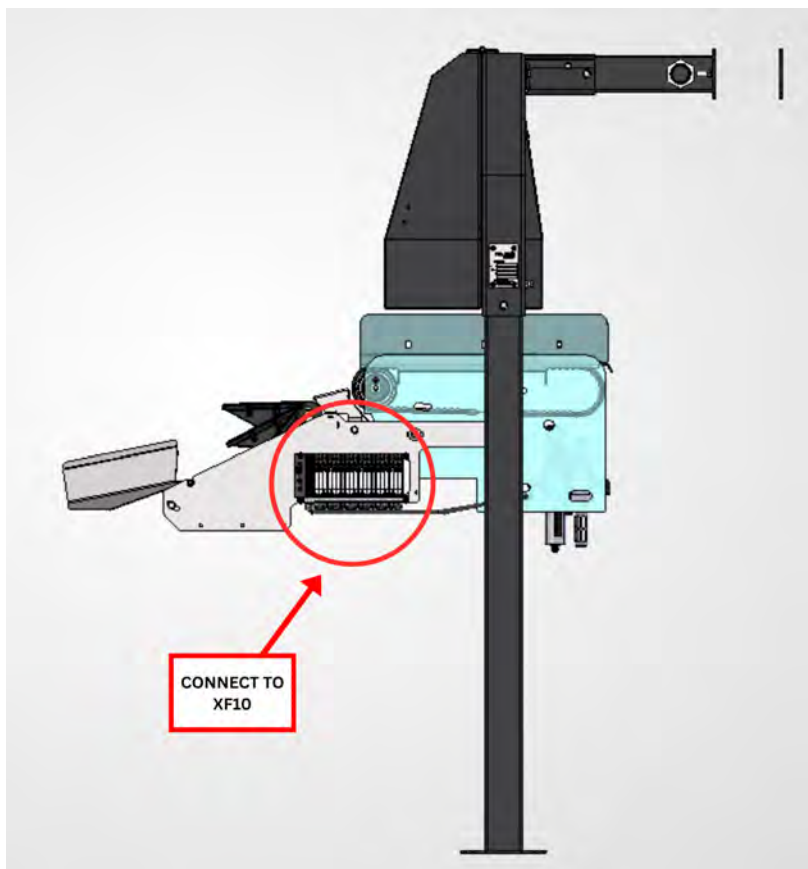


Figure 32.

SOURCE	CAMERA CABLE ROUTING				DESTINATION
CAM ENCL	GANTRY	CAMERA		POE INJECTOR	POE INJECTOR PORT
1-1	1	1		GS7	8
1-2		2		GS7	7
1-3		3		GS7	6
1-4		4		GS7	5
2-1	2	5		GS7	4
2-2		6		GS7	3
2-3		7		GS7	2
2-4		8		GS7	1
3-1	3	9		GS8	8
3-2		10		GS8	7
3-3		11		GS8	6
3-4		12		GS8	5

Figure 33.

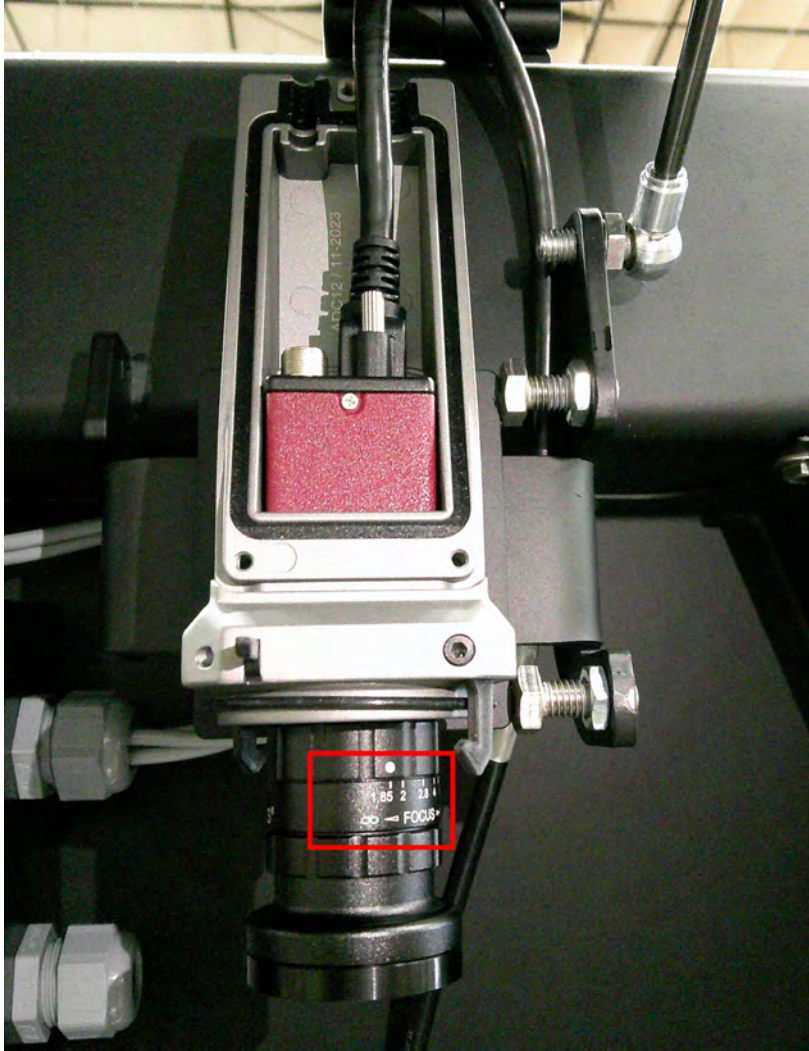
Lighting & Camera Calibration

EyeConic units ship with lighting and cameras calibrated to function in most production environments without further adjustment. In the event that a part comes out of calibration or requires replacement, use the following procedure to set lighting and cameras to factory settings.

The following camera & lighting calibration instructions should be performed with the **belt not running**:

Set aperture on each camera to 1.85 lock setting using thumb screw, shown in **[Fig 34]**. below.

Figure 34.



Step 2: Align camera enclosures using bubble level and guide boxes on HMI display. Guide boxes can be accessed through gear icon, login (7304), camera setup, lane adjust. Close hood. Be sure to level the guide boxes both vertically and horizontally with the bubble level. Reference **[Fig 35]** below.

Figure 35.



Step 3: Place Extech LT45 probe in calibration tool. Use HMI to turn on lights: gear icon, login (7304), camera setup, light adjust (suggested starting point of 25 on main light and 50 on side lights).

Place calibration tool in each lane and measure light intensity. Adjust side light positions and lighting intensity until each lane measures between 1400-1900 Lux. Remove Extech LT45 probe from calibration tool.

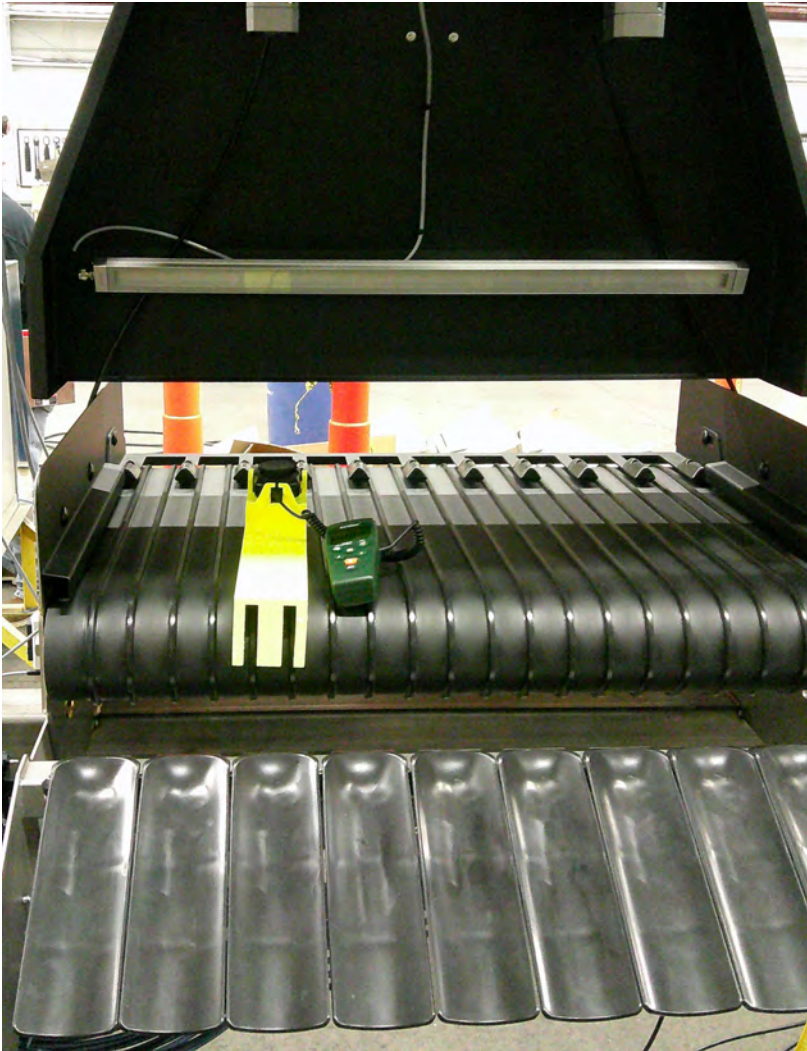
Figure 36.



Step 4: Place calibration tool directly under each camera (Lanes 3, 7, 13, 17). Stream live camera images of the calibration tool by pressing the gear icon, login **(7304)**, camera setup, lane adjust.

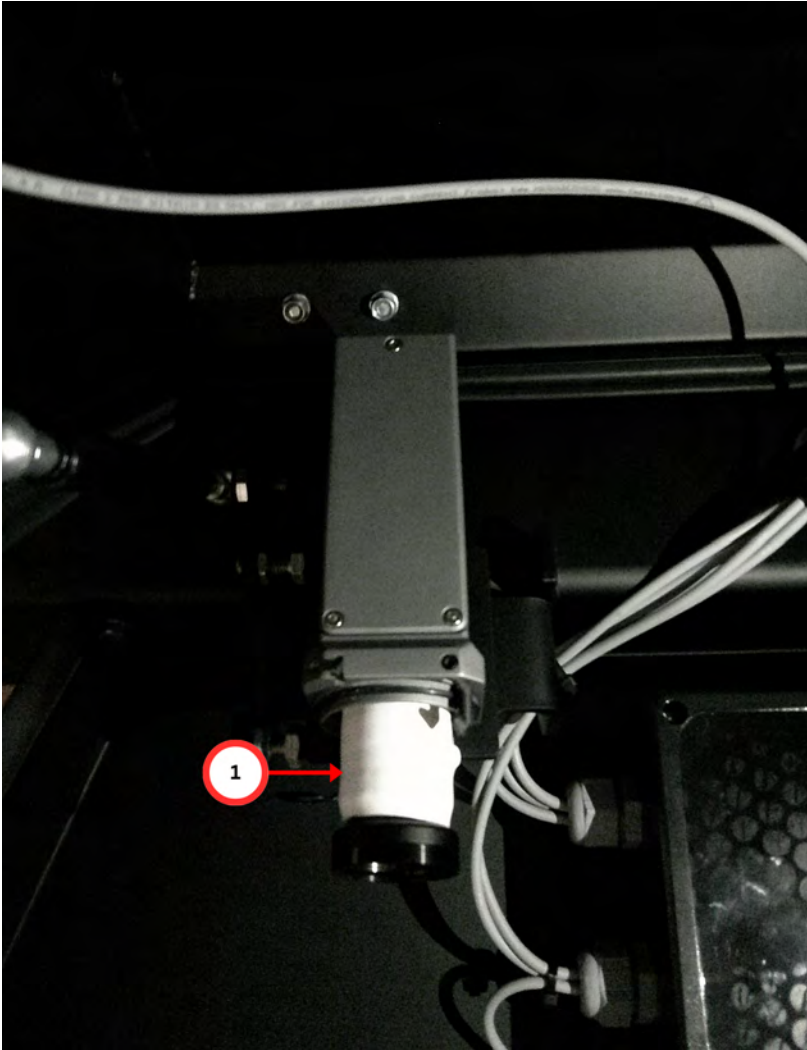
Adjust focus on each camera lens until the words “Camera in Focus” and the numbers “1234567890” are clear and sharp on the HMI display. Use thumbscrew to lock in focus.

Figure 37.



Step 5: Open hood. Remove the Camera 1 lens from the camera. Place the **[9550.2020]** locking band over the lens and reinstall the lens into the camera. Repeat for all cameras. Close hood.

Figure 38.

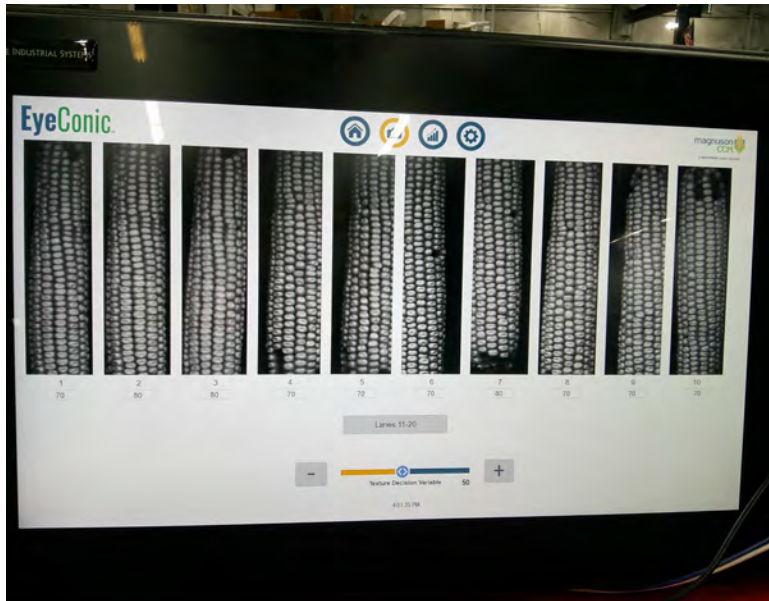


Item	Part Number	Description
1	9550.2020	LOCKING BAND

The following camera & lighting calibration instructions should be performed with the **belt running**:

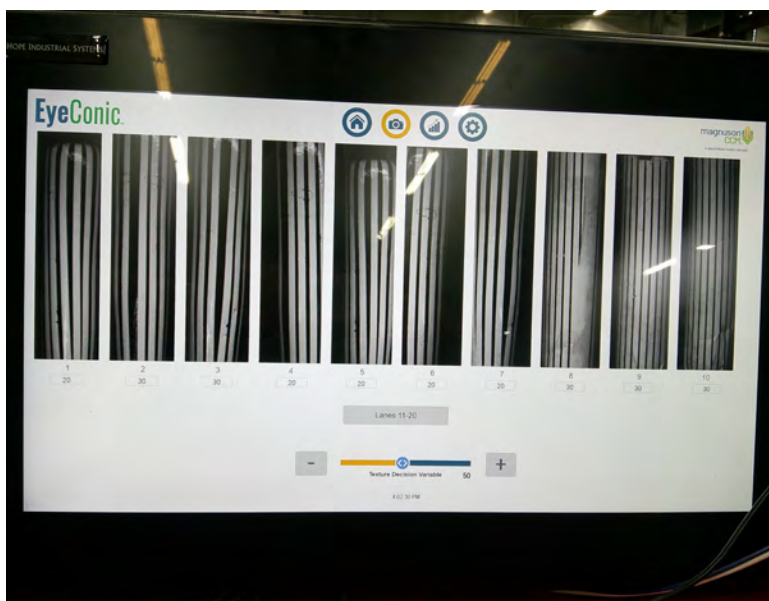
Step 1: Press the camera icon on the HMI and set the Texture Decision Variable to 50. Place an ear of good corn (corn with kernels) on the belt in Lane 1 and allow it to pass through the machine. The flipper should not trigger and the score on the HMI should be 60 or higher for the lane tested. Repeat for all lanes.

Figure 39.



Step 2: Place an ear of reject corn (corn with husk, no kernels showing) on the belt in Lane 1 and allow it to pass through the machine. The flipper should trigger down and the score on the HMI should be 30 or lower for the lane tested. Repeat for all lanes.

Figure 40.



Section 5: Adjustments

This section covers all mechanical and electrical adjustment procedures of the EyeConic.

Belt Speed Adjustment

Eyeconic Belt Speed

For the EyeConic to function properly, the belt speed must be controlled by a variable frequency drive (VFD) or similar speed control device. Refer to VFD manual for motor speed adjustment instructions.

**NOTE**

Refer to the manual from your chosen VFD for motor speed adjustment instructions.

Belt Speed Adjustment Instructions

Figure 41.

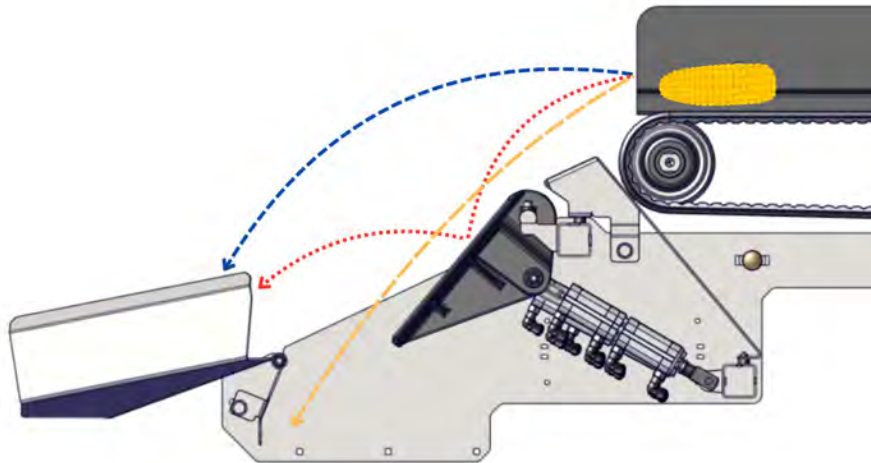
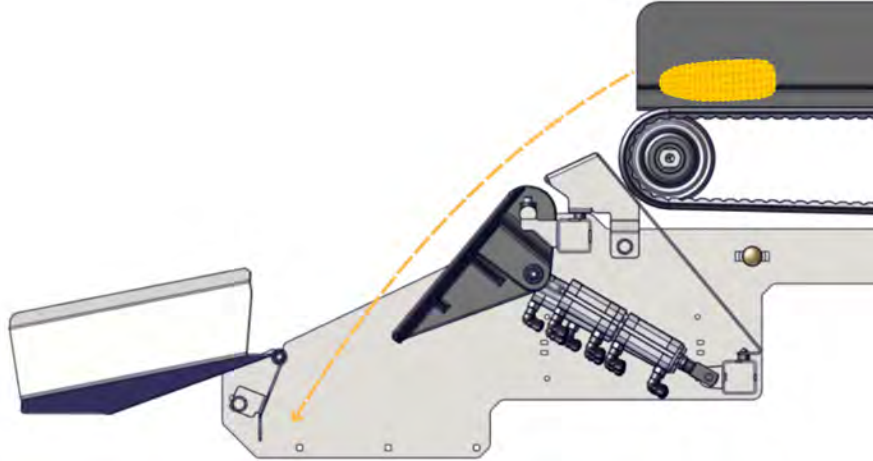


Table 1. Belt Speed Adjustment

Line	Color	Notes
Long dash	Yellow	Good trajectory
Medium dash	Blue	Fast trajectory
Short Dash	Red	Slow Trajectory

When corn passes through the ribbed inspection belt [4151003] the wide flippers [4021028.0004] are placed in the down position as shown in [Fig. 42]. Corn should pass smoothly into the re-husk chute without making contact with flippers.

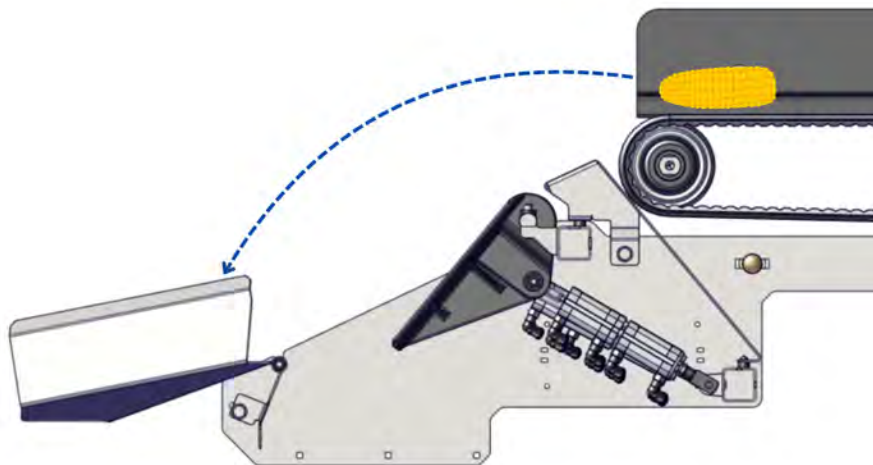
Figure 42.



Good trajectory

If corn clears the re-husk chute, belt speed is too fast. Speed should be decreased. Refer to [Fig. 43] below.

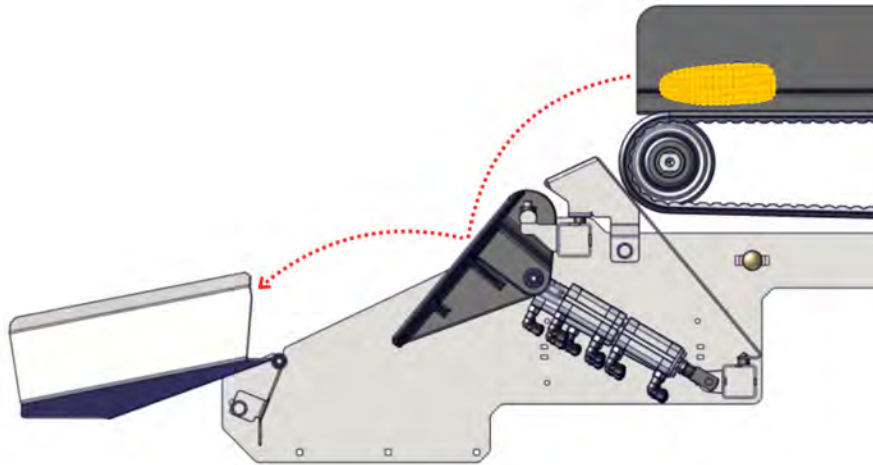
Figure 43.



Fast trajectory

For corn that contacts and bounces off the flippers [4021028.0004], the belt speed is too slow. Speed should be increased. Refer to [Fig. 44] below.

Figure 44.



Slow trajectory

Section 6: Operations

The operations chapter covers the controls and operation procedures of the EyeConic, including the HMI (Human Machine Interface) and operational controls.

Controls

Texture Decision Variable

The main control of the EyeConic machine is known as the **Texture Decision Variable**, located in the HMI to help with the algorithm of the corn being sorted.

This feature determines how much husk is accepted in the feeder and what amount of husk on an ear is cause for rejection. The customer can easily adjust the Texture Decision Variable on the HMI control screen to make the sorting decision accept more or less husk on an ear for the reject decision.

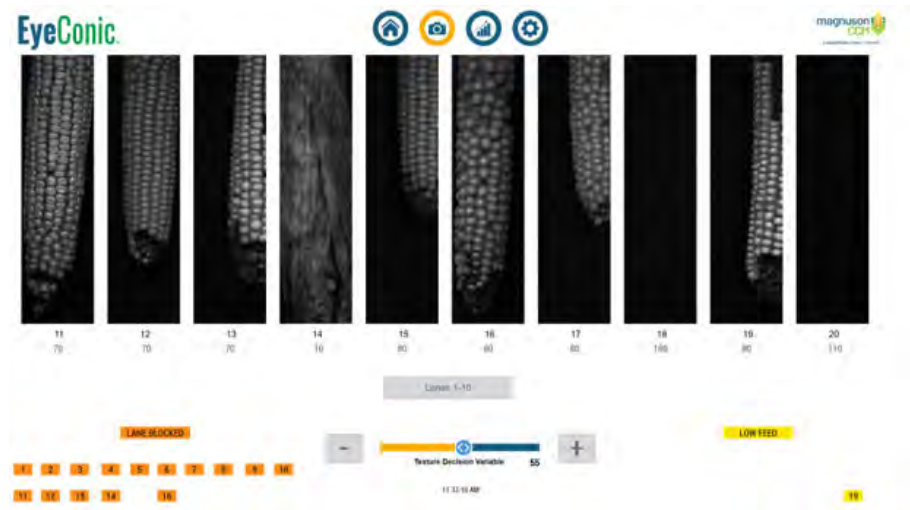
The Texture Decision Variable is the decision point of the EyeConic. It uses the cameras to determine what husks are accepted through the machine, and what husks are rejected. Husks can be accepted or rejected due to each ear of corn's genetics.

Each ear is scanned and the surface is evaluated in a patent pending algorithm that produces a score. A lower number is typically associated with husk being present in the image. A higher number is typically associated with a low amount of husk in the image.

If the image score is greater than the Texture Decision value, the ear is allowed to pass through the sorter where images with scores below the Texture Decision value are rejected.

The user can view the score of the last ear through each lane by pressing the camera icon. Ten lanes are displayed on the screen at one time. **[Figure 45]** on the following page show the last ear that was scanned. The user can switch between lanes being viewed by pressing the Lanes button in the center of the screen.

Figure 45.



Scores displayed are values rounded to the nearest 10 whereas the Texture Decision value is an integer. This means that an ear with minimal husk showing may be scored by the algorithm as a 46, but the HMI display will show a score of 50. The ear will still reject if the Texture Decision is set to 47 or higher, regardless of the HMI showing a score of 50.

**NOTE**

In rare circumstances ears may also be rejected if their score is above the Texture Decision setting if their Coefficient of Variation (CV) and/or Entropy score fall outside the set values. The CV and Entropy values are hidden during normal operation. Changing CV and Entropy sorting values are considered advanced troubleshooting. See the [Advanced Troubleshooting \(page 69\)](#) section for more information.

Starting & Stopping the EyeConic

The EyeConic requires an external 'enable' signal to start. Removing this signal will stop the EyeConic from flipping, will turn off the lights, and an error message will appear on the EyeConic HMI.

Figure 46.



The enable signal indicates that the system feeding the EyeConic is powered on and/or ready to feed product to the EyeConic. The enable signal is a 24VDC signal provided by customer equipment.

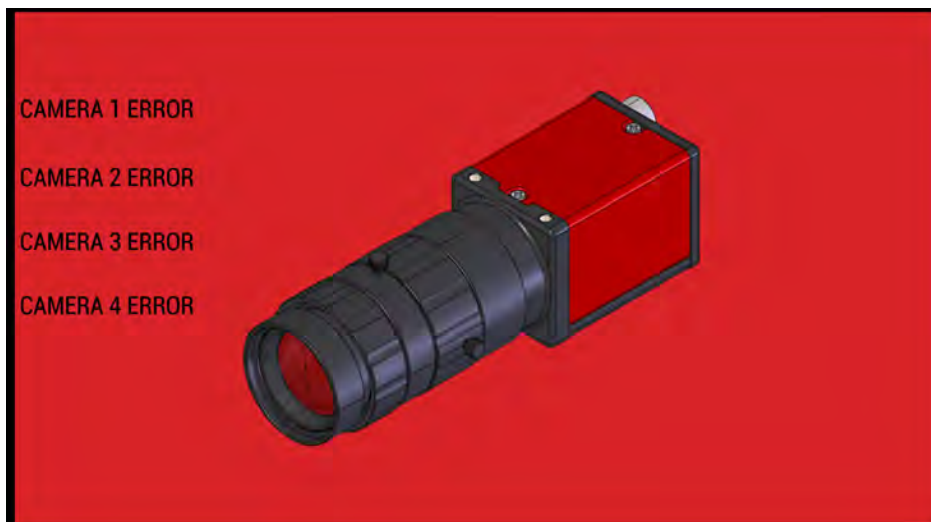
Additionally, the EyeConic requires compressed air to run and if the air supply falls below 35-psi the HMI will provide an error.

Figure 47.



The EyeConic will also indicate if any of the cameras are not communicating and will provide the following error message.

Figure 48.



Monitoring Operations

An important component of this machine is that the EyeConic displays production data on the HMI and has the ability to send the data it collects to a central computer at the customer processing facility.

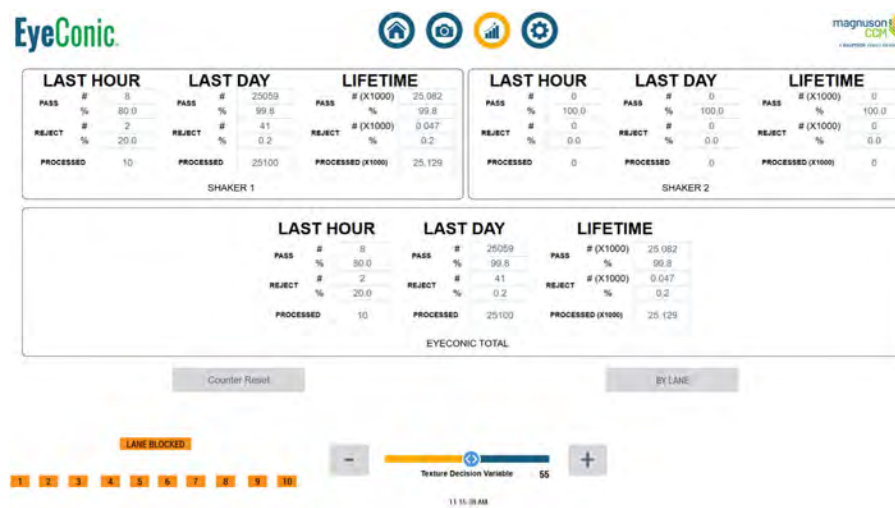
The EyeConic is able to calculate:

- Number of ears processed
- Number of husks rejected (husk present)
- Total number of ears
- Percentage of ears passed

Data can be viewed in the statistics icon by:

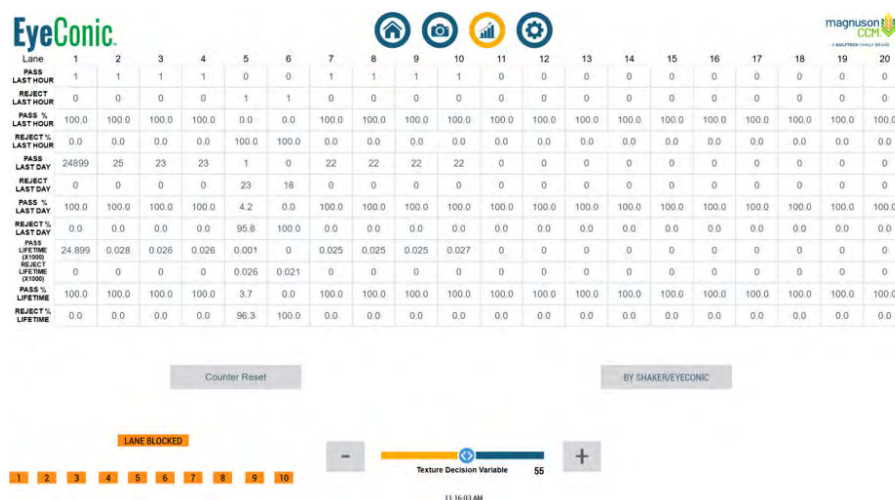
- Lifetime - All counts since machine was put into service
- Last Day - All counts since "Counter Reset" was pressed (or since 3am)
- Per Hour - Counts over last 1 hour of run time (at the hour)

Figure 49.



The statistics icon also allows data to be viewed by lane by pushing the By Lane button. Lane specific information can be helpful for troubleshooting problems with inconsistent lighting and camera focus that may result in incorrect sorting decisions

Figure 50.



Pressing the home icon creates a visual display of the data, error messaging, and warnings. The charts create a visual indication of the machine performance across the entire EyeConic. The graphs are helpful for identifying specific lanes/cameras that are over sorting/under sorting due to lighting and/or camera focus problems. The graphs can also be helpful to identify lanes that are being underfed/overfed from the feed system.

Warning and error messages include:

Warning Message	Description
Low Feed	Indicates when the amount of corn scanned in a lane is lower than the average amount across the entire machine
Lane Blocked	Indicates lanes where no corn has been detected for a predetermined amount of time.
High Husk	Indicates a higher-than-normal percentage of ears scanned with husk detected.
Cylinder EOL	A maintenance warning that a cylinder has been actuated to the preset life value and may need to be replaced.



NOTE

All warning settings and levels can be adjusted in the settings icon.

Figure 51.



NOTE

Overfed lanes are susceptible to multiple ears touching ear other and/or falling between lanes as they pass by the camera and flippers. Overfed corn will decrease the sorting effectiveness of the EyeConic and attempts should be made to level the feed of ears as evenly as possible across all lanes.

HMI

The EyeConic is designed with a computer HMI and monitor. Depending on the installation process, one HMI may control one or more EyeConic machines. This machine relies on the electrical input of the HMI system, where the main home screen and camera screen function. Magnuson CCM creates these settings per customer preference prior to delivery.

**WARNING**

Magnuson CCM strongly encourages users to not adjust specific settings such as the coefficient variation and the entropy cam per each camera. This is considered [Advanced Troubleshooting \(page 69\)](#); customers should reference this section of the manual for more information.

A setting that users are able to modify is called the texture decision variable. This function allows machine operators to see what the ears of corn look like as they are coming through the machine. This setting is used to adjust the amount of corn coming in through the EyeConic and rejects ears of corn that are genetically deformed.

Output Parameters

Output parameters refer to the data that is electronically transferred from the customer's EyeConic machine to the main plant computer at Magnuson CCM (SCADA System). This system consists of statistics that helps the plant run more sufficiently as well as the machines being produced.

The data produced are counts of ears processed, passed and rejected as well as the thresholds or COV and Entropy from each camera. All of the alarms and warnings are also passed through these outputs.

Data Output

TCP LINK : opc.tcp://172.16.20.1:4840

Variables location Objects=PLC1=GVL

Variables	Output
Scans_per_Ear	: ARRAY [1..20] OF INT;
Ear_average_score	: ARRAY [1..20] OF INT;
Entropy_avg_newest	: ARRAY[1..20] OF INT;
CV_avg_newest	: ARRAY[1..20] OF INT;
CV_Pass_Score	: ARRAY[0..10] OF INT;
cv_reject_score	:ARRAY[0..10] OF INT;
Entropy_pass_Score	:ARRAY[0..10] OF INT;
entropy_reject_score	:ARRAY[0..10] OF INT;
bheartbeat	: BOOL ;
entropy_var	: REAL := 45;
CV_Decision	:REAL := 25;
CV_decision_highlimit	:REAL := 25;
dintPassCounterLane	: ARRAY[1..32] OF DINT;
dintPassCounterLane	: ARRAY[1..32] OF DINT;
dintRejectCounterLane	: ARRAY[1..32] OF DINT; lanes
dintRejectCounterLane	: ARRAY[1..32] OF DINT; lanes
dintRejectCounterLane	: ARRAY[1..32] OF DINT; lanes
dintProcessedCounterLane	: ARRAY[1..32] OF DINT
dintProcessedCounterLane	: ARRAY[1..32] OF DINT
dintpasslaneHour	: ARRAY[1..32] OF DINT;

Variables	Output
dintrejectlaneHour	: ARRAY[1..32] OF DINT;
dintprocessedlanehour	:ARRAY[1..32] OF DINT;
dintpasstotalhour	:DINT;
dintshakerprocessed_hr	: ARRAY[0..1] OF DINT;
dintShakerfeed_avg	: ARRAY[0..1] OF DINT;
dintpasspersshakerhour	: ARRAY[0..2] OF DINT;
dintrejectpersshakerhour	: ARRAY[0..2] OF DINT;
dintrejecttotalhour	:DINT;
dintprocessedtotalhour	:DINT;
dintpasslaneHourPercent	: ARRAY[1..32] OF REAL;
dintrejectlaneHourPercent	: ARRAY[1..32] OF REAL;
dintpasslaneday	: ARRAY[1..32] OF DINT;
dintrejectlaneday	: ARRAY[1..32] OF DINT;
dintprocessedlaneday	: ARRAY[1..32] OF DINT;
dintpasspersshakerperday	: ARRAY [0..2] OF DINT;
dintrejectpersshakerperday	: ARRAY[0..2] OF DINT;
dintprocessedpersshakerperday	: ARRAY[0..1] OF DINT;
dintpasstotalday	:DINT;
dintpasstotalday	:DINT;
dintprocessedtotalday	:DINT;
ipasspercentageday	: REAL;
irejectpercentageday	: REAL;
ipasspercentagehour	: REAL;
irejectpercentagehour	: REAL;
dintpasslanedaypercent	: ARRAY[1..32] OF REAL;
dintfaillanedaypercent	: ARRAY[1..32] OF REAL;
dintpassshakerperhourPercent	: ARRAY[0..1] OF REAL;
dintrejectshakerperhourpercent	:ARRAY[0..1] OF REAL;
dintpassshakerperdaypercent	: ARRAY[0..1] OF REAL;
dintrejectshakerperdaypercent	: ARRAY[0..1] OF REAL;
dintpassshakertotalpercent	: ARRAY[0..1] OF REAL;
dintrejectshakertotalpercent	: ARRAY[0..1] OF REAL;
iHigh_husk_warning_set	: INT := 30;
rlowfeedwarningthreshold_dev	: INT:=65;
rlowfeedwarningthreshold_set	: ARRAY [0..1] OF REAL;
dintlowfeedwarningthreshold	:ARRAY[0..1] OF REAL;
dintPassCounterShaker	: ARRAY[0..1] OF DINT;
dintProcessedCounterTotal	: DINT;

Variables	Output
dintPassCounterTotal	: DINT;
dintRejectCounterTotal	: DINT;
dintRejectCounterTotal	: DINT;
dintPassCounterPerShaker	: ARRAY[0..1] OF DINT;
dintRejectCounterPerShaker	: ARRAY[0..1] OF DINT;
dintRejectCounterPerShaker	: ARRAY[0..1] OF DINT;
dintprocessedpershaker	: ARRAY[0..1] OF DINT;
dintprocessedpershaker	: ARRAY[0..1] OF DINT;
iPassPercentage	: REAL;
iPassPercentageLane	: ARRAY[1..32] OF REAL;
iFailPercentage	: REAL;
iFailPercentage	: REAL;
iFailPercentageLane	: ARRAY[1..32] OF REAL;
udintLifecycleCountLane	: ARRAY[1..32] OF UDINT;
rDecisionThersholdTexture	: REAL := 50;
blowfeedwarning_active	: BOOL := TRUE;
bBlockedlanewarning_active	: BOOL := TRUE;
bHighHuskWarning_active	: BOOL := TRUE;
bCylinderEOLWarning_active	: BOOL := TRUE;
iCylinderEOLsetting	: DINT := 5000000;
iblockedlanemin	: INT := 5;
CV_pass	: INT;
cv_reject	: INT;
entropy_reject	: int;
Entropy_pass	: INT;
dintroguelaneHour	: ARRAY[1..32] OF DINT;
dintroguelaneday	: ARRAY[1..32] OF DINT;
dintrockslaneHour	: ARRAY[1..32] OF DINT;
dintrockslaneday	: ARRAY[1..32] OF DINT;
total_rocks	: DINT;
total_rocksperhour	: DINT;
total_rocksperday	: DINT;
rockspershaker	: ARRAY[0..1] OF DINT;
rockspershakerperhour	: ARRAY[0..1] OF DINT;
rockspershakerperday	: ARRAY[0..1] OF DINT;
dintRogueArea	: ARRAY[1..20] OF DINT;
dintRogueArea	: ARRAY[1..20] OF DINT;
totalRogues	: DINT;

Variables	Output
totalRoguesperhour	: DINT;
totalRoguesperday	: DINT;
rogues_per_Shakerperhour	: ARRAY [0..1] OF DINT;
rogues_per_Shakerperday	: ARRAY [0..1] OF DINT;
rogues_per_Shaker	: ARRAY [0..1] OF DINT;

Setting Parameters

Flipper timing can be adjusted through the settings icon. The Flipper Delay and Flipper Dwell Time settings allow the user to compensate for slower or faster belt speed on the shaker feeder. The Flipper Delay is the amount of time the EyeConic will wait until the flipper moves down to reject an ear. The Flipper Dwell Time is how long the flipper stays down to reject an ear. A slower belt will typically require each setting to increase whereas a faster belt will typically require the settings to decrease.

Additionally flipper function can be turned off on any selected lane in order to perform maintenance or troubleshoot by pushing the Lane Active button. Green indicates a lane is active.

Figure 52.



Warning messages can be accessed through the settings icon. All warning messages can be turned off or adjusted by hitting the Login button and entering the code **[7304]**.

Figure 53.



The Advanced Control button navigates to all the functions other than the vision system.

Figure 54.



IMPORTANT

The Camera Setup button should only be used when a camera or light is replaced or for advanced tuning of the vision system. See Advanced Troubleshooting for more information.

Low Feed warnings are applied to each lane and will trigger when the amount of ears scanned in a lane fall below the % setting in the % of Avg to Trip Warning value field. The # of Low Feed Lanes to Trip Shaker Warning field is intended to identify potential blocked lanes in the shaker. The Shaker Warning will trigger if low feed is detected in the number of lanes identified in the Shaker Warning field.

High Husk is intended to identify problems with the husker. If any shaker rejects a higher % of ears than the % Rejected to Trip Warning field, the High Husk warning will show on the home icon. The Blocked

Lane is intended to identify any lane on the shaker that is not feeding any corn. If any lane exceeds the time (in seconds) of the value in the Time of Blocked Lanes to Trip Warning field, the Blocked Lane error will show on the home icon.

Cylinder EOL warning will appear when the cylinder counter in any lane exceeds the Warning Trip Threshold value. Cylinder counts every time it is activated if you do a test cycle or manually fire it will increase the cylinder counts.

To change the values of any of the settings, press the field you want to change. A virtual keyboard will appear for you to change the value.

Press the back button when you are done making changes.

Figure 55.



Testing Flippers

If flipper performance is inconsistent or a flipper has been replaced, flippers can be actuated manually by pushing the Enable Manual Flipper Control button. See [Fig. 65]. Then push which lane you want the flipper to actuate to test that flipper. The flipper will stay in the down position until the lane is pressed a second time which will return the flipper to the center position.

After pressing the Enable Manual Flipper Control button, the Enable Test Flipper Cycle button will become active. Press the Enable Test Flipper Cycle button to watch each flipper actuate down and then back to neutral in order at a set cadence. This test is very useful to determine if all flippers are reacting at the same speed or if a cylinder is getting worn-out and reacting slow.

Seasonal Operations

As mentioned earlier in this manual, the EyeConic is set up to run solely on its own. However, there are some seasonal operation tasks that machine operators should be cautious of such as:

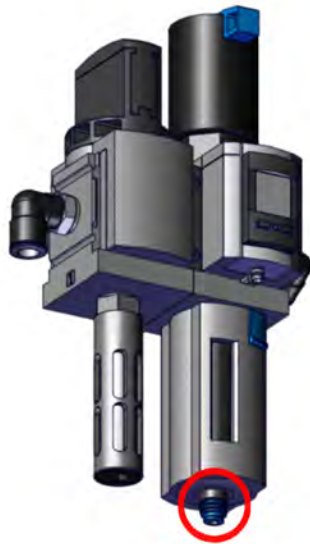
- Check the moisture separator (and emptying if necessary)
- Check that all valves & wires are intact
- Test the air valves & checking flipper operation

- Inspect acceleration belt for excessive wear/damages
- Check belt tension is adjusted correctly
- Inspect parts on machine for breakage
- Ensuring the camera enclosures is free of any debris

Moisture Separator

The moisture separator collects water and is designed as a tiny knob on the bottom of the filter housing on the air prep unit. Activate the hand valve to drain the moisture. See **[Fig. 56]** below.

Figure 56.



Moisture separator circled in red.



WARNING

If the machine operator needs to clean the lens of the camera, they must do so with compressed air. DO NOT use cloth or liquid to wipe down lens.

Start of Shift Procedures

All shift operators and mechanics should ensure that the EyeConic is functioning properly by checking for the following:

- Inspect the machine for any damaged parts
- Check/clear any blockages in machine
- Ensure camera enclosures are clean prior to starting up the machine

Assigning Maintenance Tasks

The EyeConic's function is designed for the machine to run completely on its own and electronically. Manual operation of the EyeConic is minimal. As an operator of the machine, it is important to keep a lookout for jams or air leaks.

Section 7: Maintenance

In-Season

Minimal in-season maintenance is required for the EyeConic. An important task to always note while the machine is running and functioning during season is to clean the camera enclosure glass if needed.

**IMPORTANT**

Clean the camera enclosure **ONLY** with compressed air.

Off-Season

Off-season maintenance for the EyeConic machine is also minimal. Tasks include:

- Drain the water from the air filter
- Turn off compressed air
- Turn off electrical disconnect
- Loosen the belt tension

**NOTE**

Occasionally, the tension belts have the tendencies of taking a set to where they maintain the shape that they're in while sat a stand still if the belts don't move. This should be a periodical task by turning on the EyeConic to maintain belt elasticity and prevent the belt from taking set.

Pre-Season Set Up

Pre-season start-up operation tasks for the EyeConic include:

- Drain the water & air filter (required)
- Enable a flipper cycle test to assure all flippers move expectedly
- Assure nothing is broken or jammed up

**NOTE**

Refer to the [Seasonal Operations \(page 62\)](#) section of this manual for further instruction on how to drain water from the air filter.

Cleaning

Cleaning the EyeConic will also be a minimum maintenance task. It is important to always ensure the camera enclosure glass is clean and clear of any debris. Clean the glass only with compressed air.

**WARNING**

Do NOT clean the enclosure glass with any fabrics, towels, or liquid cleaning substance.

Section 8: Spare Parts

This section describes how to order spare parts and how to replace certain parts of the EyeConic.

Ordering Spare 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 & description
- Quantity of parts required & purchase order number

Recommended Spare 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.

Item	Part Number	Description	Quantity
	4021028.0004	FLIPPER,WIDE	
	4151003	INSPECTION BELT,RIBBED	
	4151010	AY,CYLINDER 3-WAY SORT	
	4151018	MANIFOLD,20-VALVE	
	4151018.001	VALVE,EYECONIC	
	4151018.002	AIRLINE CARTRIDGE,Ø1/4"	
	4151018.003	AIRLINE CARTRIDGE,Ø3/8"	
	4151039	LANE GUIDE	
	4151025	BUSHING,FLIPPER	

Camera Installation



NOTE

Cameras are factory calibrated and focused. These do not require the customers manual adjustments. However, customers will have to connect a cable through the camera housing, located in the inner shrouds, during initial installation.

The camera of the EyeConic is housed on the top bar of the frame **[4151001]**. Cameras are factory focused by Magnuson CCM and will be preset for the customer/buyer prior to delivery. If any camera changes need to be adjusted, call your Magnuson CCM Sales Representative.

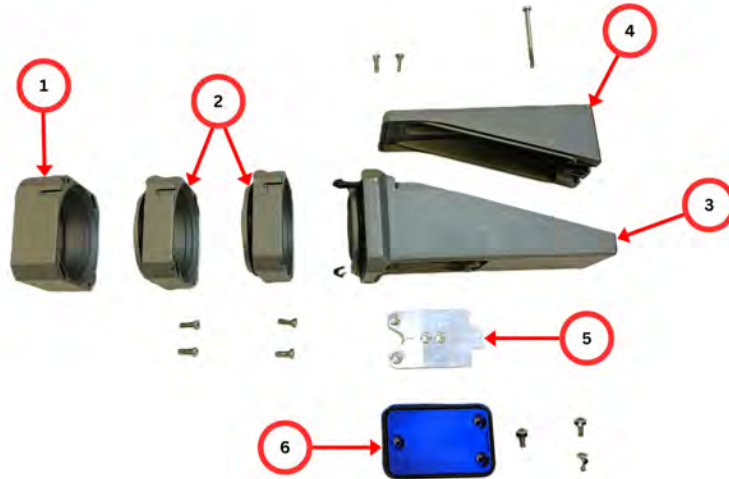
The internal camera installation consists of the 4 different parts:

Figure 57.

Item	Description	Notes
1	Locking Band	Rubber locking band helps prevent the camera lens from coming out of focus, staying in place.
2	Color Filter	
3	Lens	Remove thumbscrew from lens adjustment ring (narrow ring: furthest from camera). Leave thumbscrew for aperture adjustment ring installed (wide ring: closest to camera).
4	Camera	

The camera mount installation consists of 6 parts:

Figure 58.



Item	Description	Notes
1	Lens Tube	
2	Lens Tube Extensions	Must install both extensions. Use anti-seize on screws.
3	Enclosure Body	
4	Enclosure Lid	Use anti-seize on screws. Rubber cord seal must be present.
5	Camera Plate	Use plate labeled '1' (discard the un-used plates).
6	Base Plate	

Figure 59.



Camera fully installed in housing.

Section 9: Troubleshooting

When packing plant personnel conduct ongoing inspection and monitoring of the EyeConic seed corn sorter, 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.

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 assistance is required for troubleshooting or repair of the machine, contact your local Magnuson CCM service representative. Refer back to the [Contacting Magnuson CCM \(page 5\)](#) chapter.

Advanced Troubleshooting

This section ties closely with the texture decision variable and HMI control screen.

The coefficient variation code and the entropy camera features are used for independent camera control per each camera. The entropy values stay mostly unchanged. Once the customer/buyer finds the most accurate number setting for their machine, the user should leave the entropy number at that level unless it needs to be adjusted.



IMPORTANT

The coefficient variation can fluctuate at times based on the corn or lighting.

If the EyeConic is kicking or rejecting out ears of corn that should be going through the machine, the coefficient variation code needs to be raised.



NOTE

The coefficient variation number should not be set over 40.

The shaker lane cameras should be set as such:

Shaker	Camera 1 setting	Camera 2 setting
Shaker 1	1 to 5	6 to 10
Shaker 2	11 to 15	16 to 20

To adjust the shaker numbers, use the small keypad on the control panel screen under the words **WARNING SET UP** to make those adjustments and set them by pressing **ENTER** on that same keypad.

**NOTE**

The Texture Decision variable is the primary tool for making the sorting decision more or less sensitive to the amount of husk present. Lighting levels, region of interest (ROI), Coefficient of Variation (CV) and Entropy values in the Camera Setup screen can help tune the vision system to achieve more precise sorting results. This section will explain how each setting can affect the sorting decision and how to make adjustments.

To access the advanced troubleshooting features, press the gear icon and the Login button. Enter [7304].

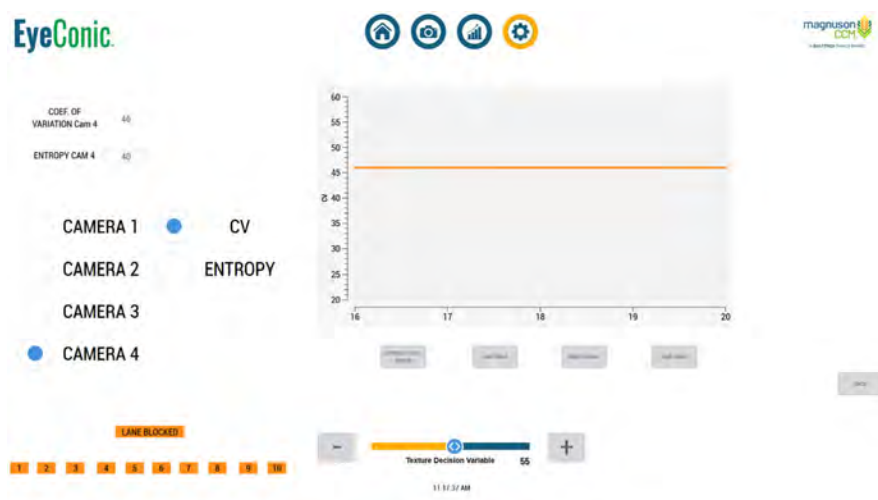
Figure 60.**Figure 61.****Lighting Level**

Lighting needs to be as even as possible across all lanes. Magnuson CCM recommends each lane be between 1400-1900 LUX when measured approximately 12" inside the hood from the exit wheel. If lighting levels are too bright, the images can become washed out and difficult for the camera to see dark

areas around the kernels. If the lighting levels are too dim, the images can be too dark for the camera to see the bright spots on the kernels.

To achieve the optimal lighting levels, lighting angles can be adjusted on the side lights to more evenly disperse the lighting levels within the hood. Lighting intensity from each light can be manually adjusted by pressing the Camera Setup button, then the Light Adjust button.

Figure 62.



Use the slider bars to adjust the light intensity of the lights inside each hood. The Main Light is the long light bar near the entry point of the hood. The Side Lights adjust the intensity of the two smaller lights on either side of the hood. To hit the optimal 1400-1900 Lux levels for each lane, the lights should typically be set between 25 and 40.

Figure 63.



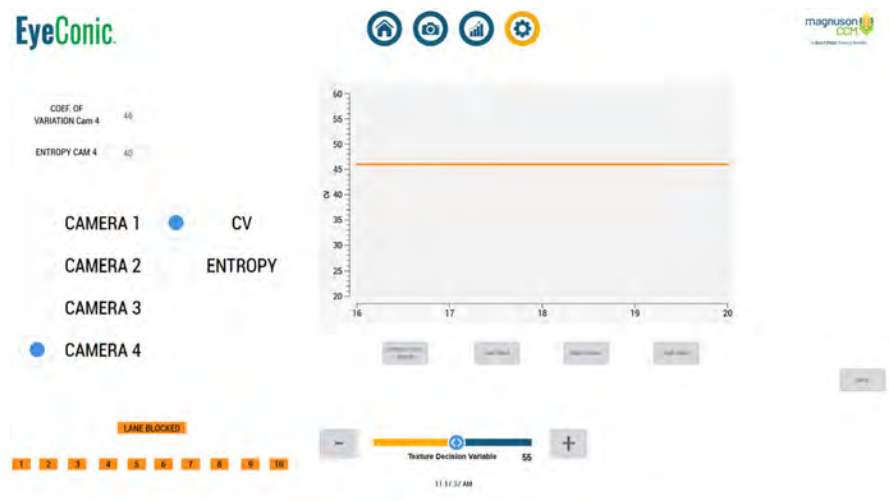
Region of Interest (ROI)

ROI is the area within each lane where Eyeconic software evaluates the image for texture. A larger ROI ensures more of the ear is captured in the image but also risks catching too much of the belt in the image

which can artificially lower the texture score. A smaller ROI captures less of the ear and reduces the amount of belt evaluated in the image, but evaluating a smaller portion of each ear can lead to fewer ears being rejected when they contain small amounts of husk. The user should attempt to size the ROI slightly smaller than the size of the corn being processed and ensure it is centered within each lane for best results.

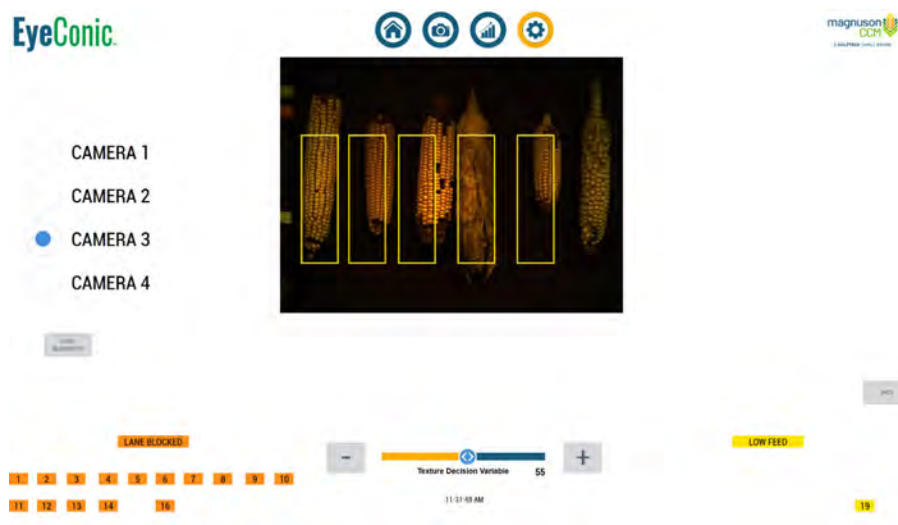
To adjust the ROI settings from the Camera Setup screen, press the Lane Adjust button.

Figure 64.



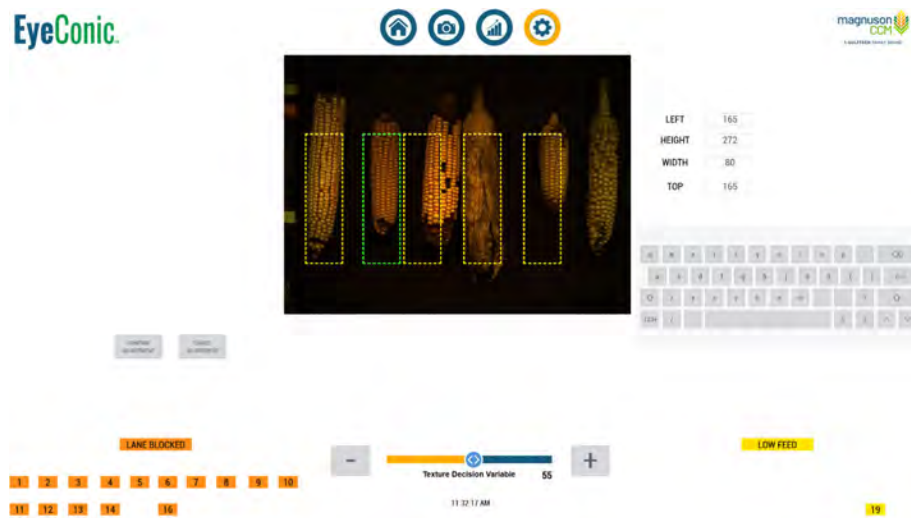
Select the camera that you want to adjust, press the Start Adjustment button and then select a rectangle for the lane ROI you want to adjust.

Figure 65.



The ROI of the lane being adjusted will turn green. Select which parameter you want to adjust and use the keyboard to enter a pixel value. Left and Top are to move the location of the ROI. Height and Width are for sizing the ROI. Push the Confirm Adjustment button to save the setting changes. Push the Cancel Adjustment button if you want to start over. Adjust each lane until all five ROI boxes are sized and centered correctly.

Figure 66.



Coefficient Variation (CV) and Entropy Values

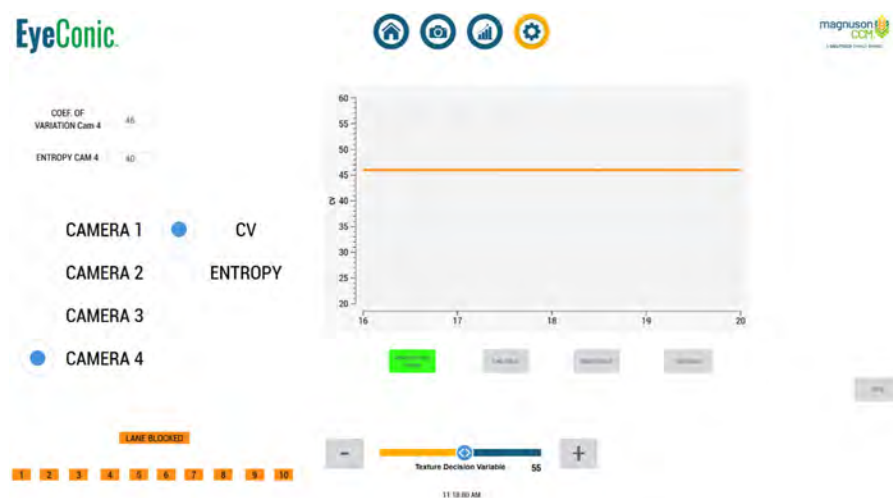


IMPORTANT

CV and Entropy values directly influence the calculation of the Texture Variable score as well as create bounding limits for specific texture properties. These should be adjusted with extreme caution! Make sure to verify that the CV and Entropy values are causing false sorting decisions before making any adjustments. Follow the steps below.

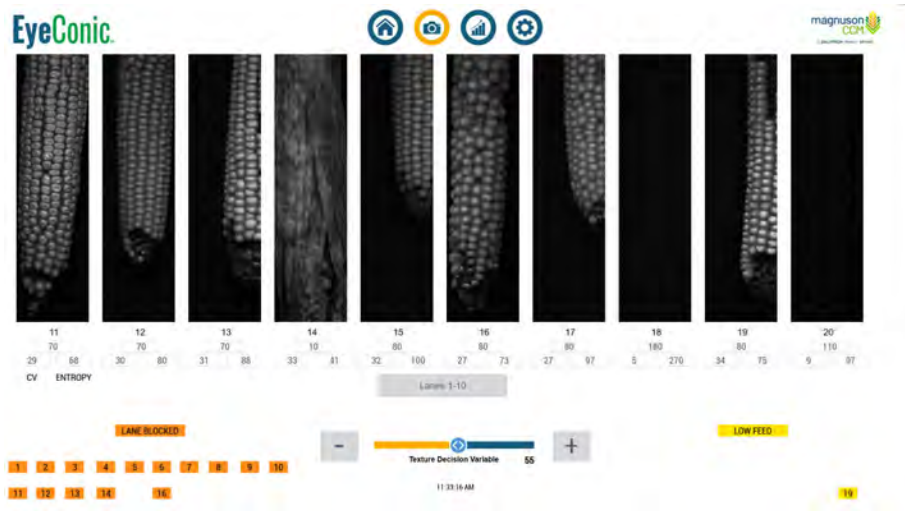
After pressing the Camera Setup button, select the camera that you want to evaluate and press the Advanced Score display button.

Figure 67.



Press the camera icon. The Texture Decision score is displayed under each image along with the CV and Entropy score.

Figure 68.



As mentioned earlier in the manual, an ear is rejected if any of the following calculations are true: the Texture Decision score is lower than the Texture Decision variable, the CV score is above the CV setting for the camera, or the Entropy score is below the Entropy setting for the camera.

Press the Lanes button to change the image between Lanes 1-10 and 11-20.



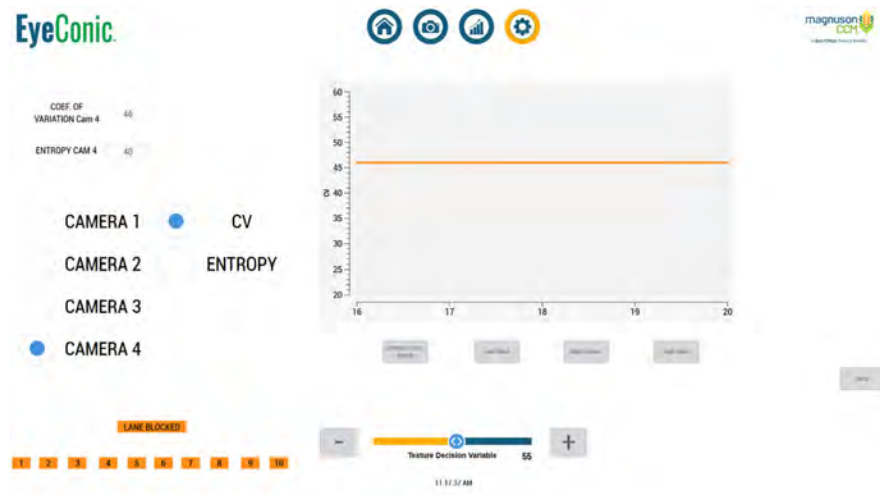
IMPORTANT

Make sure that the lighting, ROI and camera focus are set correctly before adjusting the CV or Entropy.

CV and Entropy can be set independently for each camera. Before changing values of a camera, press the CV and Entropy chart button to see the scores of ears that passed through each lane to make sure that the CV value is set above the typical ear CV score and that the Entropy value is set below the typical ear Entropy score to prevent large numbers of false rejects.

Figure 69.

To change the CV setting of a camera, press the COEF. OF VARIATION CAM box, enter the new value on the virtual keyboard, and press the enter key on the keyboard to retain the new value. To change the entropy setting of a camera, press the ENTROPY CAM box, enter the new value on the virtual keyboard and press the enter key on the keyboard to retain the value.

Figure 70.

The Single Capture button can be used to verify scoring of corn to ensure setting changes will result in correct sorting decisions. The shaker belt should be turned off and corn placed in each lane. Pressing the Single Capture button will refresh the image of the selected camera.

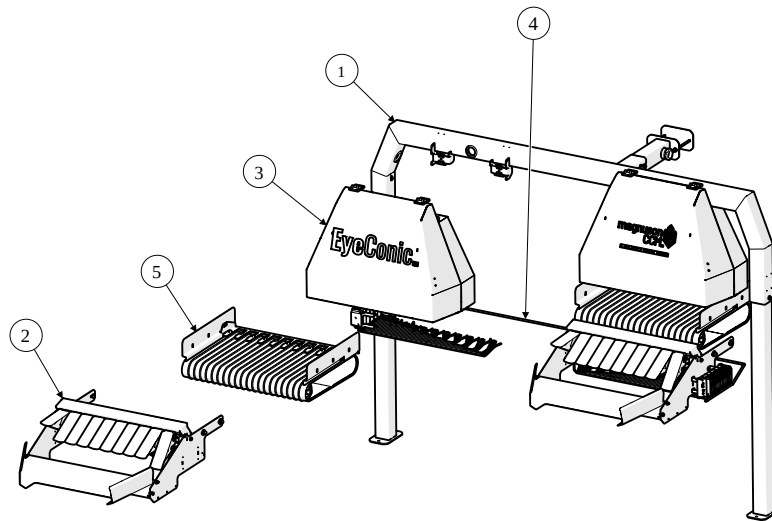
A best practice is to place a combination of ears with and without husk in each lane and evaluate the image scores against the CV, Entropy and Texture settings to ensure they are set to appropriate levels.

Section 10: Drawings

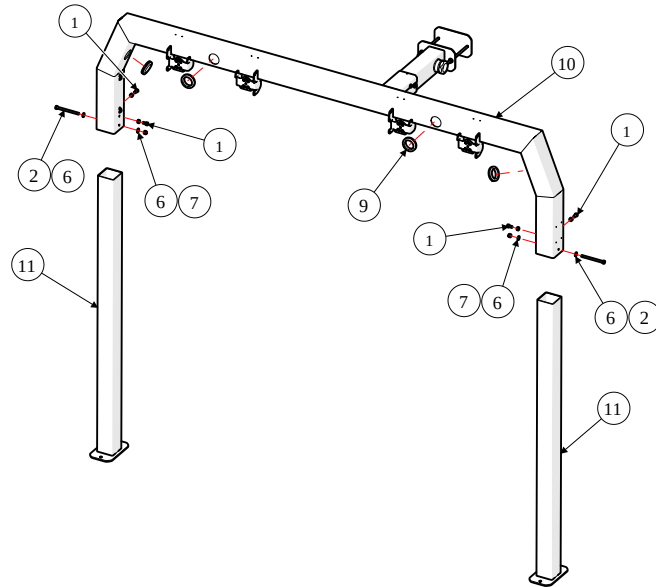
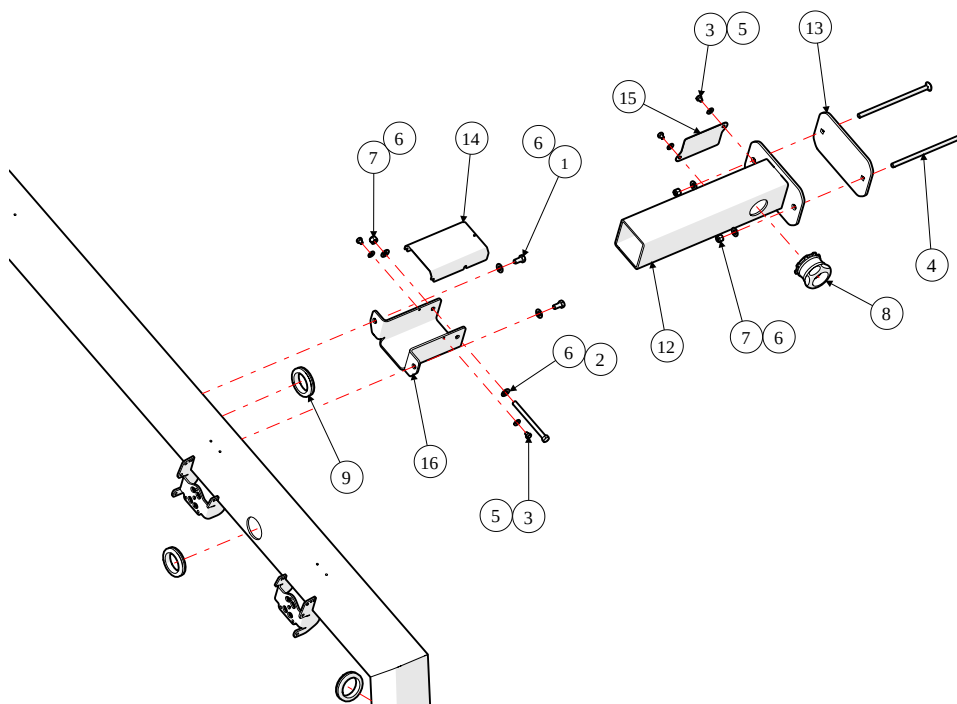
Drawing graphics of the EyeConic can be found in this section along with the appropriate bill of materials for each piece of the assembly.

4150000.8000 - EYECONIC 20-LANE 3-WAY SORT

Figure 71.



Item	Part Number	Description	Quantity
1	4150000.8001	AY,FRAME EYECONIC 20-LANE	1
2	4150000.8002	AY,FLIPPERS 3-WAY SORT	1
3	4150000.8003	AY,SHROUD EYECONIC 20-LANE	1
4	4150000.8004	AY,PNEUMATIC 3-WAY SORT	1
5	4150000.8007	AY,ACCELERATION BELTS	1

4150000.8001 - AY,FRAME EYECONIC 20-LANE**Figure 72. FRAME****Figure 73. CAMERA MOUNT**

Item	Part Number	Description	Quantity
1	0001.0540	SCR,HCS 3/8-16 x 3/4 SS	6
2	0001.0752	SCR,HCS 3/8-16 x 4 3/4 SS	3
3	0001.1009.5	SCR,HCS 1/4-20 x 5/16 SS	4
4	0001.3923.8	SCR,CRGB 3/8-16 x 8 ZNC	2
5	0001.4350	WSHR,FLT .281 x .625 x .063 SS	4
6	0001.4500	WSHR,FLT .406 x .813 x .063 SS	10
7	0001.5800	USE UP, THEN 0001.5805	5
8	0007.2143	EMT FTG,1-1/2 STR ZNC	1
9	0009.2082	GROMMET,RBR 2 x 2.75 x .188	5
10	4151001	GANTRY,20-LANE	1
11	4151002	INNER LEG,60"	2
12	4151004	WALL BRACE	1
13	4151006	WALL PLT	1
14	4151008	TOP COVER	1
15	4151009	ACCESS PNL	1
16	4151047	BRACE CHANNEL	1

4150000.8002 - AY,FLIPPERS 3-WAY SORT

Figure 74. CHUTE/DEBRIS SLIDE

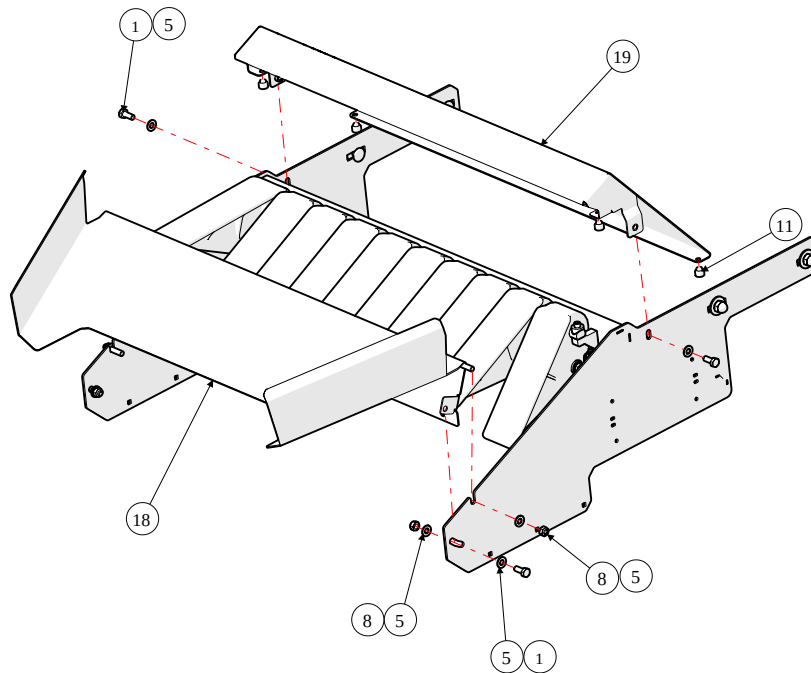


Figure 75. SIDE PLATE MOUNT

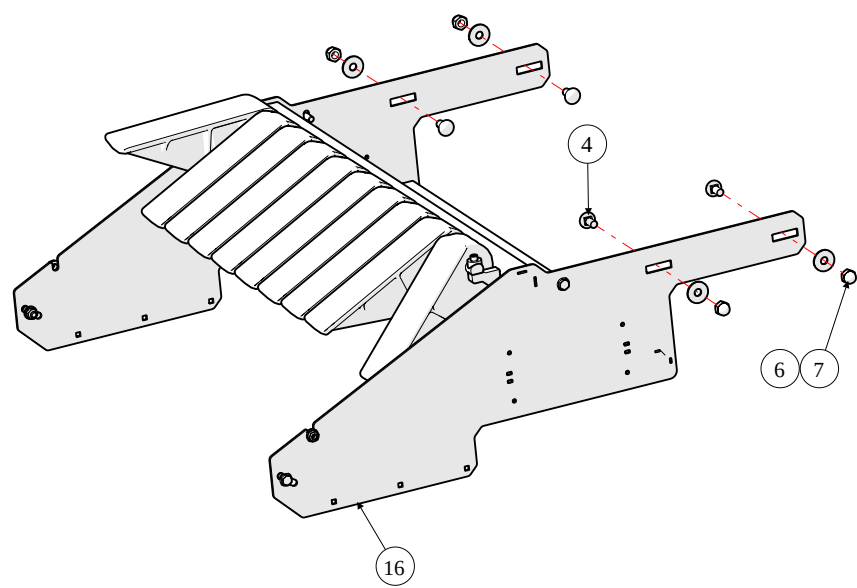


Figure 76. FLIPPER MOUNT

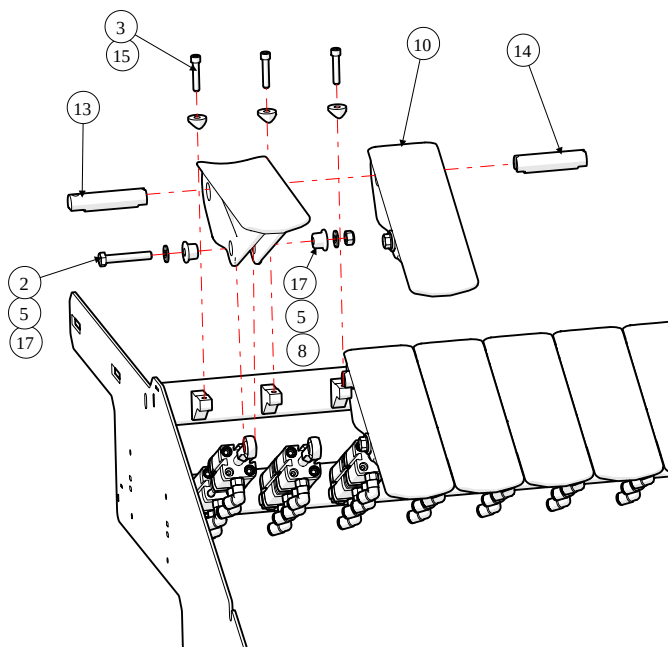
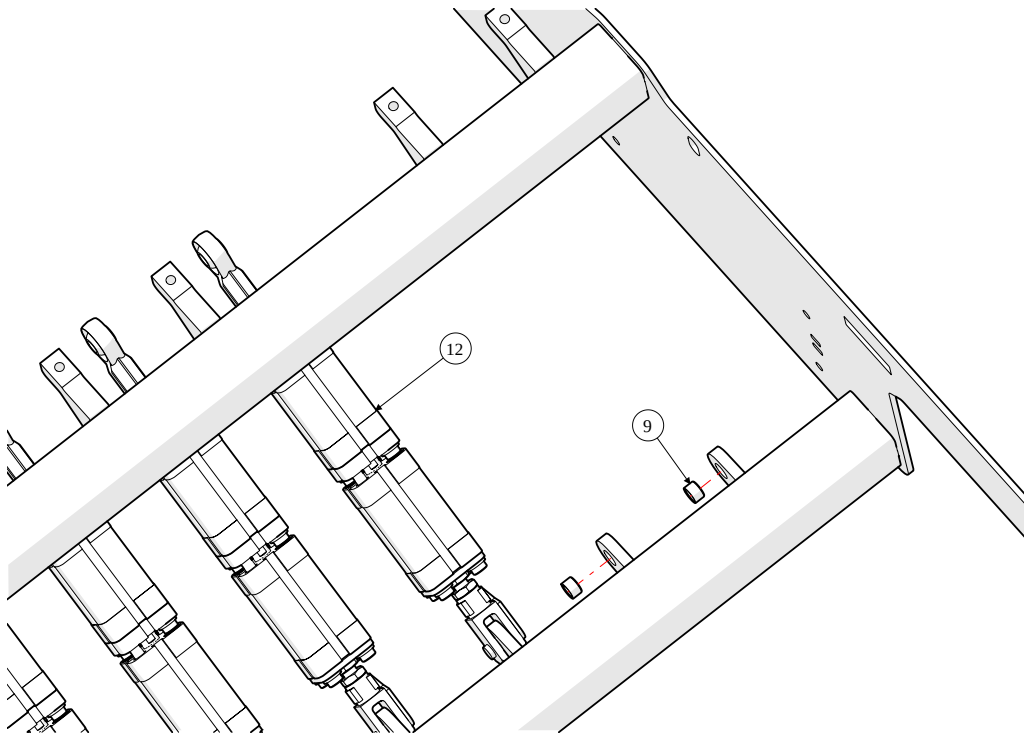
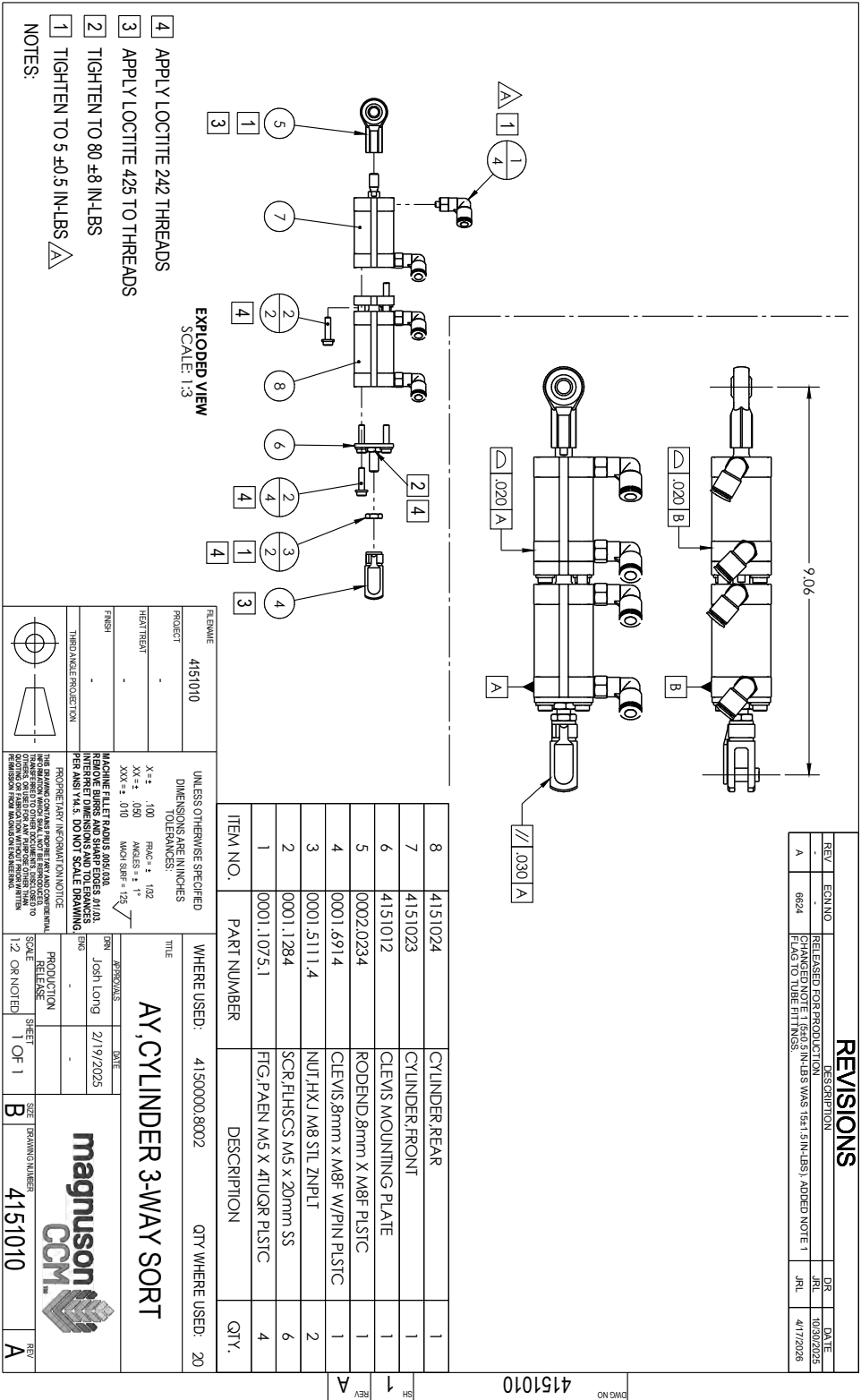


Figure 77. AY, CYL & BEARING

Item	Part Number	Description	Quantity
1	0001.1009.7	SCR,HCS M8 x 20 SS	8
2	0001.1009.11	SCR,HCS M8 x 50 DIN 931 SS	20
3	0001.1212	SCR,SCS 1/4-20 x 1 1/4 SS	22
4	0001.3934	SCR,CRGB M10 x 20 ZNC	8
5	0001.4390	WSHR,FLT .344 x .688 x .063 SS	56
6	0001.4657.3	WSHR,FLT M10 x 30 x 2.5 ZNC	8
7	0001.5118.1	NUT,ACORN M10 ZNC	8
8	0001.5815	NUT,HXSLFLKG M8 x 13MM SS	28
9	0003.0016.1	BRG,SLV 8MM x 10MM x 6MM PLSTC	20
10	4021028.0004	FLIPPER,WIDE	20
11	0009.1154	PUSH IN BUMPER	8
12	4151010	AY,CYL 3-WAY SORT	20
13	4151013	PIVOT PIN,END	4
14	4151014	PIVOT PIN,MIDDLE	16
15	4151015	SADDLE WASHER	22
16	4151016	FLIPPER MOUNT	2
17	4151025	BUSHING,FLIPPER	40
18	4151026	CHUTE,SHORT	2
19	4151031	DEBRIS SLIDE	2

AY,CYL 3-WAY SORT Drawing Notes: 4151010

Figure 78.



4150000.8003 - AY,SHROUD EYECONIC 20-LANE

Figure 79. DECALS & FRONT SHROUD

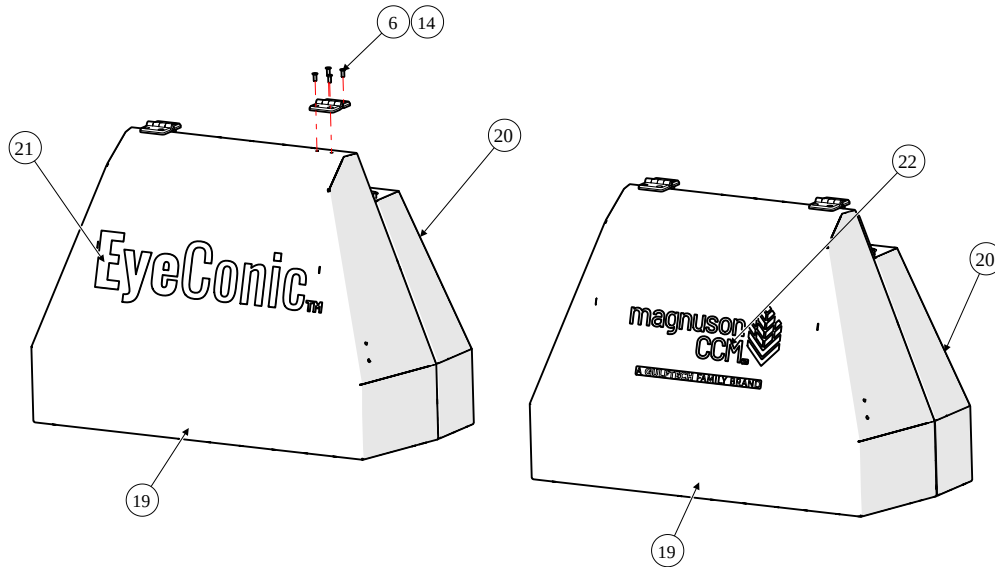


Figure 80. CAMERA STRUCTURE, ELECTRICAL JUNCTION BOX & FRONT SHROUD

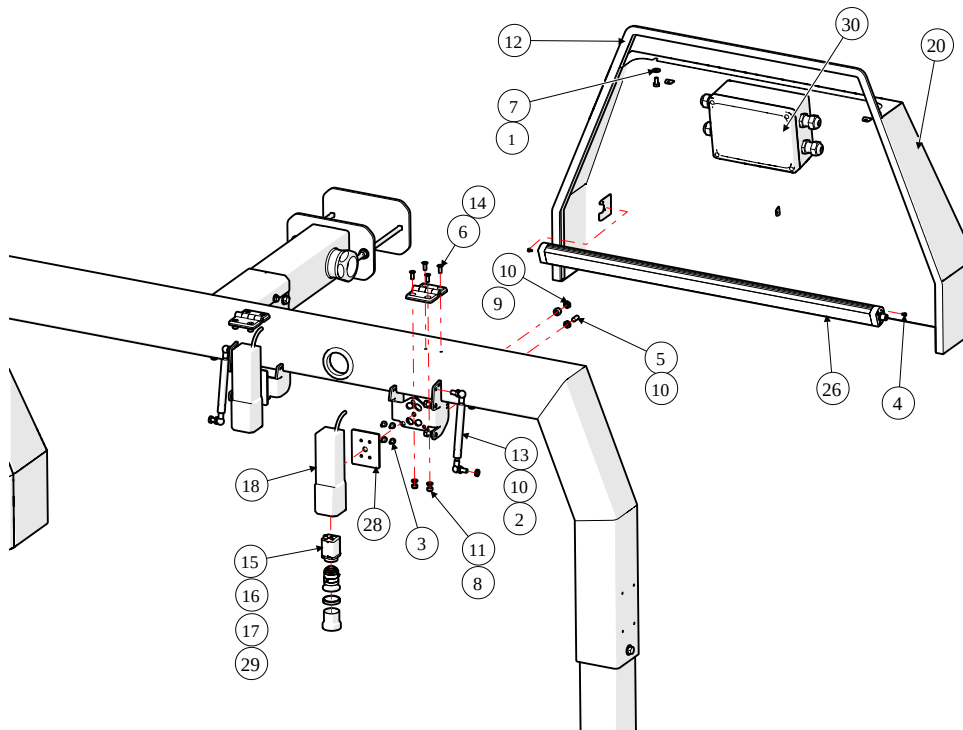
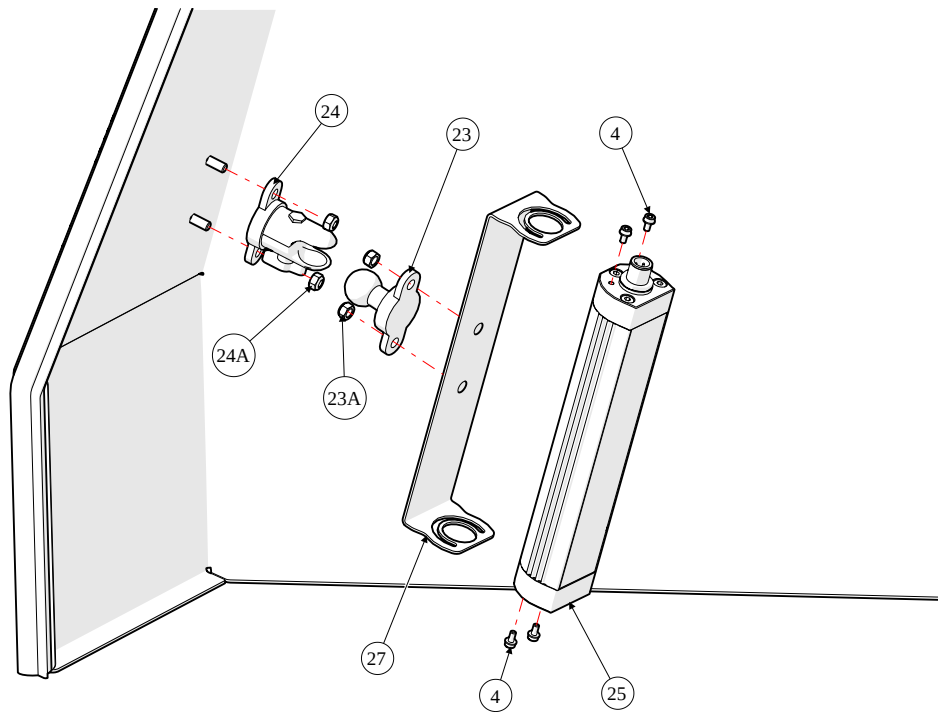


Figure 81. LIGHTING MOUNT

Item	Part Number	Description	Quantity
1	0001.0060	SCR,HCS 1/4-20 x 1/2 SS	8
2	0001.1009.7	SCR,HCS M8 x 20 SS	8
3	0001.1284.1	SCR,SCSFLG M5-.8 x 10 STLCRPLT	20
4	0001.1284.3	SCR,SCSFLG M3-.5 x 6 STLCRPLT	24
5	0001.2884.002	SCR,SSS M8-1.25 x 20 SS CNPT	12
6	0001.3801.1	SCR,FHMS M6 x 16 ZNC	16
7	0001.4350	WSHR,FLT .281 x .625 x .063 SS	8
8	0001.4686	WSHR,FLT M6 ZNC	8
9	0001.4747.1	WSHR,SPHRCL .323x.563x.344 SS	4
10	0001.5111.4	NUT,HXJ M8 STLZNPLT	28
11	0001.5817	NUT,HXSLFLKG M6 ZNC	8
12	0009.0404	SHROUD SEAL,HOLLOW ADHSV MOUNT	12
13	0009.0543	GAS SPRING,60LB 9.65 EXT x 3.5	4
14	0009.1034	HINGE,60mm	4
15	9550.2013	MAKO COLOR CAMERA POE	4
16	9550.2017	LENS,C-MOUNT 6mm	4
17	9550.2018	COLOR FLTR,ORANGE	4
18	9550.2019	CAMERA ENCL	4

Item	Part Number	Description	Quantity
19	4151029	SHROUD,FRONT	2
20	4151030.0001	SHROUD,REAR	2
21	4151032	DECAL,EYECONIC	1
22	4151033	DECAL,MAG/CCM GULFTECH	1
23	4151051	SWIVEL MOUNT,BLL HALF	4
24	4151052	SWIVEL MOUNT,SOCKET HALF	4
25	4151053	LIGHT,24VDC SHORT	4
26	4151054	LIGHT,24VDC LONG	2
27	4151055	MOUNTING BRKT,SHORT LIGHT	4
28	4151057	CAMERA MOUNT	4
29	9550.2020	LOCKING BAND,FOCUS & APERTURE	4
30	4151069	JUNCTION BOX,EYECONIC GANTRY	1

4150000.8004 - AY,PNEUMATIC 3-WAY SORT

Figure 82. MANIFOLD

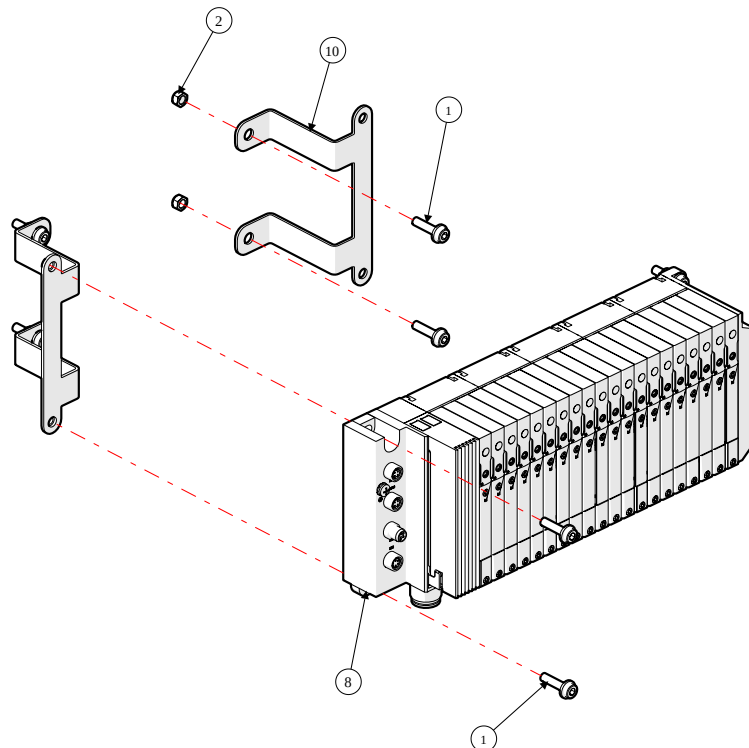


Figure 83.

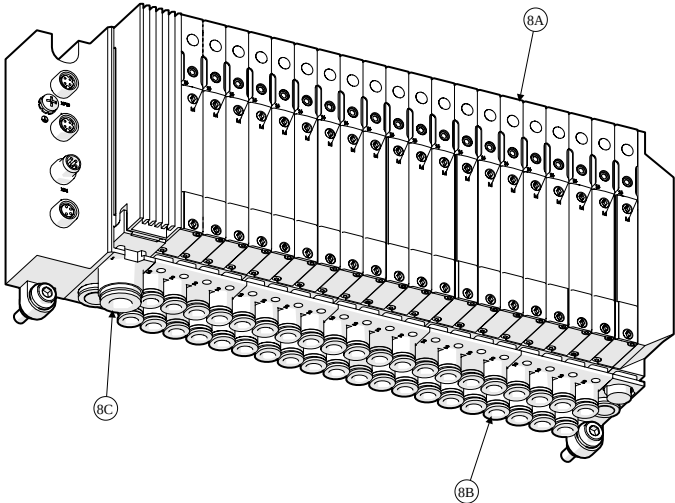


Figure 84. AIR PREP LINE

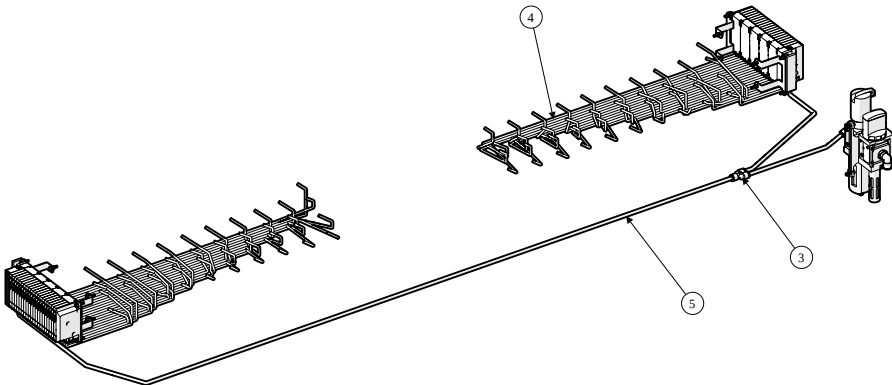
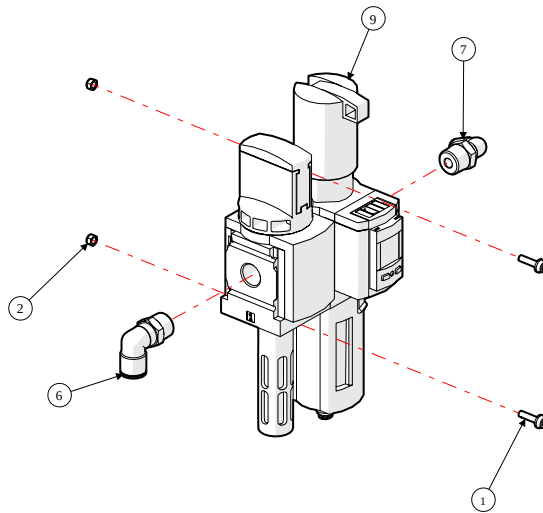
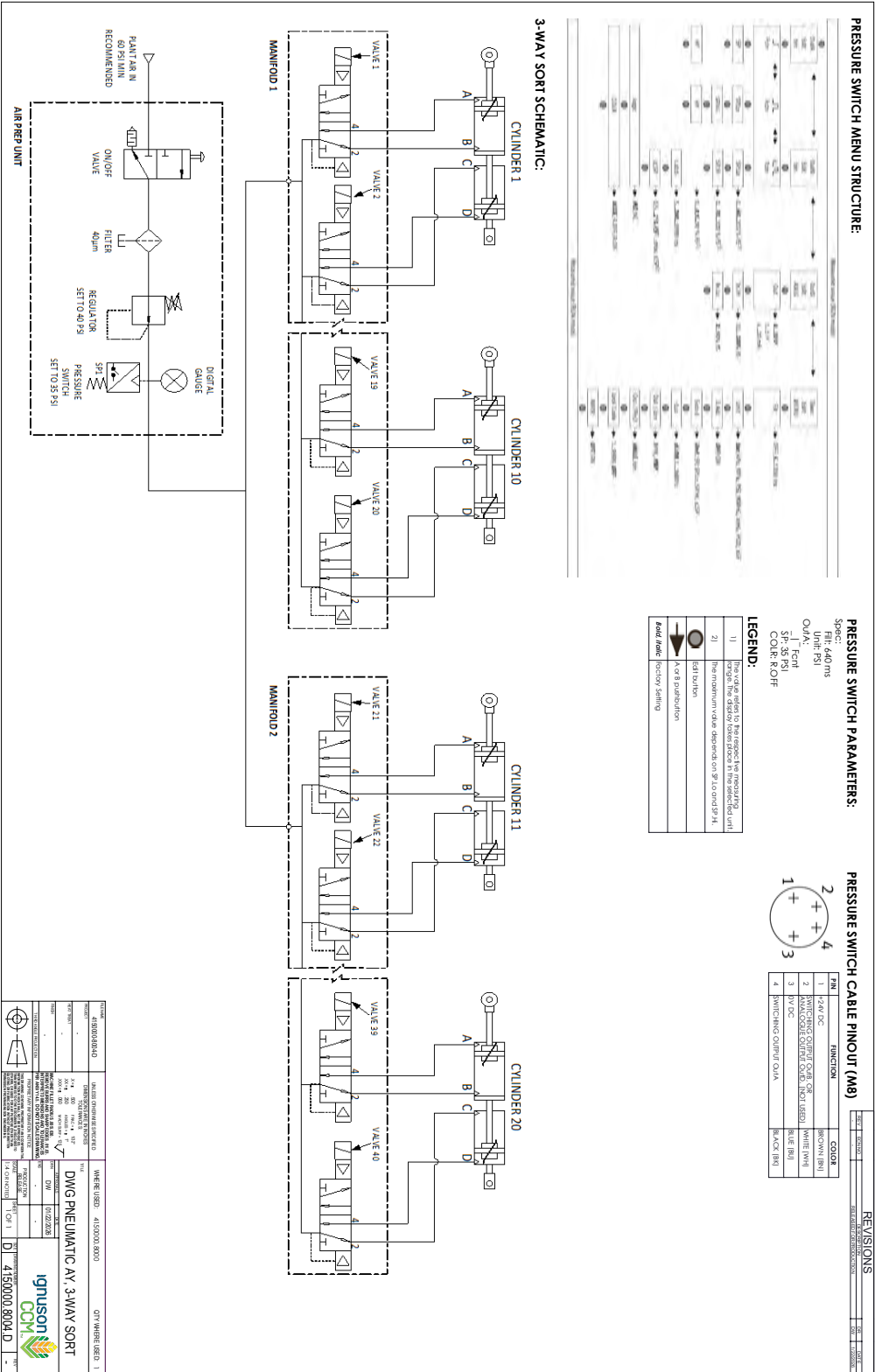


Figure 85. AIR PREP UNIT

Item	Part Number	Description	Quantity
1	0001.1284	SCR,SCSFLG M5 x 20 STLCRPLT	18
2	0001.5816	NUT,HXSLFLKG M5-0.8 x 8MM SS	10
3	0007.2011.2	FTG,PAY 6TUQR x 6TUQR x 6TUQR	1
4	0007.2125.2	RM,TUBE 1/4 OD CLRBLK (FT)	175
5	0007.2125.3	RM,TUBE 3/8 OD CLRBLK (FT)	20
6	0007.4704	FTG,PAEN 8R x 8TUQR	1
7	0007.4705	FTG,PAEN 8R x 6TUQR	1
8	4151018	MANIFOLD,20-VALVE	2
8A	4151018.001	VALVE,EYECONIC	20
8B	4151018.002	AIRLINE CARTRIDGE,Ø1/4"	40
8C	4151018.003	AIRLINE CARTRIDGE,Ø3/8"	1
9	4151021	AIR PREP,EYECONIC	1
10	4151022.0001	MANIFOLD MOUNTING BRKT	4
11	4150000.8004.D	DWG PNEUMATIC AY,3-WAY SORT	1

Pneumatic Drawing Document: 4150000.8004.D

Figure 86.



4150000.8005.3 - CNTRLS,3X EYECONIC 20LN 460V3P

Figure 87.

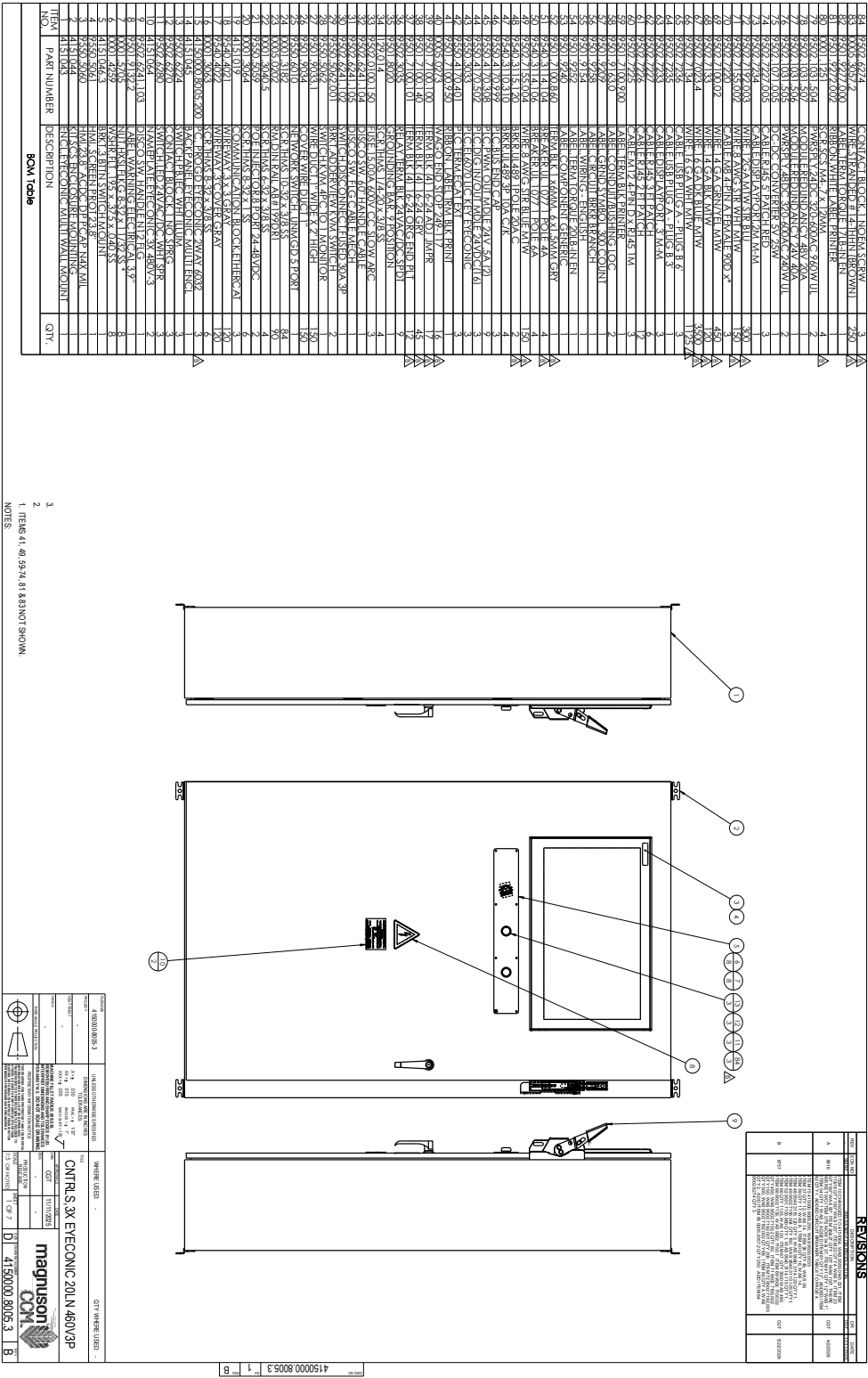
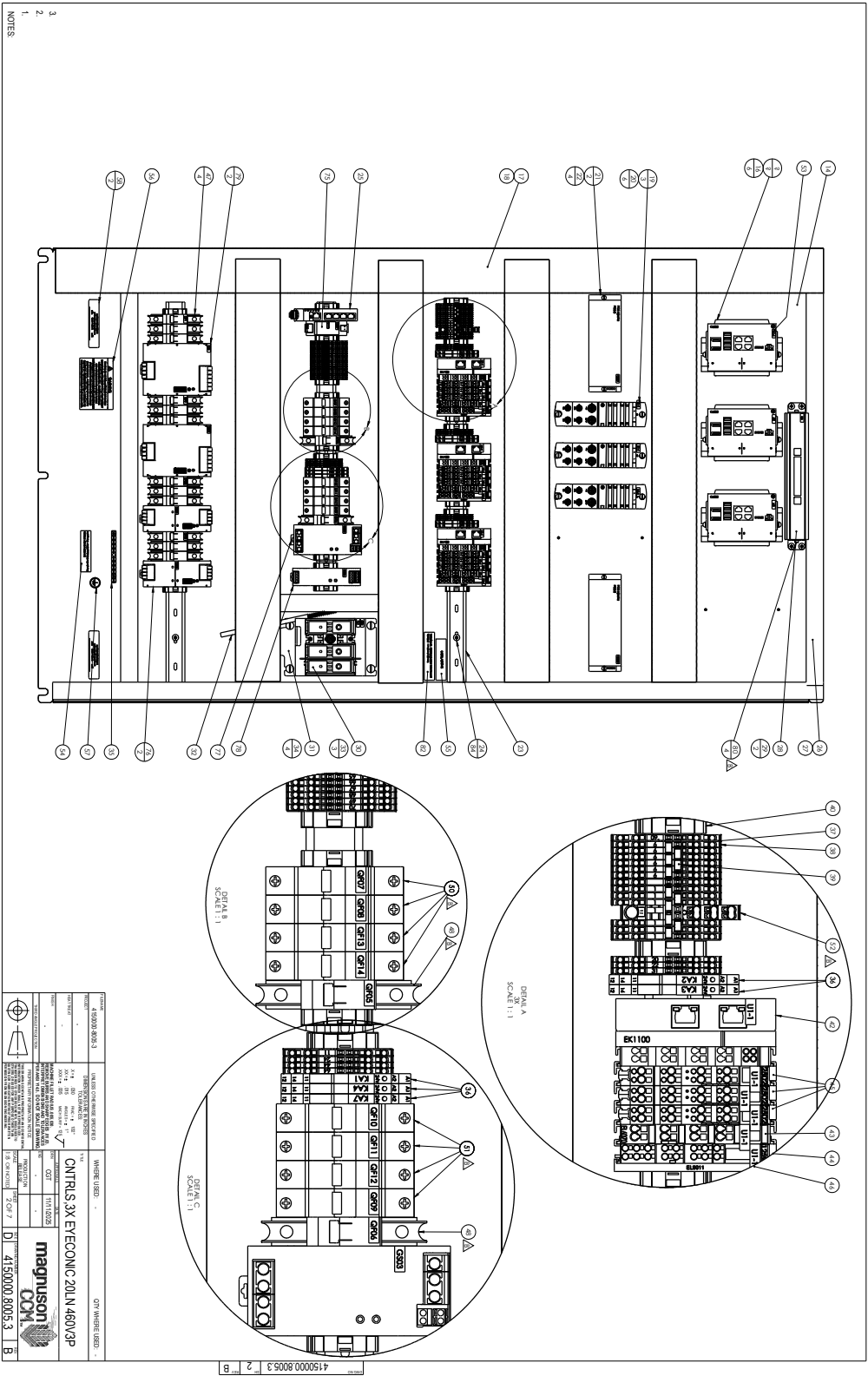


Figure 88.



NOTE

UNIT DESCRIPTION

RELAY DESCRIPTION

U1 IPC1

U2 IPC2

U3 IPC3

U4 IPC4

U1-1 IPC IO1

U2-1 IPC IO2

U3-1 IPC IO3

U4-1 IPC IO4

U1-2 FESTO IO1

U2-2 FESTO IO2

U3-2 FESTO IO3

U4-2 FESTO IO4

U1-3 MANIFOLD 1A

U2-3 MANIFOLD 2A

U3-3 MANIFOLD 3A

U4-3 VALVE STACK 4A

U1-4 MANIFOLD 1B

U2-4 MANIFOLD 2B

U3-4 MANIFOLD 3B

U4-4 VALVE STACK 4B

U1-5 AIR REG 1

U2-5 AIR REG 2

U3-5 AIR REG 3

U4-5 AIR REG 4

U1-6 IPC1 ANALOG OUT1

U2-6 IPC2 ANALOG OUT1

U3-6 IPC3 ANALOG OUT1

U4-6 IPC4 ANALOG OUT1

U1-7 IPC1 ANALOG OUT2

U2-7 IPC2 ANALOG OUT2

U3-7 IPC3 ANALOG OUT2

U4-7 IPC4 ANALOG OUT2

U1-8 IPC1 ANALOG OUT3

U2-8 IPC2 ANALOG OUT3

U3-8 IPC3 ANALOG OUT3

U4-8 IPC4 ANALOG OUT3

U1-9 IPC1 LICENSES

U2-9 IPC2 LICENSES

U3-9 IPC3 LICENSES

U4-9 IPC4 ANALOG OUT3

U1-10 IPC1 DIGITAL IO

U2-10 IPC2 DIGITAL IO

U3-10 IPC3 DIGITAL IO

U4-10 IPC4 DIGITAL IO

U5 SWITCH

UNIT DESCRIPTION

RELAY DESCRIPTION

U1 LIGHTS1

K42 DOWNSTREAM STOP REQUEST 1

K43 UPSTREAM STOP REQUEST 1

K44 LIGHTS2

K45 DOWNSTREAM STOP REQUEST 2

K46 UPSTREAM STOP REQUEST 2

K47 LIGHTS3

K48 DOWNSTREAM STOP REQUEST 3

K49 UPSTREAM STOP REQUEST 3

(K410) LIGHTS4

(K411) DOWNSTREAM STOP REQUEST 1

(K412) UPSTREAM STOP REQUEST 1

FUSE DESCRIPTION

FU1 INPUT POWER

FU2 INPUT POWER

FU3 INPUT POWER

AMPS

BKRK DESCRIPTION

GF1 GS1 POWER SUPPLY

GF2 GS2 POWER SUPPLY

GF3 GS3 POWER SUPPLY

GF4 GS4 POWER SUPPLY

GF5 IPC & REMOTE IO

GF6 LIGHTS, MANIFOLD, & REG POWER

GF7 IPC3

GF8 LOCAL IO

GF9 PNEUMATIC MANIFOLDS

GF10 LIGHTS 1

GF11 LIGHTS 2

GF12 LIGHTS 3

GF13 IPC2

GF14 IPC1

UNIT DESCRIPTION

G51 24VDC 40A

G52 24VDC 40A

G53 24V REDUNDANCY

G54 48VDC 5A

G55 48VDC 5A

G56 48V REDUNDANCY

G57 POE-1

G58 POE-2

G59 5VDC VOLTAGE CONVERTER

INTERNAL CABLES

ITEM	DESCRIPTION	DESCRIPTION2	QTY
9902 7220	COMPONENT PWR	CABLE M8 4 PIN A FEMALE 90D X"	3
9902 7226	ETHERNET COMM	CABLE M12 4 PIN D X RJ45 TM	3
9902 7228	ETHERNET COMM	CABLE RJ45 2 FT PATCH	3
9902 7227	ETHERNET COMM	CABLE RJ45 3 FT PATCH	6
9902 7227.005	ETHERNET COMM	CABLE RJ45 5 PATCH RED	3
9902 7233	VIDEO CABLE	CABLE DISPLAYPORT 3 MM	3
9902 7234	VIDEO CABLE	CABLE DISPLAYPORT 2MM	1
9902 7235	USB CABLE	CABLE USB PLUG A - PLUG B 3	3
9902 7236	USB CABLE	CABLE USB PLUG A - PLUG B 6"	1

ITEM	DESCRIPTION	DESCRIPTION	QTY
9902 7220	14" Regulator Power	CABLE M8 4 PIN A FEMALE 90D X"	1
9902 7226	Machine 1 Power	CABLE M8 4 PIN A FEMALE 90D X"	1
9902 7228	Machine 1A Analog control	CABLE M12 4 PIN A X DIGITAL 5M	1
9902 7228	Machine 1B Analog control	CABLE M12 4 PIN A X DIGITAL 5M	1
9902 7228	Machine 1C Analog control	CABLE M12 4 PIN A X DIGITAL 5M	1
9902 7228	Machine 1D Analog control	CABLE M12 4 PIN A X DIGITAL 5M	1
9902 7228	Machine 1E Analog control	CABLE M12 4 PIN A X DIGITAL 5M	1
9902 7221	MANIFOLD COMM	CABLE M8 4 PIN D MALE 5M	1
9902 7221	MANIFOLD COMM	CABLE M8 4 PIN D MALE 5M	1
9902 7221	CAMERA CABLE	CABLE GIGE CAMERA SCK LOGIC XX M	1
9902 7121	CABLE 120CM	CABLE 120CM 18 AWG PVC NO/SH	XX

UNIT DESCRIPTION

RELAY DESCRIPTION

U1 IPC1

U2 IPC2

U3 IPC3

U4 IPC4

U1-1 IPC IO1

U2-1 IPC IO2

U3-1 IPC IO3

U4-1 IPC IO4

U1-2 FESTO IO1

U2-2 FESTO IO2

U3-2 FESTO IO3

U4-2 FESTO IO4

U1-3 MANIFOLD 1A

U2-3 MANIFOLD 2A

U3-3 MANIFOLD 3A

U4-3 VALVE STACK 4A

U1-4 MANIFOLD 1B

U2-4 MANIFOLD 2B

U3-4 MANIFOLD 3B

U4-4 VALVE STACK 4B

U1-5 AIR REG 1

U2-5 AIR REG 2

U3-5 AIR REG 3

U4-5 AIR REG 4

U1-6 IPC1 ANALOG OUT1

U2-6 IPC2 ANALOG OUT1

U3-6 IPC3 ANALOG OUT1

U4-6 IPC4 ANALOG OUT1

U1-7 IPC1 ANALOG OUT2

U2-7 IPC2 ANALOG OUT2

U3-7 IPC3 ANALOG OUT2

U4-7 IPC4 ANALOG OUT2

U1-8 IPC1 ANALOG OUT3

U2-8 IPC2 ANALOG OUT3

U3-8 IPC3 ANALOG OUT3

U4-8 IPC4 ANALOG OUT3

U1-9 IPC1 LICENSES

U2-9 IPC2 LICENSES

U3-9 IPC3 LICENSES

U4-9 IPC4 ANALOG OUT3

U1-10 IPC1 DIGITAL IO

U2-10 IPC2 DIGITAL IO

U3-10 IPC3 DIGITAL IO

U4-10 IPC4 DIGITAL IO

U5 SWITCH

UNIT DESCRIPTION

RELAY DESCRIPTION

U1 LIGHTS1

K42 DOWNSTREAM STOP REQUEST 1

K43 UPSTREAM STOP REQUEST 1

K44 LIGHTS2

K45 DOWNSTREAM STOP REQUEST 2

K46 UPSTREAM STOP REQUEST 2

K47 LIGHTS3

K48 DOWNSTREAM STOP REQUEST 3

K49 UPSTREAM STOP REQUEST 3

(K410) LIGHTS4

(K411) DOWNSTREAM STOP REQUEST 1

(K412) UPSTREAM STOP REQUEST 1

FUSE DESCRIPTION

FU1 INPUT POWER

FU2 INPUT POWER

FU3 INPUT POWER

AMPS

BKRK DESCRIPTION

GF1 GS1 POWER SUPPLY

GF2 GS2 POWER SUPPLY

GF3 GS3 POWER SUPPLY

GF4 GS4 POWER SUPPLY

GF5 IPC & REMOTE IO

GF6 LIGHTS, MANIFOLD, & REG POWER

GF7 IPC3

GF8 LOCAL IO

GF9 PNEUMATIC MANIFOLDS

GF10 LIGHTS 1

GF11 LIGHTS 2

GF12 LIGHTS 3

GF13 IPC2

GF14 IPC1

UNIT DESCRIPTION

G51 24VDC 40A

G52 24VDC 40A

G53 24V REDUNDANCY

G54 48VDC 5A

G55 48VDC 5A

G56 48V REDUNDANCY

G57 POE-1

G58 POE-2

G59 5VDC VOLTAGE CONVERTER

INTERNAL CABLES

ITEM	DESCRIPTION	DESCRIPTION2	QTY
9902 7220	COMPONENT PWR	CABLE M8 4 PIN A FEMALE 90D X"	3
9902 7226	ETHERNET COMM	CABLE M12 4 PIN D X RJ45 TM	3
9902 7228	ETHERNET COMM	CABLE RJ45 2 FT PATCH	3
9902 7227	ETHERNET COMM	CABLE RJ45 3 FT PATCH	6
9902 7227.005	ETHERNET COMM	CABLE RJ45 5 PATCH RED	3
9902 7233	VIDEO CABLE	CABLE DISPLAYPORT 3 MM	3
9902 7234	VIDEO CABLE	CABLE DISPLAYPORT 2MM	1
9902 7235	USB CABLE	CABLE USB PLUG A - PLUG B 3	3
9902 7236	USB CABLE	CABLE USB PLUG A - PLUG B 6"	1

ITEM	DESCRIPTION	DESCRIPTION	QTY
9902 7220	14" Regulator Power	CABLE M8 4 PIN A FEMALE 90D X"	1
9902 7226	Machine 1 Power	CABLE M8 4 PIN A FEMALE 90D X"	1
9902 7228	Machine 1A Analog control	CABLE M12 4 PIN A X DIGITAL 5M	1
9902 7228	Machine 1B Analog control	CABLE M12 4 PIN A X DIGITAL 5M	1
9902 7228	Machine 1C Analog control	CABLE M12 4 PIN A X DIGITAL 5M	1
9902 7228	Machine 1D Analog control	CABLE M12 4 PIN A X DIGITAL 5M	1
9902 7228	Machine 1E Analog control	CABLE M12 4 PIN A X DIGITAL 5M	1
9902 7221	MANIFOLD COMM	CABLE M8 4 PIN D MALE 5M	1
9902 7221	MANIFOLD COMM	CABLE M8 4 PIN D MALE 5M	1
9902 7221	CAMERA CABLE	CABLE GIGE CAMERA SCK LOGIC XX M	1
9902 7121	CABLE 120CM	CABLE 120CM 18 AWG PVC NO/SH	XX

UNIT DESCRIPTION

RELAY DESCRIPTION

U1 IPC1

U2 IPC2

U3 IPC3

U4 IPC4

U1-1 IPC IO1

U2-1 IPC IO2

U3-1 IPC IO3

U4-1 IPC IO4

U1-2 FESTO IO1

U2-2 FESTO IO2

U3-2 FESTO IO3

U4-2 FESTO IO4

U1-3 MANIFOLD 1A

U2-3 MANIFOLD 2A

U3-3 MANIFOLD 3A

U4-3 VALVE STACK 4A

U1-4 MANIFOLD 1B

U2-4 MANIFOLD 2B

U3-4 MANIFOLD 3B

U4-4 VALVE STACK 4B

U1-5 AIR REG 1

U2-5 AIR REG 2

U3-5 AIR REG 3

U4-5 AIR REG 4

U1-6 IPC1 ANALOG OUT1

U2-6 IPC2 ANALOG OUT1

U3-6 IPC3 ANALOG OUT1

U4-6 IPC4 ANALOG OUT1

U1-7 IPC1 ANALOG OUT2

U2-7 IPC2 ANALOG OUT2

U3-7 IPC3 ANALOG OUT2

U4-7 IPC4 ANALOG OUT2

U1-8 IPC1 ANALOG OUT3

U2-8 IPC2 ANALOG OUT3

U3-8 IPC3 ANALOG OUT3

U4-8 IPC4 ANALOG OUT3

U1-9 IPC1 LICENSES

U2-9 IPC2 LICENSES

U3-9 IPC3 LICENSES

U4-9 IPC4 ANALOG OUT3

U1-10 IPC1 DIGITAL IO

U2-10 IPC2 DIGITAL IO

U3-10 IPC3 DIGITAL IO

U4-10 IPC4 DIGITAL IO

U5 SWITCH

UNIT DESCRIPTION

RELAY DESCRIPTION

U1 LIGHTS1

K42 DOWNSTREAM STOP REQUEST 1

K43 UPSTREAM STOP REQUEST 1

K44 LIGHTS2

K45 DOWNSTREAM STOP REQUEST 2

K46 UPSTREAM STOP REQUEST 2

K47 LIGHTS3

K48 DOWNSTREAM STOP REQUEST 3

K49 UPSTREAM STOP REQUEST 3

(K410) LIGHTS4

(K411) DOWNSTREAM STOP REQUEST 1

(K412) UPSTREAM STOP REQUEST 1

FUSE DESCRIPTION

FU1 INPUT POWER

FU2 INPUT POWER

FU3 INPUT POWER

AMPS

BKRK DESCRIPTION

GF1 GS1 POWER SUPPLY

GF2 GS2 POWER SUPPLY

GF3 GS3 POWER SUPPLY

GF4 GS4 POWER SUPPLY

GF5 IPC & REMOTE IO

GF6 LIGHTS, MANIFOLD, & REG POWER

GF7 IPC3

GF8 LOCAL IO

GF9 PNEUMATIC MANIFOLDS

GF10 LIGHTS 1

GF11 LIGHTS 2

GF12 LIGHTS 3

GF13 IPC2

GF14 IPC1

UNIT DESCRIPTION

G51 24VDC 40A

G52 24VDC 40A

G53 24V REDUNDANCY

G54 48VDC 5A

G55 48VDC 5A

G56 48V REDUNDANCY

G57 POE-1

G58 POE-2

G59 5VDC VOLTAGE CONVERTER

INTERNAL CABLES

ITEM	DESCRIPTION	DESCRIPTION2	QTY
9902 7220	COMPONENT PWR	CABLE M8 4 PIN A FEMALE 90D X"	3
9902 7226	ETHERNET COMM	CABLE M12 4 PIN D X RJ45 TM	3
9902 7228	ETHERNET COMM	CABLE RJ45 2 FT PATCH	3
9902 7227	ETHERNET COMM	CABLE RJ45 3 FT PATCH	6
9902 7227.005	ETHERNET COMM	CABLE RJ45 5 PATCH RED	3
9902 7233	VIDEO CABLE	CABLE DISPLAYPORT 3 MM	3
9902 7234	VIDEO CABLE	CABLE DISPLAYPORT 2MM	1
9902 7235	USB CABLE	CABLE USB PLUG A - PLUG B 3	3
9902 7236	USB CABLE	CABLE USB PLUG A - PLUG B 6"	1

ITEM	DESCRIPTION	DESCRIPTION	QTY
9902 7220	14" Regulator Power	CABLE M8 4 PIN A FEMALE 90D X"	1
9902 7226	Machine 1 Power	CABLE M8 4 PIN A FEMALE 90D X"	1
9902 7228	Machine 1A Analog control	CABLE M12 4 PIN A X DIGITAL 5M	1
9902 7228	Machine 1B Analog control	CABLE M12 4 PIN A X DIGITAL 5M	1
9902 7228	Machine 1C Analog control	CABLE M12 4 PIN A X DIGITAL 5M	1
9902 7228	Machine 1D Analog control	CABLE M12 4 PIN A X DIGITAL 5M	1
9902 7228	Machine 1E Analog control	CABLE M12 4 PIN A X DIGITAL 5M	1
9902 7221	MANIFOLD COMM	CABLE M8 4 PIN D MALE 5M	1
9902 7221	MANIFOLD COMM	CABLE M8 4 PIN D MALE 5M	1
9902 7221	CAMERA CABLE	CABLE GIGE CAMERA SCK LOGIC XX M	1
9902 7121	CABLE 120CM	CABLE 120CM 18 AWG PVC NO/SH	XX

UNIT DESCRIPTION

RELAY DESCRIPTION

U1 IPC1

U2 IPC2

U3 IPC3

U4 IPC4

U1-1 IPC IO1

U2-1 IPC IO2

U3-1 IPC IO3

U4-1 IPC IO4

U1-2 FESTO IO1

U2-2 FESTO IO2

U3-2 FESTO IO3

U4-2 FESTO IO4

U1-3 MANIFOLD 1A

U2-3 MANIFOLD 2A

U3-3 MANIFOLD 3A

U4-3 VALVE STACK 4A

U1-4 MANIFOLD 1B

U2-4 MANIFOLD 2B

U3-4 MANIFOLD 3B

U4-4 VALVE STACK 4B

U1-5 AIR REG 1

U2-5 AIR REG 2

U3-5 AIR REG 3

U4-5 AIR REG 4

U1-6 IPC1 ANALOG OUT1

U2-6 IPC2 ANALOG OUT1

U3-6 IPC3 ANALOG OUT1

U4-6 IPC4 ANALOG OUT1

U1-7 IPC1 ANALOG OUT2

U2-7 IPC2 ANALOG OUT2

U3-7 IPC3 ANALOG OUT2

U4-7 IPC4 ANALOG OUT2

U1-8 IPC1 ANALOG OUT3

U2-8 IPC2 ANALOG OUT3

U3-8 IPC3 ANALOG OUT3

U4-8 IPC4 ANALOG OUT3

U1-9 IPC1 LICENSES

U2-9 IPC2 LICENSES

U3-9 IPC3 LICENSES

U4-9 IPC4 ANALOG OUT3

U1-10 IPC1 DIGITAL IO

U2-10 IPC2 DIGITAL IO

U3-10 IPC3 DIGITAL IO

U4-10 IPC4 DIGITAL IO

U5 SWITCH

UNIT DESCRIPTION

RELAY DESCRIPTION

U1 LIGHTS1

K42 DOWNSTREAM STOP REQUEST 1

K43 UPSTREAM STOP REQUEST 1

K44 LIGHTS2

K45 DOWNSTREAM STOP REQUEST 2

K46 UPSTREAM STOP REQUEST 2

K47 LIGHTS3

K48 DOWNSTREAM STOP REQUEST 3

K49 UPSTREAM STOP REQUEST 3

(K410) LIGHTS4

(K411) DOWNSTREAM STOP REQUEST 1

(K412) UPSTREAM STOP REQUEST 1

FUSE DESCRIPTION

FU1 INPUT POWER

FU2 INPUT POWER

FU3 INPUT POWER

AMPS

BKRK DESCRIPTION

GF1 GS1 POWER SUPPLY

GF2 GS2 POWER SUPPLY

GF3 GS3 POWER SUPPLY

GF4 GS4 POWER SUPPLY

GF5 IPC & REMOTE IO

GF6 LIGHTS, MANIFOLD, & REG POWER

GF7 IPC3

GF8 LOCAL IO

GF9 PNEUMATIC MANIFOLDS

GF10 LIGHTS 1

GF11 LIGHTS 2

GF12 LIGHTS 3

GF13 IPC2

GF14 IPC1

UNIT DESCRIPTION

G51 24VDC 40A

G52 24VDC 40A

G53 24V REDUNDANCY

G54 48VDC 5A

G55 48VDC 5A

G56 48V REDUNDANCY

G57 POE-1

G58 POE-2

G59 5VDC VOLTAGE CONVERTER

INTERNAL CABLES

ITEM	DESCRIPTION	DESCRIPTION2	QTY
9902 7220	COMPONENT PWR	CABLE M8 4 PIN A FEMALE 90D X"	3
9902 7226	ETHERNET COMM	CABLE M12 4 PIN D X RJ45 TM	3
9902 7228	ETHERNET COMM	CABLE RJ45 2 FT PATCH	3
9902 7227	ETHERNET COMM	CABLE RJ45 3 FT PATCH	6
9902 7227.005	ETHERNET COMM	CABLE RJ45 5 PATCH RED	3
9902 7233	VIDEO CABLE	CABLE DISPLAYPORT 3 MM	3
9902 7234	VIDEO CABLE	CABLE DISPLAYPORT 2MM	1
9902 7235	USB CABLE	CABLE USB PLUG A - PLUG B 3	3
9902 7236	USB CABLE	CABLE USB PLUG A - PLUG B 6"	1

ITEM	DESCRIPTION	DESCRIPTION	QTY
9902 7220	14" Regulator Power	CABLE M8 4 PIN A FEMALE 90D X"	1
9902 7226	Machine 1 Power	CABLE M8 4 PIN A FEMALE 90D X"	1
9902 7228	Machine 1A Analog control	CABLE M12 4 PIN A X DIGITAL 5M	1
9902 7228	Machine 1B Analog control	CABLE M12 4 PIN A X DIGITAL 5M	1
9902 7228	Machine 1C Analog control	CABLE M12 4 PIN A X DIGITAL 5M	1
9902 7228	Machine 1D Analog control	CABLE M12 4 PIN A X DIGITAL 5M	1
9902 7228	Machine 1E Analog control	CABLE M12 4 PIN A X DIGITAL 5M	1
9902 7221	MANIFOLD COMM	CABLE M8 4 PIN D MALE 5M	1
9902 7221	MANIFOLD COMM	CABLE M8 4 PIN D MALE 5M	1
9902 7221	CAMERA CABLE	CABLE GIGE CAMERA SCK LOGIC XX M	1
9902 7121	CABLE 120CM	CABLE 120CM 18 AWG PVC NO/SH	XX

UNIT DESCRIPTION

RELAY DESCRIPTION

U1 IPC1

U2 IPC2

U3 IPC3

U4 IPC4

U1-1 IPC IO1

U2-1 IPC IO2

U3-1 IPC IO3

U4-1 IPC IO4

U1-2 FESTO IO1

U2-2 FESTO IO2

U3-2 FESTO IO3

U4-2 FESTO IO4

U1-3 MANIFOLD 1A

U2-3 MANIFOLD 2A

U3-3 MANIFOLD 3A

U4-3 VALVE STACK 4A

U1-4 MANIFOLD 1B

U2-4 MANIFOLD 2B

U3-4 MANIFOLD 3B

U4-4 VALVE STACK 4B

U1-5 AIR REG 1

U2-5 AIR REG 2

U3-5 AIR REG 3

U4-5 AIR REG 4

U1-6 IPC1 ANALOG OUT1

U2-6 IPC2 ANALOG OUT1

U3-6 IPC3 ANALOG OUT1

U4-6 IPC4 ANALOG OUT1

U1-7 IPC1 ANALOG OUT2

U2-7 IPC2 ANALOG OUT2

U3-7 IPC3 ANALOG OUT2

U4-7 IPC4 ANALOG OUT2

U1-8 IPC1 ANALOG OUT3

U2-8 IPC2 ANALOG OUT3

U3-8 IPC3 ANALOG OUT3

U4-8 IPC4 ANALOG OUT3

U1-9 IPC1 LICENSES

U2-9 IPC2 LICENSES

U3-9 IPC3 LICENSES

U4-9 IPC4 ANALOG OUT3

U1-10 IPC1 DIGITAL IO

U2-10 IPC2 DIGITAL IO

U3-10 IPC3 DIGITAL IO

U4-10 IPC4 DIGITAL IO

U5 SWITCH

UNIT DESCRIPTION

RELAY DESCRIPTION

U1 LIGHTS1

K42 DOWNSTREAM STOP REQUEST 1

K43 UPSTREAM STOP REQUEST 1

K44 LIGHTS2

K45 DOWNSTREAM STOP REQUEST 2

K46 UPSTREAM STOP REQUEST 2

K47 LIGHTS3

K48 DOWNSTREAM STOP REQUEST 3

K49 UPSTREAM STOP REQUEST 3

(K410) LIGHTS4

(K411) DOWNSTREAM STOP REQUEST 1

(K412) UPSTREAM STOP REQUEST 1

FUSE DESCRIPTION

FU1 INPUT POWER

FU2 INPUT POWER

FU3 INPUT POWER

AMPS

BKRK DESCRIPTION

GF1 GS1 POWER SUPPLY

GF2 GS2 POWER SUPPLY

GF3 GS3 POWER SUPPLY

GF4 GS4 POWER SUPPLY

GF5 IPC & REMOTE IO

GF6 LIGHTS, MANIFOLD, & REG POWER

GF7 IPC3

GF8 LOCAL IO

GF9 PNEUMATIC MANIFOLDS

GF10 LIGHTS 1

GF11 LIGHTS 2

GF12 LIGHTS 3

GF13 IPC2

GF14 IPC1

UNIT DESCRIPTION

G51 24VDC 40A

G52 24VDC 40A

G53 24V REDUNDANCY

G54 48VDC 5A

G55 48VDC 5A

G56 48V REDUNDANCY

G57 POE-1

G58 POE-2

G59 5VDC VOLTAGE CONVERTER

INTERNAL CABLES

ITEM	DESCRIPTION	DESCRIPTION2	QTY
9902 7220	COMPONENT PWR	CABLE M8 4 PIN A FEMALE 90D X"	3
9902 7226	ETHERNET COMM	CABLE M12 4 PIN D X RJ45 TM	3
9902 7228	ETHERNET COMM	CABLE RJ45 2 FT PATCH	3
9902 7227	ETHERNET COMM	CABLE RJ45 3 FT PATCH	6
9902 7227.005	ETHERNET COMM	CABLE RJ45 5 PATCH RED	3
9902 7233	VIDEO CABLE	CABLE DISPLAYPORT 3 MM	3
9902 7234	VIDEO CABLE	CABLE DISPLAYPORT 2MM	1
9902 7235	USB CABLE	CABLE USB PLUG A - PLUG B 3	3
9902 7236	USB CABLE	CABLE USB PLUG A - PLUG B 6"	1

ITEM	DESCRIPTION	DESCRIPTION	QTY
9902 7220	14" Regulator Power	CABLE M8 4 PIN A FEMALE 90D X"	1
9902 7226	Machine 1 Power	CABLE M8 4 PIN A FEMALE 90D X"	1
9902 7228	Machine 1A Analog control	CABLE M12 4 PIN A X DIGITAL 5M	1
9902 7228	Machine 1B Analog control	CABLE M12 4 PIN A X DIGITAL 5M	1
9902 7228	Machine 1C Analog control	CABLE M12 4 PIN A X DIGITAL 5M	1
9902 7228	Machine 1D Analog control	CABLE M12 4 PIN A X DIGITAL 5M	1
9902 7228	Machine 1E Analog control	CABLE M12 4 PIN A X DIGITAL 5M	1
9902 7221	MANIFOLD COMM	CABLE M8 4 PIN D MALE 5M	1
9902 7221	MANIFOLD COMM	CABLE M8 4 PIN D MALE 5M	1
9902 7221	CAMERA CABLE	CABLE GIGE CAMERA SCK LOGIC XX M	1
9902 7121	CABLE 120CM	CABLE 120CM 18 AWG PVC NO/SH	XX

UNIT DESCRIPTION

RELAY DESCRIPTION

U1 IPC1

U2 IPC2

U3 IPC3

U4 IPC4

U1-1 IPC IO1

U2-1 IPC IO2

U3-1 IPC IO3

U4-1 IPC IO4

U1-2 FESTO IO1

U2-2 FESTO IO2

U3-2 FESTO IO3

U4-2 FESTO IO4

U1-3 MANIFOLD 1A

U2-3 MANIFOLD 2A

U3-3 MANIFOLD 3A

U4-3 VALVE STACK 4A

U1-4 MANIFOLD 1B

U2-4 MANIFOLD 2B

U3-4 MANIFOLD 3B

U4-4 VALVE STACK 4B

U1-5 AIR REG 1

U2-5 AIR REG 2

U3-5 AIR REG 3

U4-5 AIR REG 4

U1-6 IPC1 ANALOG OUT1

U2-6 IPC2 ANALOG OUT1

U3-6 IPC3 ANALOG OUT1

U4-6 IPC4 ANALOG OUT1

U1-7 IPC1 ANALOG OUT2

U2-7 IPC2 ANALOG OUT2

U3-7 IPC3 ANALOG OUT2

U4-7 IPC4 ANALOG OUT2

U1-8 IPC1 ANALOG OUT3

U2-8 IPC2 ANALOG OUT3

U3-8 IPC3 ANALOG OUT3

U4-8 IPC4 ANALOG OUT3

U1-9 IPC1 LICENSES

U2-9 IPC2 LICENSES

U3-9 IPC3 LICENSES

U4-9 IPC4 ANALOG OUT3

U1-10 IPC1 DIGITAL IO

U2-10 IPC2 DIGITAL IO

U3-10 IPC3 DIGITAL IO

U4-10 IPC4 DIGITAL IO

U5 SWITCH

UNIT DESCRIPTION

RELAY DESCRIPTION

U1 LIGHTS1

K42 DOWNSTREAM STOP REQUEST 1

K43 UPSTREAM STOP REQUEST 1

K44 LIGHTS2

K45 DOWNSTREAM STOP REQUEST 2

K46 UPSTREAM STOP REQUEST 2

K47 LIGHTS3

K48 DOWNSTREAM STOP REQUEST 3

K49 UPSTREAM STOP REQUEST 3

(K410) LIGHTS4

(K411) DOWNSTREAM STOP REQUEST 1

(K412) UPSTREAM STOP REQUEST 1

FUSE DESCRIPTION

FU1 INPUT POWER

FU2 INPUT POWER

FU3 INPUT POWER

AMPS

BKRK DESCRIPTION

GF1 GS1 POWER SUPPLY

GF2 GS2 POWER SUPPLY

GF3 GS3 POWER SUPPLY

GF4 GS4 POWER SUPPLY

GF5 IPC & REMOTE IO

GF6 LIGHTS, MANIFOLD, & REG POWER

GF7 IPC3

GF8 LOCAL IO

GF9 PNEUMATIC MANIFOLDS

GF10 LIGHTS 1

GF11 LIGHTS 2

GF12 LIGHTS 3

GF13 IPC2

GF14 IPC1

UNIT DESCRIPTION

G51 24VDC 40A

Figure 90.

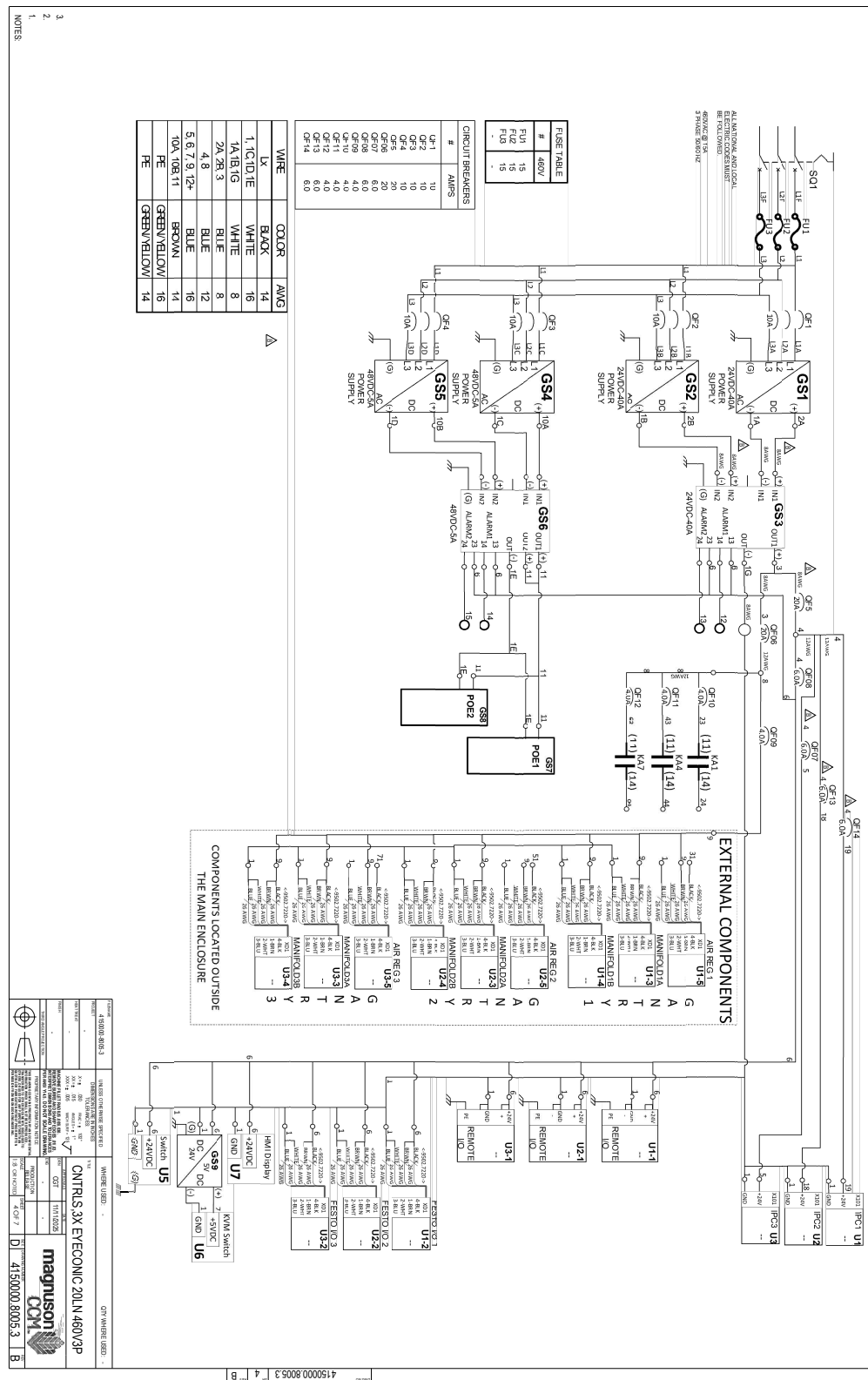


Figure 91.

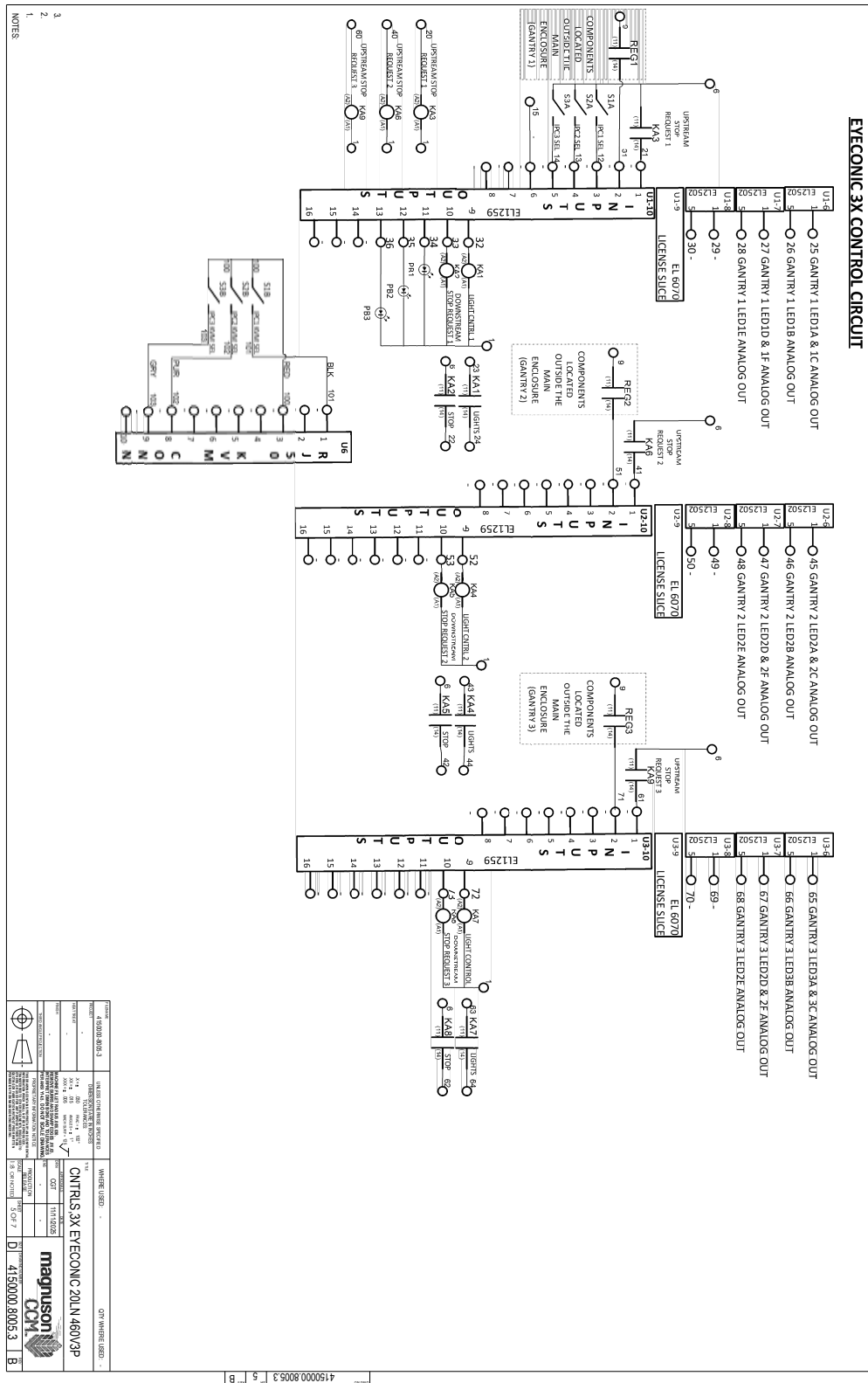


Figure 92.

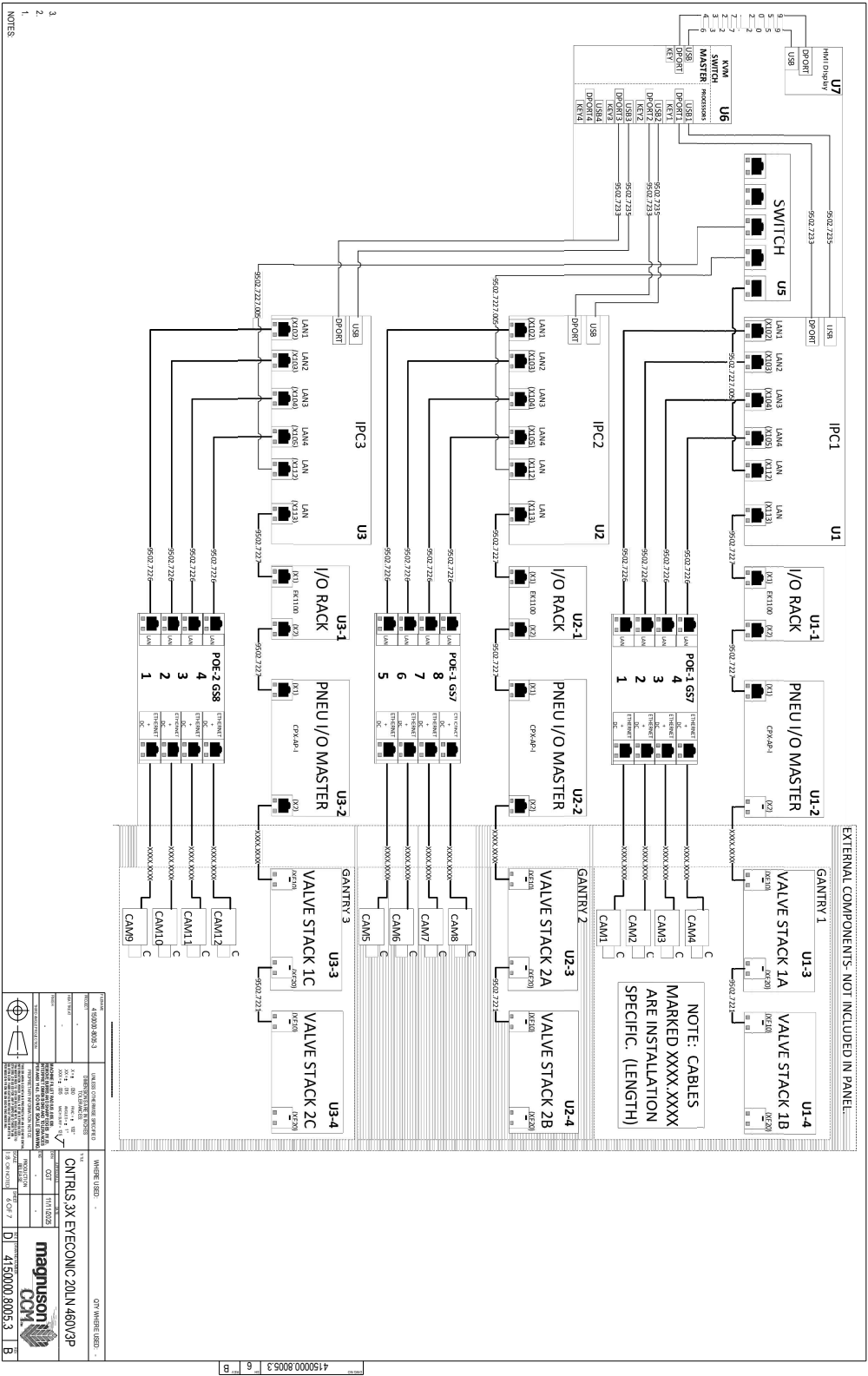
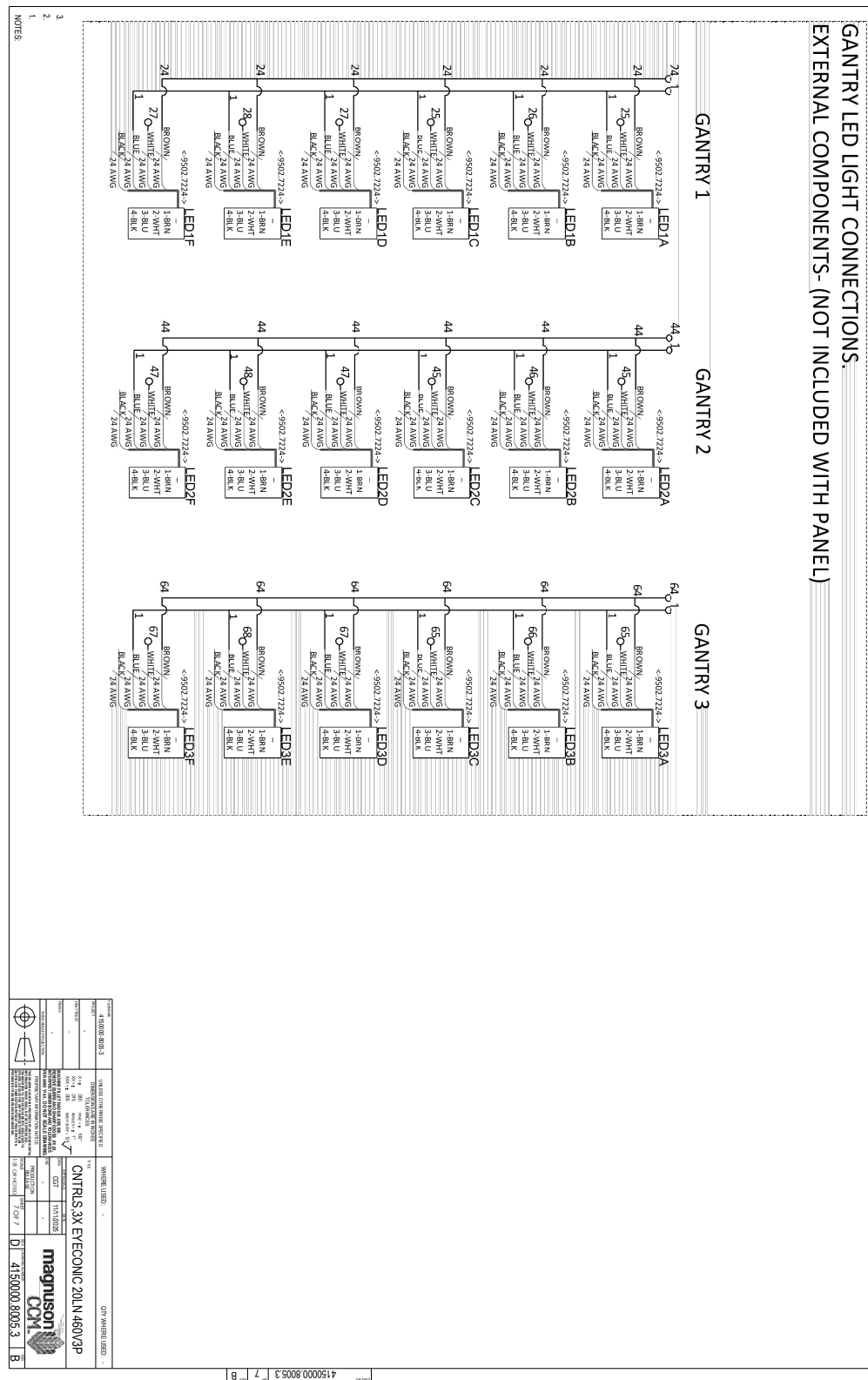
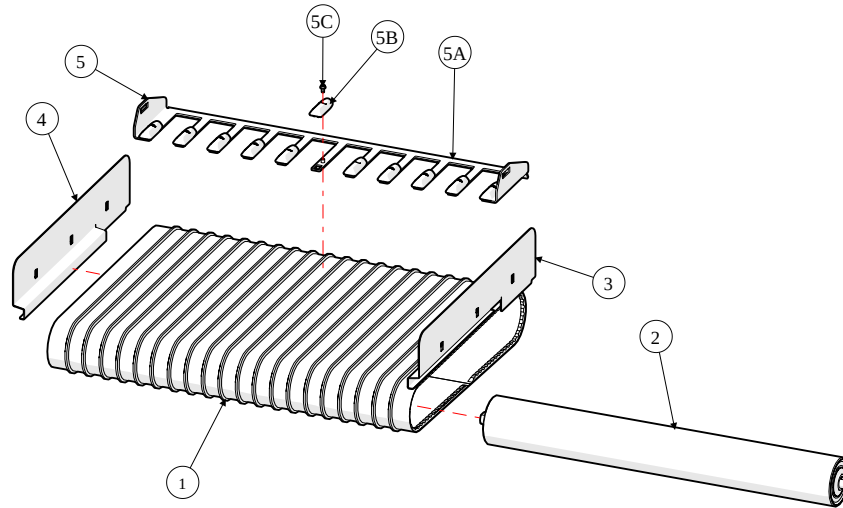


Figure 93.



4150000.8007 - AY,ACCELERATION BELTS

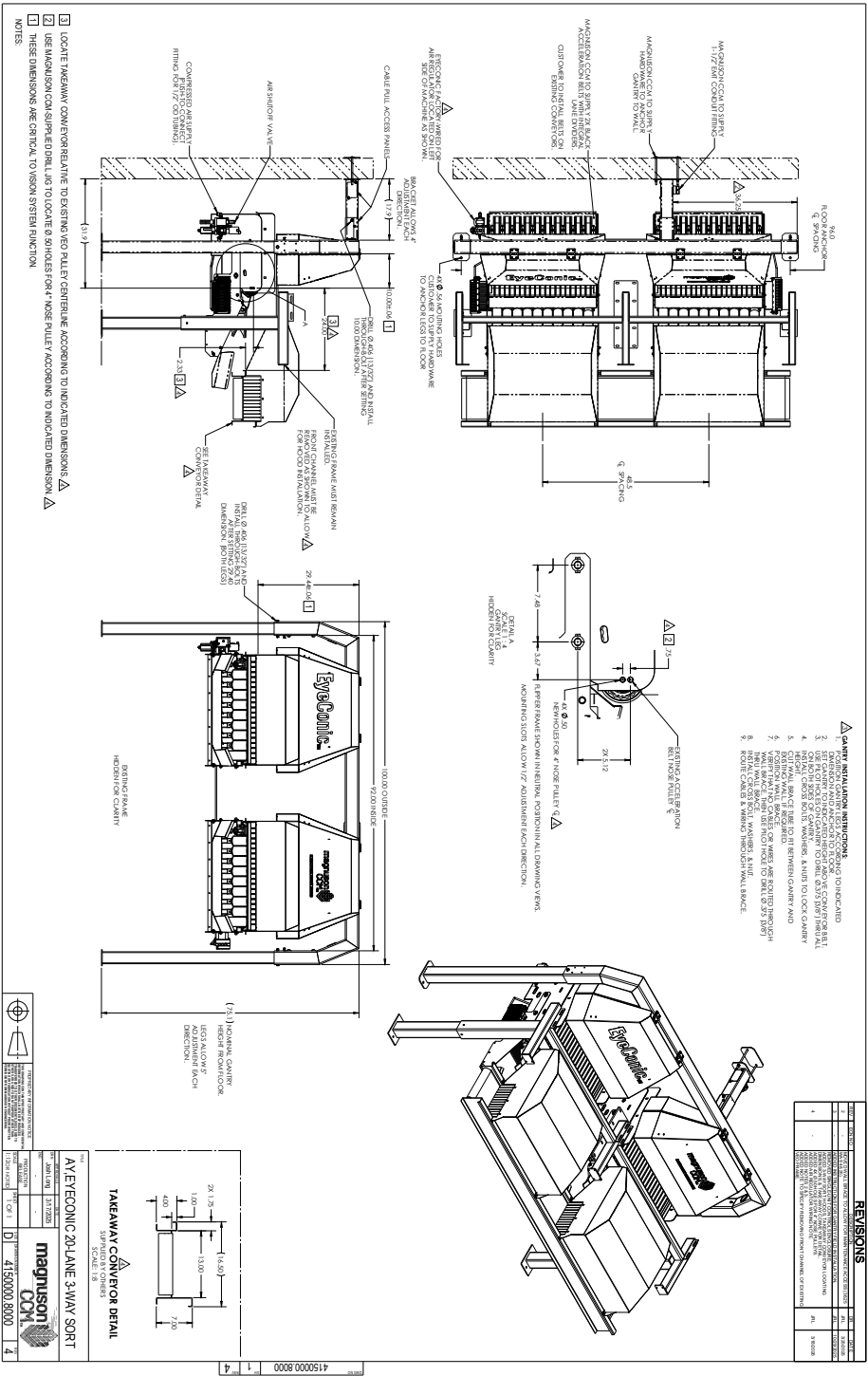
Figure 94.



Item	Part Number	Description	Quantity
1	4151003	INSPECTION BELT,RIBBED	2
2	4151005	NOSE ROLLER,4"	2
3	4151034	EDGE COVER,RH	2
4	4151035	EDGE COVER,LH	2
5	4151037	AY,GUIDE BAR	2
5A	4151038	GUIDE BAR	1
5B	4151039	LANE GUIDE	11
5C	0001.1284.1	SCR,SCSFLG M5-.8 x 10 STLCRPLT	11

4150000.8000 Installation Drawing

Figure 95.



Section 11: Parts Lookup Index

Part Number	Part Description	Used In	Assembly	Item	Page Number
0001.0060	SCR,HCS 1/4-20 x 1/2 SS	4150000.8003	AY,SHROUD EYECONIC 20- LANE	1	83
0001.0540	SCR,HCS 3/8-16 x 3/4 SS	4150000.8001	AY,FRAME EYECONIC 20- LANE	1	78
0001.0752	SCR,HCS 3/8-16 x 4 3/4 SS	4150000.8001	AY,FRAME EYECONIC 20- LANE	2	78
0001.1009.11	SCR,HCS M8 x 50 DIN 931 SS	4150000.8002	AY,FLIPPERS 3- WAY SORT	2	80
0001.1009.5	SCR,HCS 1/4-20 x 5/16 SS	4150000.8001	AY,FRAME EYECONIC 20- LANE	3	78
0001.1009.7	SCR,HCS M8 x 20 SS	4150000.8002	AY,FLIPPERS 3- WAY SORT	1	80
"	"	4150000.8003	AY,SHROUD EYECONIC 20- LANE	2	83
0001.1212	SCR,SCS 1/4-20 x 1 1/4 SS	4150000.8002	AY,FLIPPERS 3- WAY SORT	3	80
0001.1251	SCR,SCS M4-.7 x 12MM	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	80	88
0001.1284	SCR,SCSFLG M5 x 20 STLCRPLT	4150000.8004	AY,PNEUMATIC 3- WAY SORT	1	86
0001.1284.1	SCR,SCSFLG M5-.8 x 10 STLCRPLT	4150000.8003	AY,SHROUD EYECONIC 20- LANE	3	83
0001.1284.3	SCR,SCSFLG M3-.5 x 6 STLCRPLT	4150000.8003	AY,SHROUD EYECONIC 20- LANE	4	83
0001.2884.002	SCR,SSS M8-1.25 x 20 SS CNPT	4150000.8003	AY,SHROUD EYECONIC 20- LANE	5	83
0001.3040.5	SCR,THMS 6-32 x 3/8 SS	4150000.8005.3	4150000.8005.3 CNTRLS,3X EYECONIC 20LN 460V3P	22	88
0001.3063	SCR,THMS 8-32 x 3/8 SS	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	16	88

Part Number	Part Description	Used In	Assembly	Item	Page Number
0001.3064	SCR,THMS 8-32 x 1 SS	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	20	88
0001.3182	SCR,THMS 10-32 x 3/8 SS	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	24	88
0001.3801.1	SCR,FHMS M6 x 16 ZNC	4150000.8003	AY,SHROUD EYECONIC 20- LANE	6	83
0001.3923.8	SCR,CRGB 3/8-16 x 8 ZNC	4150000.8001	AY,FRAME EYECONIC 20- LANE	4	78
0001.3934	SCR,CRGB M10 x 20 ZNC	4150000.8002	AY,FLIPPERS 3- WAY SORT	4	80
0001.4259	WSHR,FLT .195 x .375 x .040 SS	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	6	88
0001.4259	WSHR,FLT .195 x .375 x .040 SS	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	6	88
0001.4350	WSHR,FLT .281 x .625 x .063 SS	4150000.8001	AY,FRAME EYECONIC 20- LANE	5	78
"	"	4150000.8003	AY,SHROUD EYECONIC 20- LANE	7	83
0001.4390	WSHR,FLT .344 x .688 x .063 SS	4150000.8002	AY,FLIPPERS 3- WAY SORT	5	80
0001.4500	WSHR,FLT .406 x .813 x .063 SS	4150000.8001	AY,FRAME EYECONIC 20- LANE	6	78
0001.4657.3	WSHR,FLT M10 x 30 x 2.5 ZNC	4150000.8002	AY,FLIPPERS 3- WAY SORT	6	80
0001.4686	WSHR,FLT M6 ZNC	150000.8003	AY,SHROUD EYECONIC 20- LANE	8	83
0001.4747.1	WSHR,SPHRCL .323x.563x.344 SS	4150000.8003	AY,SHROUD EYECONIC 20- LANE	9	83
0001.5111.4	NUT,HXJ M8 STLZNPLT	4150000.8003	AY,SHROUD EYECONIC 20- LANE	10	83
0001.5118.1	NUT,ACORN M10 ZNC	4150000.8002	AY,FLIPPERS 3- WAY SORT	7	80
0001.5705	NUT,HXSLFLKG 8-32 x 11/32 SS *	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	7	88

Part Number	Part Description	Used In	Assembly	Item	Page Number
0001.5800	USE UP, THEN 0001.5805	4150000.8001	4150000.8001 AY,FRAME EYECONIC 20- LANE	7	78
0001.5815	NUT,HXSLFLKG M8 x 13MM SS	4150000.8002	AY,FLIPPERS 3- WAY SORT	8	80
0001.5816	NUT,HXSLFLKG M5-0.8 x 8MM SS	4150000.8004	AY,PNEUMATIC 3- WAY SORT	2	86
0001.5817	NUT,HXSLFLKG M6 ZNC	4150000.8003	AY,SHROUD EYECONIC 20- LANE	11	83
0003.0016.1	BRG,SLV 8MM x 10MM x 6MM PLSTC	4150000.8002	AY,FLIPPERS 3- WAY SORT	9	80
0005.0202	RM,DIN RAIL AB#199DR1	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	23	88
0005.0273	WAGO END STOP 249-117	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	40	88
0005.3057.2	WIRE,STRANDED #14- THHN (BROWN)	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	83	88
0007.2011.2	FTG,PAY 6TUQR x 6TUQR x 6TUQR	4150000.8004	AY,PNEUMATIC 3- WAY SORT	3	86
0007.2125.2	RM,TUBE 1/4 OD CLRBLK (FT)	4150000.8004	AY,PNEUMATIC 3- WAY SORT	4	86
0007.2125.3	RM,TUBE 3/8 OD CLRBLK (FT)	4150000.8004	AY,PNEUMATIC 3- WAY SORT	5	86
0007.2143	EMT FTG,1-1/2 STR ZNC	4150000.8001	AY,FRAME EYECONIC 20- LANE	8	78
0007.4704	FTG,PAEN 8R x 8TUQR	4150000.8004	AY,PNEUMATIC 3- WAY SORT	6	86
0007.4705	FTG,PAEN 8R x 6TUQR	4150000.8004	AY,PNEUMATIC 3- WAY SORT	7	86
0009.0404	SHROUD SEAL,HOLLOW ADHSV MOUNT	4150000.8003	AY,SHROUD EYECONIC 20- LANE	12	83
0009.0543	GAS SPRING,60LB 9.65 EXT x 3.5	4150000.8003	AY,SHROUD EYECONIC 20- LANE	13	83
0009.1034	HINGE,60mm	4150000.8003	AY,SHROUD EYECONIC 20- LANE	14	83
0009.1154	PUSH IN BUMPER	4150000.8002	AY,FLIPPERS 3- WAY SORT	11	80

Part Number	Part Description	Used In	Assembly	Item	Page Number
0009.2082	GROMMET,RBR 2 x 2.75 x .188	4150000.8001	AY,FRAME EYECONIC 20-LANE	9	78
129.014	SCR,THMS 1/4-20 x 3/8 SS	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	34	88
4021028.0004	FLIPPER,WIDE	4150000.8002	AY,FLIPPERS 3-WAY SORT	10	80
4150000.8001	AY,FRAME EYECONIC 20-LANE	4150000.8000	EYECONIC 20-LANE 3-WAY SORT	1	76
4150000.8002	AY,FLIPPERS 3-WAY SORT	4150000.8000	EYECONIC 20-LANE 3-WAY SORT	2	76
4150000.8003	AY,SHROUD EYECONIC 20-LANE	4150000.8000	EYECONIC 20-LANE 3-WAY SORT	3	76
4150000.8004	AY,PNEUMATIC 3-WAY SORT	4150000.8000	EYECONIC 20-LANE 3-WAY SORT	4	76
4150000.8004.D	DWG PNEUMATIC AY,3-WAY SORT	4150000.8004	AY,PNEUMATIC 3-WAY SORT	11	86
4150000.8005.200	PC,BECKHOFF COMPACT	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	15	88
4150000.8007	AY,ACCELERATION BELTS	4150000.8000	EYECONIC 20-LANE 3-WAY SORT	5	76
4151001	GANTRY,20-LANE	4150000.8001	AY,FRAME EYECONIC 20-LANE	10	78
4151002	INNER LEG,60"	4150000.8001	AY,FRAME EYECONIC 20-LANE	11	78
4151003	INSPECTION BELT,RIBBED	4150000.8007	AY,ACCELERATION BELTS	1	95
4151004	WALL BRACE	4150000.8001	AY,FRAME EYECONIC 20-LANE	12	78
4151005	NOSE ROLLER,4"	4150000.8007	AY,ACCELERATION BELTS	2	95
4151006	WALL PLT	4150000.8007	AY,ACCELERATION BELTS	13	95
4151008	TOP COVER	4150000.8007	AY,ACCELERATION BELTS	14	95
4151009	ACCESS PNL	4150000.8007	AY,ACCELERATION BELTS	15	95
4151010	AY,CYL 3-WAY SORT	4150000.8002	AY,FLIPPERS 3-WAY SORT	12	80

Part Number	Part Description	Used In	Assembly	Item	Page Number
4151013	PIVOT PIN,END	4150000.8002	AY,FLIPPERS 3-WAY SORT	13	80
4151014	PIVOT PIN,MIDDLE	4150000.8002	AY,FLIPPERS 3-WAY SORT	14	80
4151015	SADDLE WASHER	4150000.8002	AY,FLIPPERS 3-WAY SORT	15	80
4151016	FLIPPER MOUNT	4150000.8002	AY,FLIPPERS 3-WAY SORT	16	80
4151018	MANIFOLD,20-VALVE	4150000.8004	AY,PNEUMATIC 3-WAY SORT	8	86
4151019	COMMUNICATION BLOCK,ETHERCAT	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	19	88
4151021	AIR PREP,EYECONIC	4150000.8004	AY,PNEUMATIC 3-WAY SORT	9	86
4151022.0001	MANIFOLD MOUNTING BRKT	4150000.8004	AY,PNEUMATIC 3-WAY SORT	10	86
4151025	BUSHING,FLIPPER	4150000.8002	AY,FLIPPERS 3-WAY SORT	17	80
4151026	CHUTE,SHORT	4150000.8002	AY,FLIPPERS 3-WAY SORT	18	80
4151029	SHROUD,FRONT	415000.8003	AY,SHROUD EYECONIC 20-LANE	19	84
4151030.0001	SHROUD,REAR	4150000.8003	AY,SHROUD EYECONIC 20-LANE	20	84
4151031	DEBRIS SLIDE	4150000.8002	AY,FLIPPERS 3-WAY SORT	19	80
4151032	DECAL,EYECONIC	4150000.8003	AY,SHROUD EYECONIC 20-LANE	21	84
4151033	DECAL,MAG/CCM GULFTECH	4150000.8003	AY,SHROUD EYECONIC 20-LANE	22	84
4151034	EDGE COVER,RH	4150000.8007	AY,ACCELERATION BELTS	3	95
4151035	EDGE COVER,LH	4150000.8007	AY,ACCELERATION BELTS	4	95
4151037	AY,GUIDE BAR	4150000.8007	AY,ACCELERATION BELTS	5	95
4151043	ENCL,EYECONIC MULTI WALL MOUNT	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	1	88

Part Number	Part Description	Used In	Assembly	Item	Page Number
4151044	KIT,SCS ENCL MOUNTING	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	2	88
4151045	BACKPANEL,EYECONIC MULTI ENCL	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	14	88
4151046.3	BRKT,3 BTTN SWITCH MOUNT	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	5	88
4151047	BRACE CHANNEL	4150000.8001	AY,FRAME EYECONIC 20-LANE	16	78
4151051	SWIVEL MOUNT,BLL HALF	4150000.8003	AY,SHROUD EYECONIC 20-LANE	23	84
4151052	SWIVEL MOUNT,SOCKET HALF	4150000.8003	AY,SHROUD EYECONIC 20-LANE	24	84
4151053	LIGHT,24VDC SHORT	4150000.8003	AY,SHROUD EYECONIC 20-LANE	25	84
4151054	LIGHT,24VDC LONG	4150000.8003	AY,SHROUD EYECONIC 20-LANE	26	84
4151055	MOUNTING BRKT,SHORT LIGHT	4150000.8003	AY,SHROUD EYECONIC 20-LANE	27	84
4151057	CAMERA MOUNT	4150000.8003	AY,SHROUD EYECONIC 20-LANE	28	84
4151064	NAMEPLATE,EYECONIC 3X 480V-3	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	10	88
4151069	JUNCTION BOX,EYECONIC GANTRY	4150000.8003	AY,SHROUD EYECONIC 20-LANE	30	84
9501.7100.100	TERM BLK (4) 16-24 ADJ JMPR	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	39	88
9501.7100.101	TERM BLK (4) 16-24 ORG END PLT	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	37	88
9501.7100.140	TERM BLK (4) 16-24 GRY	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	38	88

Part Number	Part Description	Used In	Assembly	Item	Page Number
9501.7100.860	TERM BLK 1 x6MM, 6 x1.5MM GRY	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	52	88
9501.7100.900	LABEL,TERM BLK PRINTER	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	59	88
9501.7100.950	RIBBON,LABEL TERM BLK PRINT	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	41	88
9501.8020	GROUNDING BAR, 9 POSITION	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	35	88
9501.9033.1	WIRE DUCT,1" WIDE X 2" HIGH	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	27	88
9501.9034	COVER WIRE DUCT 1"	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	26	88
9501.9132.2	LABEL,WARNING ELECTRICAL 3.9"	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	8	88
9501.9154	LABEL,WIRING - ENGLISH	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	55	88
9501.9163.0	LABEL,CONDUIT/ BUSHING LOC	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	58	88
9501.9209	LABEL,GRND SYMBOL 300 COUNT	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	57	88
9501.9240	LABEL,COMPONENT GENERIC	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	53	88
9501.9252	LABEL,TERM TORQUE 20LB-IN EN	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	54	88
9501.9258	LABEL,CIRCUIT BRKR BRANCH	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	56	88
9501.9272.002	RIBBON,WHITE LABEL PRINTER	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	81	88
9501.9277.000	LABEL,TERM TORQUE 17LB-IN	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	82	88

Part Number	Part Description	Used In	Assembly	Item	Page Number
9502.0100.150	FUSE,15.00A 600V CC SLOW ARC	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	33	88
9502.1031.504	PWRSPLY,24DC 320-600AC 960W UL	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	79	88
9502.1031.505	PWRSPLY,48DC 320-600AC 240W UL	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	76	88
9502.1031.506	MODULE,REDUNDANCY 24V 40A	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	77	88
9502.1031.507	MODULE,REDUNDANCY 48V 20A	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	78	88
9502.1071.005	DC-DC CONVERTER 5V 25W	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	75	88
9502.3035	RELAY,TERM BLK,24VAC/DC SPDT	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	36	88
9502.6224	SWITCH,PB,IEC,WHT ILLUM	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	13	88
9502.6241.102	SWITCH,DISCONNECT,F USED 30A 3P	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	30	88
9502.6241.103	DISCO SW,HANDLE N12 FLG	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	9	88
9502.6241.104	DISCO SW, 60" HANDLE CABLE	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	32	88
9502.6241.105	DISCO SW,FLG CABLE MECH	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	31	88
9502.6270	CONTACT BLOCK,1 NO SPRG	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	12	88
9502.6274	CONTACT BLOCK,1 NOEM SCRW	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	84	88
9502.6280	SWITCH,LED 24VAC/DC WHT SPRG	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	11	88

Part Number	Part Description	Used In	Assembly	Item	Page Number
9502.7023.4	WIRE,16 GA DK BLUE MTW	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	67	88
9502.7100.02	WIRE,14 GA GRN/YEL MTW	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	69	88
9502.7133	WIRE,14 GA BLK MTW	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	68	88
9502.7134	WIRE,16 GA WHT MTW	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	66	88
9502.7155.002	WIRE,8 AWG STR WH MTW	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	71	88
9502.7155.004	WIRE,8 AWG STR BLUE MTW	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	49	88
9502.7192.003	WIRE,12GA STR MTW BLU	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	72	88
9502.7220	CABLE,M8 4-PIN A FEMALE 90D x*	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	70	88
9502.7225	CABLE,M12 4-PIN D x RJ45 1M	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	60	88
9502.7226	CABLE,RJ45 2 FT PATCH	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	61	88
9502.7227	CABLE,RJ45 3 FT PATCH	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	62	88
9502.7227.005	CABLE,RJ45 5' PATCH RED	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	74	88
9502.7233	CABLE,DISPLAYPORT, 3' M-M	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	63	88
9502.7234	CABLE,DISPLAYPORT 2M M-M	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	73	88
9502.7235	CABLE,USB PLUG A - PLUG B 3'	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	64	88

Part Number	Part Description	Used In	Assembly	Item	Page Number
9502.7236	CABLE,USB PLUG A - PLUG B 6'	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	65	88
9540.3110.310	BRKR,UL489 3P 010A C/K	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	47	88
9540.3114.104	BREAKER,UL 1077 1 POLE 4A	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	51	88
9540.3114.106	BRKR,UL 1077 1 POLE 6A	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	50	88
9540.3115.120	BRKR,UL489 1POLE 20A C	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	48	88
9540.4021	WIREWAY,3 x 3 GRAY	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	18	88
9540.4022	WIREWAY,3"COVER GRAY	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	17	88
9550.2013	MAKO COLOR CAMERA POE	4150000.8003	AY,SHROUD EYECONIC 20-LANE	15	83
9550.2017	LENS,C-MOUNT 6mm	4150000.8003	AY,SHROUD EYECONIC 20-LANE	16	83
9550.2018	COLOR FLTR,ORANGE	4150000.8003	AY,SHROUD EYECONIC 20-LANE	17	83
9550.2019	CAMERA ENCL	4150000.8003	AY,SHROUD EYECONIC 20-LANE	18	83
9550.2020	LOCKING BAND,FOCUS & APERTURE	4150000.8003	AY,SHROUD EYECONIC 20-LANE	29	84
9550.3033	PLC,EL6070 LIC KEY EYECONIC	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	43	88
9550.4170.308	PLC,PWM OUT MDLE 24V .5A (2)	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	45	88
9550.4170.401	PLC TERM,ECAT EXT	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	42	88

Part Number	Part Description	Used In	Assembly	Item	Page Number
9550.4170.502	PLC,DIG IN/OUT MDLE 24VDC(16)	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	44	88
9550.4170.999	PLC,BUS END CAP EL9011	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	46	88
9550.5059	POE INJECTOR,8 PORT 24-48VDC	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	21	88
9550.5060	HMI,23.8" ACDC DP PCAP N4X MIL	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	3	88
9550.5061	HMI,SCRN PROT 23.8"	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	4	88
9550.5062	SWITCH,KVM 4PC TO 1 MONITOR	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	28	88
9550.5062.001	BRKT,ADDERVIEW KVM SWITCH	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	29	88
9550.6010	NETWORK SWITCH,UNMGD 5 PORT	4150000.8005.3	CNTRLS,3X EYECONIC 20LN 460V3P	25	88

Warranty

STANDARD TERMS AND CONDITIONS OF SALE OF MAGNUSON CCM CORPORATION

The provisions hereof, all drawings, specifications, descriptions, and other documents attached here in the 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

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

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

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

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

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

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

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

DELIVERY

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

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

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

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

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

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

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

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

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

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 OF BUYER

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

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

Any and all disputes under this Agreement shall be determined by good faith negotiation between the parties or 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.

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

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

Notes

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This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

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