GlueChek
FoldChek
CodeChek
ScoreChek

User Manual for BoxChek 7

ClearVision Technical Writing Dept.

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VALCO MELTON
CLEARVISION
THE PERFECT BOX

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Declaration of Conformity

(According to EN 45014)

CE

Manufacturer:

Valco Melton
A division of Valco Cincinnati, Incorporated
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Authorized Representatives in Europe:

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Designed by:

ClearVision Technologies
107 West 6th Avenue
Vancouver, BC V5Y 1K3
Canada

Declares that the product:

Product Name:

ClearVision GlueChek
ClearVision FoldChek
ClearVision CodeChek
ClearVision ScoreChek

Complies with the following Council Directives:

Safety of Machinery: 2006/04/EC
Low Voltage Equipment: 2014/35/EU
EMC: 204/30/EU
Reduction of Hazardous Substances (RoHS): 2011/65/EC

And conforms to the following standards:

Conducted & Radiated Emissions: EN61326-1, Class B, 2006

Power-line Harmonics & Flicker: EN 61000-3-3, 2008

Immunity: EN61326-1, Class B, 2006

Safety: EN60950-1, 2006

Risk: ISO 12100:2010

Place and Date:

Cincinnati, Ohio USA
CE Mark first fixed 2012

Signature:

Cincinnati, Ohio USA
Dave Swedes
Vice-President Engineering & Manufacturing

This Declaration of Conformity has been generated electronically and is legally binding without signature.

VALCO MELTON
CLEARVISION
THE PERFECT BOX

Disclaimer: ClearVision Technologies Inc. reserves the right to make changes with or without notice. Your product may not be exactly as shown.

1. Introduction

This manual for the ClearVision box inspection system contains information on how the BC7 system works, how it is used, and how it is maintained. It covers GlueChek, FoldChek, CodeChek and ScoreChek. If there are any questions beyond what is covered in this manual, please call ClearVision Customer Support. Our contact information can be found in Chapter 9: Support on pg. 92.

Please note that UV additive is required in the adhesive for proper detection of the adhesive on white and preprinted boards. The quantity typically depends on the amount of optical brightener in the product liner. ClearVision can provide further information on UV additive specifications during the pre-engineering process.

2. Safety and Use

Read Thoroughly Before Handling Equipment

WARNING! Read and follow all safety precautions, warnings, cautions, and other recommendations in this manual. OTHERWISE, DEATH, PERSONAL INJURY OR EQUIPMENT DAMAGE COULD OCCUR.

Read this entire section before handling the equipment.

2.1 Symbols

The following symbols may be used on the equipment and/or in this manual.

	This symbol represents a **Caution** or a **Warning**. *Cautions* draw special attention to anything that could damage equipment or cause the loss of data. *Warnings* draw special attention to anything that could injure or kill the reader. Both Cautions and Warnings are placed before the step they apply to.
	This symbol represents a **Hot Surface**.
	This symbol represents a **Puncture Risk.** It is usually used regarding nozzle cleaning appliances and other sharp instruments that can cause puncture wounds and risk exposure to bloodborne pathogens and other debris.
	This symbol means that **Working Gloves** are required.
	This symbol means that **Goggles** are required.
	This symbol indicates a Shock Hazard. There is a presence of non-insulated dangerous voltage within the product's enclosure. This voltage may cause electrical shock or fire.
	This symbol indicates the need to Unplug/Disconnect All Power Sources and to let them de-energize before attempting any type of work or maintenance. Remember that there can still be energy in equipment, cords, and wires even when unplugged/disconnected.
	This symbol indicates the need to **Lock Out All Power Sources** and to let them de-energize before attempting any type of work or maintenance. If power is not locked out, the person working on the equipment may be injured or killed if someone unknowingly switches on the power to the equipment.
	This symbol indicates a Note. Notes point out something of special interest or importance to the reader. They give tips, hints, and information in addition to what is necessary for the step preceding it.

2.2 Owner Responsibilities

The owner of the equipment is obligated to manage all safety information. Some examples include:

- Examine all safety materials and documents as well as jurisdictional laws and make certain all laws, recommendations, and other safety/hazard laws, certification requirements, training, and instructions are followed and kept current.
- Maintain all safety materials including tags, labels, documents, and MSDS information. Make certain they are distinct and can be read/understood. Replace any that are dirty, worn, or unreadable.
- Make sure all personnel who will handle, install, maintain, operate, fix, and work around the equipment have ready access to the safety information, training, and equipment according to jurisdictional authorities.

The owner of the equipment is under obligation to make certain that all instructions, requirements, and jurisdictional laws are met. Some examples include:

- Make sure there are regular inspections of equipment and safety devices.
- Have regular safety drills and inspections supervised by the proper authorities.
- Provide all required safety items, first aid equipment, and training.

The owner of the equipment is under obligation to make certain that all personnel who will handle, install, maintain, operate, fix, and work around the equipment are qualified, trained, and up to date with all information regarding the equipment. Some examples include:

- Make sure all personnel have the proper safety training, equipment, education, and abilities necessary for the job function according to safety instructions and all jurisdictional laws and regulations.
- It is strongly advised that personnel receive first-responder medical care training in case of burns, medical emergencies, or other injuries. Training should be kept up to date.
- Make sure all personnel understand and can follow safety policies and procedures for the organization as well as for the specific equipment.
- Make sure that all personnel are consistently trained, evaluated, free of alcohol and medications that may impair judgment and reflexes, and are tested for banned substances according to jurisdictional authorities.

2.3 Limitations of Use

Read this document and all information regarding the equipment before handling the equipment. The intended use of the equipment is stated in Section 1 of this manual. Do not use this equipment for anything other than its intended use. Do not modify, change, or alter the equipment in any way. If you are unsure of the intended use and the limitations of use for the equipment, contact your Valco Melton Representative before handling the equipment.

2.4 Installation/Startup/Use Safety Information

Valco Melton hot melt units, cold glue units, controllers, inspection systems and all related accessories have the following universal safety precautions (this is not intended to be an exhaustive list; follow all instructions and safety precautions for the specific type of equipment involved):

WARNING! Only qualified personnel should install the equipment. Valco Melton strongly recommends that a Valco Melton Technician install all equipment. OTHERWISE, DEATH, PERSONAL INJURY, OR DAMAGE TO EQUIPMENT COULD OCCUR.

WARNING! The equipment should be installed so that it can be turned off at a location **away** from the equipment in case of injury, electrical problems, or malfunction. OTHERWISE, DEATH OR PERSONAL INJURY COULD OCCUR.

WARNING! Properly route all electrical wires. Never tamper with equipment. Only use approved and correct voltage, type of current, fuses, and other power supplies. Replace worn cords, hoses, etc. immediately. FAILURE TO OBSERVE WARNING MAY RESULT IN DEATH, PERSONAL INJURY, AND/OR EQUIPMENT DAMAGE.

WARNING! Poor ventilation, smoking, and open flames can cause overheated hot melt to ignite. Adequate ventilation must be provided. Smoking should be prohibited in the immediate vicinity of the molten adhesive. Open flames must be kept away from the area around molten adhesive. OTHERWISE, DEATH, PERSONAL INJURY, OR DAMAGE TO EQUIPMENT COULD OCCUR.

WARNING! Never use any Valco Melton equipment in an explosive environment. Explosive environments include, but are not limited to, solvent-based cleaners or adhesives, explosive materials, radioactive materials, etc. OTHERWISE, DEATH OR PERSONAL INJURY COULD OCCUR.

WARNING! Equipment will start automatically when remotely controlled by triggering devices. Be sure to disable all triggering devices, carefully release hydraulic pressure, and disconnect air pressure before servicing or working near guns, valves, and other triggered devices. OTHERWISE, DEATH OR PERSONAL INJURY COULD OCCUR.

2.5 Shut Down Safety Information

Valco Melton hot melt units, cold glue units, controllers, inspection systems and all related accessories have the following universal safety precautions (this is not intended to be an exhaustive list; follow all instructions and safety precautions for the specific type of equipment involved):

WARNING! Purge the fluid pressure and the air pressure from the system before disconnecting/disabling any part of the system. OTHERWISE, DEATH OR PERSONAL INJURY COULD OCCUR.

WARNING! Disconnect and lock out all power before maintenance or other need to open the equipment. Only qualified personnel should open and service the control. OTHERWISE, DEATH OR PERSONAL INJURY COULD OCCUR.

WARNING! Equipment may still be energized even if unplugged! When adjusting or performing checkout procedures, stay clear of any moving mechanical parts and do not touch exposed electrical equipment or electrical connectors. OTHERWISE, DEATH OR PERSONAL INJURY COULD OCCUR.

WARNING! Disconnect/disable all mechanical and/or electrical devices that send activation signals to the gun(s), valve(s), melter pump(s), etc. This includes pattern controls, timers, input/output signals, etc. Only qualified personnel should open and service the control. OTHERWISE, DEATH OR PERSONAL INJURY COULD OCCUR.

WARNING! Disable all triggering devices, relieve all residual pressure (hydraulic and air), and allow adhesive to cool before attempting to disconnect guns, hoses, valves, etc. Only qualified personnel should open and service the control. OTHERWISE, DEATH OR PERSONAL INJURY COULD OCCUR.

WARNING! Never point an adhesive dispensing gun, valve, hose, air hose, or anything else at yourself or another person. OTHERWISE, DEATH OR PERSONAL INJURY COULD OCCUR.

2.6 Hot-Melt-Specific, General Safety Information

Valco Melton hot melt units have the following universal safety precautions in addition to all other universal precautions previously mentioned (this is not intended to be an exhaustive list; follow all instructions and safety precautions for the specific type of equipment involved):

WARNING! **Never** process any polyurethane reactive (PUR) hot melt or solvent-based material in a Valco Melton unit unless you are certain that the unit is compatible and is marked “PUR”! Read all instructions and MSDS sheets carefully, following manufacturer’s instructions, especially regarding heat levels. If you have any question as to the compatibility of a Valco Melton unit for PUR hot melt, call your Valco Melton Representative before attempting to use the unit for PUR or

solvent-based materials. OTHERWISE, HAZARDOUS FUMES, EXPLOSION, DEATH, OR PERSONAL INJURY COULD OCCUR.

WARNING! Keep pump cover and electrical enclosures closed except during setup, service, and checkout procedures. OTHERWISE, DEATH OR PERSONAL INJURY COULD OCCUR.

WARNING! People with respiratory problems (e.g., asthma, bronchitis, etc.) should not work in the vicinity of molten adhesive. RESPIRATORY PROBLEMS MAY BE AGGRAVATED BY THE FUMES. Do not wear a face mask when working around molten adhesive. THE MASK MAY TRAP THE FUMES AND DEATH OR PERSONAL INJURY COULD OCCUR.

WARNING! Keep hot melt hoses away from walkways and the moving parts of hot melt systems. OTHERWISE, PERSONAL INJURY OR EQUIPMENT DAMAGE COULD OCCUR.

WARNING! Hot surfaces! Do not touch! Use extreme caution when refilling the unit by hand. OTHERWISE, PERSONAL INJURY COULD OCCUR.

WARNING! Always wear protective gloves and goggles around all machinery, especially hot melt. OTHERWISE, SERIOUS PERSONAL INJURY COULD OCCUR.

WARNING! Never use an open flame to heat hot melt components or adhesive. OTHERWISE, DEATH, PERSONAL INJURY, OR DAMAGE TO EQUIPMENT COULD OCCUR.

2.7 What to Do if Contact with Hot Adhesive Occurs

If hot adhesive comes in contact with the skin**,** do the following:

WARNING! Do not attempt to remove heated hot melt adhesive from the skin. OTHERWISE, SEVERE PERSONAL INJURY AND DEATH COULD OCCUR.

1. Immediately immerse the contacted area in clean, cold water.

> It is strongly recommended that a source of clean, cold water be provided near the hot melt work area

2. Cover the affected area with a clean, wet compress and call the emergency medical response system (such as 911) immediately.
3. Watch for and treat the subject for signs of shock while waiting for professional help to arrive.

2.8 What to Do if Inhalation of Adhesive Fumes Occurs

If adhesive fumes are inhaled, immediately follow these steps:

1. Take the victim away from the immediate work area.
2. Provide victim with fresh air.
3. Call the emergency medical response system (such as 911) immediately.

2.9 What to Do if Adhesive-Related Fire or Explosion Occurs

During the heating and melting process, the surface of the adhesive will be exposed to air. The mixture of polymer fumes and air can catch fire if the hot melt is overheated.

WARNING! Poor ventilation, smoking, and open flames can cause overheated hot melt to ignite. Adequate ventilation must be provided. Smoking should be prohibited in the immediate vicinity of the molten adhesive. Open flames must be kept away from the area around molten adhesive. OTHERWISE, DEATH, PERSONAL INJURY, OR DAMAGE TO EQUIPMENT COULD OCCUR.

WARNING! Exposed arcing may ignite the fume/air mixture. Shield all electrical equipment from melt fumes to avoid exposed arcing. OTHERWISE, PERSONAL INJURY OR EQUIPMENT DAMAGE COULD OCCUR.

WARNING! Do not use a water extinguisher to extinguish the fire! OTHERWISE, PERSONAL INJURY OR EQUIPMENT DAMAGE COULD OCCUR.

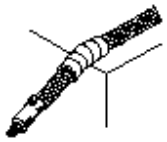
If the hot melt adhesive ignites, promptly perform the following steps:

1. Sound a fire alarm.
2. Evacuate the immediate area.
3. Turn off all local electrical equipment at the source.
4. Leave the area immediately if conditions are unsafe.

If you feel you can fight the fire **safely**, do ***one*** of the following:

- Smother the fire with a fire blanket.
- Aim a CO_2 fire extinguisher at the base of the flames.
- Aim a dry-powder fire extinguisher at the base of the flames.

2.10 Hose Safety Information

DO NOT		DO	
Do not use bindings, wire ties, or unapproved fasteners around the hoses.		**Do** use approved wrapping (P/N KAP0434), making sure the wrapping is slightly snug but not tight.	
Do not place hoses close together.		**Do** allow at least 2 inches (5.1 cm) between hoses for proper ventilation.	
Do not bend hoses sharply. **Do not** allow kinks or indentations in the hoses.		**Do** use a minimum bend radius of 10 inches for a 20-inch diameter coil hose.	
Do not use unapproved hooks to hang hoses. **Do not** wrap hoses over or around objects.		**Do** use a hose hanging kit (P/N 781xx827).	
Do not use the “one handed/one wrench” technique to attach or remove hoses. **Do not** wrench on any surface other than the large hexagon swivel nuts.		**Do** use two hands and two wrenches to tighten or loosen connections on hoses. **Do** wrench only on large hexagon swivel nuts.	
Do not allow hoses to rub against objects or to come into contact with sharp edges or points.		**Do** wrap the hoses in approved padding (P/N 795xx549) if the hoses must be installed where they will come into contact with objects.	
Do not use worn, damaged, or bent hoses.		**Do** inspect all hoses regularly for damage and/or wear and replace damaged or worn hoses immediately.	

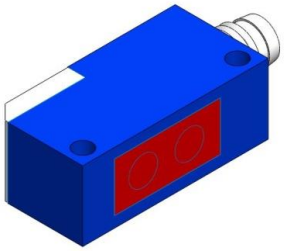
3. Overview

This section describes the overall structure and configuration of the inspection system.

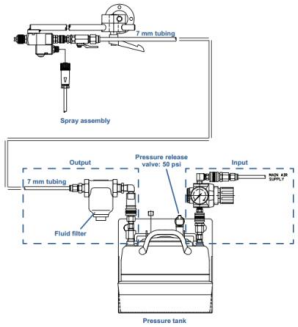
3.1 Parts and System Specification

Control Cabinet

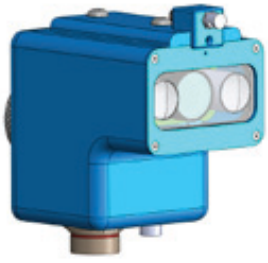
Encoder



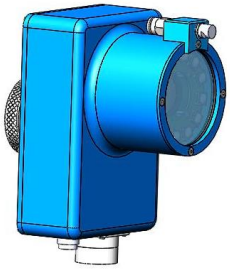
PhotoEye



UV Marking System



GlueChek / FoldChek Camera



CodeChek Camera

ScoreChek Camera

Stack Light

Touch screen

3.1.1 Control Cabinet

The Control Cabinet, shown on the left, contains all the control electronics and the touch screen needed to operate the inspection system. The cameras, encoder, PhotoEyes, and marking system are all connected to the Cabinet via the connector panel inside the cabinet, which is accessible through a hole on the underside of the cabinet.

Specifications

The following table shows the electrical and physical specifications of the Control Cabinet.

Item	Boxchek7 Cabinet
Control Cabinet Dimensions:	20″ x 27″ x 10.5″
Control Cabinet Weight:	50 lbs.
Input Voltage:	100 – 240 VAC
Max. Current Draw:	5 Amps
Max. Power Draw:	500 Watts
IP Rating	IP40
Max Operating Ambient Temperature	50C [122F]

Dimensions of Cabinet

The Cabinet measures 20 x 27 x 10.5″ / 490 x 665 x 265mm **(W x H x D).** It has M6 threaded inserts on the back face at each corner for mounting to ClearVision bracketing or a custom solution.

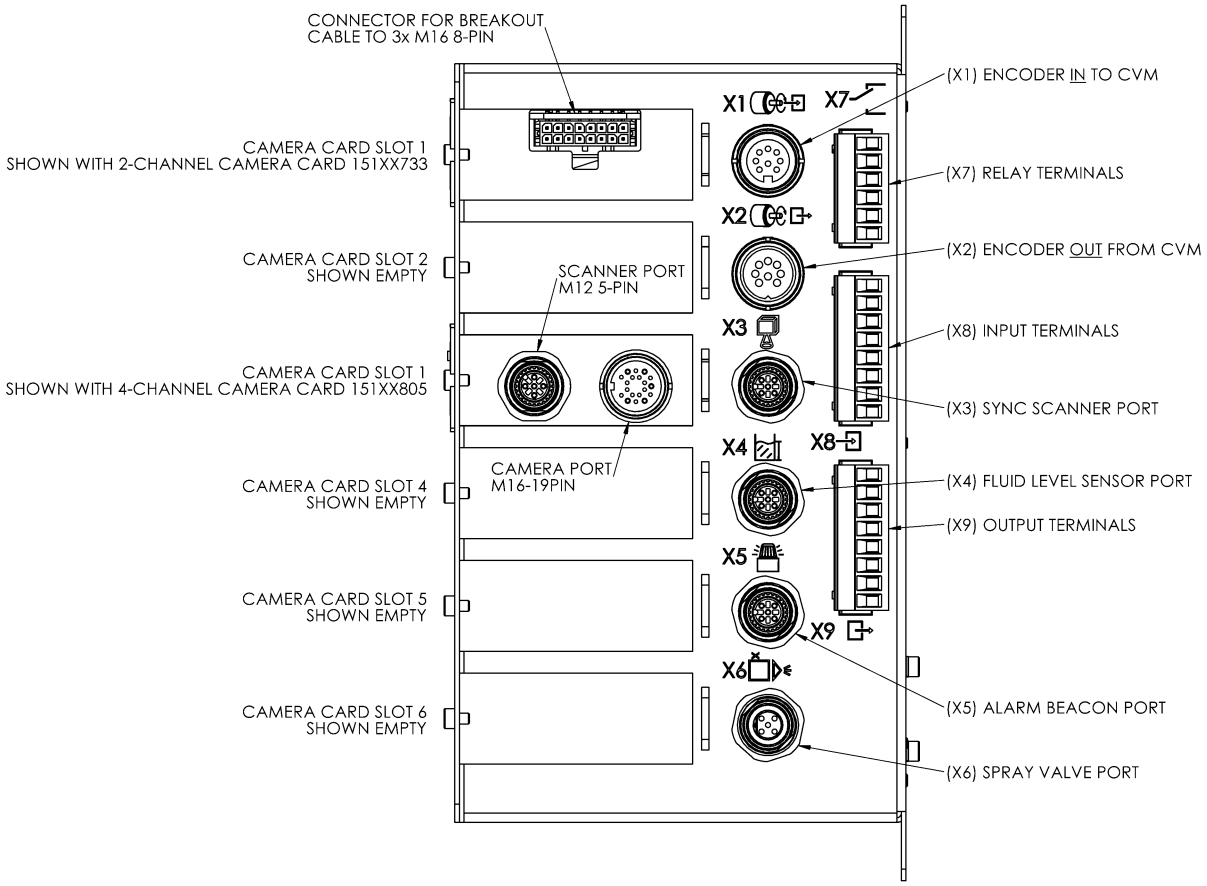
Clearance to Cabinet

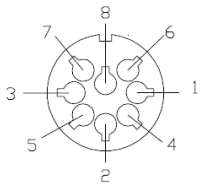
The Cabinet needs a certain amount of clearance on its sides to allow sufficient airflow and to ensure access to cables. Please allow **2″ / 50 mm clearance on the Cabinet sides** and **4″ / 100mm clearance on the bottom**.

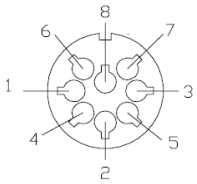
Connections to Cabinet

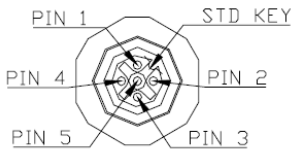
All external components are connected to the Control Cabinet. The cables pass in through the cable boot at the bottom of the cabinet, and then connect to one of the two electronics modules inside. The top module is the ClearVision Module, or CVM. The bottom module is the Motherboard Module (MBM). The following figures show the electrical connectors available on either module.
Please note the Cabinet is capable of having up to six cameras connected.

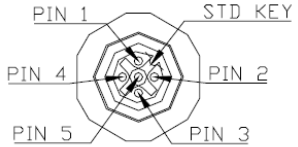
ClearVision Module or CVM

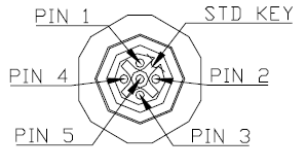


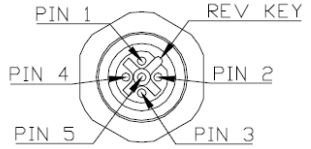
X1 Encoder Input [VDD-Encoder compatible] [PCB J7]			
Pin	Description	Color	Pin Location
1	Ground	Black	
2	A-Signal	Orange	
3	+24V	Red	
4	B-Signal	Yellow	
5	Z-Signal	Brown	
6	/Z-Signal	Violet [Pink]	
7	/B-Signal	Blue	
8	/A-Signal	Green	
Connecting cable: 030XX630-633 (or similar encoder cable)			Color: Grey

X2 Encoder Output [VDD-Encoder compatible] [PCB J6]			
Pin	Description	Color	Pin Location
1	Ground	Black	
2	A-Signal	Orange	
3	+V External [12-24V]	Red	
4	B-Signal	Yellow	
5	Z-Signal	Brown	
6	/Z-Signal	Violet [Pink]	
7	/B-Signal	Blue	
8	/A-Signal	Green	
Connecting Cable: 030XX630-633 (or similar encoder cable)			Color: Grey

X3 Sync Scanner Input [PCB J5]			
Pin	Description	Color	Pin Location
1	24V	Brown	
2	PNP / NPN *	White	
3	GND	Blue	
4	PNP / NPN*	Black	
5	N/C	Grey	
Connecting cable: 030XX738 (or similar scanner cable)			Color: Grey

X4 Low Level Control Input [PCB J4]			
Pin	Description	Color	Pin Location
1	24V	Brown	
2	Level 1	White	
3	GND	Blue	
4	Level 2	Black	
5	N/C	Grey	
Connecting cable: 030XX738 (or similar scanner cable)			Color: Grey

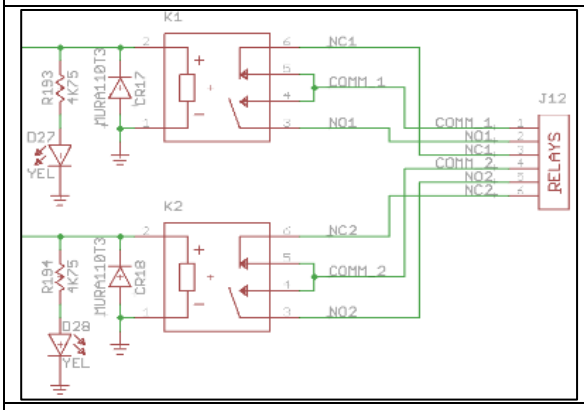
X5 Alarm Beacon Output [PCB J3]			
Pin	Description	Color	Pin Location
1	GND	Brown	
2	Blue Light	White	
3	Red Light	Blue	
4	Audio Alarm	Black	
5	Amber Light	Grey	
Connecting Cable: 030XX738 (or similar scanner cable)			Color: Grey

X6 Marking Valve Output [PCB J2]			
Pin	Description	Color	Pin Location
1	Valve Coil 1	Brown	
2	Valve Coil 2	White	
3	Purge 1	Blue	
4	Purge 2	Black	
5	PE	Green/Yellow	
Connecting Cable: 030XX743 (or similar valve cable)			Color: Grey

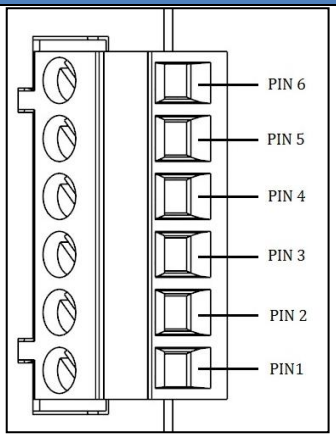
* Use Switch SW1 to select the Pin that is used

X7 Relay Output [PCB J12]

Schematic



Pin	Description
1	Relay 1 – Common
2	Relay 1 – N.O.
3	Relay 1 – N.C.
4	Relay 2 – Common
5	Relay 2 – N.O.
6	Relay 2 – N.C.

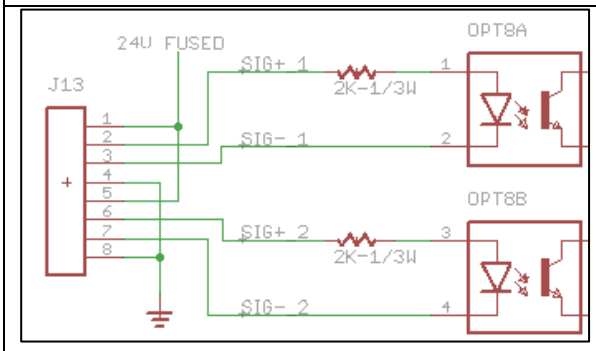


Connecting cable: 029XX089 (For feed interrupt)

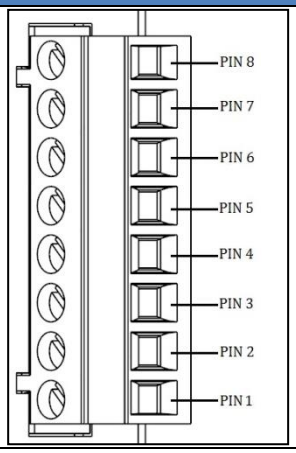
Color: Grey

X8 AUX Input [PCB J13]

Schematic



Pin	Description
1	24VDC
2	INPUT 1 (+)
3	INPUT 1 (-)
4	GND
5	24VDC
6	INPUT 2 (+)
7	INPUT 2 (-)
8	GND

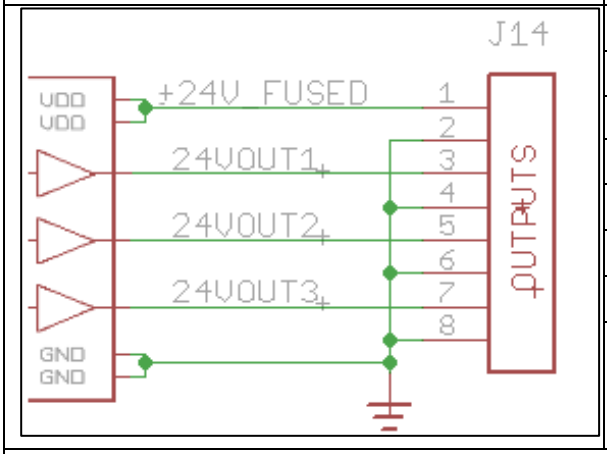


Connecting cable: None Standardized

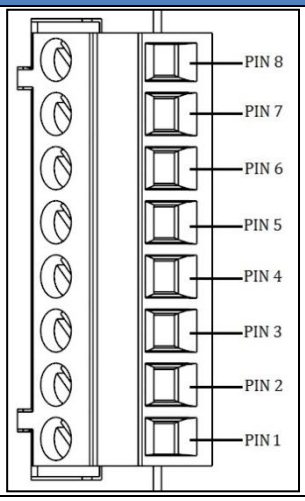
None Standardized

X9 AUX Output [PCB J14]

Schematic



Pin	Description
1	24VDC
2	GND
3	AUX OUTPUT 1
4	GND
5	AUX OUTPUT 2
6	GND
7	AUX OUTPUT 3
8	GND

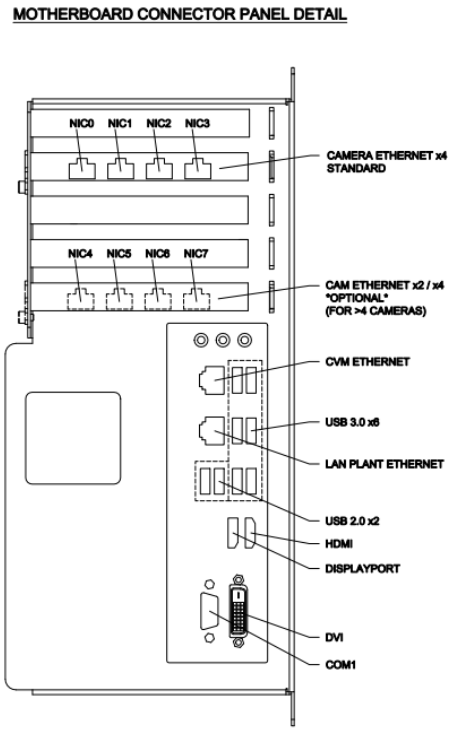


Connecting cable: CV10652 (For BundleChek "Bad Box" signal)

Color: Blue

Motherboard Module (MBM)

Cameras are typically connected to one camera network port on the 4-port network card of on the MBM, and the “LED” and “Camera” connectors on a single camera card. In the case where there is a BundleChek system, the data cable for the BundleChek must be connected to NIC0.



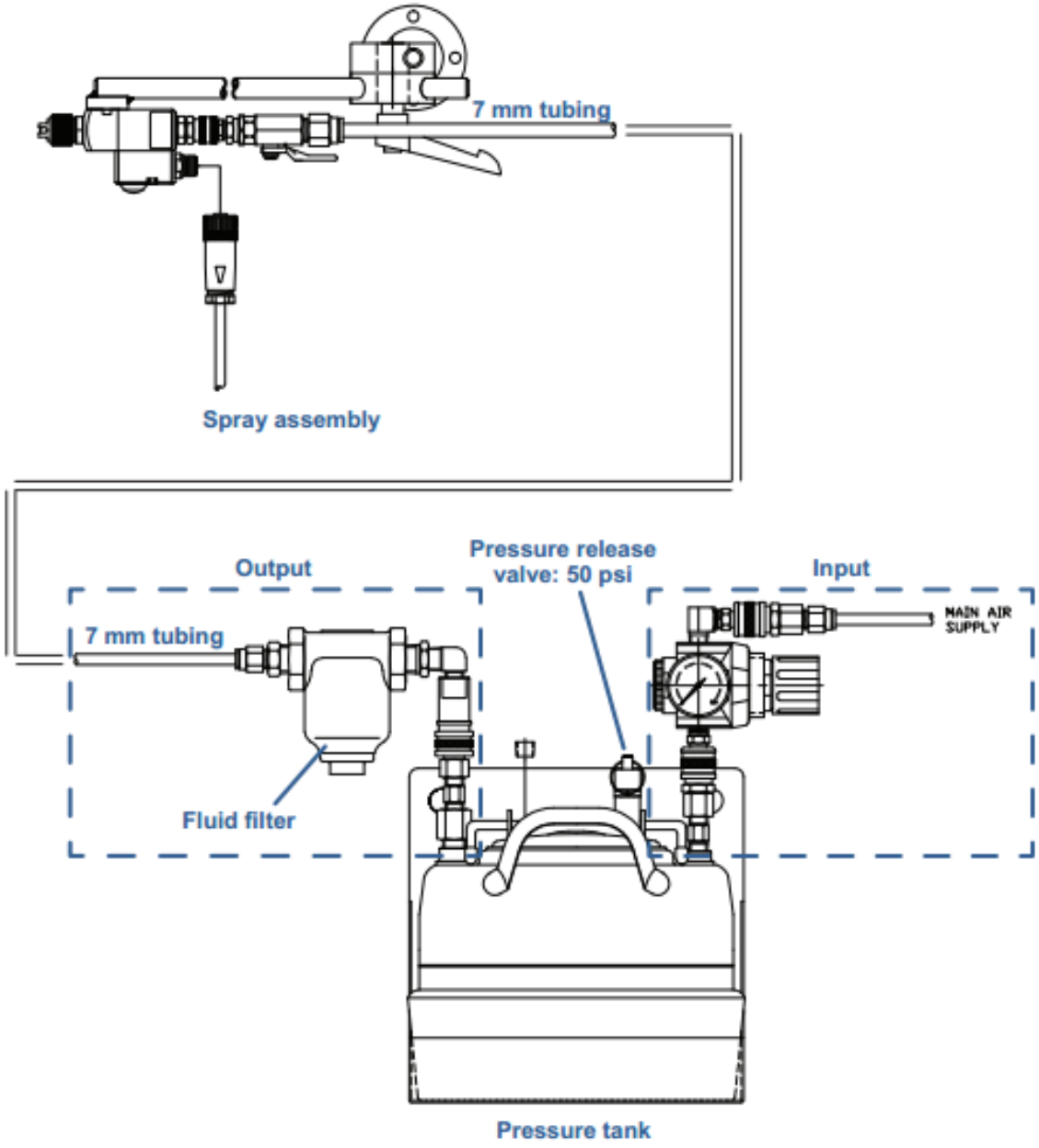
3.1.2 Stack Light

The stack light notifies the operator of a defective box both through an audible alarm and a light. The stack light has several different sound patterns configurable on the light itself.

Switch Select				Audible Function
SW7	**SW8**	**SW9**	**SW10**	
Off	Off			Steady Tone
On	Off			Pulsed Tone – 1.5 Hz Rate
Off	On			Siren Tone – 1.5Hz Rate
On	On			Chirp Tone – 1.5Hz Rate
		Off	Off	Low Sound Intensity
		On	Off	Medium Sound Intensity
		Off	On	Medium High Sound Intensity
		On	On	High Sound Intensity

3.1.3 UV Marking System

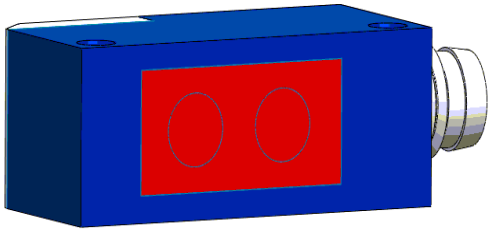
The marking system applies UV dye to the fold of the defective box. It consists of a one-gallon pressure tank filled with a dye and water solution, and a spray assembly.



3.1.4 Encoder

The Encoder tracks the position of the belts used in performing speed calculations and determining when to take pictures. It should be mounted on a belt which runs at the same speed as the boxes.

3.1.5 Photoelectric Sensor

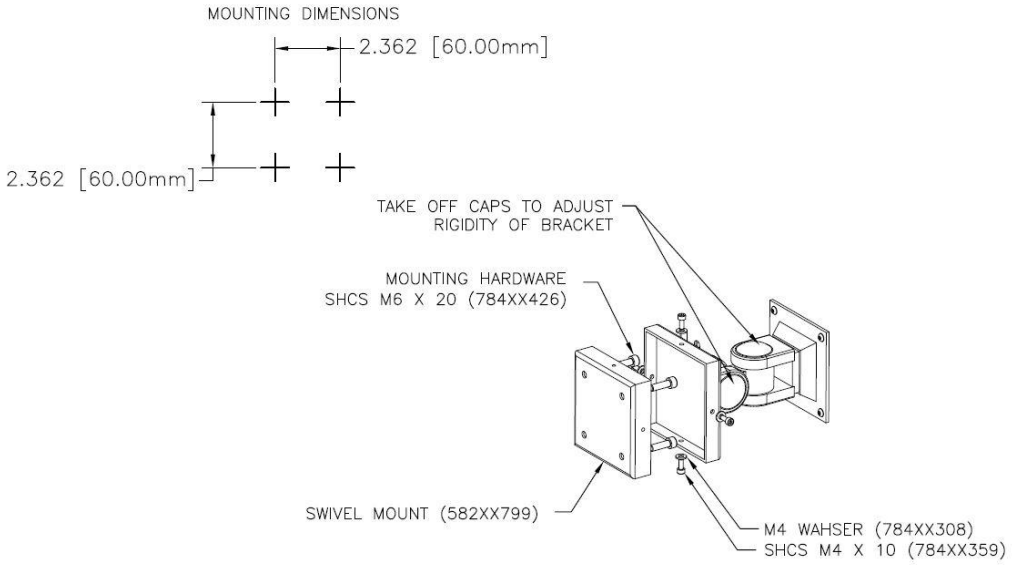


In most cases, each camera has a photoelectric sensor (a.k.a. PhotoEye) associated to it. The PhotoEye is responsible for detecting and counting the boxes passing by. It provides accurate timing information for the camera(s). It should be mounted before the camera but not farther away than the maximum depth of a sheet on that particular machine (typically between 6" - 18″ / 152.4mm - 457.2mm before the camera on most machines). Also, it should be mounted as close as possible above the sheet's surface (typically between 1″ - 4.5″ / 25.4mm - 114.3mm depending on the application). The view of the PhotoEye should not be obstructed by anything.

3.1.6 Touch screen

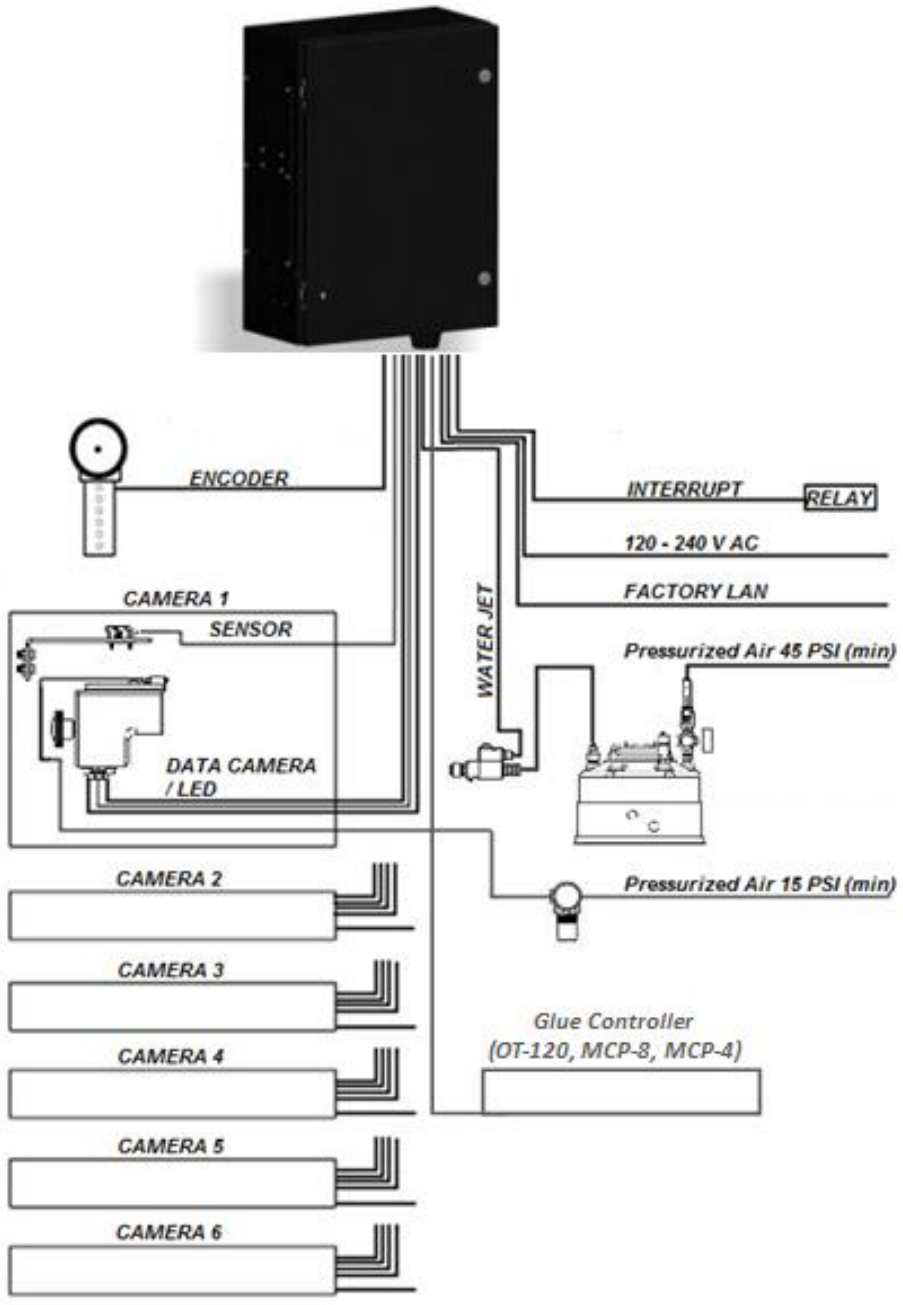
The touchscreen will connect to any USB port and, depending on the specific model, either an HDMI port or the VGA port.

The mounting bracket for touchscreen allows the operator to swivel the control for best viewing.

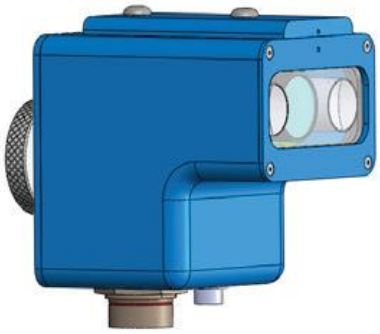


3.2 System Connectivity

All components are connected to the control cabinet. Shown below is a typical system with one camera. All the lines represent specific connections. The open lines to the right are connections supplied by the box plant. The labels on the connections also represent the naming on the connector panel.



3.2.1 GlueChek and FoldChek Camera

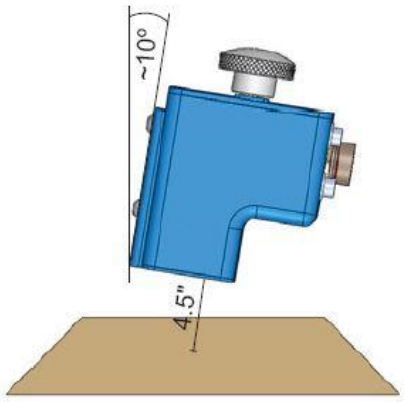


The GlueChek camera module acts as the eyes for the GlueChek system and FoldChek system. It contains a high-speed camera, LEDs for lighting, and specialized optics.

The position of the cameras or bracketing should not be changed after the installation. If physical changes are necessary, please contact ClearVision for assistance with this task.

For **GlueChek** the camera is normally mounted approximately 4.5″ / 114.3mm from the glue tab at a 10º tilt. Please see 6.1.1 Positioning the GlueChek Camera if camera needs to be switched between top and bottom gluing.

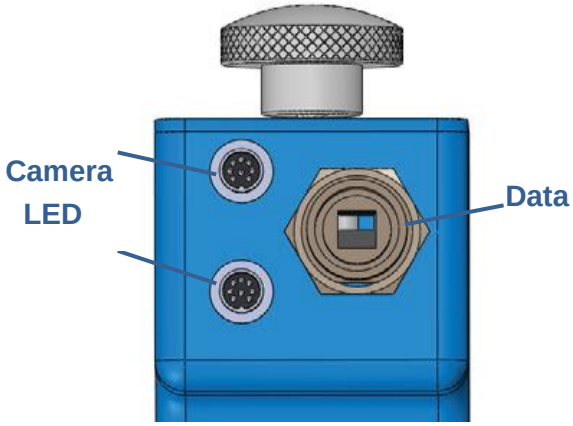
For **FoldChek**, the camera is located 13-20″ / 330.2mm – 508mm from the fold at a 15° tilt. The camera position is set during the calibration phase of the installation. The FoldChek camera can be moved at the beginning of each order. Please see 6.1.2 Positioning the FoldChek Camera.



Note: Each FoldChek camera is pre-focused to a specific distance specified on the label. This distance must match the distance from camera to board. If it does not, the camera will need to be refocused on-site.

Connections to Camera Module

There are three cables connecting the camera and the cabinet. They comprise the trigger signals, the power for the lighting, and the data line to feed images to the Cabinet. The image on the right shows the underside of the camera module and the connectors.

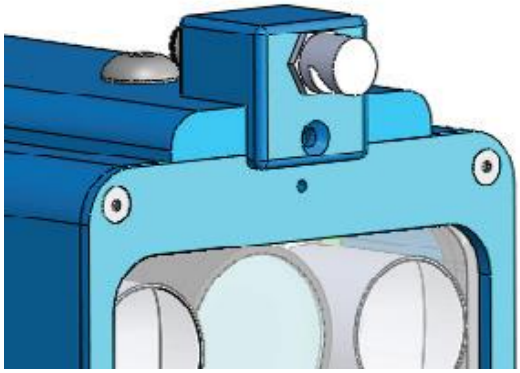


The table below shows each individual connection with a description of the signal it is intended for.

Signal	Description	Type of Connection
CAMERA	Trigger and power for the camera in the module.	M16 DIN 8-PIN
LED	Lighting for camera module.	M16 DIN 8-PIN
DATA	GigE connection to camera module.	Cat 6, RJ45

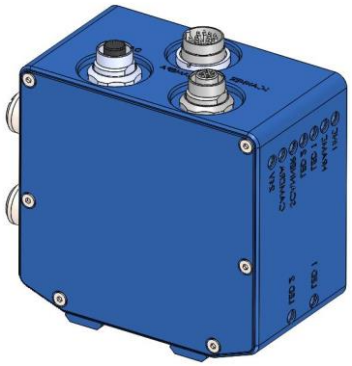
Air Cleaning System

If required by the setup of the installation, the camera module can be equipped with an air cleaning nozzle. The nozzle and nozzle bracket, mounted on the Camera Module are shown in the image on the right. The pressure on the nozzle should be between 15 and 20 psi (1 - 1.4 bar). The flow rate is approx. 1.4 gpm (5 lpm) at 20 psi (1.4 bars). Depending on the application, more air pressure may be required. To conserve energy, the air supply for the camera can be controlled by a plant-supplied solenoid which activates when the machine is on. Air is only recommended for camera's pointing upwards.



Note: The air supplied to the camera must be filtered using an oil filter.

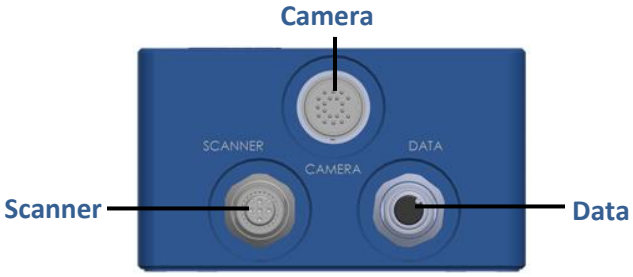
3.2.2 Narrow GlueChek Camera



The Narrow GlueChek camera module acts as the eyes for the GlueChek system. It contains an integrated high-speed camera, LEDs for lighting, and specialized optics.

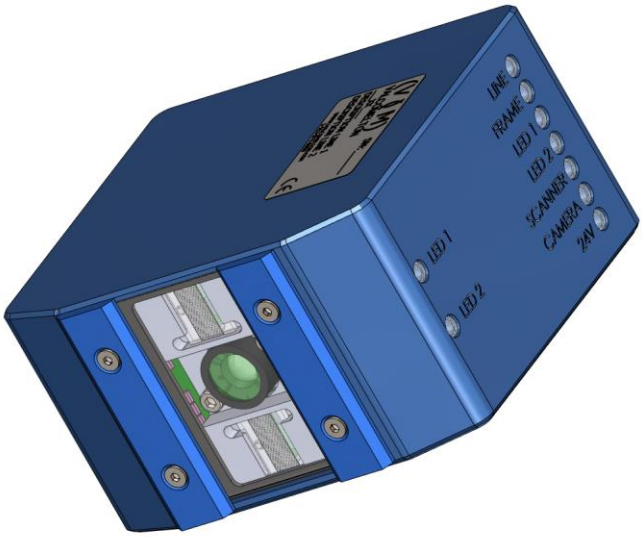
The GlueChek camera is installed with bracketing to support the camera, and integrated product guide, and photoelectric scanner sensor to trigger the camera acquisition. For installations with fixed glue application, the camera and bracketing will be permanently installed at the correct position.

The Narrow GlueChek camera module has 3 electrical cable ports.



PORT	DESCRIPTION	TYPE OF CONNECTION
CAMERA	Trigger signals and power for the integrated camera & LEDs	M16 19-PIN
DATA	Gigabit Ethernet connection to camera.	M12 8-PIN (GigE)
SCANNER	Sensor port for detecting product to be inspected. Intended for use with Valco photoelectric sensors. *This is an auxiliary port and, depending on installation, the sensor may instead be connected directly into the CVM in the Control Cabinet.*	M12 5-PIN

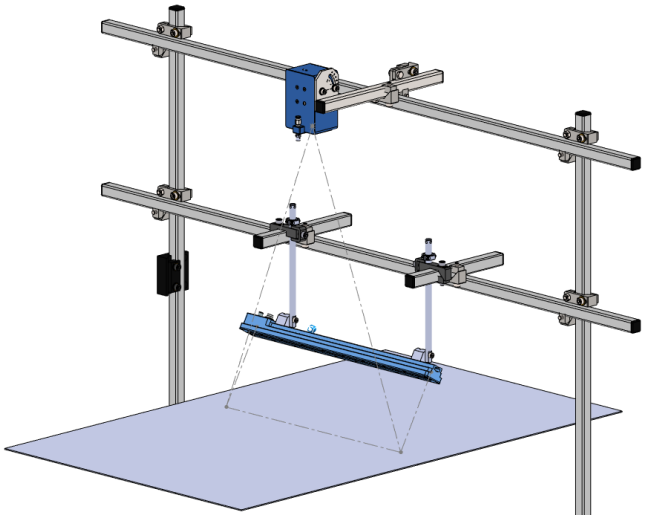
3.2.3 GlueChek: Camera Module Protective Glass



Over time, glue and dust accumulate on the protective glass, reducing image quality and consistency. Wipe off dried glue and dust with a wet cloth. Do not use sharp objects or printing dye cleaner on the glass. When cleaning the glass, please check the functionality of the air cleaning nozzle on the camera module and adjust the air pressure if necessary.

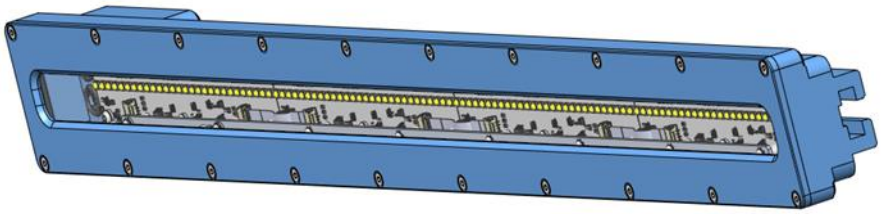
3.2.4 Mega GlueChek Camera

Mega GlueChek is a variation of the ClearVision GlueChek technology that uses different hardware. It uses the same software, test suite, and user interface as other GlueChek systems. It is used to provide glue inspection across large regions, panels, or entire cartons. In these systems the lighting is separated from the camera. The Camera module and lighting LED Module are mounted separately. For larger illuminated regions, the LED module will also be powered from a separate DC power supply.



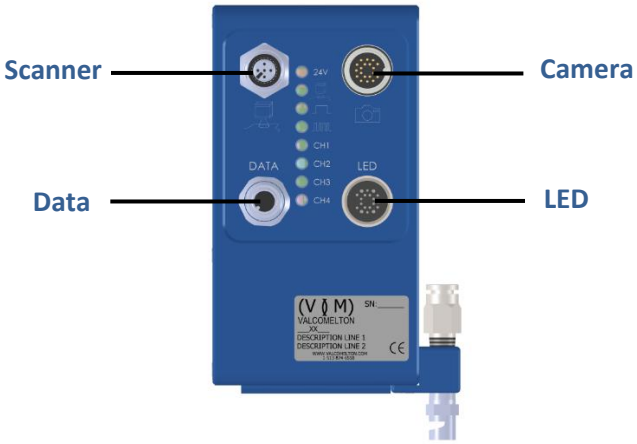
Camera and LED modules with bracketing

Camera Module



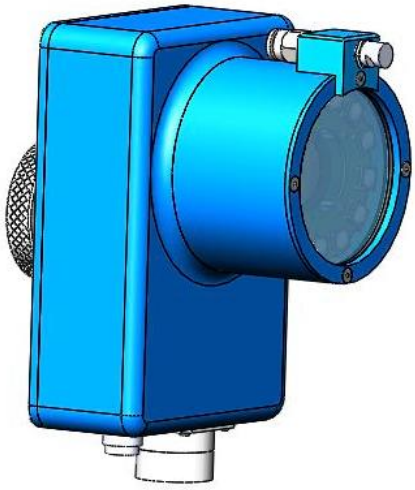
LED Module

The Mega GlueChek camera module has 4 electrical cable ports.

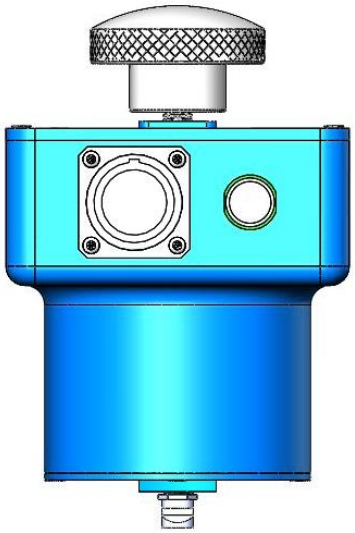


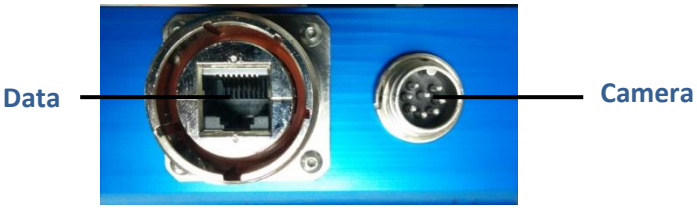
PORT	DESCRIPTION	TYPE OF CONNECTOR
CAMERA	Trigger signals and 24VDC power input port for the camera.	M16 19-PIN (Male)
LED	Trigger signals output port to drive separate LED module. Carries 24VDC at low power, can allow some small LED modules to operate without separate power supply.	M16 19-PIN (Female)
DATA	Gigabit Ethernet connection to camera.	M12 8-PIN (GigE)
SCANNER	Sensor port for detecting product to be inspected. Intended for use with Valco photoelectric sensors. *This is an auxiliary port and, depending on installation, the sensor may instead be connected directly into the CVM in the Control Cabinet.*	M12 5-PIN

3.2.5 CodeChek Camera



The CodeChek camera module inspects the area containing the barcode as specified by the operator during the order setup. It contains a high-speed camera and specialized optics.





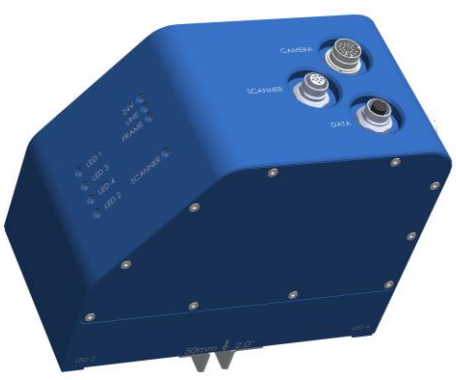
Connections to Camera Module

There are two cables connecting the camera and the cabinet. They comprise of the power for the lighting, trigger signal and camera, and the data line to feed images to the Cabinet. The image on the right shows the underside of the camera module and the connectors.

The table below shows each individual connection with a description of the signal it is intended for. The LEDs triggering circuits is inside the camera and is designed to turn on when the camera is exposing.

Signal	Description	Type of Connection
CAMERA	Trigger and power for the camera in the module.	M16 DIN 8-PIN
DATA	GigE connection to camera module.	Cat 6, RJ45

3.2.6 ScoreChek Camera



For ScoreChek the camera is normally mounted approximately 2″ / 50 mm from the front face of the camera to the product. Guide rails must be used with a gap of 10mm. Please see section 6.1.4 Positioning ScoreChek Camera if camera needs to be switched between top and bottom gluing.

The ScoreChek camera module acts as the eyes for the system. It contains a high-speed camera, LEDs for lighting, and specialized optics.

The position of the camera and bracket should not be changed after the installation. If physical changes are necessary, please contact ClearVision for assistance with this task.

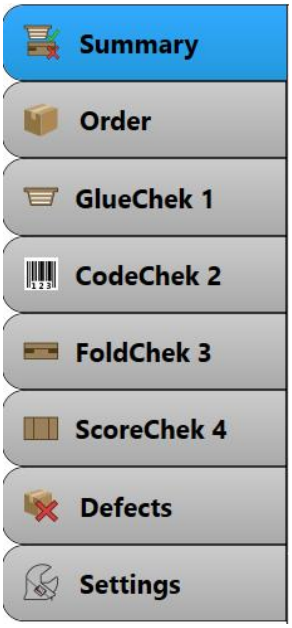
Connections to Camera Module

There are two cables connecting the camera and the cabinet (one camera cable and one data cable). The scanner is connected to either the camera by the scanner port or directly to the cabinet by a scanner cable. The camera cable includes power for the camera and the lighting, and if applicable, the trigger signal. The data cable feeds images to the Cabinet. The following image shows the camera module and the connectors.

The following table shows each individual connection with a description of the signal it is intended for.

Signal	Source	Destination	Description	Type of Connection
CAMERA	Camera	Cabinet	Trigger and power for the camera in the module	M16 DIN 19-PIN
DATA	Camera	Cabinet	GigE connection to camera module.	Cat 6, RJ45
SCANNER	Scanner	Camera	Trigger signal	M12 5-PIN
	Scanner	Cabinet		

3.3 The User Interface

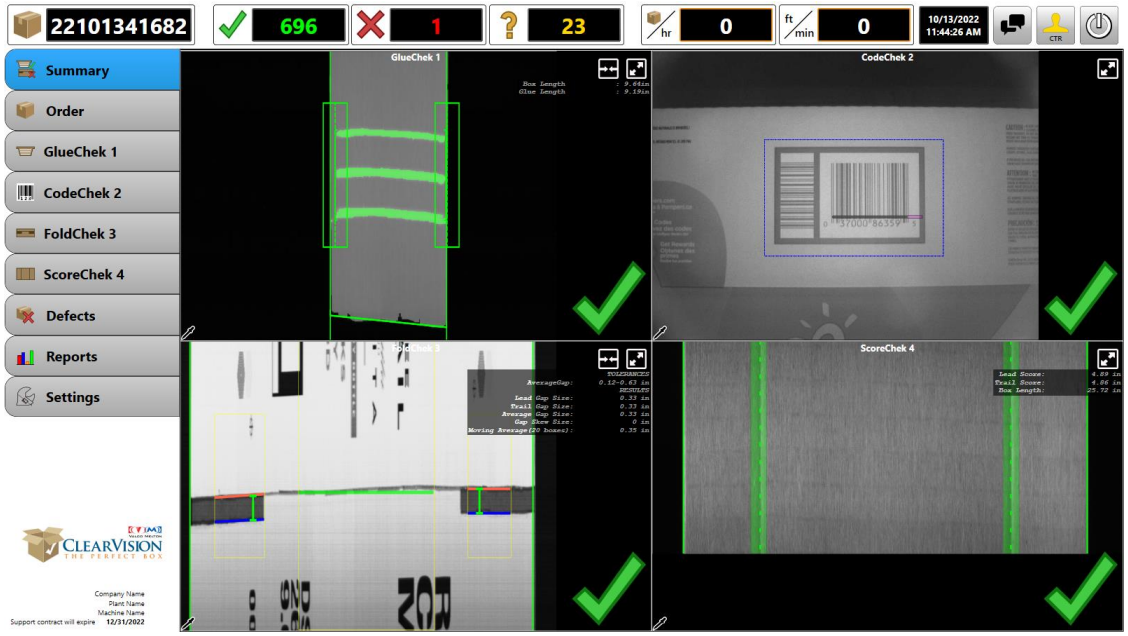


All interactions with the inspection system are done through the software via the touch screen user interface. The BoxChek system has four levels of user, from Level 1 (Operator) to Level 4 (ClearVision Support). This section describes functionality that is available to the Level 1 user (operator), and Level 2 user (Supervisor).

The inspection software consists of several menus which can be selected by clicking on the corresponding tabs at the side of the user interface. The menu of each interface varies depending on the systems that are being used. In its initial state the software consists only of the **Order**, **Defects** and **Settings** Tabs. The following is a short description of each menu.

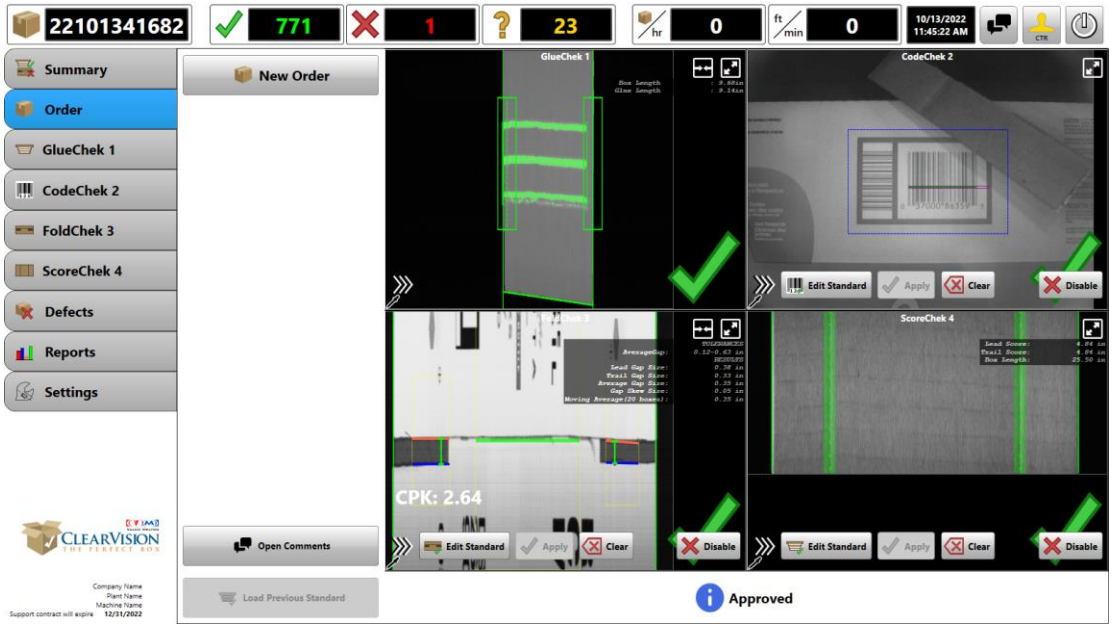
3.3.1 Summary Menu

The **Summary Menu** shows the operator a live image for each testsuite (GlueChek, FoldChek, CodeChek, and ScoreChek) and whether it passed or failed the inspection. A green check mark beside the image signifies a pass, while a red “X” signifies a failure.



3.3.2 Order Menu

The **Order Menu** is used to create new orders or view them in real-time. The operator can set the standards for the order depending on the camera that is running.



3.3.3 Test Suite Menu

The **System Menu** varies depending on which testsuites are configured, i.e., GlueChek, CodeChek, etc. In this case the GlueChek, CodeChek, FoldChek, and ScoreChek testsuites are set up. Settings for each testsuite can be changed in each of these menus by the operator.

3.3.4 Defects Menu

The **Defects Menu** allows operators to review defects from past or current orders.

1. An image of every defective box is saved and archived under the customer order number in which it was found. Operators and maintenance personnel typically use this menu to review defects and to understand why they are occurring. Select an order from the list to be displayed by clicking on it. The most current order is at the top of the list.

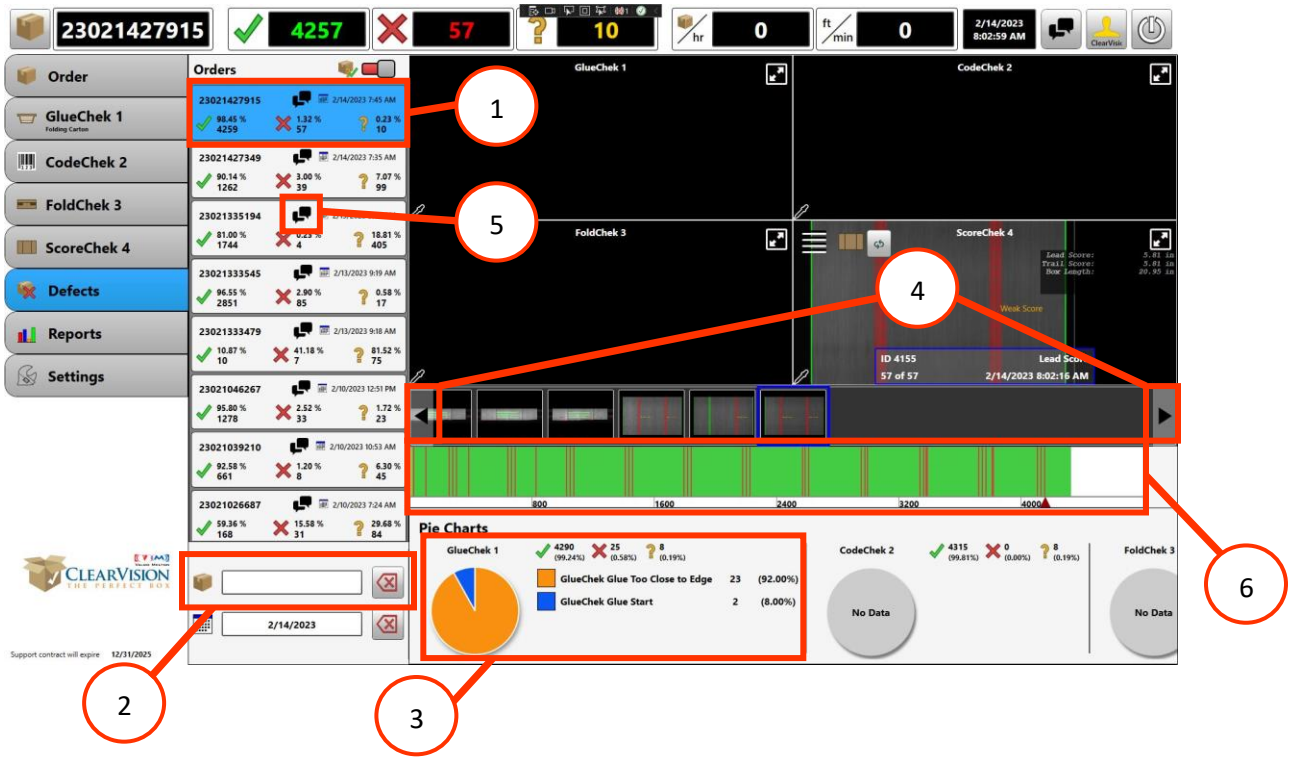
2. To search for an order, type the selected order number in question. Hit enter to display the order.

3. Along the bottom of the screen, information per testsuite is shown specifying the number of boxes (and the percentages) that have passed, have failed, and were not analyzed (because the standard was not set up yet). When boxes failed, the number and type of defects are also shown and displayed on a pie chart to help the user to analyse the results.

4. Use the left/right arrows to navigate through the defective box images.

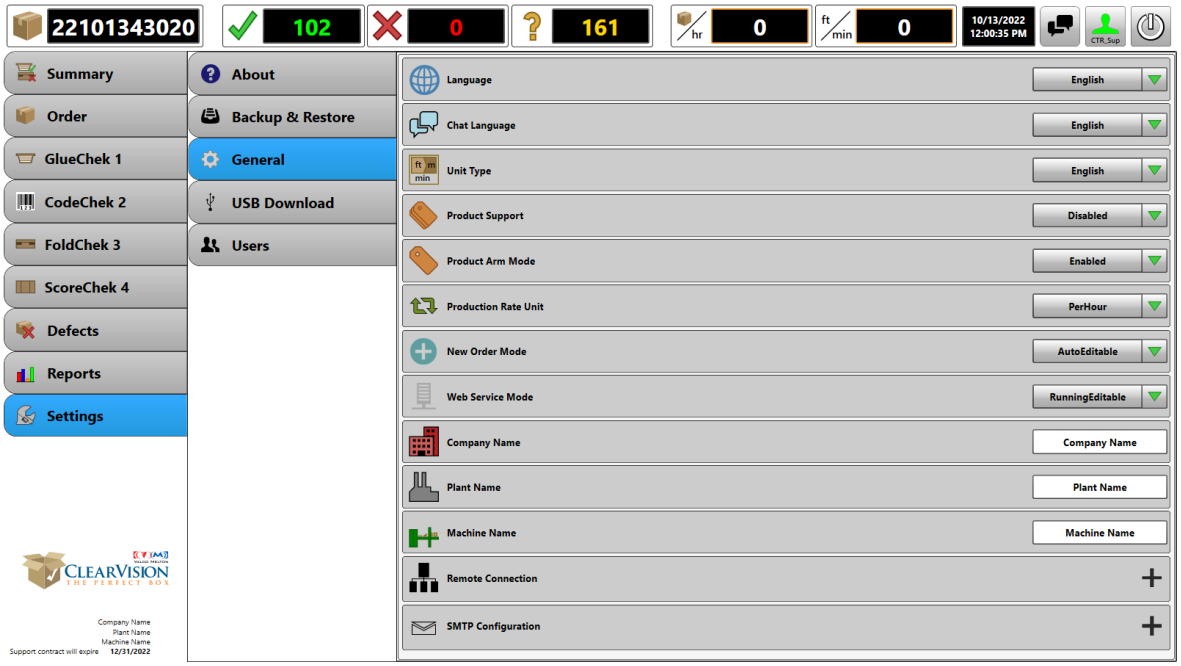
5. Direct access to the order's comments. For more details go to Adding New Comments and Viewing/Editing Comments.

6. If Enabled, shows the roll map for the order. This shows where passed/failed/not Analyzed boards appeared during the order and can help visualize when defects occurred. The axis is box Count. Note: If you would like the roll map enabled, please contact ClearVision Support.



3.3.5 Settings Menu

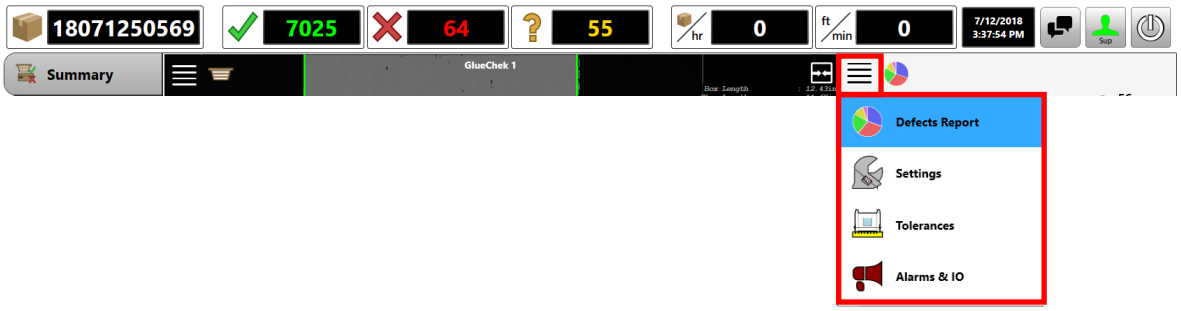
The **Settings Menu** is used during the installation of the inspection system for setting up and calibrating the camera(s), as well as for configuring the inspection software for the installation. The menu varies depending on the level of the user. Level 4 users and ClearVision personnel will have, for example, access to some settings that a level 1, 2 or 3 users may not have. A level 2 user will have the following access:



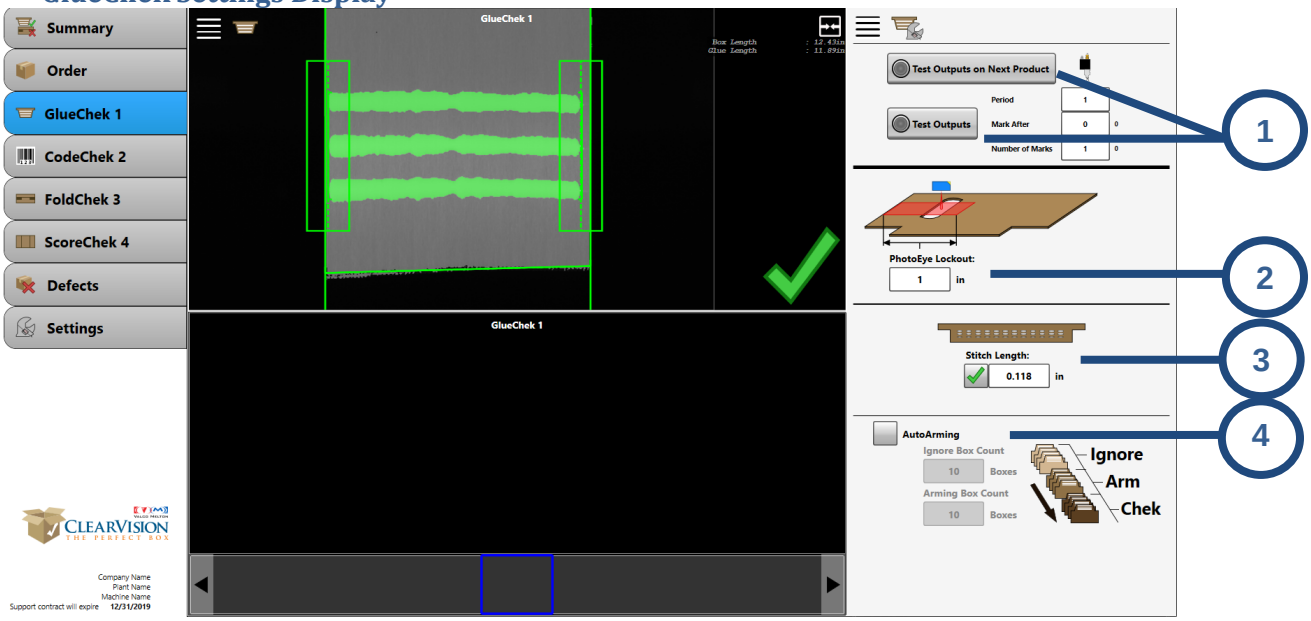
3.3.6 System Menu

The **System Menu** is located within each Testsuite on the top right side of the image display. The drop-down list can be displayed by pressing the icon ≡.

The **System Menu** varies depending on the level of the user. Level 4 users and ClearVision personnel have, for example, access to some settings that a level 1, 2 or 3 users may not have. A level 2 user has access to Defects Report, Settings, Tolerances, and Alarms & IO.



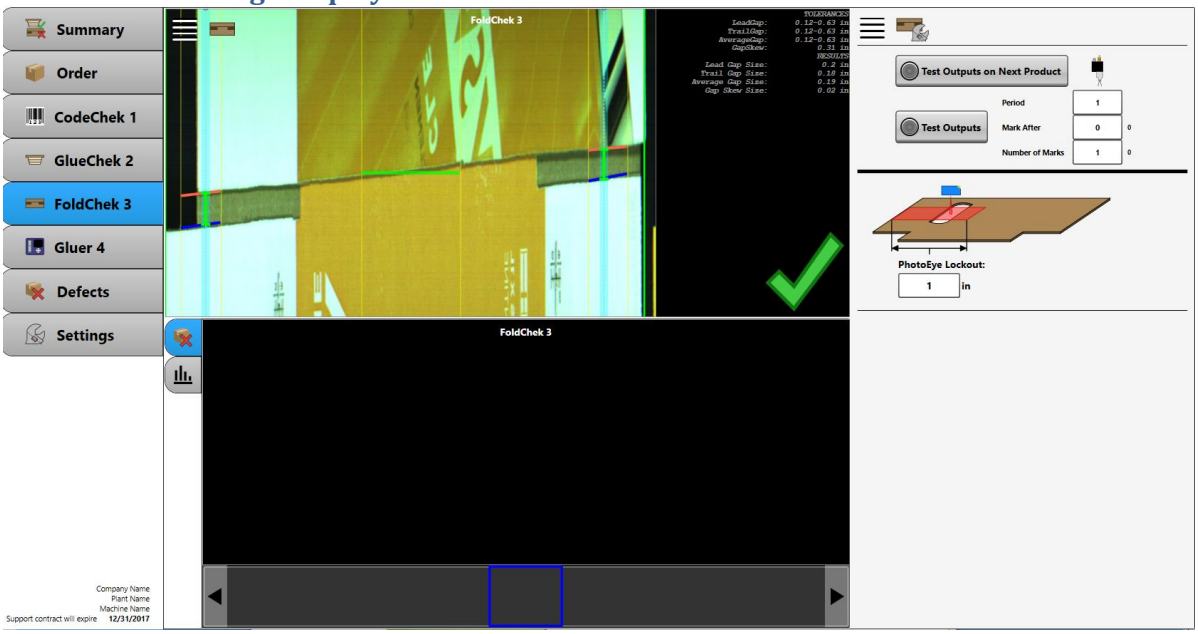
GlueChek Settings Display



Through the settings menu in the GlueChek tab, the operator can:

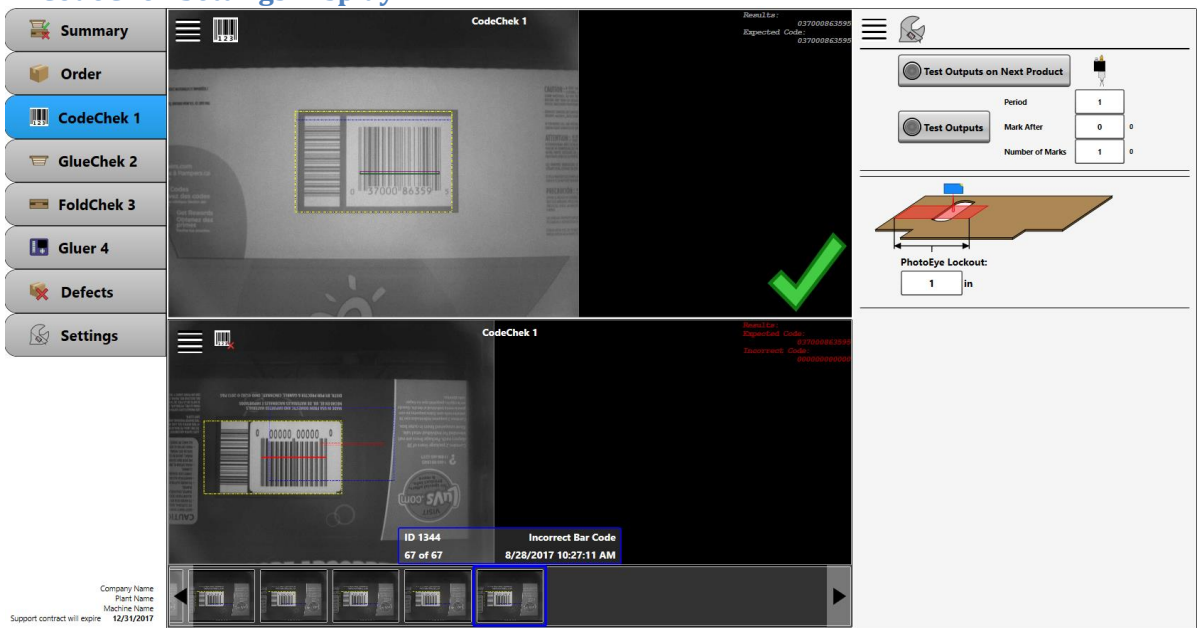
1. If required, test Outputs on Next Product or Test Outputs.
2. If required, change the photoeye lockout for boxes with die-cuts.
3. If required, enable, or disable Stitch Length feature.
4. If required, enable, or disable the auto-arming feature.

FoldChek Settings Display



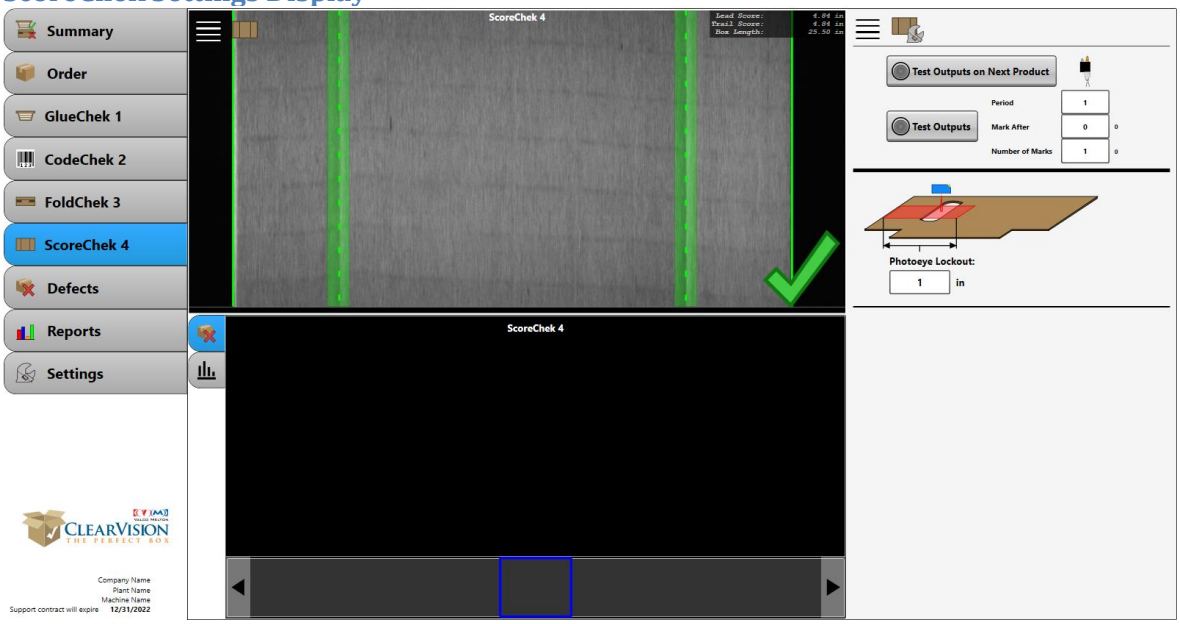
The FoldChek Settings options are the same as the GlueChek Settings except for the stitch length and auto-arming feature.

CodeChek Settings Display



The CodeChek Settings options are same as the FoldChek Settings.

ScoreChek Settings Display

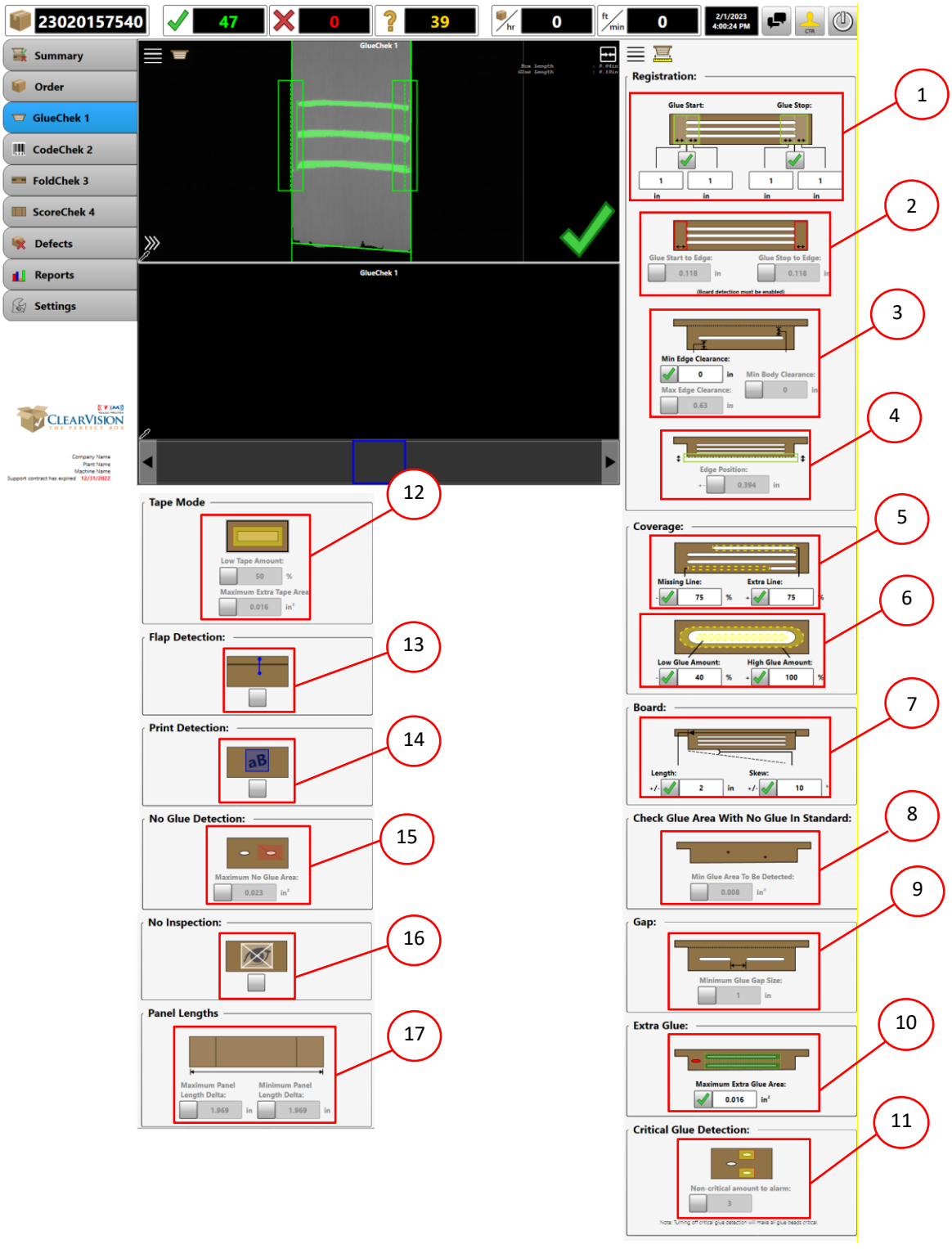


The ScoreChek Settings options are same as the FoldChek Settings.

3.3.7 Tolerance Menu

GlueChek Tolerance Display

1. Glue Start and Glue Stop point – These are measured from the lead edge and trail edge of the glue position found on the standard. It is possible to adjust both the positive and negative values of tolerances. Changing the positive value will adjust the right tolerance from the start/stop line and changing the negative value will adjust the left tolerance from the start/stop line.
2. Glue Start Edge and Glue Stop Edge point – The minimum allowed distance of the glue to the edge of the glue tab. The lead and trail sides can be configured to be different distances. If glue enters this region, the product will be flagged as a failure. The left and right edges of the board must be detected accurately.
3. Edge Clearance
    a. The minimum and maximum edge clearance - This is the distance from the glue line to the edge of the box that is running parallel to the glue line.
    b. Minimum body Clearance - This is the minimum distance the closest glue line to the body of the glue tab (if applicable). If the glue gets too close to the body, the product will fail.
4. Edge Position – The allowed vertical movement of the glue tab. If the glue tab edge moves up or down greater than the allowed tolerance, the product will be flagged as a failure.
5. Coverage Missing/Extra lines – The acceptable amount of extra or missing glue from one line. E.g., 30 means we will alert for one line missing 30%.
6. Coverage Low/High Glue Amount – The acceptable amounts of glue present in a glue blob or glue line. This is measured in pixels. In this case, the system will alert if there is greater than 100% of the pixels or if there is 40% or more pixels missing when comparing to the standard.
7. Skew – The allowed amount of skew of the box in degrees.
8. Check Glue Area with no Glue in Standard - Used only when no glue is expected. When the standard is armed with no glue, any glue found will cause a failure.
9. Glue Gap (only applicable in Bracket mode) – If a glue gap larger than the specified amount is found, a failure will occur.
10. Extra Glue (only applicable in Bracket mode) – If a certain amount of glue is found outside of a bracket of glue, a failure will occur.
11. Critical Glue Detection (only applicable in Bracket mode) – Allows up to a set amount of non-critical glue brackets to fail before a failure of the product occurs.
12. Tape Mode (only applicable in Bracket mode) - Allows UV fluorescent tape to be armed and inspected for. Missing tape and extra tape can be configured separately to flag the product as a failure.
13. Flap Detection – Once armed, if a flap isn't present, a failure will occur.
14. Print Detection – This will check to make sure the armed print is in the same position.
15. No Glue Detection – if a set amount of glue area falls within the specified area during arming, a failure will occur.
16. No Inspection – GlueChek will completely ignore any glue in this region specified during arming.
17. Panel Length – If the panel lengths change by a set amount, a failure will occur. This will only check the panels that were armed with.


23020157540
47
0
39
0
0
2/1/2023
4:00:24 PM
Summary
Order
GlueChek 1
CodeChek 2
FoldChek 3
ScoreChek 4
Defects
Reports
Settings
GlueChek 1
GlueChek 1
Registration:
Glue Start:
Glue Stop:
Glue Start to Edge:
Glue Stop to Edge:
Min Edge Clearance:
Min Body Clearance:
Max Edge Clearance:
Edge Position:
Coverage:
Missing Line:
Extra Line:
Low Glue Amount:
High Glue Amount:
Board:
Length:
Skew:
Check Glue Area With No Glue In Standard:
Min Glue Area To Be Detected:
Gap:
Minimum Glue Gap Size:
Extra Glue:
Maximum Extra Glue Area:
Critical Glue Detection:
Non-critical amount to alarm:
Tape Mode
Low Tape Amount:
Maximum Extra Tape Area:
Flap Detection:
Print Detection:
No Glue Detection:
Maximum No Glue Area:
No Inspection:
Panel Lengths
Maximum Panel Length Delta:
Minimum Panel Length Delta:
1
2
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16
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FoldChek Tolerance Display

The Tolerance Menu for FoldChek is used to set parameters for the glue. The parameters include:

LG = Lead Gap, TG = Trail Gap

1. Minimum and maximum size of average gap. Measured in inches. System will alarm if:

$$\frac{LG + TG}{2} < Min \text{ OR } \frac{LG + TG}{2} > Max$$

2. The minimum and maximum lead and trail gaps acceptable individually. System will alarm if:

LG < Min or LG > Max or TG < Min or TG > Max

3. The allowed amount of skew in the gap. System will alarm if:

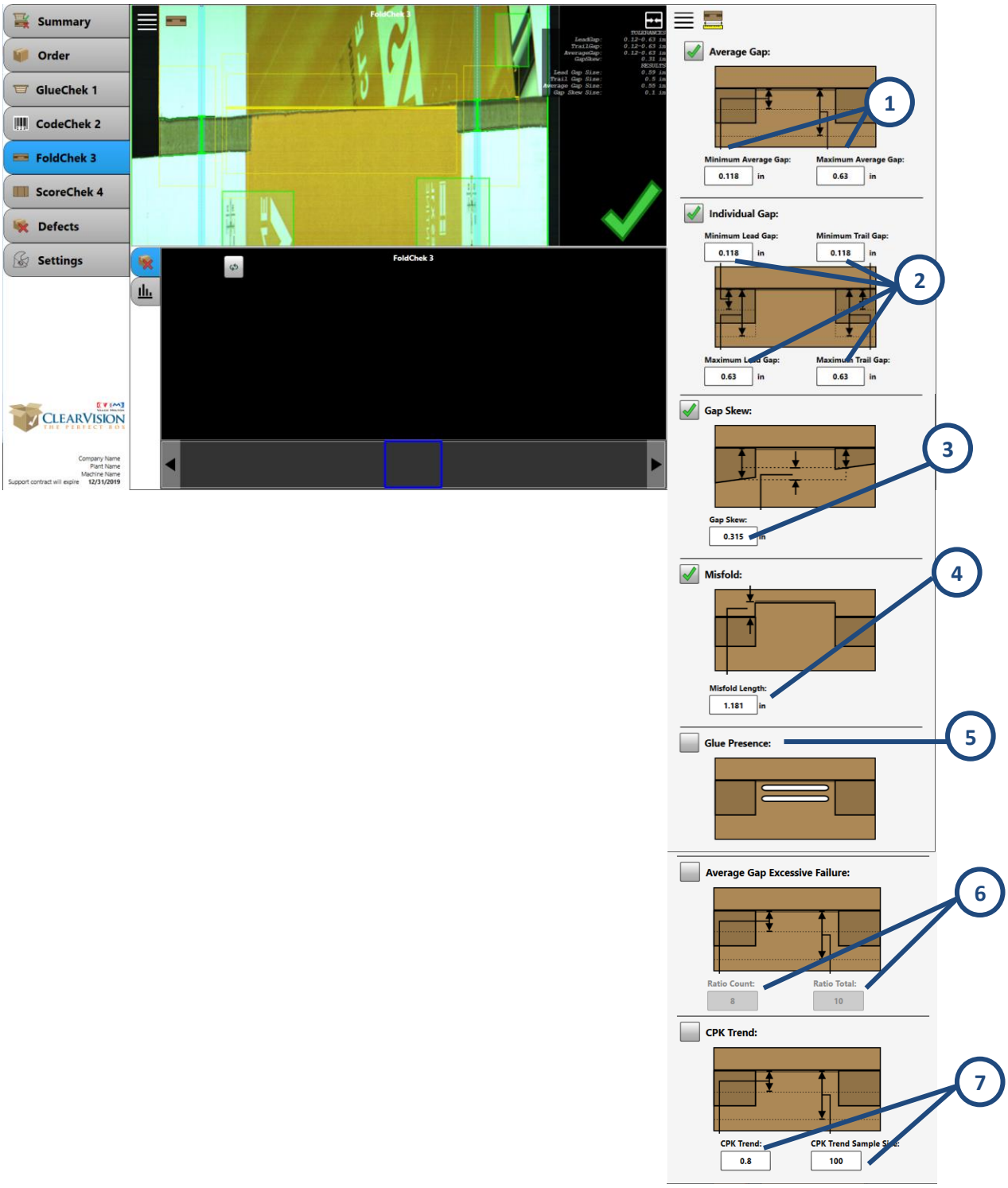
TG – LG > Max Skew

4. Enable or disable the ability to detect misfolds. Checks if the tab is under or over the 4th panel in comparison to the standard.

5. Enable or disable the ability to detect glue presence which should not be visible.

6. Can enable failure on excessive average Gap size failures. This will change the failure message to report an excessive average Gap failure is occurring. This is different and separate to the global excessive Failures alarm that will trigger on all failure types. That will still trigger.

7. Can be used to fail if the CPK drops below a certain threshold for a certain number of boxes.

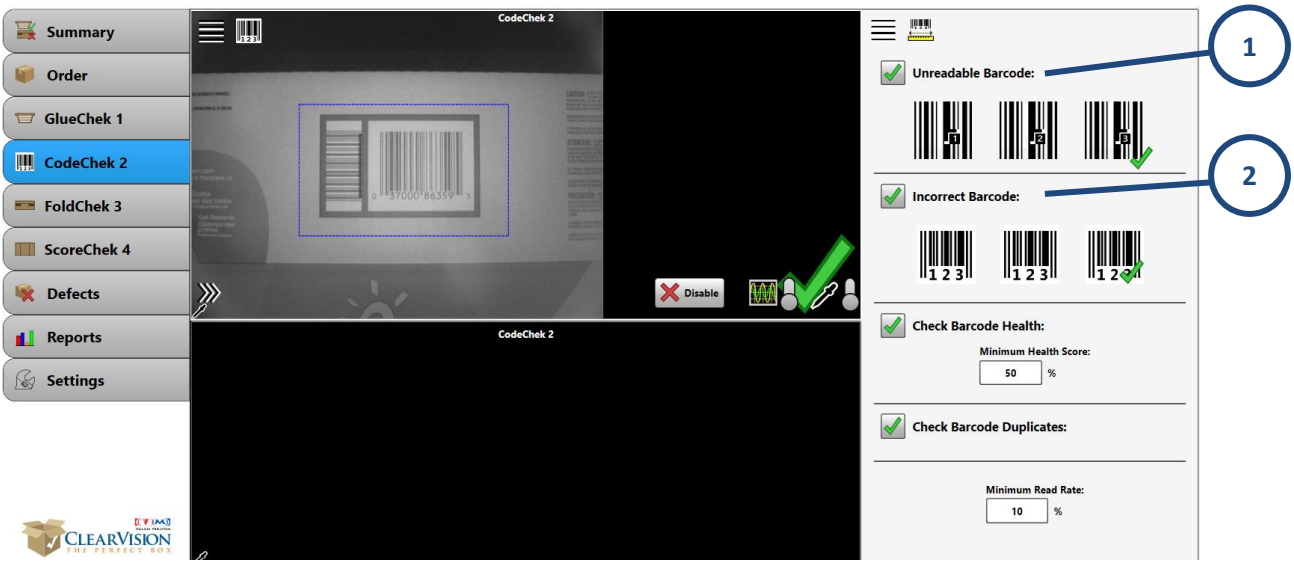

Summary
Order
GlueChek 1
CodeChek 2
FoldChek 3
ScoreChek 4
Defects
Settings
FoldChek 3
Average Gap:
Minimum Average Gap:
0.118
in
Maximum Average Gap:
0.63
in
1
Individual Gap:
Minimum Lead Gap:
0.118
in
Minimum Trail Gap:
0.118
in
Maximum Lead Gap:
0.63
in
Maximum Trail Gap:
0.63
in
2
Gap Skew:
Gap Skew:
0.315
in
3
Misfold:
Misfold Length:
1.181
in
4
Glue Presence:
5
Average Gap Excessive Failure:
Ratio Count:
8
Ratio Total:
10
6
CPK Trend:
CPK Trend:
0.8
CPK Trend Sample Size:
100
7

CodeChek Tolerance Display

The Tolerance Menu for CodeChek is used to set parameters for the barcodes. The parameters include:

1. Unreadable Barcode. Enable this feature to track and trace applications in which case a defect is when a box' code is unreadable.

2. Incorrect Barcode. Enable this feature in case of product mixing to ensure the code for the current box matches the code from the arming.

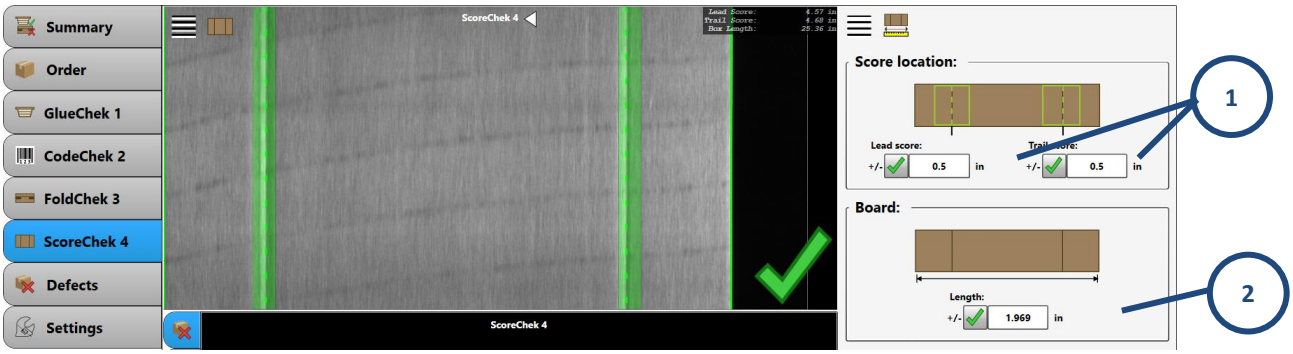


ScoreChek Tolerance Display

The Tolerance Menu for ScoreChek is used to set parameters for the glue. The parameters include:

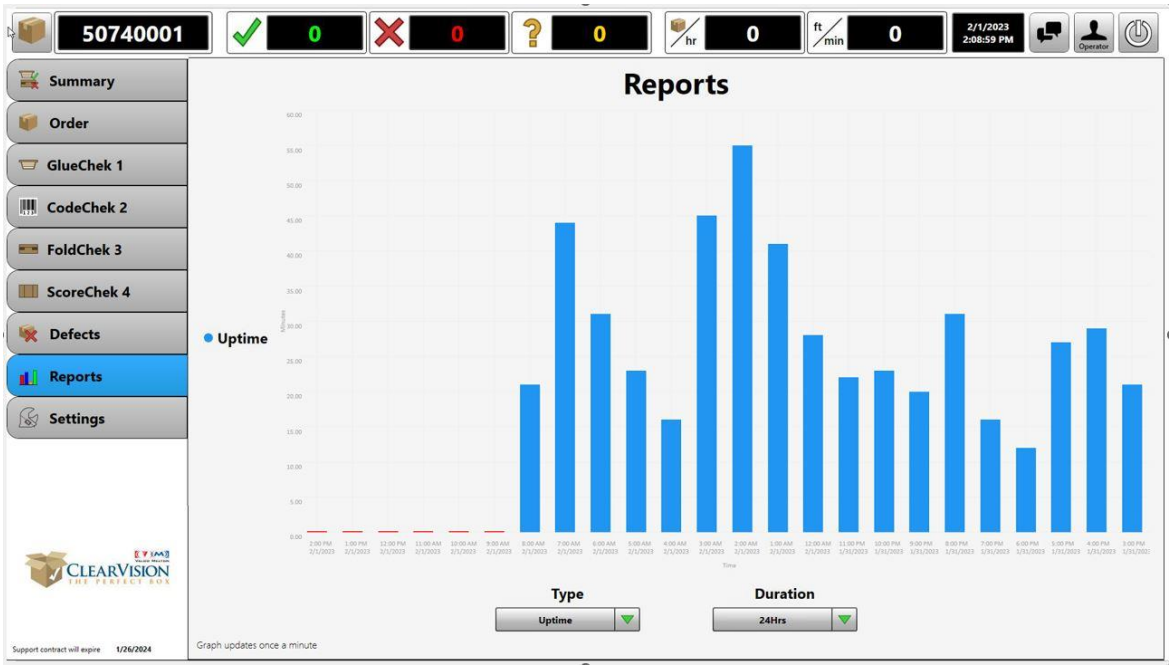
1. The acceptable variance in the lead and trail scores. The scores must be within the tolerances.

2. The acceptable variance in box length.



3.3.8 Reports Menu

The Reports menu allows the user to see various report types over different time spans.



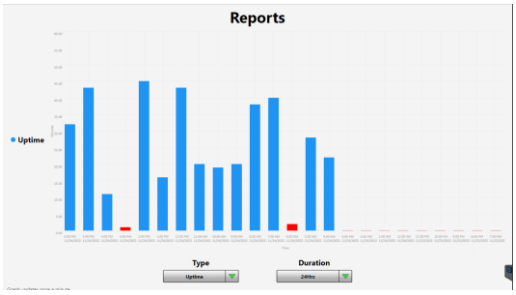
The currently supported reports are:

- **Uptime**: This defines how many minutes within a 60-minute window the machine was producing products. The calculation is performed based on a configurable target products per minute. If in that minute the target has been reached, that minute is counted towards the uptime, if the target is not reached, that minute is not counted.
- **Products Per Hour**: Defines how many products have been run for each hour. There's a configurable target that will color the column blue if it reaches the target, and red if it does not. This allows easy identification if a target has not been reached in an hour.
- **Defects Per Hour**: Defines how many defects have occurred for each hour. There's a configurable target that will color the column blue if it's below a target, and red if it goes above. This allows easy identification if a target has been reached in an hour.

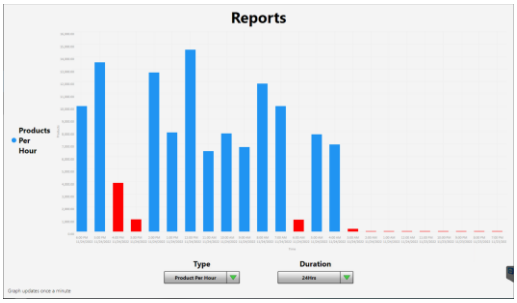
There are currently three duration time spans that the charts can be view over

- 24 hours
- 72 hours
- 7 Days

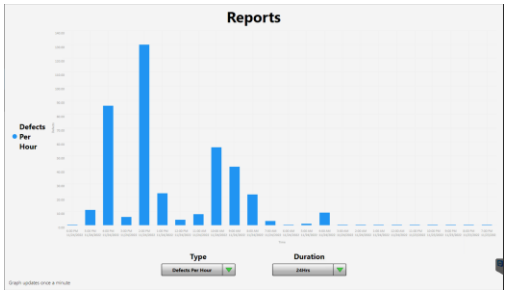
Note: If you require changes to any of the configurable options, please contact ClearVision Support.



Example of Uptime chart over 24 hours



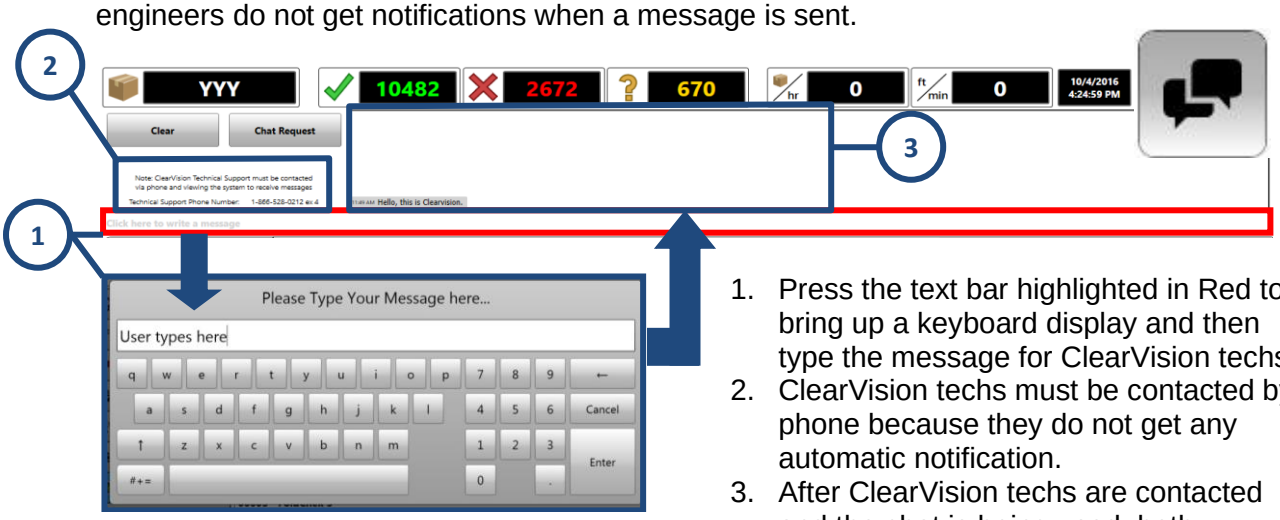
Example of Products per Hour chart over 24 hours



Example of Defects Per Hour chart over 24 hours

3.3.9 Chat Feature

The **Chat Feature** allows the user to leave a message in the chat box for support technicians to see when they log into that system. The user must call the support number as field engineers do not get notifications when a message is sent.



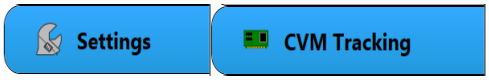
1. Press the text bar highlighted in Red to bring up a keyboard display and then type the message for ClearVision techs.
2. ClearVision techs must be contacted by phone because they do not get any automatic notification.
3. After ClearVision techs are contacted and the chat is being used, both messages are displayed for the Operator and Clearvision Staff to see

The “Chat Request” button is used by ClearVision techs to get the operator’s attention as it sounds an alarm on site. The “Clear” button is used to delete the conversation from the display.

3.3.10 CVM Tracking Utility

The **CVM Tracking Utility** is a feature found in systems with Specialty Folder Gluer or Folding Carton machines. It allows operators to support learning and verifying photo-eye positions. It can be used as a setup utility or to assist in updating the configuration when a camera is moved.

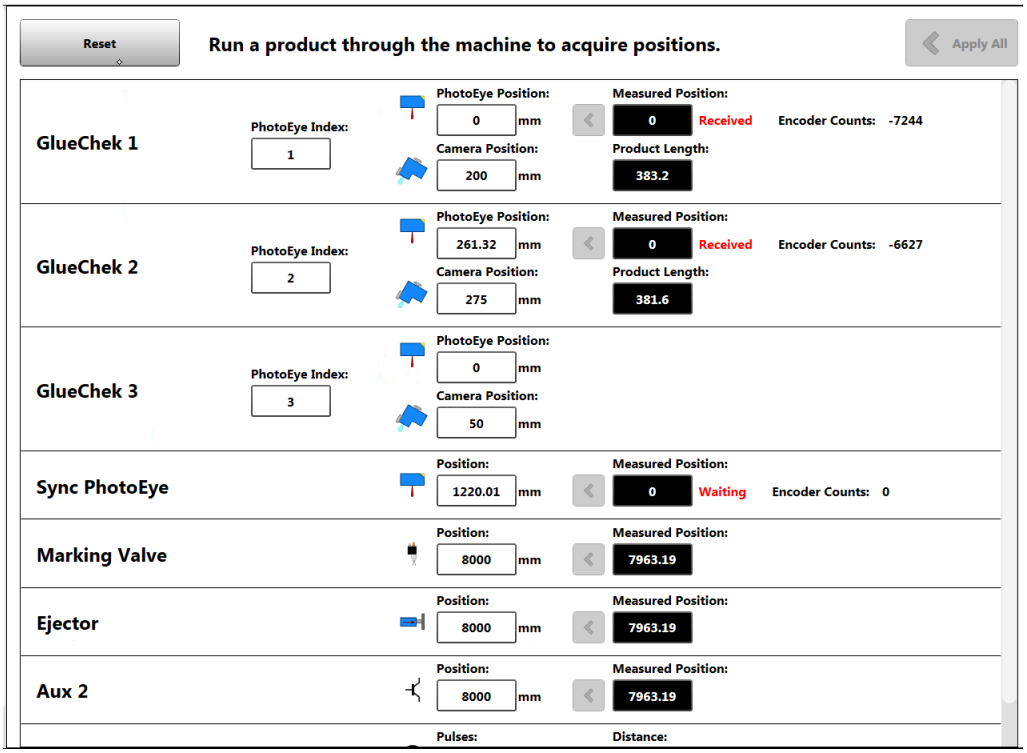
Level 3 & 4 users needs to go to the Settings Tab > CVM Tracking Menu



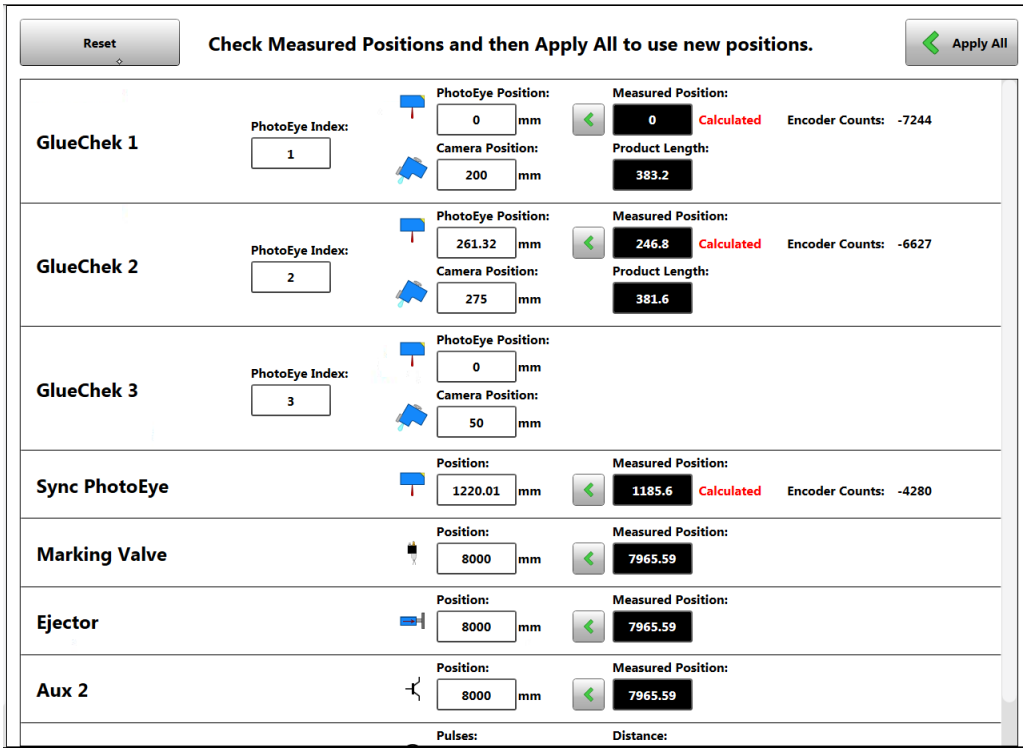
Operators of Specialty Folder Gluer or Folding Carton machines can access the utility from the Order Tab with the Positions Learn button.

Once in the CVM Tracking Utility, follow the prompts at the top of the screen to verify or learn positions.

1. Select the “Verify Positions” button to start.
2. Then, run a product through the machine to acquire positions.

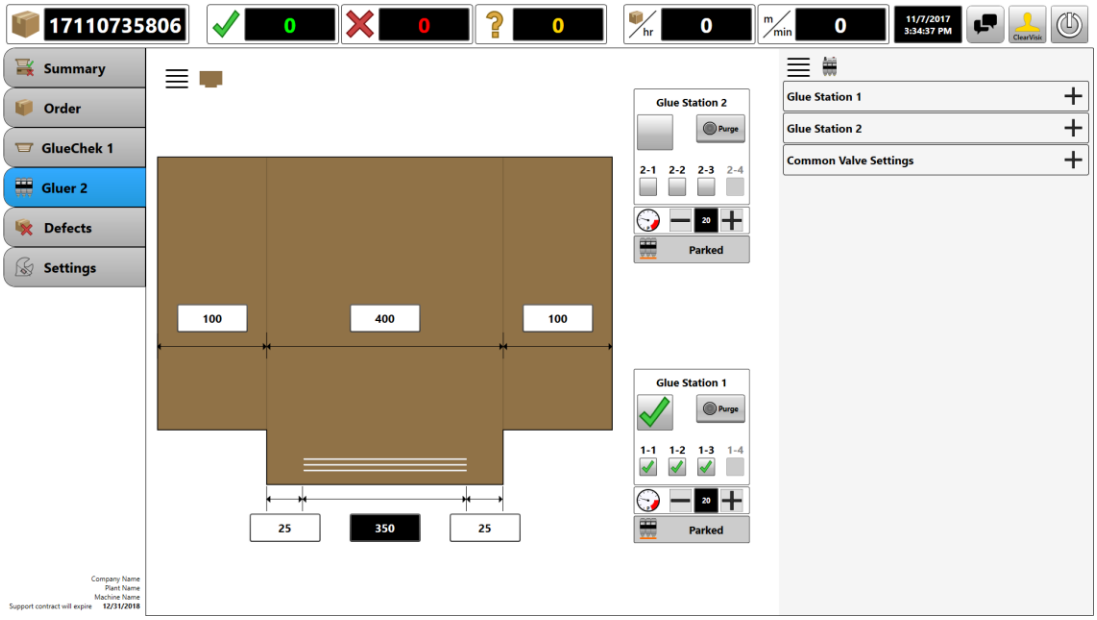


3. Once all the photo-eyes have been triggered and the new positions calculated, apply each Measured Position individually or select “Apply All” button.



3.3.11 Gluer Tab

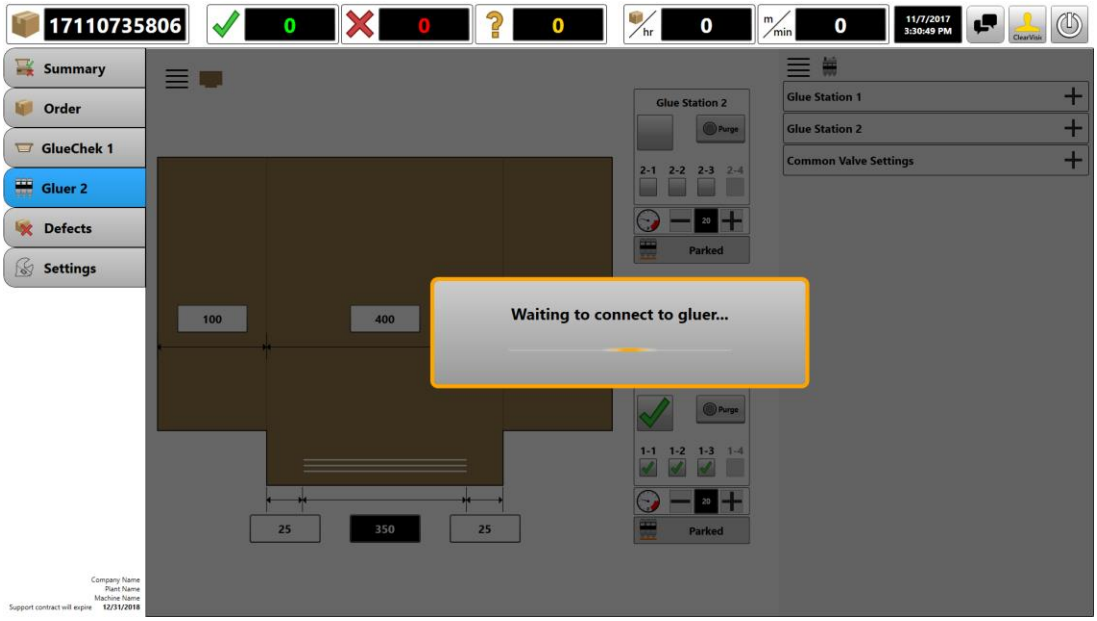
If your system contains a Glue Controller from Valco Melton (OT-120, MCP-8, or MCP-4) the BC7 system communicates directly with it. The connection between the two systems allows control of the Glue Controller from the BC7 touch screen.



The following is a brief explanation of the gluer functionality including short descriptions and images.

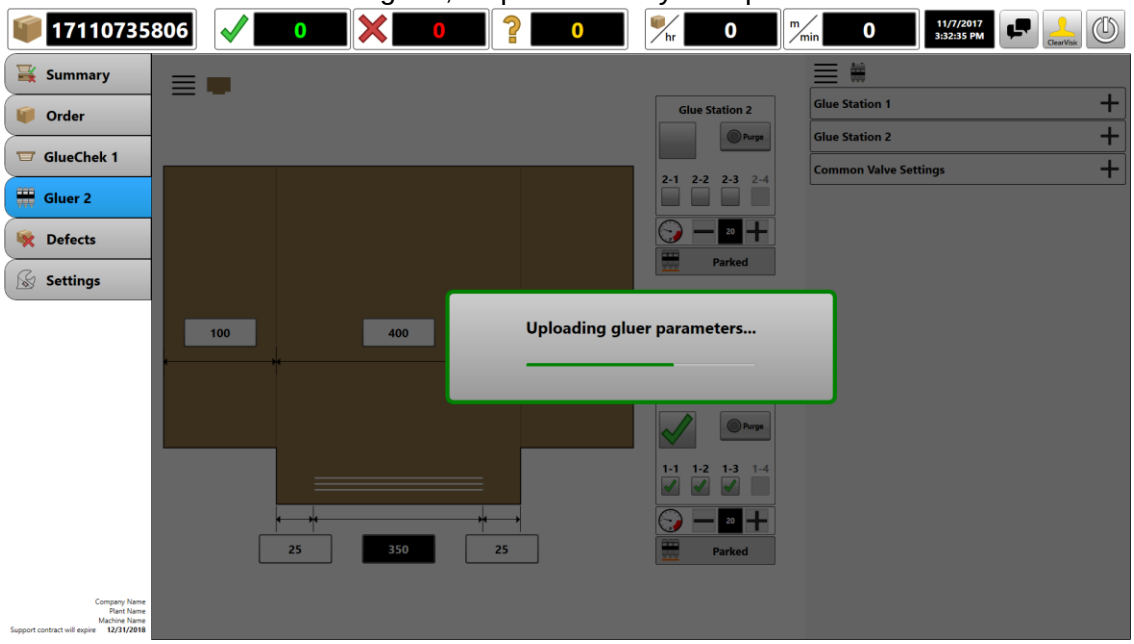
Waiting for Gluer to Connect:

When BoxChek is waiting for the gluer to become available, this screen is shown. It can occur if the gluer is powered off, has an incorrect or non-configured network setting, or no physical Ethernet connection.



Uploading Parameters from Gluer after Connection:

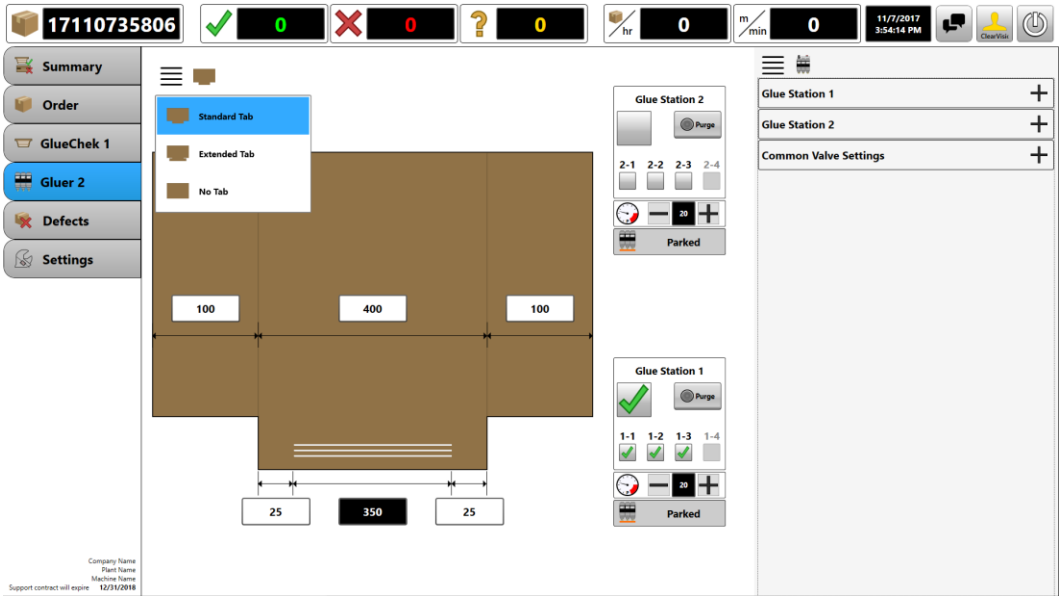
When BoxChek connects to the gluer, it uploads the system parameters to BoxChek7.



Selecting Box Mode:

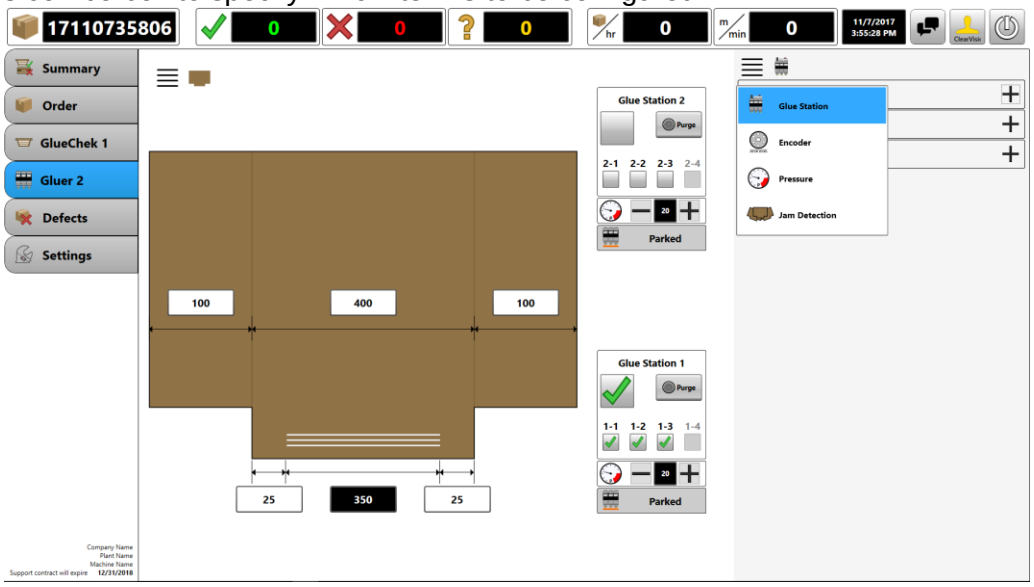
Use this combo box to select the desired box style as following:

- Standard Tab Mode: User defines the start and end flap lengths, score-to-score length, and the start/end gluing offsets. The glue length is calculated from these values.
- Extended Tab Mode: In addition to the parameters specified in standard tab mode, the user also specifies the distance the tab extends beyond the score-to-score lines.
- No Tab Mode: User defines the pattern delay and length.

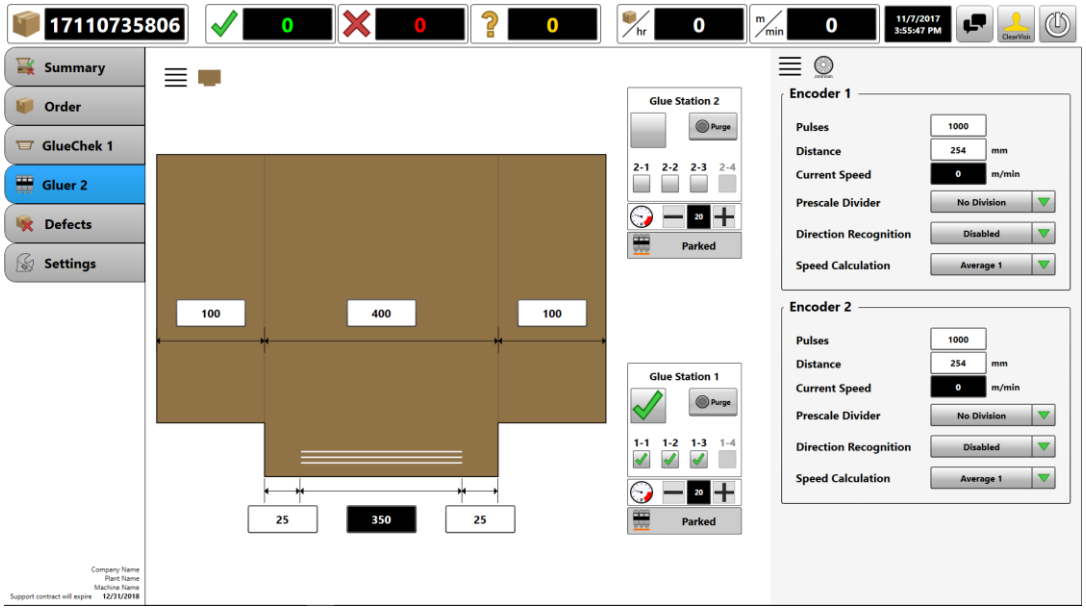


Selecting Gluer Feature for Configuration:

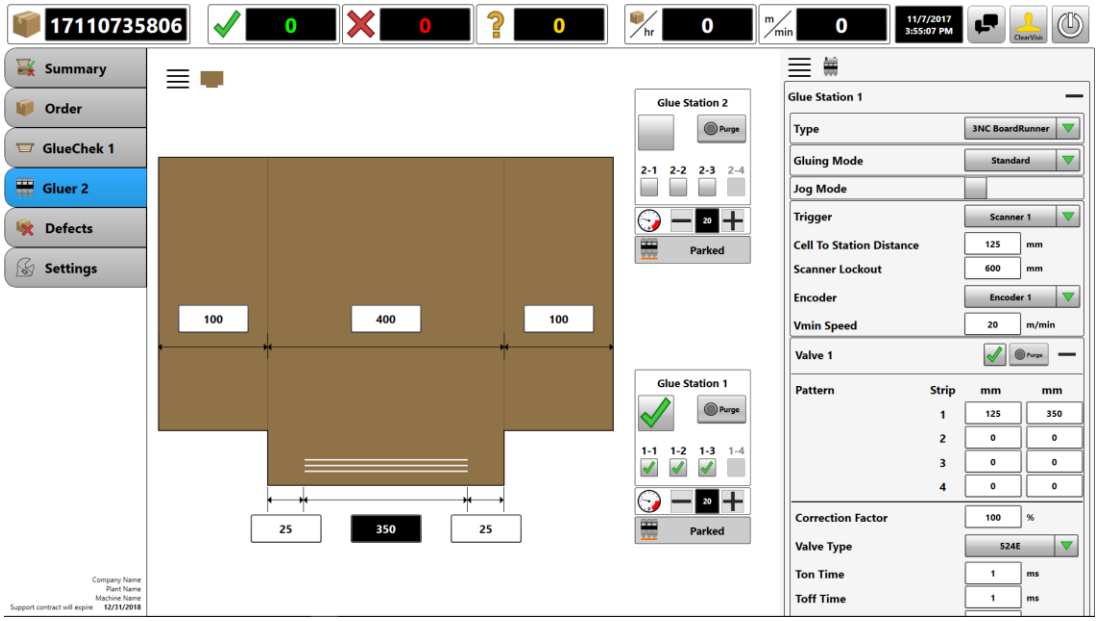
Use this combo box to specify which item is to be configured.



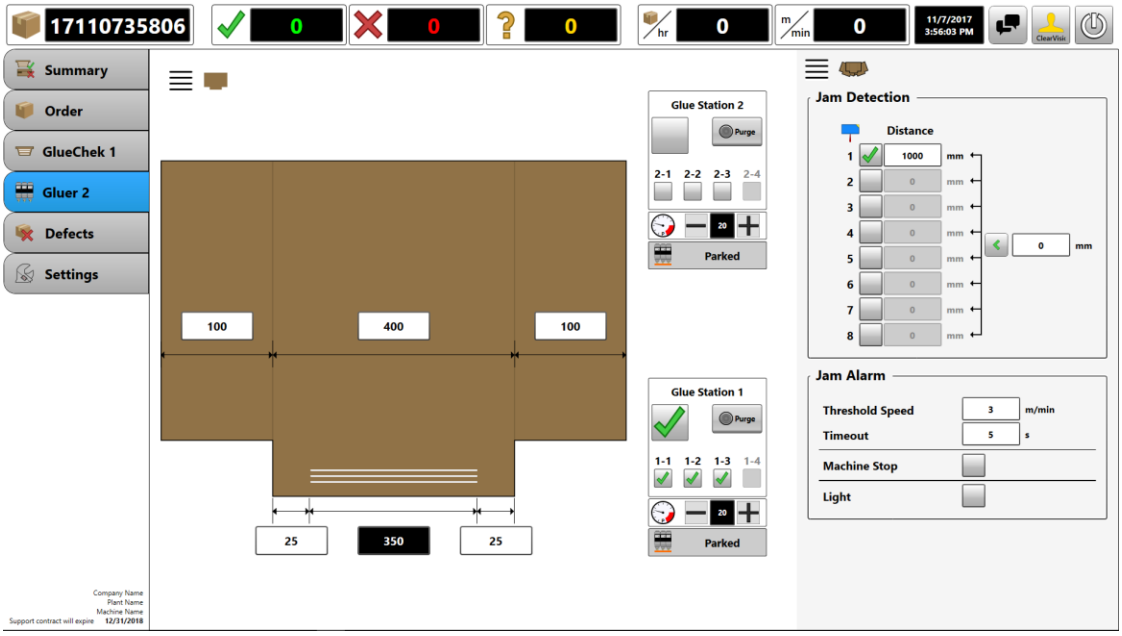
Configuring Encoders:



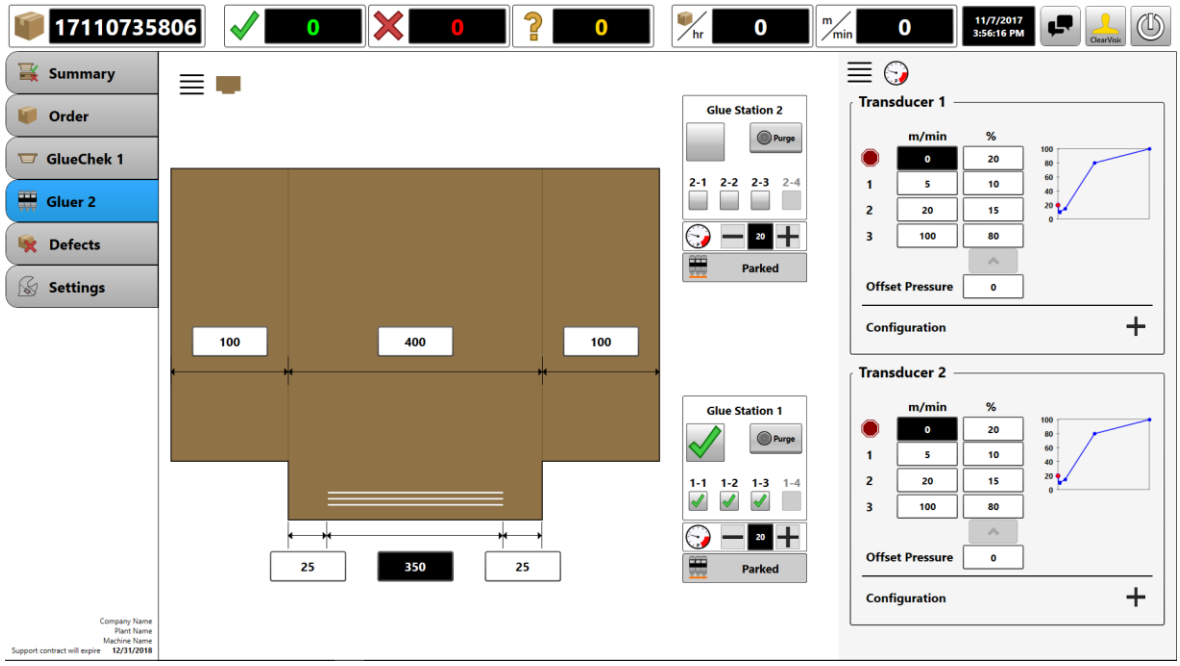
Configuring Glue Station:



Configuring Jam Detection:

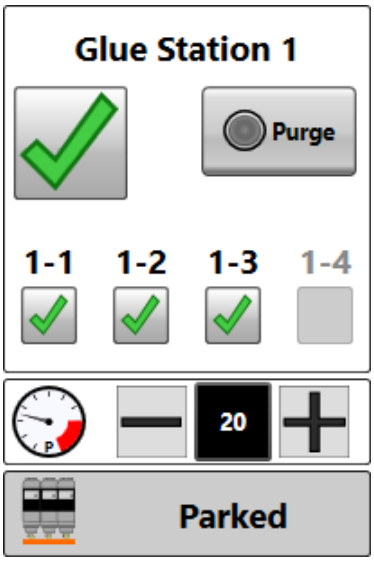


Configuring Pressure Transducers:



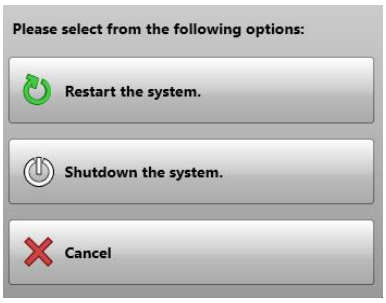
Glue Station:

- The large check box enables/disables all valves in the glue station.
- The smaller check boxes enable/disable an individual valve.
- The purge button will activate all valves in the glue station.
- The current pressure transducer operating pressure (in percent) is shown in the middle box. The plus and minus buttons (+/-) will offset the pressure in 1% increments.
- The lowest box indicates the state of the tip-sealer.



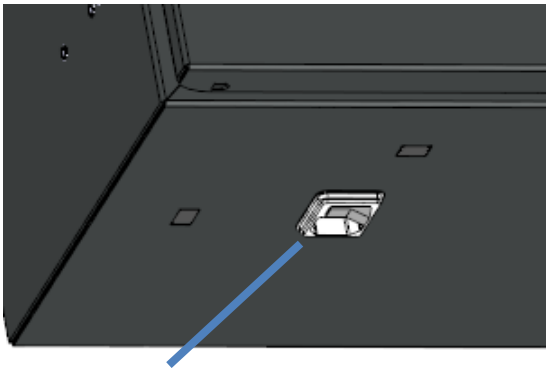
3.3.12 Exit

When the **Exit** button is pressed, several operations are available. The user can either restart or shutdown the system. Please use the power push button on the underside of the Control Cabinet to shut down the system if necessary.



4. Using the Inspection System

4.1 Turning System On



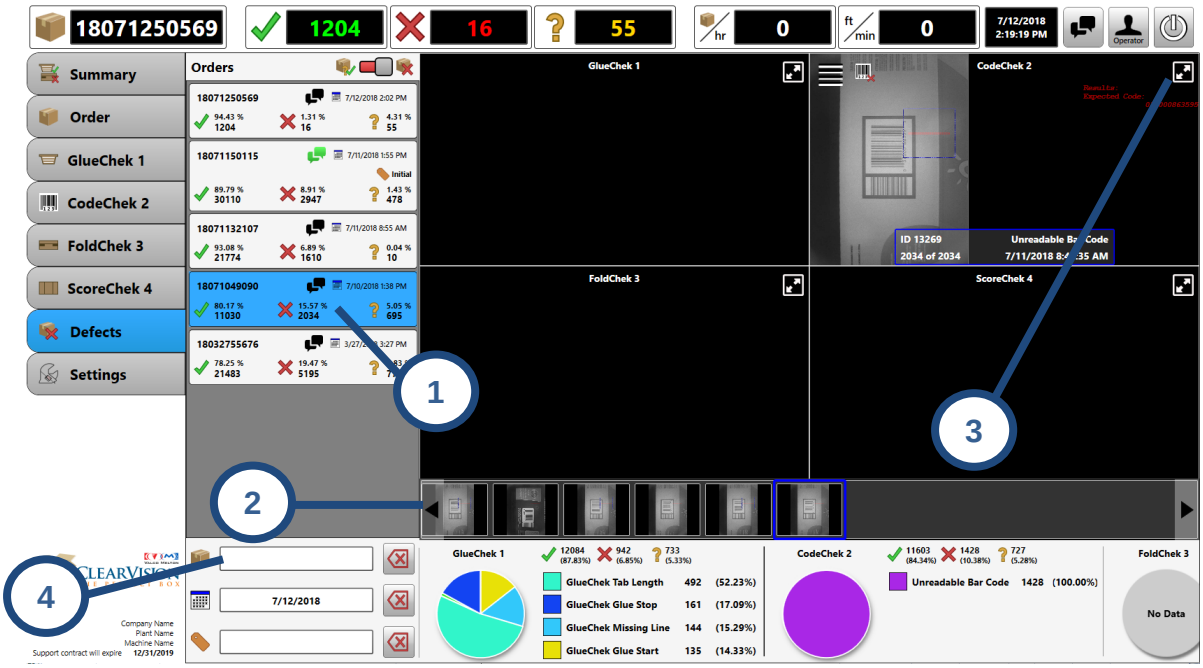
Power Switch

A power switch is located at the bottom left of the Cabinet door. To turn the system on, Turn the power switch and wait for 30-45 seconds.

To turn the system off, turn the power switch to the off position.

4.2 Reviewing Defects

The **Defects** menu is used to review defective boxes from previous or current orders. The images of defective boxes are archived and are only removed when they become the oldest images and when there is a need for space to save newer defect images (depending on the number of defects on a particular machine).



1. Select an order from the list to be displayed by clicking on it. The most current order will be at the top of the list.

2. Use the left/right arrows to navigate through the defective box images or swipe the touchscreen.

3. To view images full-screen, tap the square image on the top right of the test-suite window.

4. To search for an order key in the selected order number in question. Hit enter to display the order.

5. The information displayed in the list of defective orders will tell the user the date and order name.

6. It will show how many boxes passed, how many failed, and the quality of the boxes (Quality = passes/total no. of boxes) of the order. i.e., no fails = 100% quality.

7. It will also tell you number of rejected bundles if there are any.

5. GlueChek Inspection System

GlueChek is a camera inspection system that takes a picture of every carton. The system then compares each carton to the Standard that the operator has chosen for that particular order and test suite. GlueChek examines every aspect of glue quality and consistency. Once the systems have been set up for an order, they take a picture of every carton and analyze the high-resolution images, showing users the result of their analysis in the Summary menu. GlueChek uses proprietary inspection algorithms.

GlueChek can be configured to examine any aspect of glue quality and consistency, such as:

- *Pattern Registration*
- *Glue Profile*
- *Bead Consistency*
- *Length of Applied Glue*
- *Glue Area*
- *Scrap on glue tap*
- *Skewed Cartons*

When a defect is found, the system performs the following three actions:

1. Sounds the alarm to alert operators.

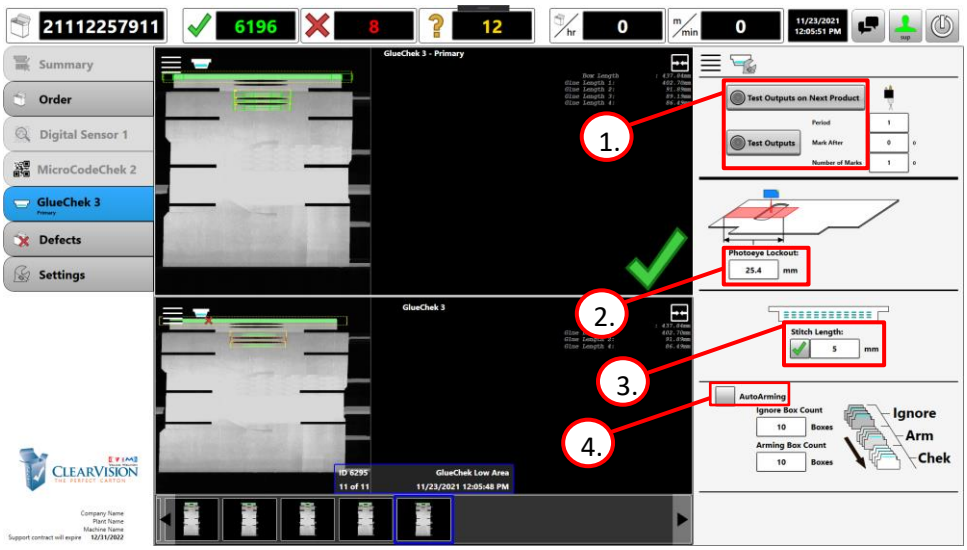
2. The defective carton is marked with UV solution.

3. Records and archives the image of the defective carton.

The operator can identify the carton with a black light and remove the defective carton in the bundle after the counter ejector.

Images of each defective carton are archived for future review. The system stores about six months worth of order information and pictures, depending on use. Once the hard drive is full, the system begins to overwrite the oldest entries.

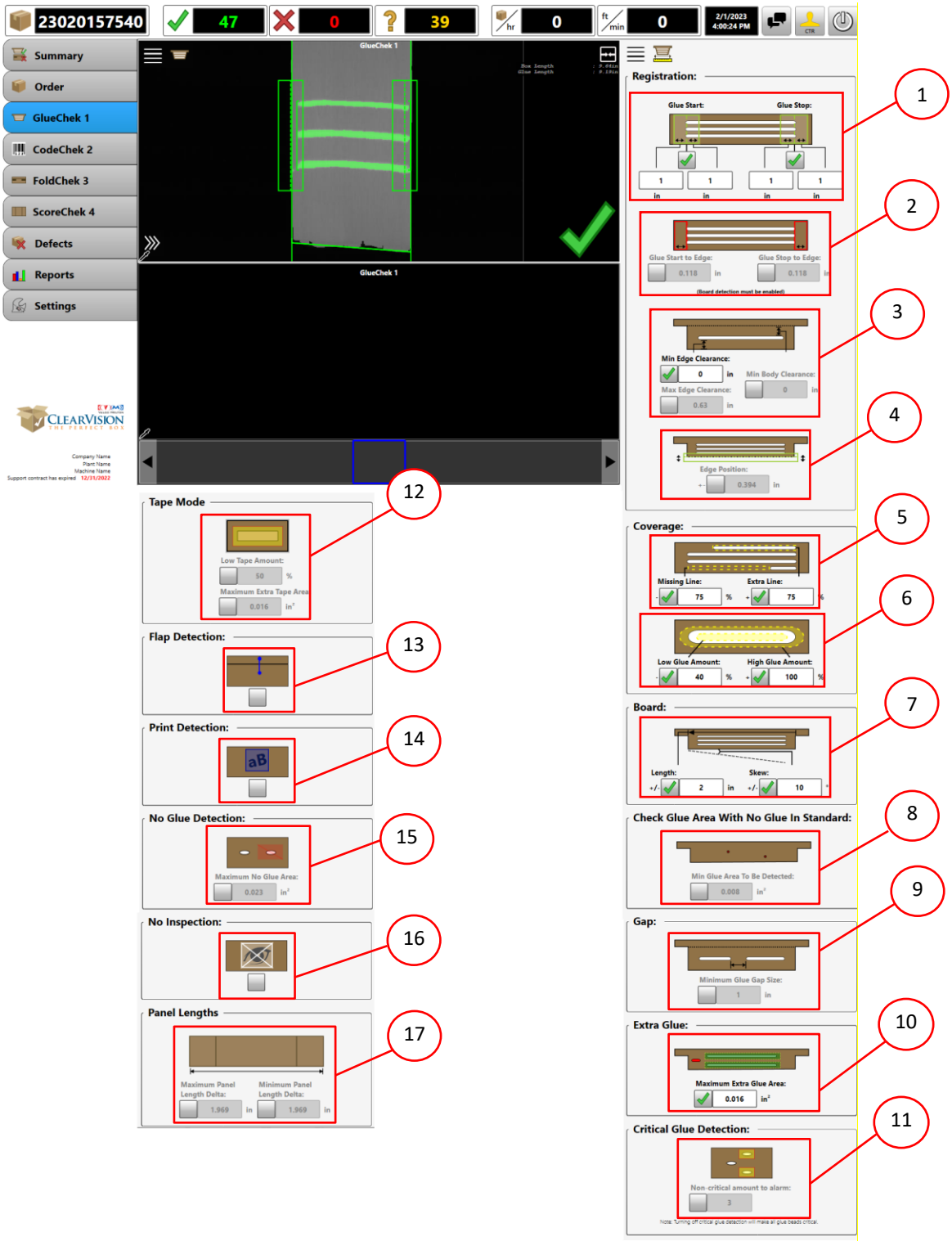
5.1 GlueChek Settings



Through the settings menu in the GlueChek tab, an operator and supervisor can:

1. If required, test Outputs on Next Product or Test Outputs.
2. If required, change the photoeye lockout for boxes with die-cuts.
3. Supervisor ONLY. If required, can enable stitch mode for inspection (this will not turn stitching on for the gluer, but allow GlueChek to treat stitched glue as a single glue line that have a stitch less than the desired distance.
4. If required, enable, or disable the auto-arming feature.

5.2 GlueChek Tolerances



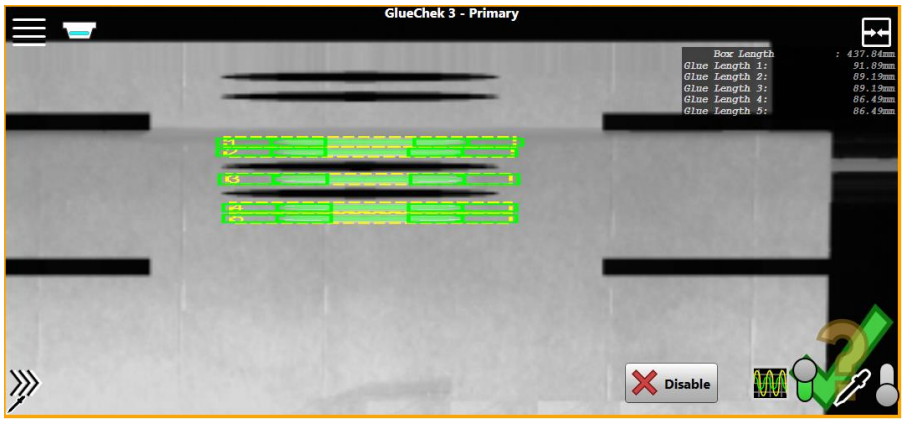
1. Glue Start and Glue Stop point – These are measured from the lead edge and trail edge of the glue position found on the standard. It is possible to adjust both the positive and negative values of tolerances. Changing the positive value will adjust the right tolerance from the start/stop line and changing the negative value will adjust the left tolerance from the start/stop line.
2. Glue Start Edge and Glue Stop Edge point – The minimum allowed distance of the glue to the edge of the glue tab. The lead and trail sides can be configured to be different distances. If glue enters this region, the product will be flagged as a failure. The left and right edges of the board must be detected accurately.
3. Edge Clearance
    a. The minimum and maximum edge clearance - This is the distance from the glue line to the edge of the box that is running parallel to the glue line.
    b. Minimum body Clearance - This is the minimum distance the closest glue line to the body of the glue tab (if applicable). If the glue gets too close to the body, the product will fail.
4. Edge Position – The allowed vertical movement of the glue tab. If the glue tab edge moves up or down greater than the allowed tolerance, the product will be flagged as a failure.
5. Coverage Missing/Extra lines – The acceptable amount of extra or missing glue from one line. E.g., 30 means we will alert for one line missing 30%.
6. Coverage Low/High Glue Amount – The acceptable amounts of glue present in a glue blob or glue line. This is measured in pixels. In this case, the system will alert if there is greater than 100% of the pixels or if there is 40% or more pixels missing when comparing to the standard.
7. Skew – The allowed amount of skew of the box in degrees.
8. Check Glue Area with no Glue in Standard - Used only when no glue is expected. When the standard is armed with no glue, any glue found will cause a failure.
9. Glue Gap (only applicable in Bracket mode) – If a glue gap larger than the specified amount is found, a failure will occur.
10. Extra Glue (only applicable in Bracket mode) – If a certain amount of glue is found outside of a bracket of glue, a failure will occur.
11. Critical Glue Detection (only applicable in Bracket mode) – Allows up to a set amount of non-critical glue brackets to fail before a failure of the product occurs.
12. Tape Mode (only applicable in Bracket mode) - Allows UV fluorescent tape to be armed and inspected for. Missing tape and extra tape can be configured separately to flag the product as a failure.
13. Flap Detection – Once armed, if a flap isn't present, a failure will occur.
14. Print Detection – This will check to make sure the armed print is in the same position.
15. No Glue Detection – if a set amount of glue area falls within the specified area during arming, a failure will occur.
16. No Inspection – GlueChek will completely ignore any glue in this region specified during arming.
17. Panel Length – If the panel lengths change by a set amount, a failure will occur. This will only check the panels that were armed with.

5.3 GlueChek Bracket Mode

GlueChek can be run in Bracket mode or Non-Bracket mode. Please contact ClearVision support to discuss and enable/disable Bracket Mode.

Non-Bracket Mode - All the glue will be treated as a single entity. For example, if the Low Glue Amount tolerance is set to 50%, the product will fail when 50% of all the glue is missing. This is mostly used when the same amount of glue is applied to the same localized location and the glue can be treated as a single area of glue.

Bracket Mode - This will treat each glue bead as its own entity. For example, if the Low Glue Amount 50%, once a single glue line loses 50% of its glue, a failure is triggered (assuming it is classified as a critical bracket). This should be used if there are multiple glue lines spread out across the product.

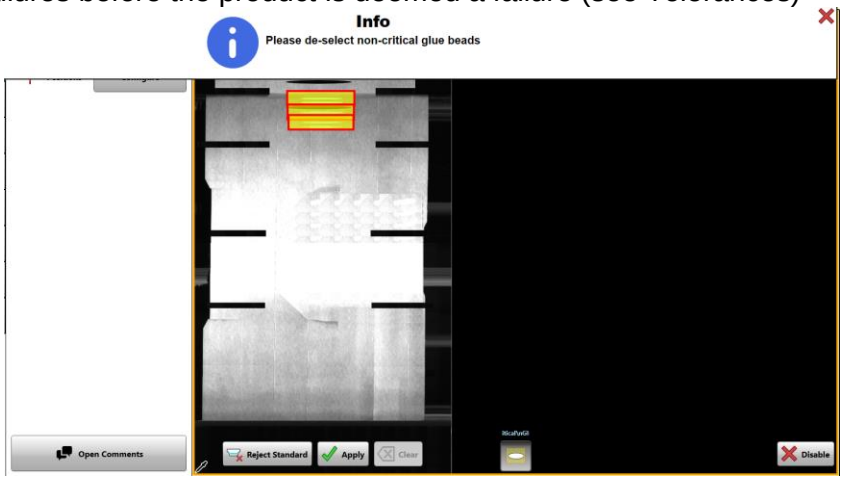


5.4 GlueChek Arming

Tests that require arming interaction either for each new order, or first-time arming when using a product. Depending on the requirements; none, a few, or all of them may be enabled for the system:

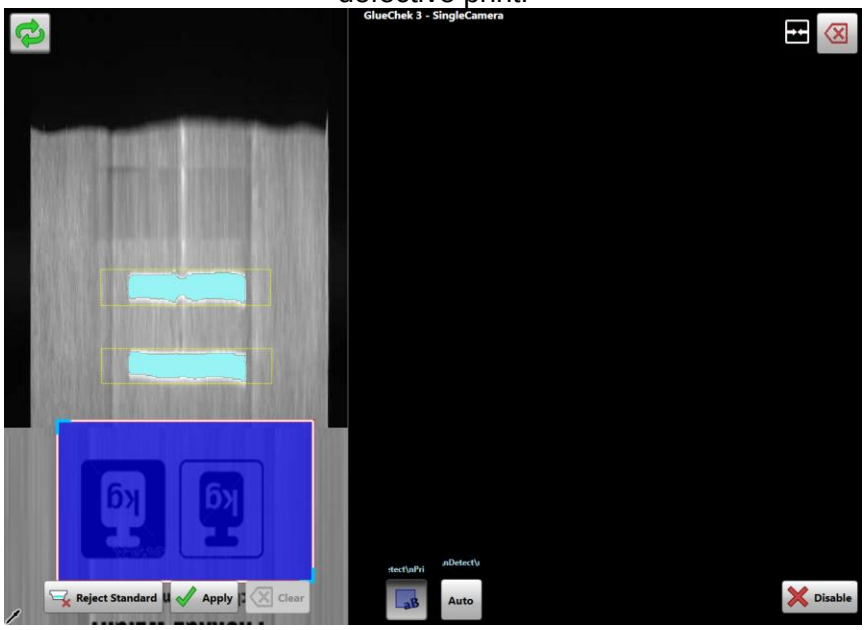
- Critical Glue Detection (if Bracket mode is enabled)
- Flap Detection
- Print Detection
- No Glue Detection
- No Inspection
- Panel Lengths

Critical Glue Detection (Bracket Mode Only) – by default, all brackets are critical, de-selecting of brackets that are not considered critical will occur during arming. Critical brackets will always fail the product if they fail, but non-critical brackets require a set number of failures before the product is deemed a failure (see Tolerances)

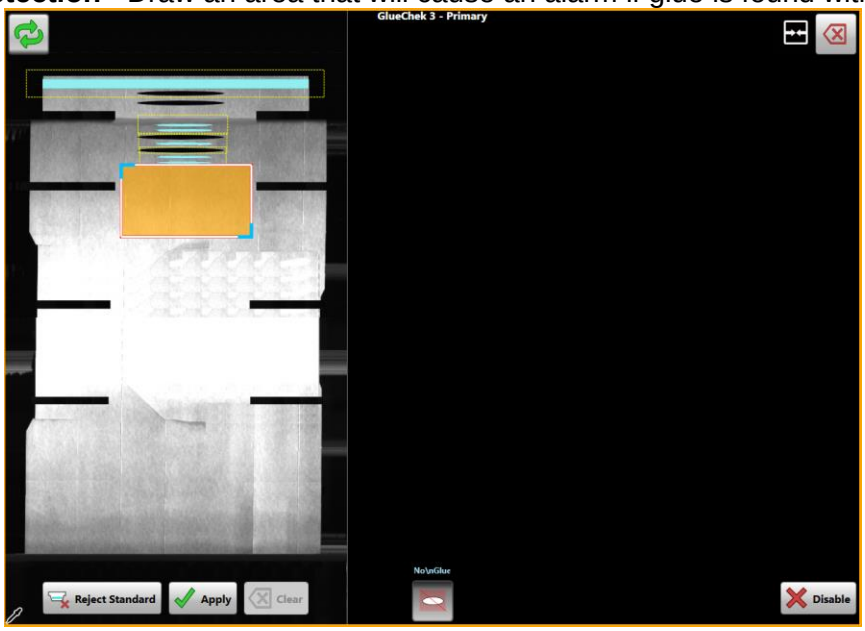


Flap Detection - Requires drawing a line over the flap. If the flap is present, an indication is displayed on screen that the flap is good (or if it is bad). Once armed, the flap must be found somewhere on that drawn line to be analyzed. If the flap is present but moves outside the position of the drawn line, GlueChek will see that as a failure.

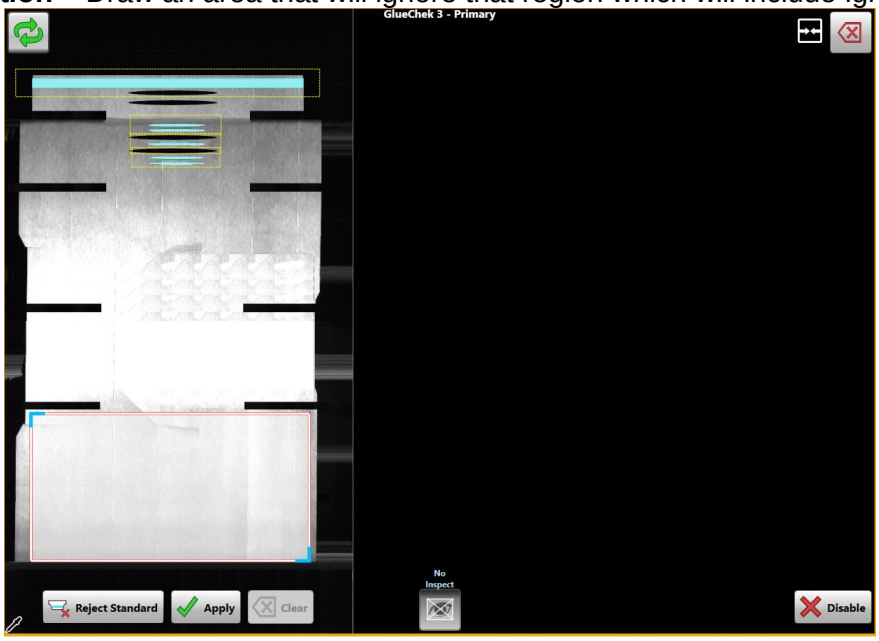
Print Detection - Requires drawing a box around any print. This test continues to check if the print is visible. This is only a presence check and does not validate print registration or defective print.



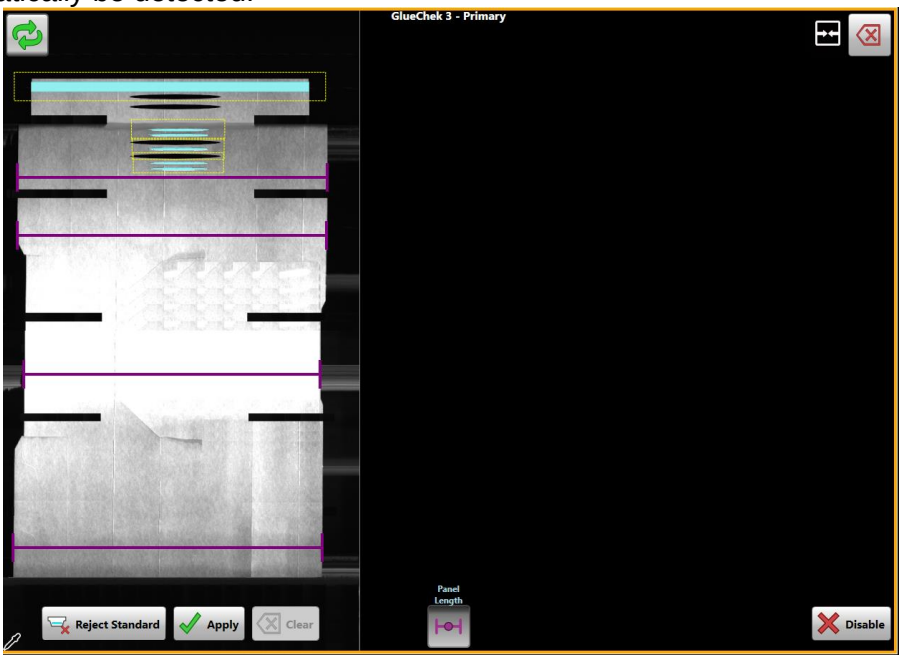
No Glue Detection - Draw an area that will cause an alarm if glue is found within this box.



No Inspection – Draw an area that will ignore that region which will include ignoring glue.



Panel Length - select each panel that the length test needs to be applied to. The panel will automatically be detected.



6. Using GlueChek, FoldChek, CodeChek and ScoreChek

GlueChek, FoldChek, CodeChek, and ScoreChek are camera inspection systems that take a picture of every box. The system then compares each box to the **Standard** that the operator has chosen for that order and testsuite. GlueChek examines every aspect of glue quality and consistency. CodeChek compares the expected barcode from the order information to what the code reads. FoldChek compares the gap to absolute tolerances set in the system. ScoreChek verifies that the score position and quality are within adjustable tolerances. Once the systems have been set up for an order, they take a picture of every box and analyze the high-resolution images, showing users the result of their analysis in the **Summary** menu. GlueChek, FoldChek, CodeChek, and ScoreChek use proprietary inspection algorithms.

In the case of GlueChek, it examines every aspect of glue quality and consistency, such as:

- Pattern Registration
- Glue Profile
- Bead Consistency
- Length of Applied Glue
- Glue Area
- Scrap on glue trap
- Skewed Boxes
- Damaged Boxes

The ScoreChek algorithms examine the following:

- Manufacturer's Gap (compared to tolerances)
- Folding sequence (compared to standard)

The CodeChek algorithms examine the following:

- Barcode or QR code (Compared to order Information).

The ScoreChek algorithms:

- Extracts accurate depth information which can reveal even very subtle score lines.
- Examine score position to a high accuracy.
- Distinguish between print and depth changes. Therefore, it does not confuse print for score or vice versa.
- Provide depth change information for each score found.

When a defect is found, the system performs the following three actions:

1. Sounds the alarm to alert operators.
2. For GlueChek, CodeChek, and ScoreChek the defective box is marked with UV solution. In the case of FoldChek, it marks the box after the defective box.
3. Records and archives the image of the defective box.

The operator can identify the box with a black light and remove the defective box in the bundle after the counter ejector.
Images of each defective box are archived for future review. The system stores about six months worth of order information and pictures, depending on use. Once the hard drive is full, the system begins to overwrite the oldest entries.

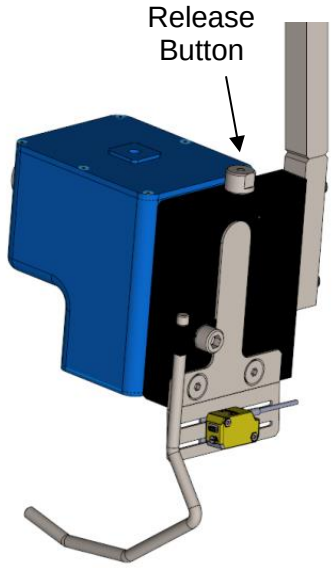
6.1 Positioning Camera Module

6.1.1 Positioning the GlueChek Camera

Depending on whether the order uses inside or outside gluing, the operator moves the camera to the correct position so that it is viewing the side of the board that is being glued. The bracket is rigidly fixed, and it should not be adjusted after the installation. The camera easily fits into a locating slot for each position. The camera front face will be at 4.5″ (114mm) from the box, at an angle of 5°.

To change the camera position, push down the silver buttons on top and bottom of the Quick Connect bracket to slide the camera into the top or bottom position.

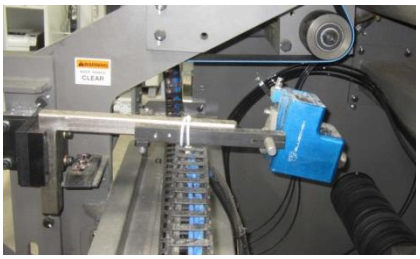
To avoid seeing the glue tray or ceiling lights, use the shroud included.
Additionally, the box needs to be held straight while it is being imaged by GlueChek. This is ensured by installation of the product guides supporting the box during imaging.



“Quick Connect” bracket for camera

6.1.2 Positioning the FoldChek Camera

Standard installations have one FoldChek camera location. The camera is mounted on a sliding bracket. The camera can be moved along the sliding bracket by using either a switch or by computer depending on how it is set up. The camera must be centered with the gap on the box at the start of the new order.



6.1.3 Positioning the CodeChek Camera

CodeChek cameras are usually installed after the die-cutter and before the gluer at a fixed distance from the boxes and must be pointed towards the area where the barcode will appear on the boxes. CodeChek camera location may vary if there a certain machine that require it to be located somewhere else.

The CodeChek camera needs to be installed with the front of the camera at 13.5″ (342mm) from panel with barcode and with the side of the camera at 4.5″ from the folding rail, looking perpendicularly at the board. A scrap shield also needs to be installed upstream of the CodeChek photoeye to avoid miss-triggers.

6.1.4 Positioning the ScoreChek Camera

The bracket is rigidly fixed, and it should not be adjusted after the installation.

The camera easily fits into a locating slot for each position. The camera front face must be at a distance of 2″ (50 mm) from the product. Guide rails must be used with a gap of 10mm.

Note: If the camera and the guide rails are moved, it will impact the lighting of the score decreasing the robustness of the system.

Additionally, the box needs to be held straight while it is being imaged by ScoreChek. This is ensured by installation of the product guides supporting the box during imaging.

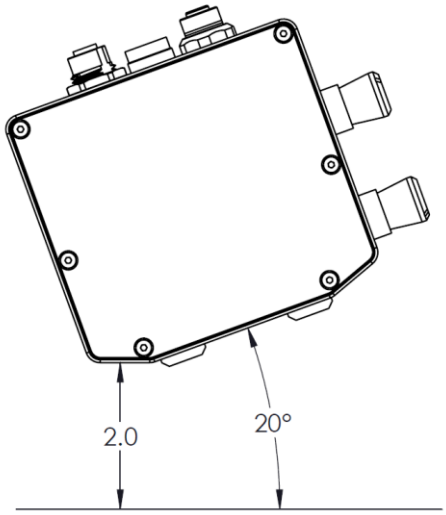
Note: If there is any physical change or adjustment in the position of the camera or photoeye for GlueChek, FoldChek, CodeChek, and/or ScoreChek after the installation, enter these changes in the Settings of each System Menu. How to proceed with these changes is explained in the section 3.3.6 System Menu.

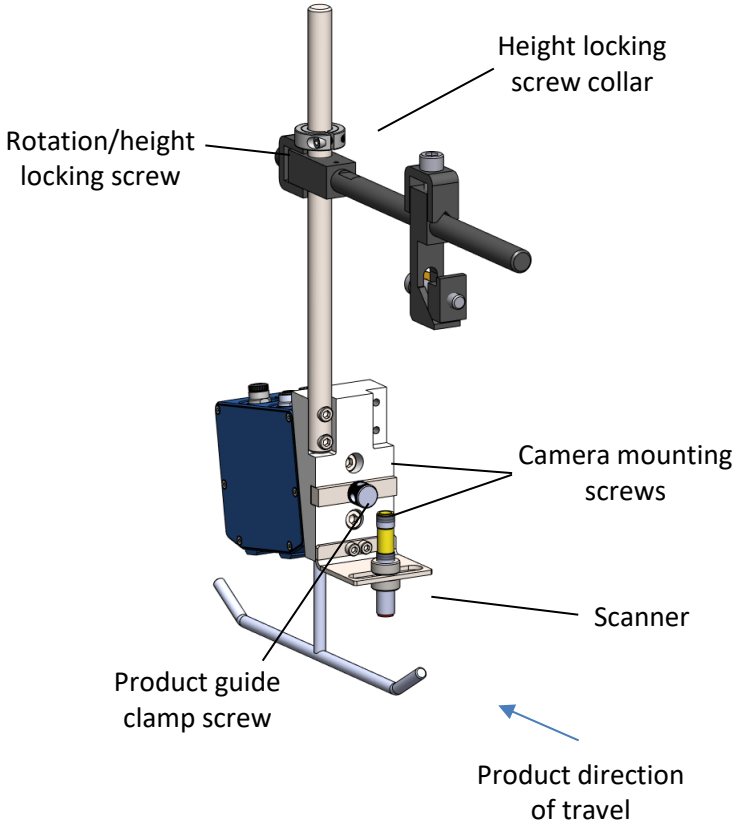
6.1.5 Positioning the Narrow GlueChek Camera

For correct imaging, the camera bottom face must be at 2″ [50mm] from the product surface, creating an angle between the glass window and the product of 20°.

Commonly for systems with multiple glue locations, multiple camera mounting brackets can be installed, and the camera moved between them as needed. To move the camera between brackets, remove the 2x **camera mounting screws**.

The carton needs to be held straight while it is being imaged by GlueChek. Use adequate product guides to support the carton during imaging.

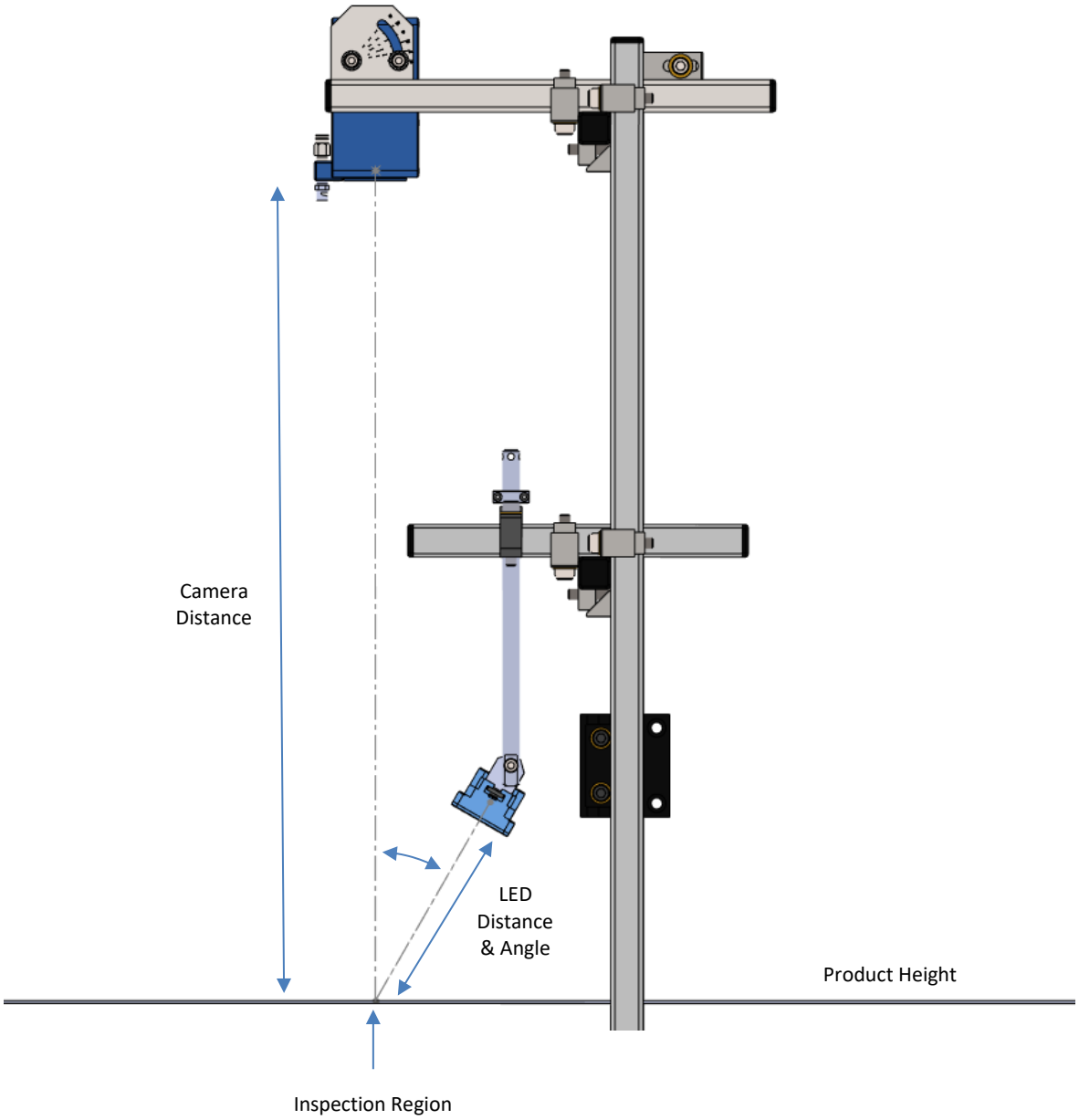




6.1.6 Positioning the Mega GlueChek Camera

The Mega GlueChek camera is factory-focused for the intended Camera Distance of each installation. The installed height should not be changed. The LED Distance should be kept small, ideally 2-4" [50-100mm], without interfering. The camera should be mounted at 90° to observe straight down across the machine, and the LED Angle should be 20-45° (toward upstream or downstream direction) to avoid direct lighting reflections off the product into the camera.

It is critical that the line of bright light projected by the LED module meets the centerline of the camera module at the height of the product, shown here at the Inspection Region



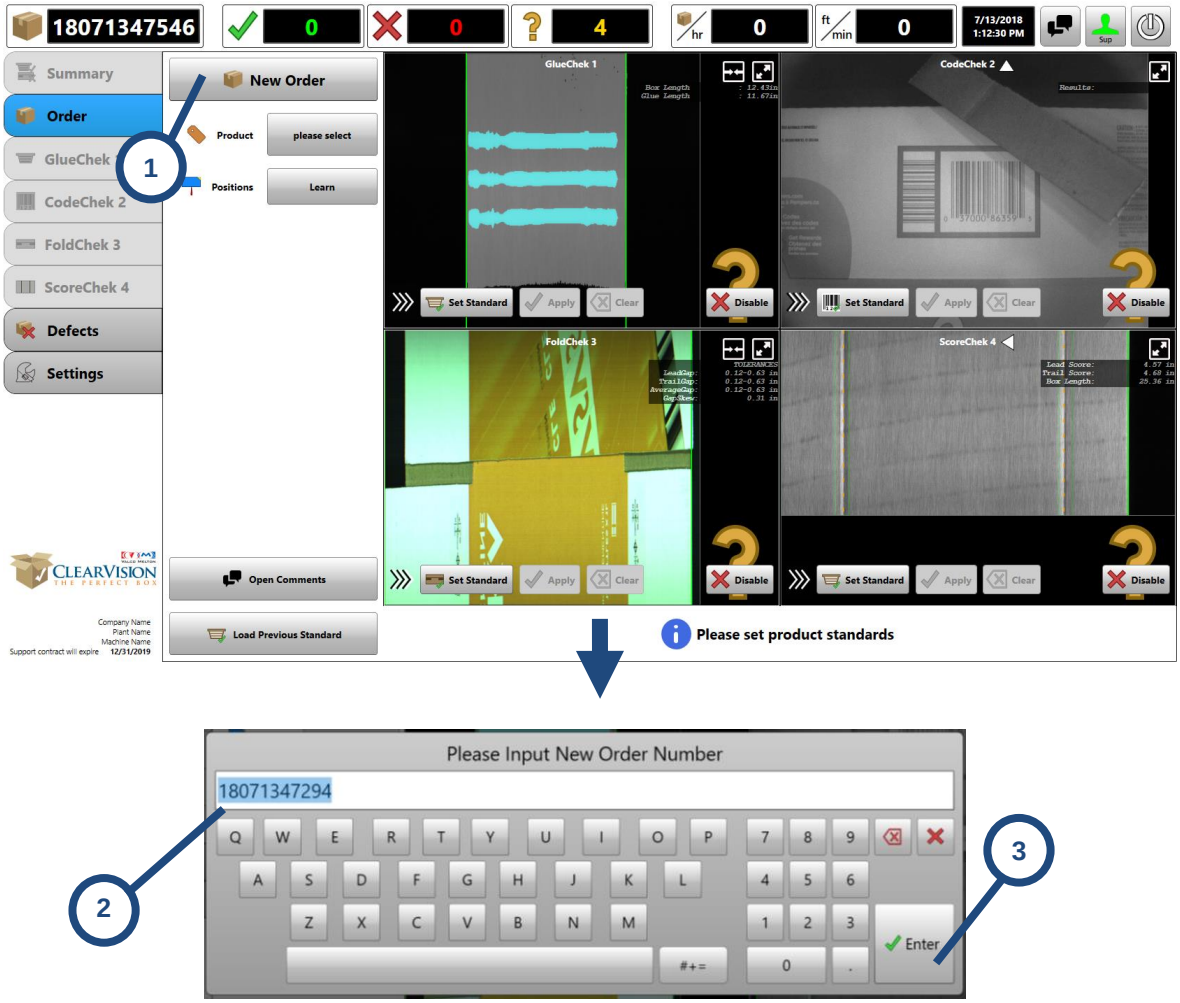
6.2 Configuring Software for New Order

At the start of a new order, the operator must perform two primary tasks:

- Enter the order number.
- Set the standards for each test-suite.

6.2.1 Creating a New Order

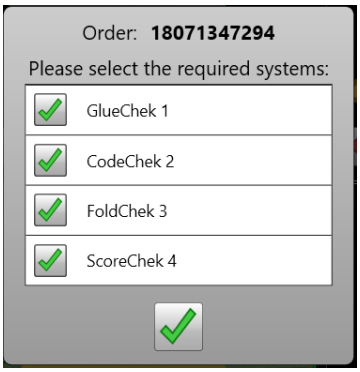
1. Use the **New Order** button to start the setup of a new order. The order number should be a unique number for each customer order. It should not be a profile number that describes the box type, size, or other characteristics.



2. With the on-screen keyboard, type in the order number.
3. Enter the new order number with **Enter**.

Note: It is possible to integrate automatic order creation with KiwiPlan. Contact KiwiPlan and Clearvision support to get this setup.

4. If the system is pre-configured to determine which systems to enable/disable, the following prompt will show up. The tick marks are set by default, select, or deselect your preferences.



5. If the system is pre-configured to select by product name, press the "**please select**" button.

The system allows you to add a new product name or select one from previous entries. Select or add your preference and press "**Accept**" button.

Important: The following steps require the machine setup to be complete and boxes of the new order passing through.

6.2.2 Setting a New Standard

Proceed to set the standards for each system.

GlueChek

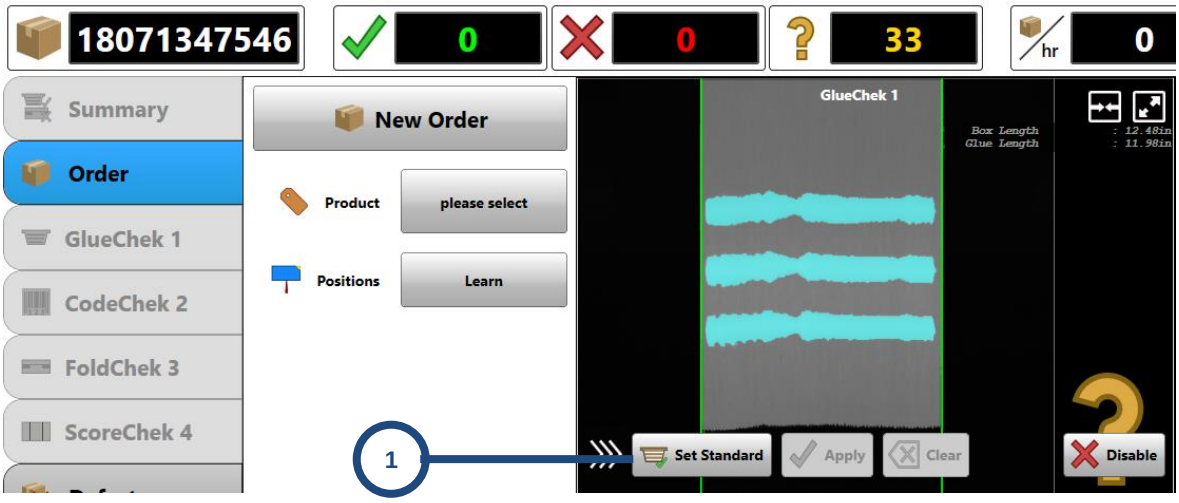
GlueChek has two options to set a New Standard:

- By pressing ***Set Standard*** or
- By enabling ***Auto-Arming*** in Settings menu for the GlueChek testsuite.

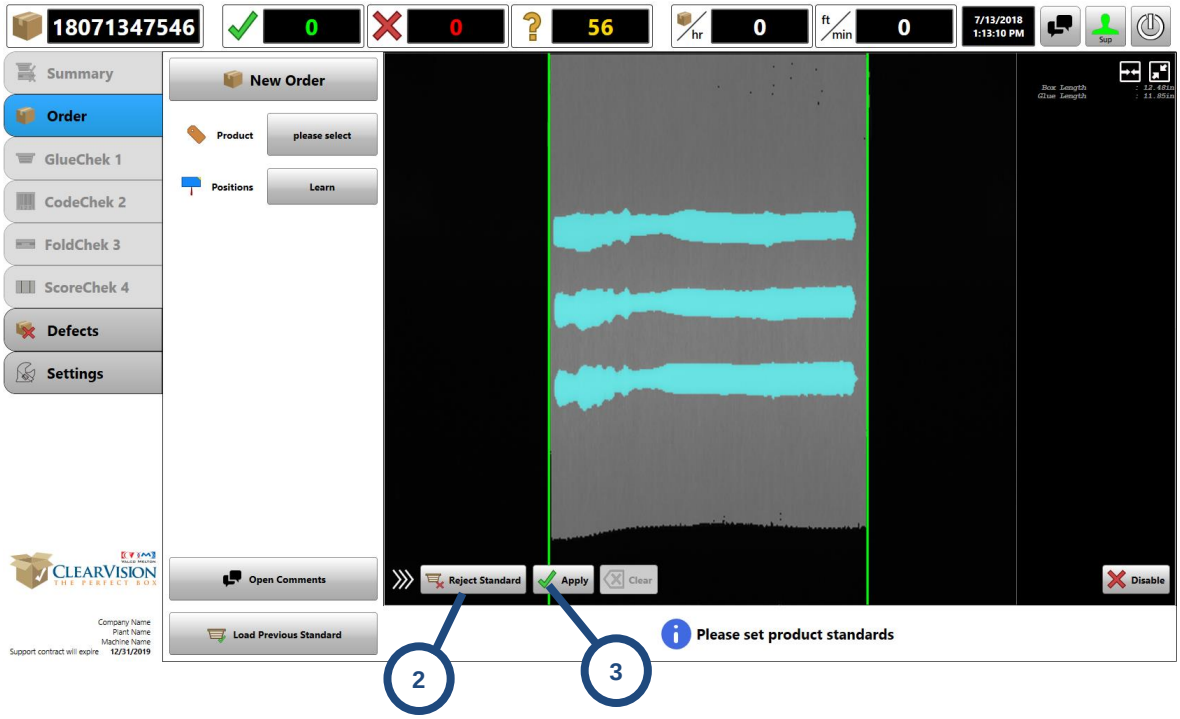
Set Standard

If pressing "Set Standard", follow the next steps:

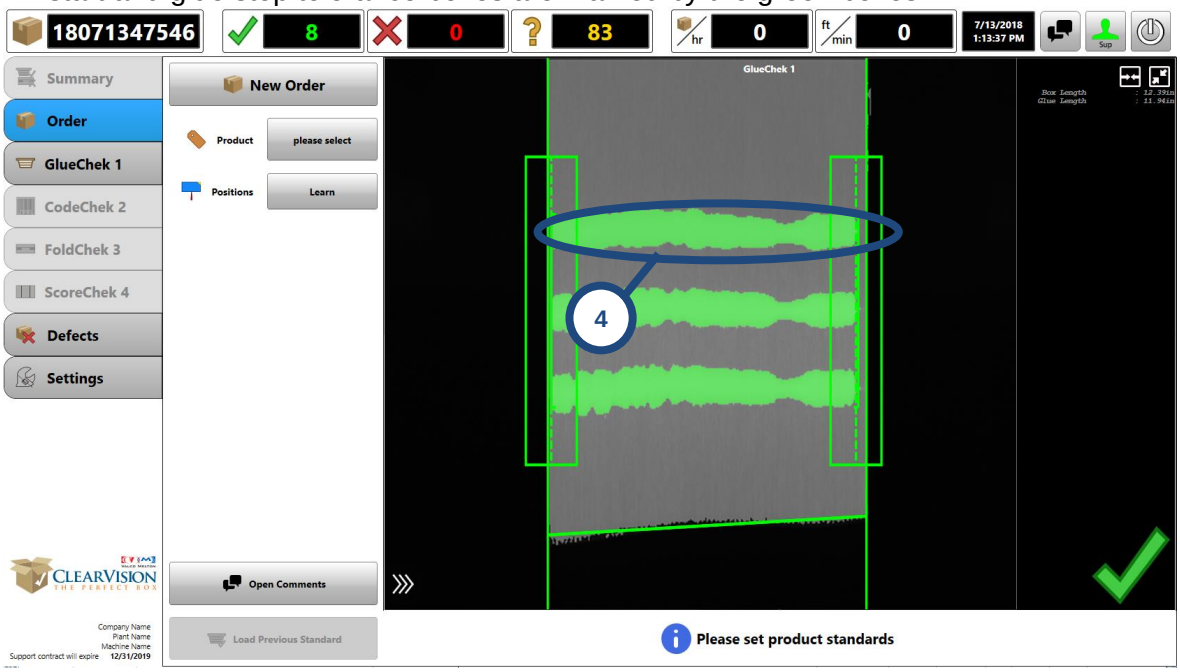
1. Teach the system by pressing "Set Standard" button.



2. If the glue looks unsatisfactory, press “Reject Standard” button and return to step 1. Otherwise, continue to step 3.
3. If the glue is satisfactory, press “Apply” button to arm the system.



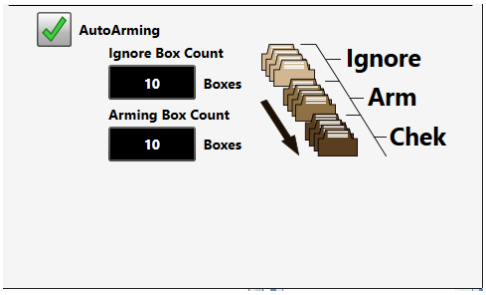
4. The system is now armed. The areas of glue will be highlighted in green. The glue start and glue stop tolerance boxes are marked by the green boxes.



Auto-Arming

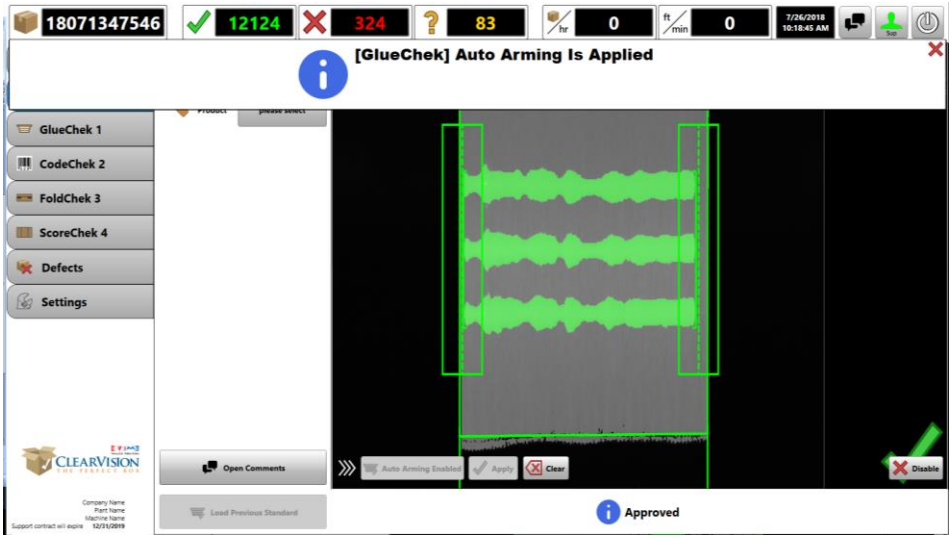
If enabling "Auto-Arming" on Settings menu for GlueChek, follow the next steps:

1. Supervisors can enable "Auto-Arming" on Settings menu for the GlueChek testsuite.

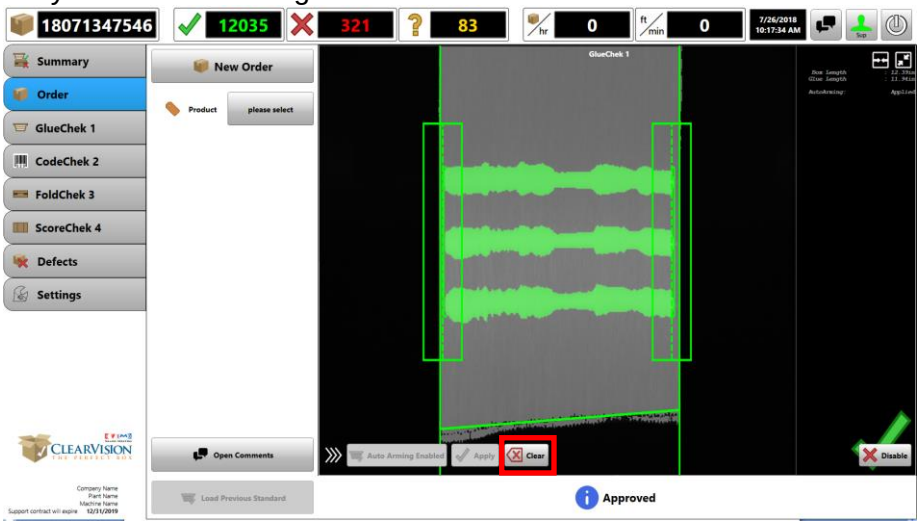


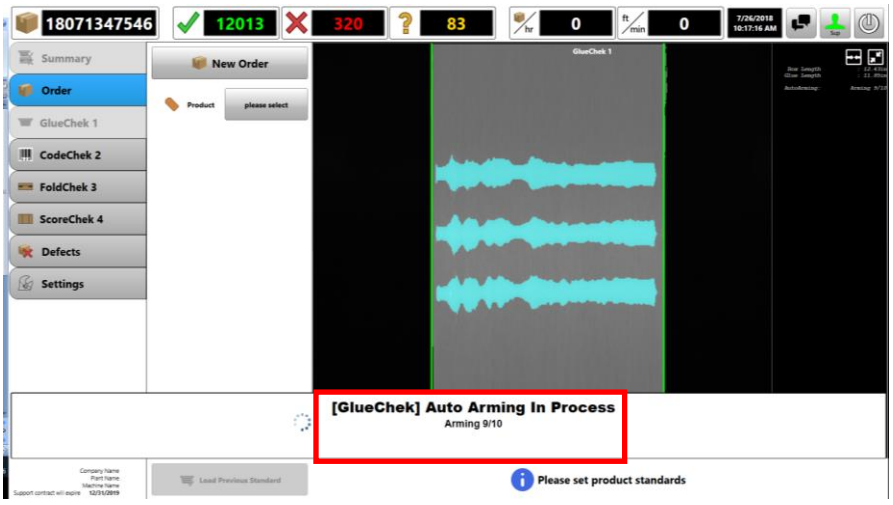
- The ignore box count is the number of boxes that the system will ignore while arming.
- The arming box count is the number of boxes that the system will use to arm the system with.

2. The system is auto-armed automatically:



3. If the Standard of the auto-arm feature needs to be changed, press on “Clear” button and the system auto-arms again:





Note: when auto-arming feature is enabled, the new orders will automatically auto-arm. To disable auto-arming, disable it manually in Settings menu for the GlueChek testsuite.

FoldChek

1. Press “Set Standard” button to set the standard for the FoldChek System. After pressing the button on the order screen, the image viewer will maximize to show incoming full size box images.

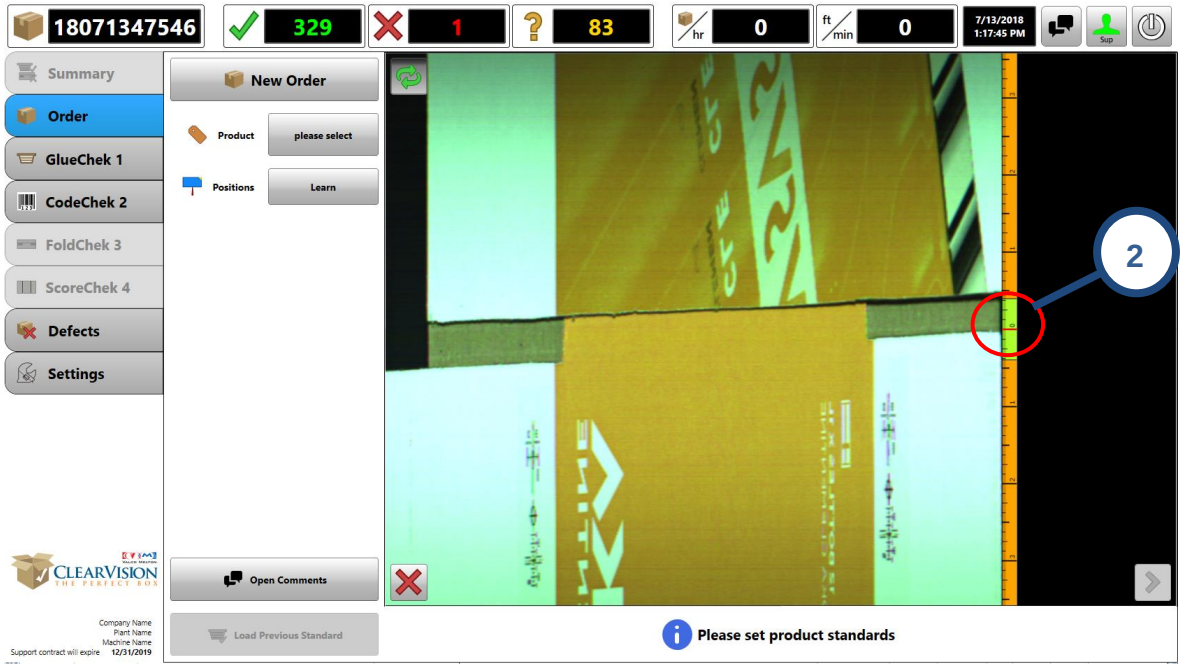
2. The image will contain a green section with a ruler on the right of the image showing real life distances. The gap of the box must fall in the center of the green section. If it is required, manually adjust the camera position until you see that the gap falls in that position.

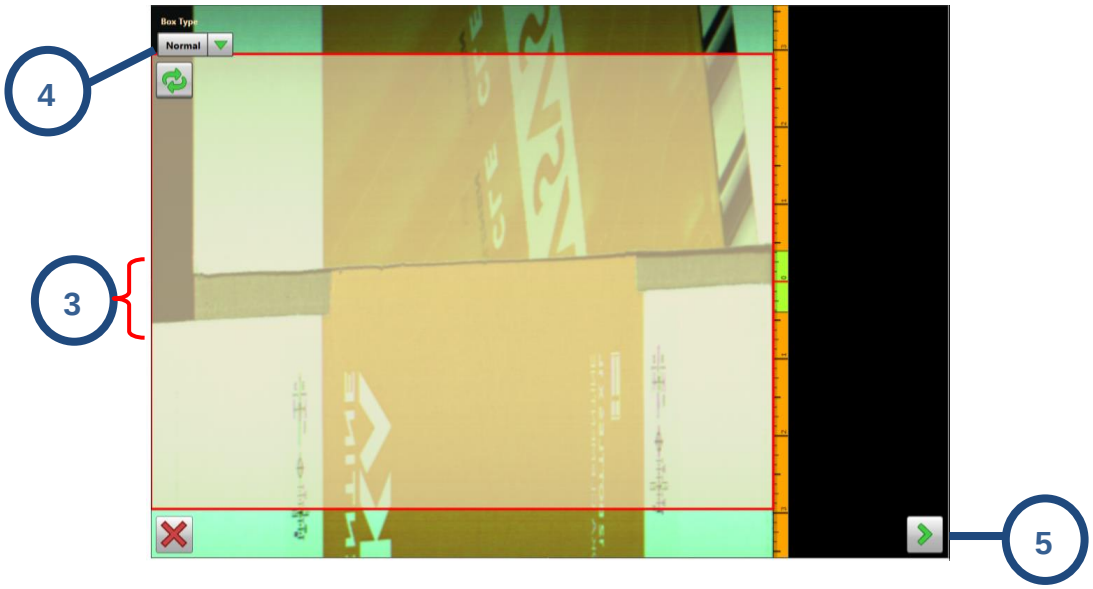
3. Set up the region of interest by pressing on the screen and dragging until the gap region is centered. Leave enough space on the top and bottom area of the gap to be able to detect misfold and big gap defects. Also, avoid any rail.

4. After the region of interest is centered on the gap, select the type of boxes (normal, square, or extended glue tab) from the combo box located in the top-left corner.

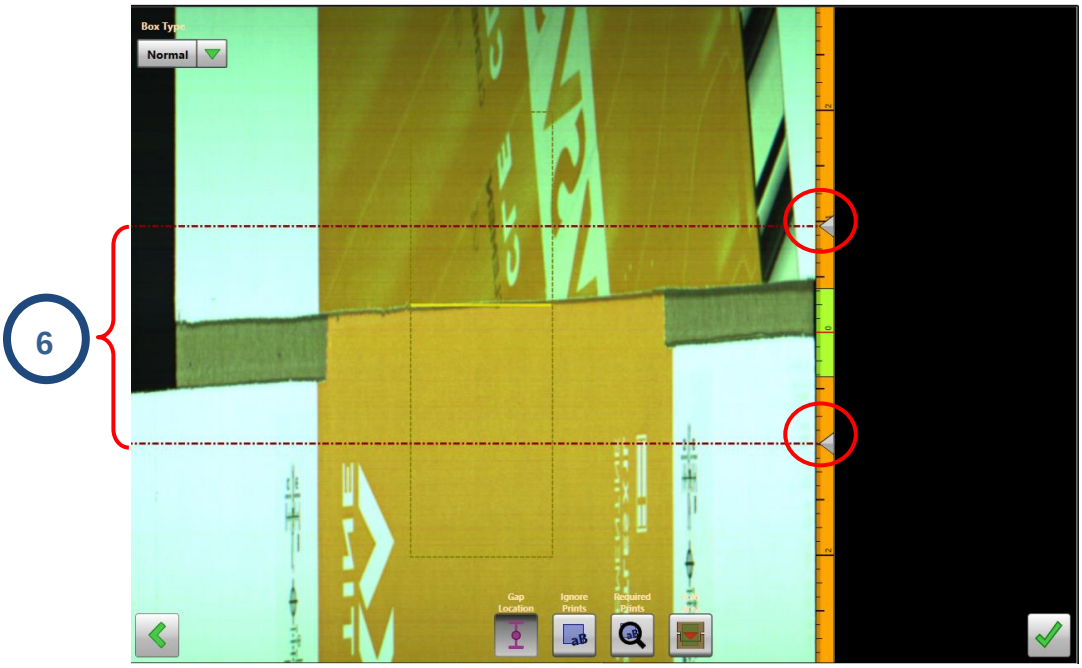
   Note: Press the “Refresh” button to start the set up again 

5. Press the green arrow button to go to the next screen.



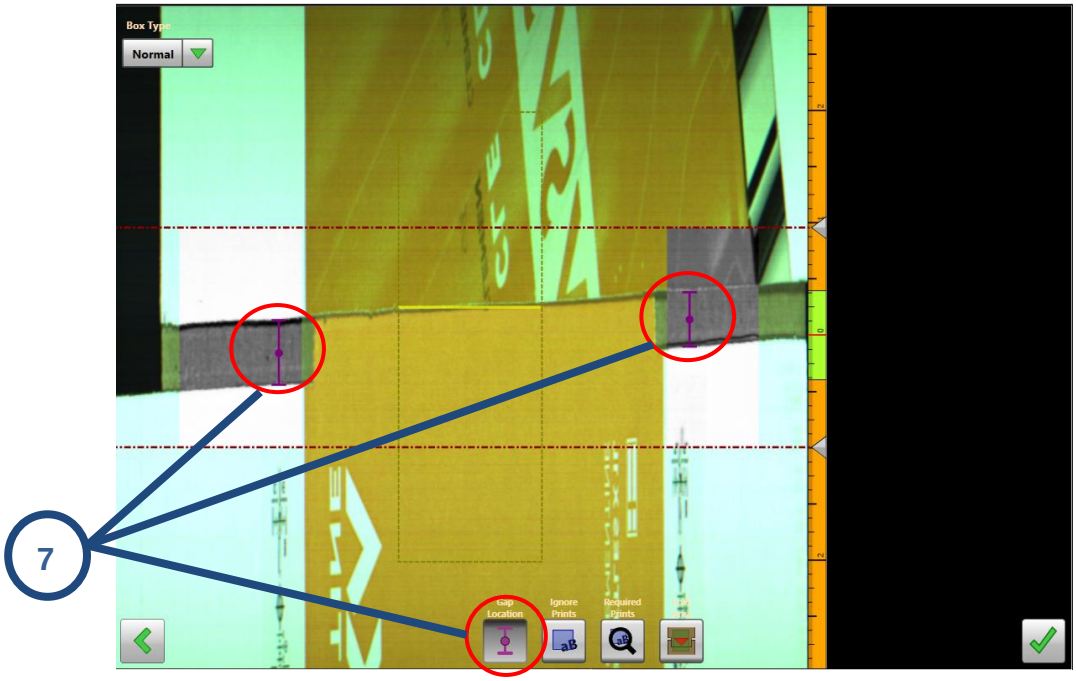


6. Set up the gap detection region making sure that there is enough space so any gap will fall inside. Also, avoid any rail. If necessary, adjust the gap detection region by moving the arrow measurement positions.

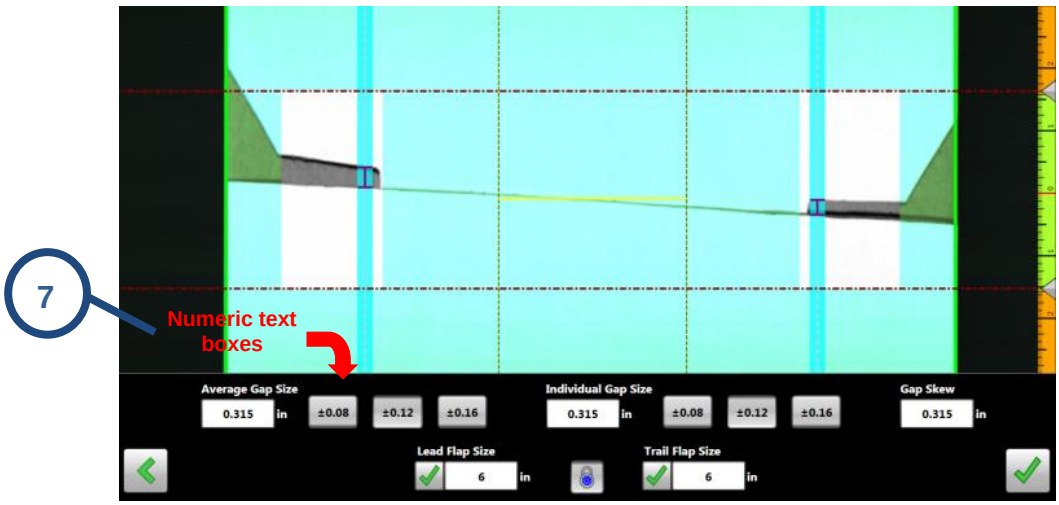


7. Set up the gap measurement positions. Either manually or numerically.

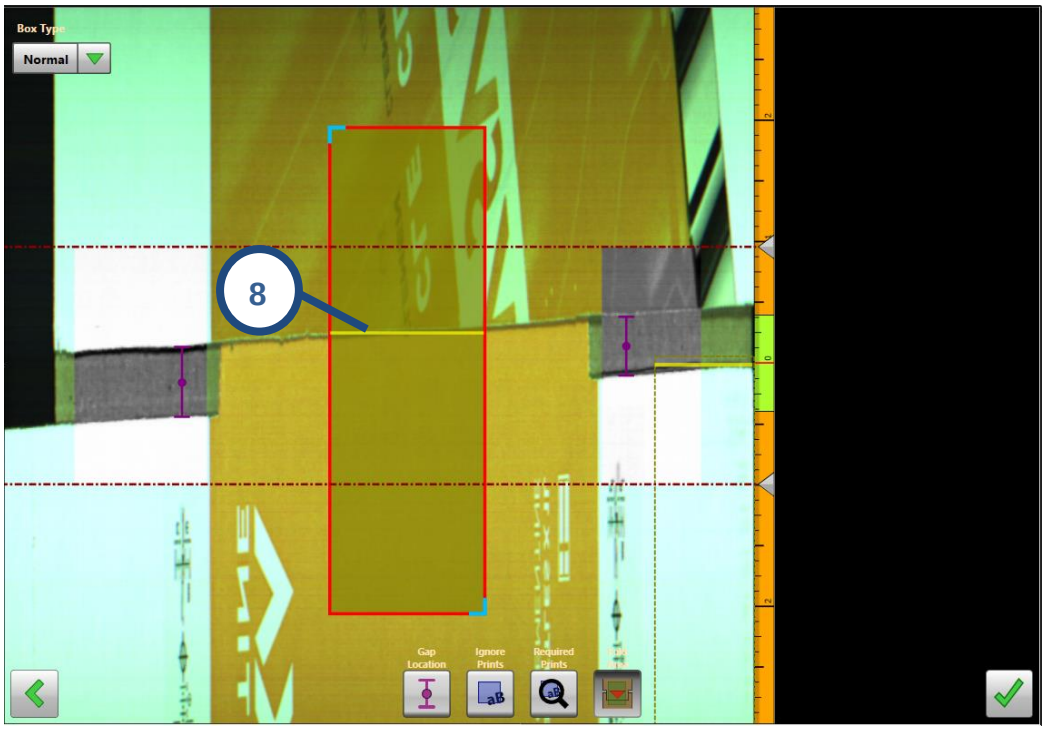
    a. *Manual arming:* select the “Gap location” button and then press on the screen in the desired position. The gap mark (purple) should cover the real gap. If necessary, drag and drop the gap marks to relocate them.



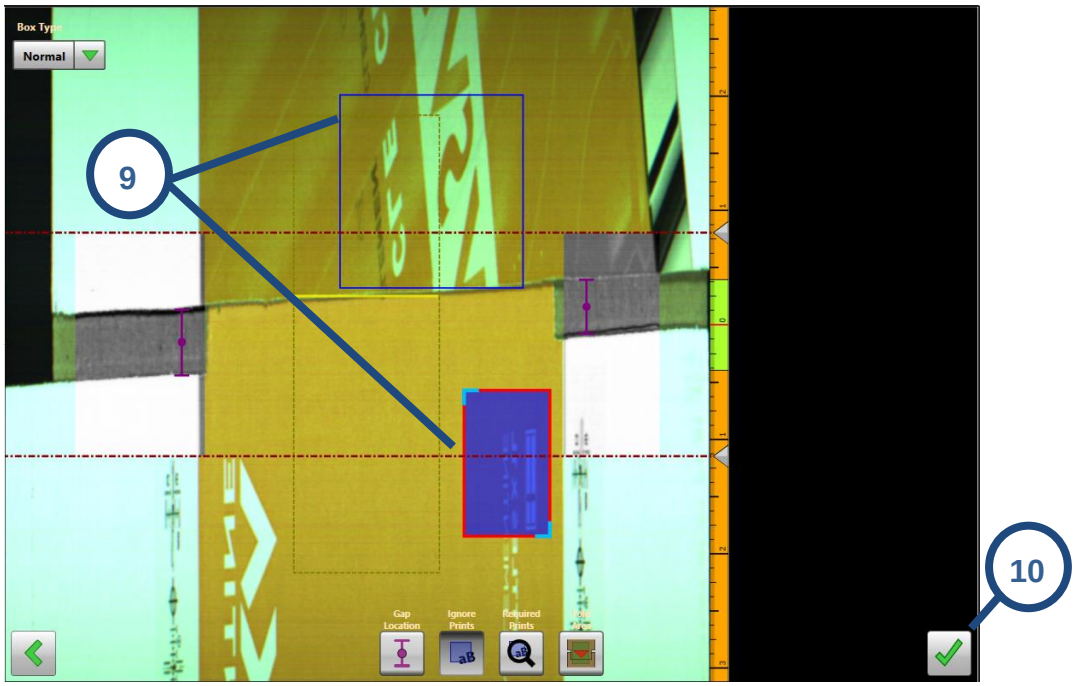
b. *Numerical arming:* FoldChek may be configured to use numerical arming. If this is the case, enter the data manually by using the numeric text boxes.



8. Make sure the misfold region is big enough to detect misfolded glue tabs. Avoid any rail. The fold mark (yellow line) should be located on top of the fold position. If necessary, press the “Misfold” button and adjust the region by dragging and dropping.



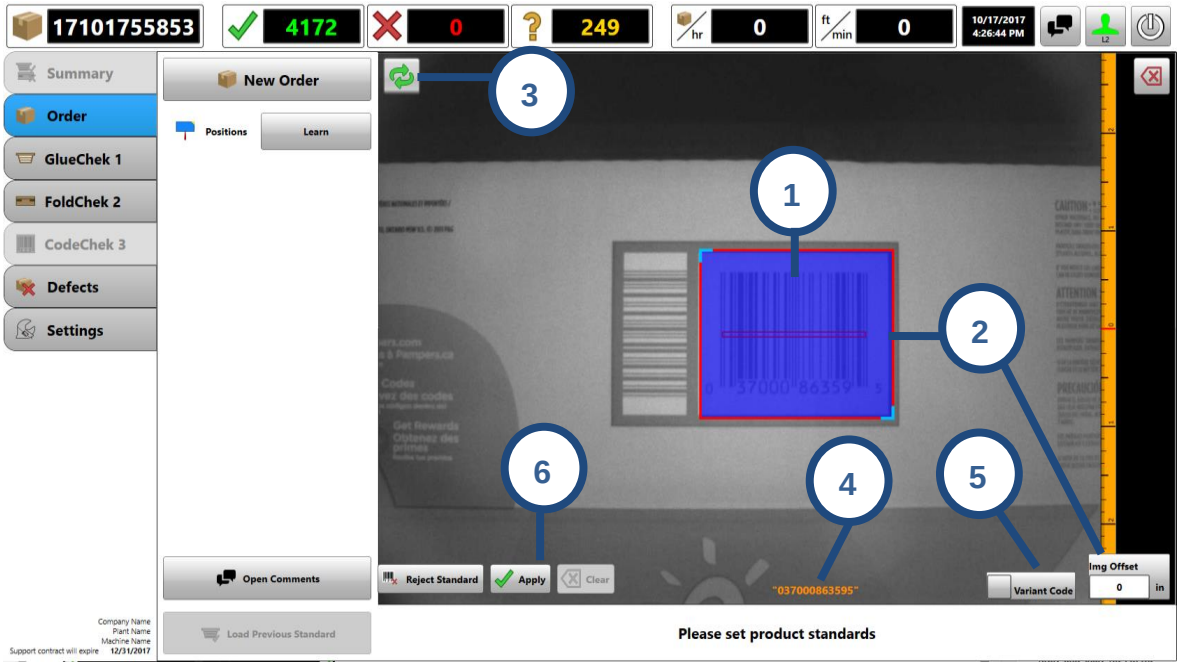
9. Cover all the prints on the flaps by adding the required “ignore print regions”. Press the “Ignore Print” button and then draw blue regions on the screen until cover all prints.

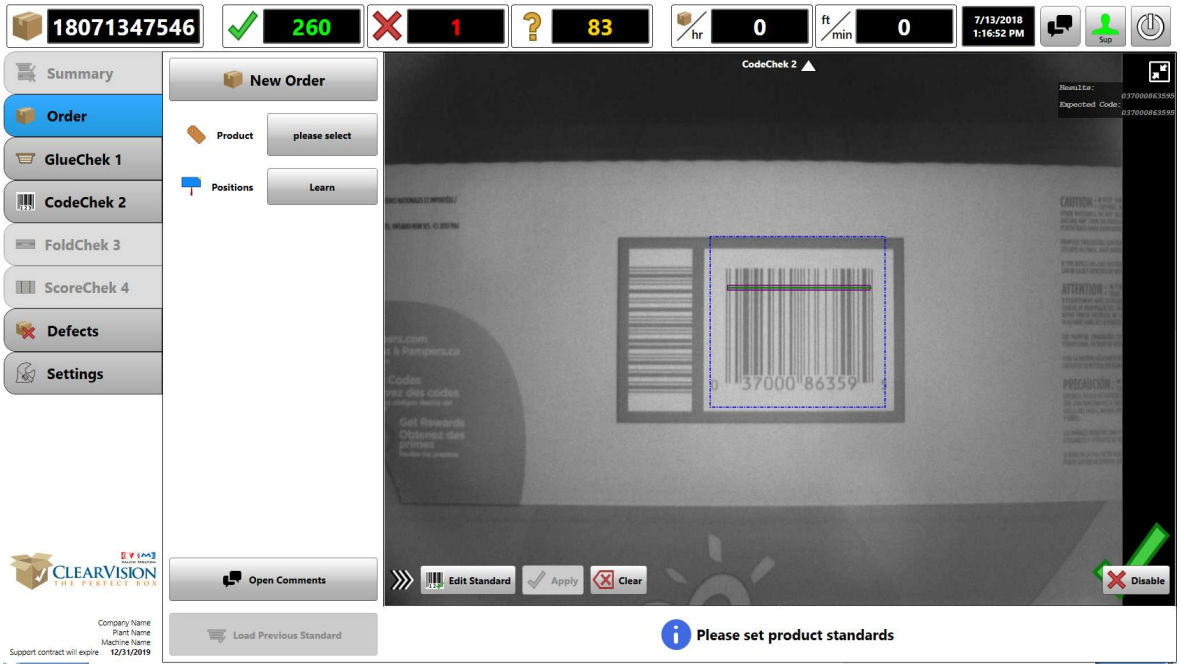


10. Press “Finish” button (green check mark).

CodeChek

1. Press the CodeChek “Set Standard”. The image viewer will maximize to show a rectangle around an automatically detected barcode.
2. The barcodes should appear centered in the image. If that is not the case, refine the rectangle by covering only the desired barcode. You can also press the text box in the bottom right corner “Image Offset” to specify the distance from the leading edge when the camera takes the image of the box.
3. Make sure the “refresh” button is pressed down. Note that after changing the image offset, a box needs to be run to confirm the right position.
4. The system will automatically read the barcode and display it at the bottom of the image. Confirm that the code is correct.
   a. If the system is reading the wrong code in the case of multiple codes, position the region of interest manually to read the right barcode.
   b. If the code is not readable, this means the system will likely not be able to read it in production. Contact Clearvision support.
5. If the setup is only to validate the readability of the barcode, select the “Variant Code” mode by adding a tick mark on it.
6. Press “Apply” to save the standard.

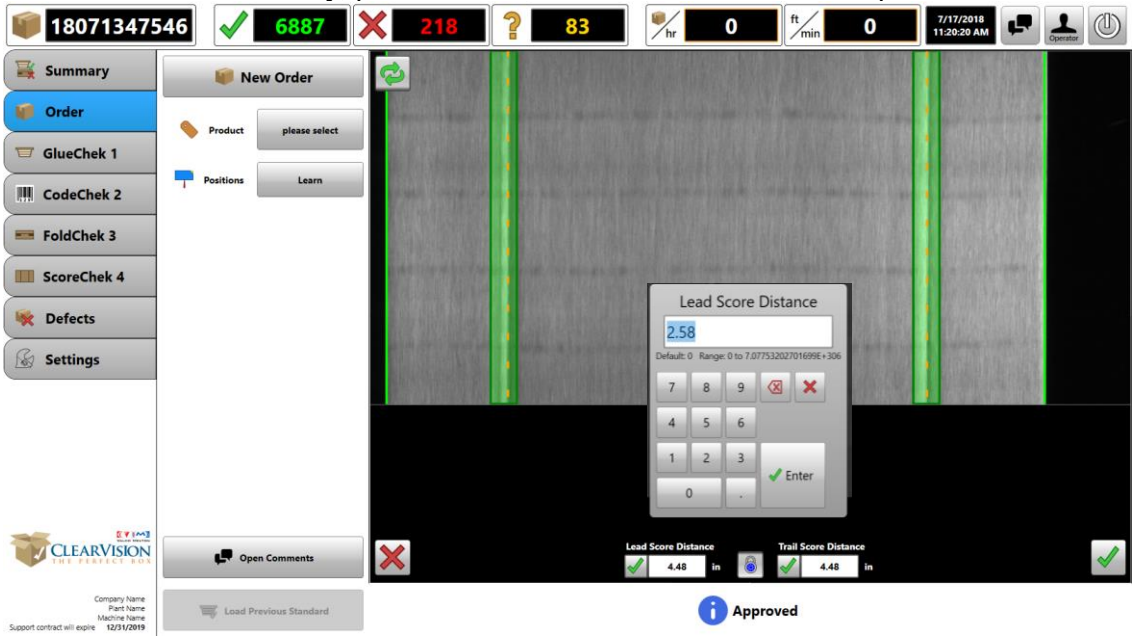


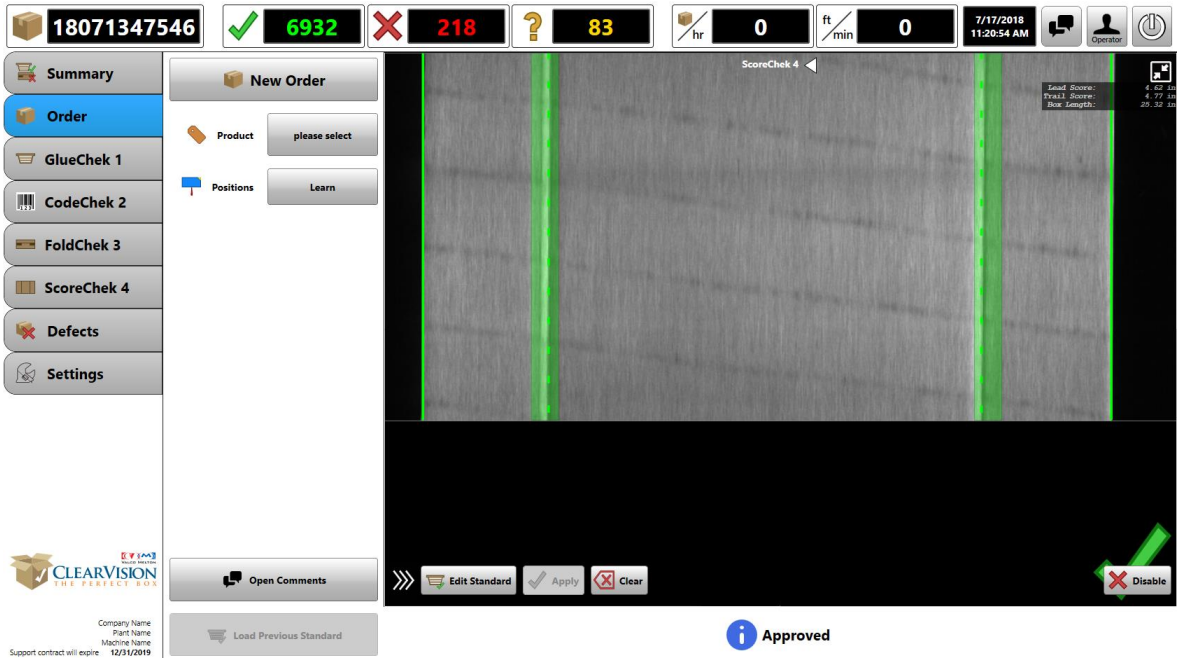


Note: It is possible to integrate target barcode information with KiwiPlan. Contact KiwiPlan and Clearvision support to get this setup.

ScoreChek

1. Press the ScoreChek “Set Standard”. The image viewer will maximize.
2. The Lead Score Distance and the Trail Score Distance need to be set manually. Lead Score Distance is from the lead edge of the board to the lead score. Trail Score Distance is from the trail edge of the board to the trail score. The dotted line indicates a score present. The inspection of any of these scores can be turned on/off by enabling/disabling the check box next to the lead/trail distances.
3. When the distances are set satisfactory, press “Finish” button (green check mark) to set the standard.
   If it looks unsatisfactory, press the red “X” mark, and return to step 1.



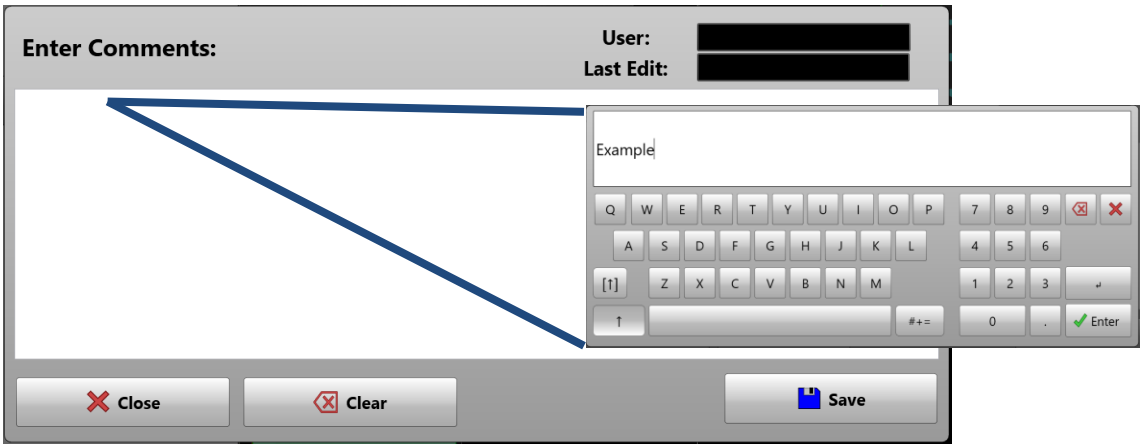


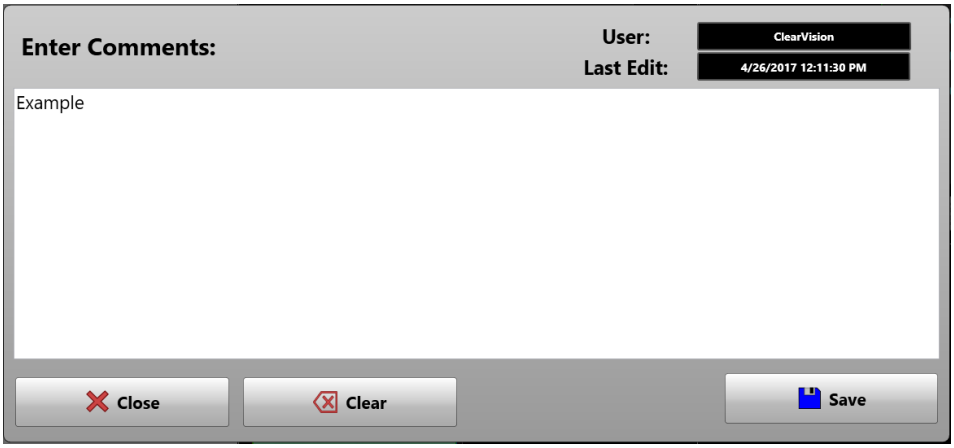
6.3 Modifying an Order

6.3.1 Adding New Comments

1. If it is required to add a comment to the current order, press the "**Open Comments**" button.

2. Click on the blank space and with the on-screen keyboard type the comment. Then, click on "Enter" and "Save" the message.
   The date and time of the last edit will be recorded.

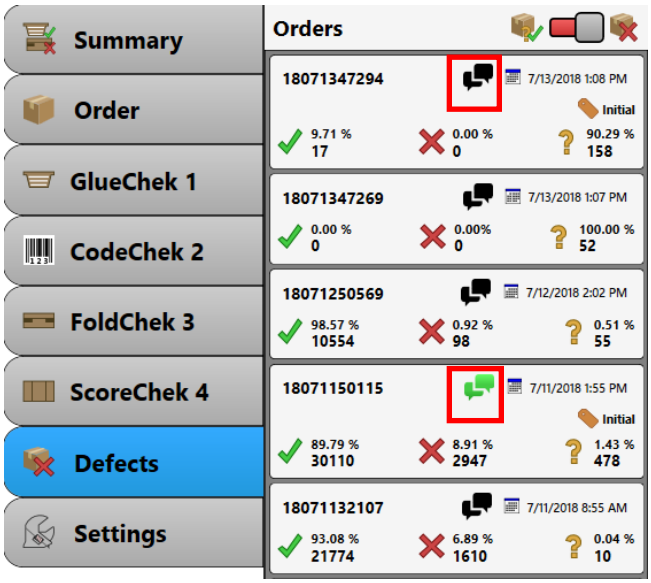




- The button "Clear" clears the comment message.
- The button "Save" saves the message into the order.
- The button "Close" closes the message editing window without saving the message.

6.3.2 Viewing/Editing Comments

It is possible to view, edit, or add comments from previous orders. Click on Defects Tab to see the order list. The orders with comments appear with a green-coloured message icon, the orders with no comments appear with a black-coloured message icon.
Clicking on them to view, edit, or add the comments.



6.3.3 Resetting the Standard during an Order

It is possible that the glue pattern changes significantly during an order, but it is still acceptable.
In cases where the pattern is still acceptable, please simply re-set the Standard. To do so, go to Order Tab and follow the steps below.

1. Press the “Edit Standard” buttons to reset the standards for CodeChek and FoldChek and the “Set Standard” button to reset the standards for GlueChek.

2. The FoldChek can be edited to move the points of measurements.

In cases where the pattern is not acceptable anymore, please press the “Clear” button and setup the system again.

No further interaction is required during the order unless there is an intentional glue pattern change, or counter ejector movement.

7. Maintenance

Preventative maintenance is required to ensure proper operation of the inspection equipment. The following steps should be performed every day:

- Wipe camera front glass using a soft cloth every shift.
- Check cables for signs of damage (e.g., tears, kinks). Report damaged cables to ClearVision Support.

The following tasks should be performed at least once per week, and potentially more frequently if required by the specific application and installation.

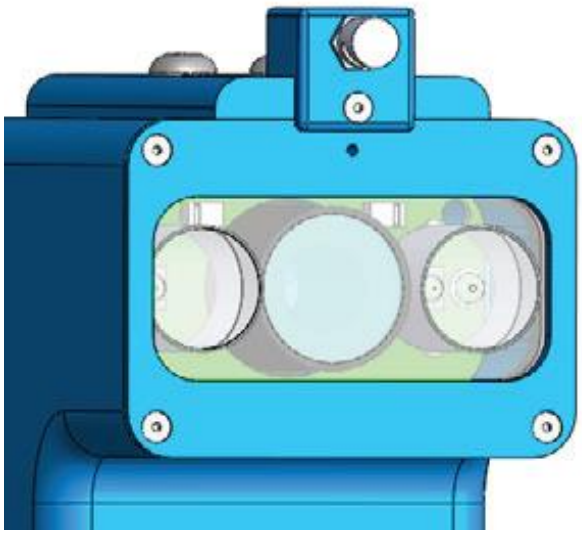
7.1 Checking Pressure Tank Fluid Level

As the UV/water solution is used to mark defective boxes, the pressure tank eventually runs dry and must be refilled. The pressure tank holds one gallon of liquid. Check the fill level of the pressure tank and if necessary, refill with UV or UV/water solution.

The inspection system comes with a water-based, UV-fluorescent blue dye. To order additional 1-gallon bottles from Valco-Melton, use part number 713XX059. This dye must be mixed or diluted with water in a 1:1 mixture. Adjust the ratio if stronger or weaker fluorescing is desired. Use a stronger dye mixture when it is difficult to see the dye on the marked boxes.

For more information on the UV solution, or to order additional UV solution, please contact your Valco-Melton representative.

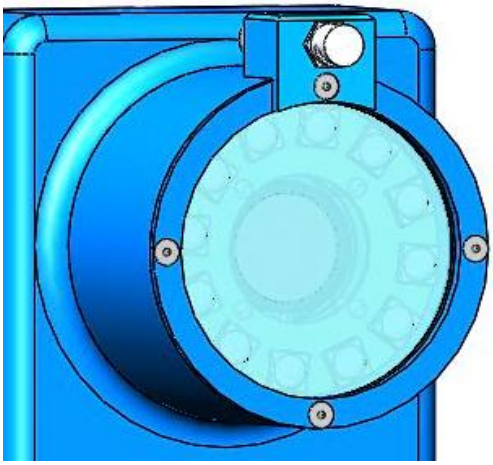
7.2 GlueChek/FoldChek: Camera Module Protective Glass



Although the air cleaning system on the camera module protective glass lens protects it from the majority of glue spatter and debris, periodic cleaning of the glass is necessary. Over time, glue and dust accumulates on the protective glass, reducing image quality and consistency. Wipe off dried glue and dust with a wet cloth. Do not use sharp objects or printing dye cleaner on the glass. When cleaning the glass, please check the functionality of the air cleaning nozzle on the camera module and adjust the air pressure if necessary.
Ensure the air has an oil filter. If not, air cleaning will be worse than none.

7.3 CodeChek: Camera Module Protective Glass

The CodeChek camera can be equipped with an air cleaning system, as shown on the right. Over time, dust accumulates on the protective glass, reducing image quality and consistency.
Wipe off dust with a wet cloth. Do not use sharp objects or printing dye cleaner on the glass. When cleaning the glass, please check the functionality of the air cleaning nozzle (when mounted) on the camera module and adjust the air pressure if necessary.



Ensure the air has an oil filter. If not, air cleaning will be worse than none.

7.4 ScoreChek: Camera Module Protective Glass

Over time, glue and dust accumulates on the protective glass, reducing image quality and consistency. Wipe off dried glue and dust with a wet cloth. Do not use sharp objects or printing dye cleaner on the glass.

When cleaning the glass, please check the functionality of the air cleaning nozzle on the bracket and adjust the air pressure if necessary.
Only use air if an oil filter is used.

8. Troubleshooting

The following list provides an overview of the most frequently asked questions and is meant as an introductory guide to common troubleshooting scenarios. Should you require any assistance or have any questions, please do not hesitate to contact ClearVision Technical Support (contact information can be found in Chapter 9: Support on pg. 92. Most problems can be resolved in less than 30 minutes with the assistance of remote support.

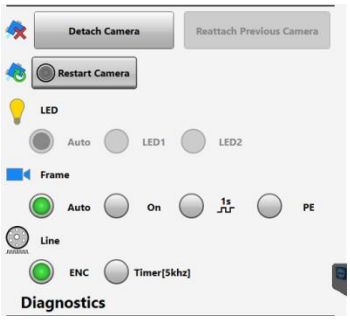
8.1 General Inspection System Troubleshooting

8.1.1 Camera not initializing

CAUSE: If the camera gets stuck in initializing (see top part of the following image).

REMEDY: Try the following options

- Try detaching the camera and then reattach previous camera.
- Restart camera.
- Restart the BoxChek Cabinet.



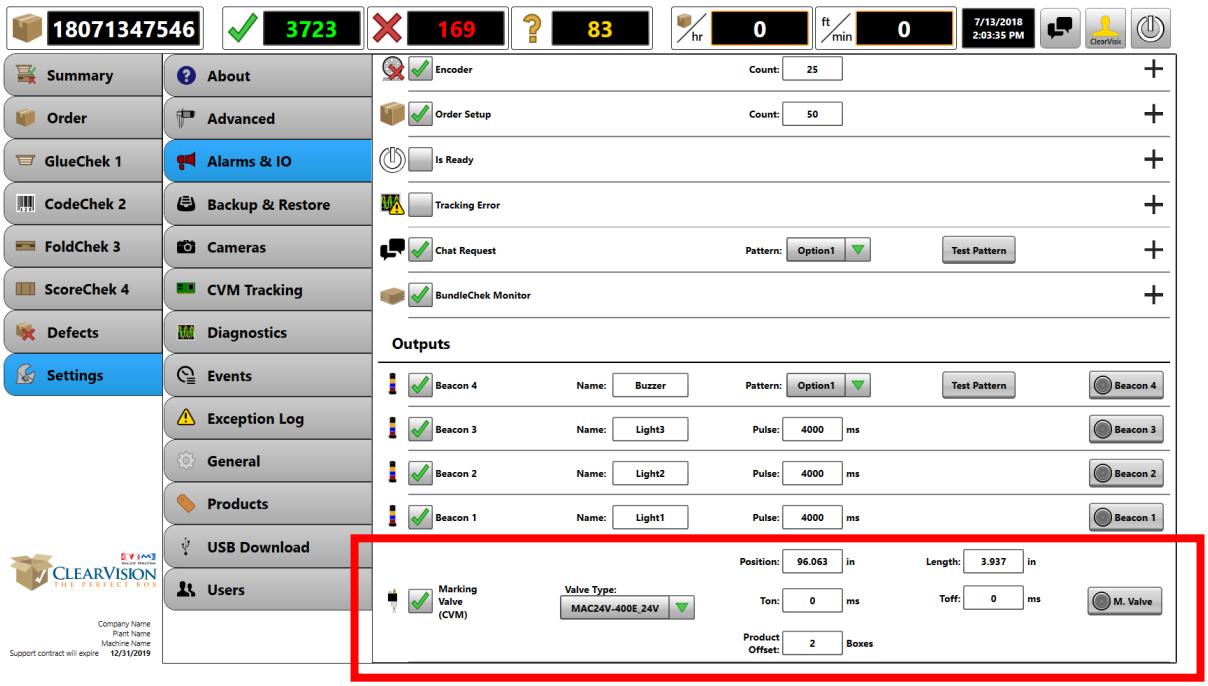
8.1.2 UV Marking System Not Marking Defective Boxes

CAUSE: A component from the marking system may be clogged or faulty, a software setting may have been changed, or a cable may have been disconnected.

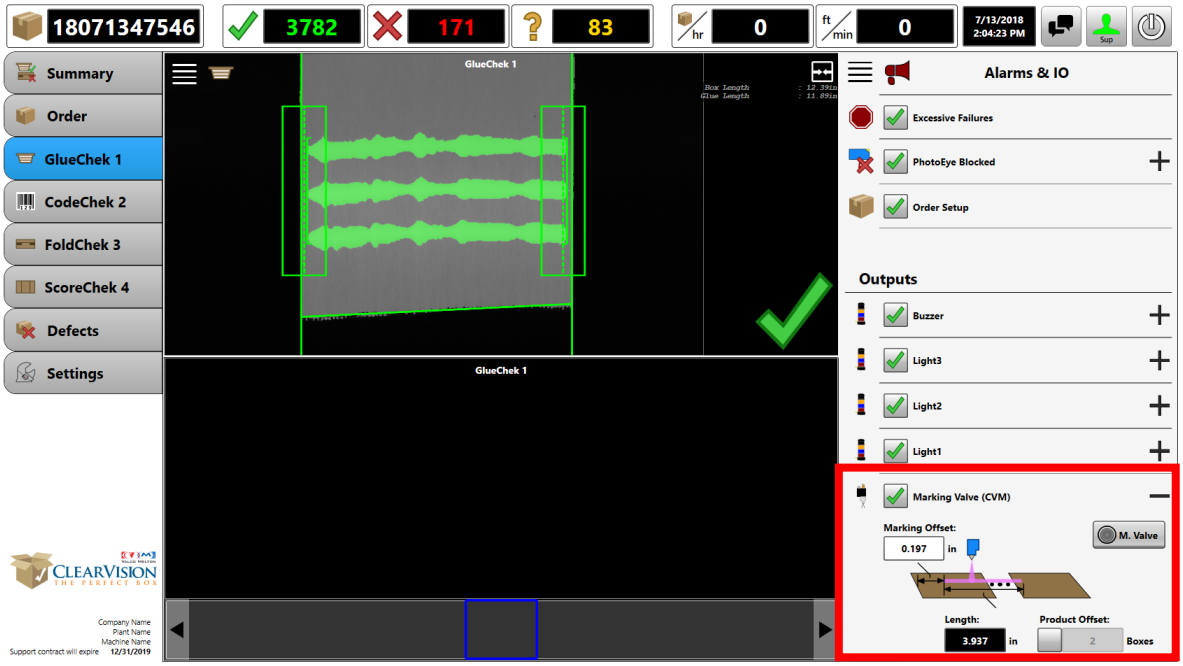
REMEDY: Follow these steps.

1. Fill pressure tank with UV dye / water solution.
2. Check air pressure on tank (20 – 40 psi [1.4 – 2.6 bar], depending on amount of liquid spray wanted).
3. Check that the misting nozzle is pointed at the box fold.
4. Ensure the UV marking electrical cable is connected properly.
5. Check that water jet is enabled in software (**Settings** menu).

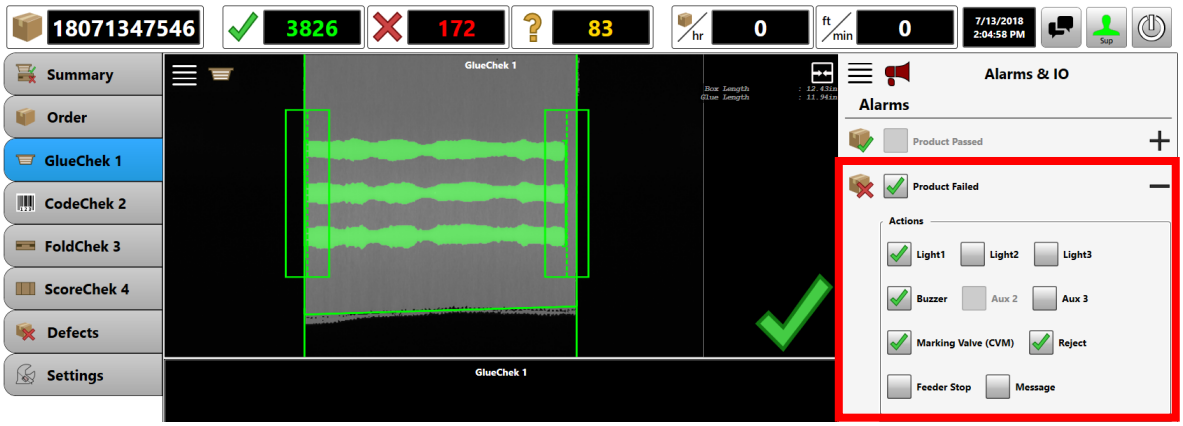
As a user Level 3 or higher, go to Alarms & IO Menu in the settings tab and in each system, screen allows the operator to check the water marking system. Ensure all marking valve boxes are ticked. In the alarms & IO menu in the setting tab the marking valve box needs to be enabled.



In the alarms & IO menu in the specific system screen there are two places where the marking valve box needs to be enabled. One is under Outputs section.



The other one is under the product failed section.



8.1.3 UV Marking System Marking Boxes Too Late / Early

CAUSE: The nozzle of the marking system has moved, or the setting in the software has changed.

REMEDY: Measure distance from first photoelectric sensor in the system (normally belonging to a GlueChek camera) and contact ClearVision.

8.1.4 Boxes Not Counted Accurately

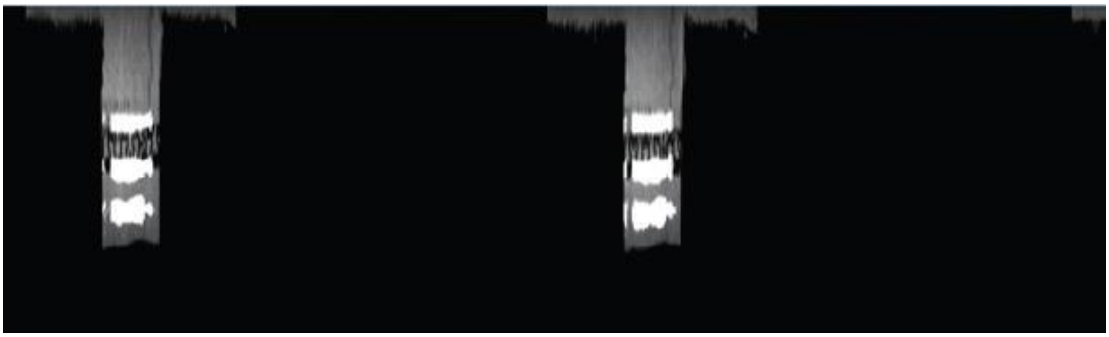
Any obstruction of the photoelectric sensor can cause the detection of boxes to fail. This can present itself in the form of boxes not being detected and counted, giving the impression that the system is “frozen”. It can also result in glue tabs not being displayed properly. (For example, it might appear as if the glue tab jumps from left to right.)

CAUSE: An object is present in the path of the photoelectric sensor.

REMEDY: A pile of scrap underneath the photo sensor could be the reason for unreliable readings. Please clean area beneath the PhotoEye and ensure that it is not obstructed by anything. For instance, make sure that no guide rails are in the view of the PhotoEye.

8.1.5 Symptom: More than One Box Recorded at Once

The image below shows several glue tabs, and such an image will cause the inspection system to detect a problem, as this means that the photoelectric sensor belonging to the camera is malfunctioning.

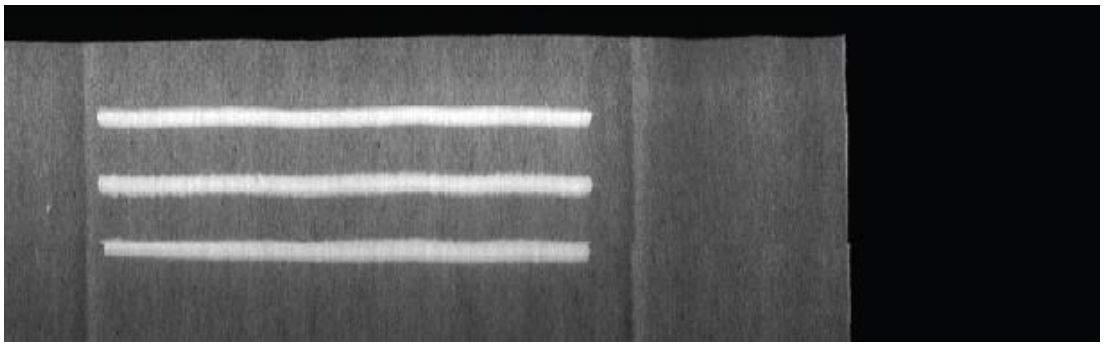


CAUSE: An object is present in the view of the photoelectric sensor.

REMEDY: A pile of scrap underneath the photo sensor can be the reason for unreliable readings. Please clean area beneath PhotoEye and ensure that it is not obstructed by any objects. For instance, make sure that no guide rails are in the view of the PhotoEye.

8.1.6 Box appears Scaled or Shifted

The image below shows a glue tab shifted to the left.



CAUSE 1: Encoder contact pressure is too weak / strong.

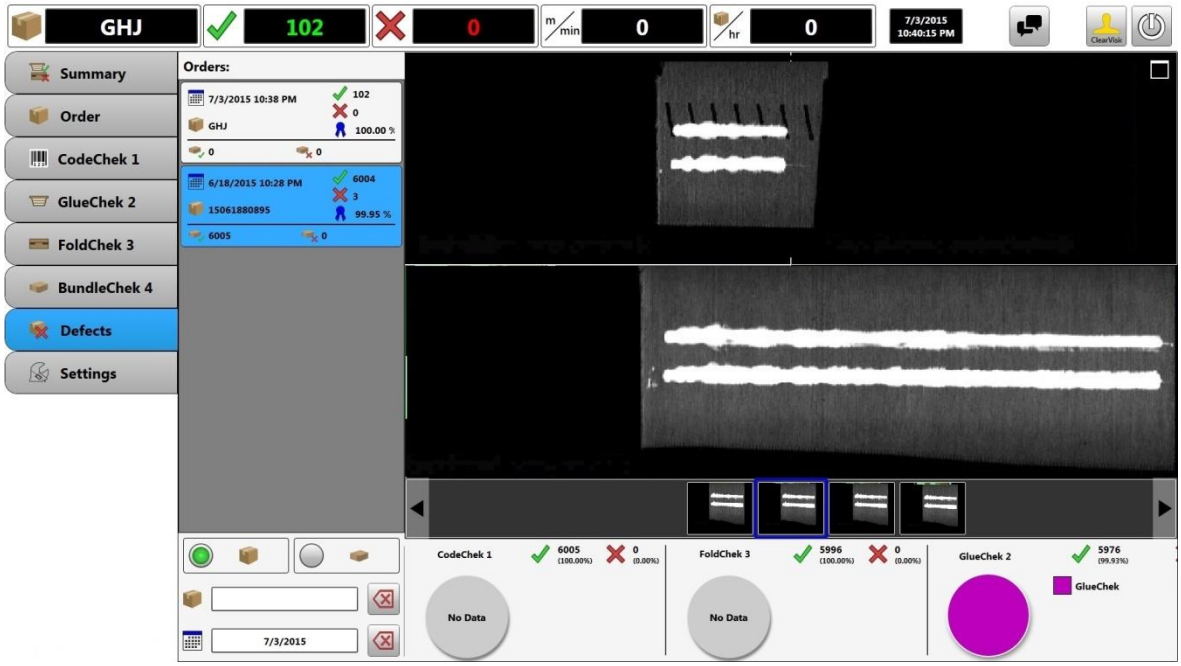
REMEDY: The pressure of encoder wheel against the belt must be sufficient to guarantee accurate reading. It should be strong enough to prevent any slipping. However, if there is too much pressure, the encoder shaft would not be able to freely rotate. The encoder wheel requires a normal force of about 5 - 10 lbs to not slip. It could also be that the feed belt has slipped off away from beneath the encoder wheel.

CAUSE 2: Camera position has changed.

REMEDY: Check if the position of the camera is correct. Correct the positioning of camera.

8.1.7 False Alarms at Beginning of Order

The screenshot below shows the **Defects** screen of an order. The system has not been taught the correct Standard for the new order.



New order being run with Standard from old order

CAUSE: A different-sized box is going through the machine. The order number and new Standard have not yet been entered. The system thinks the new box is a defect as it compares it to the Standard of the previous order.

REMEDY: Enter the new order with the correct settings.

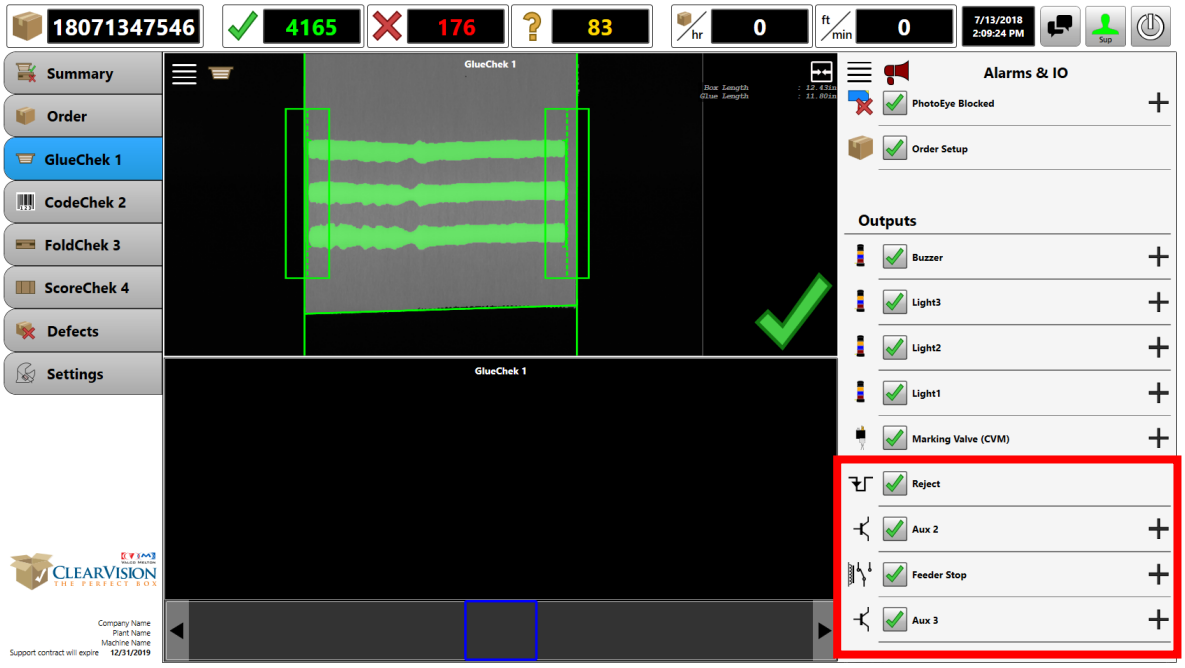
8.1.8 System does not reject defects

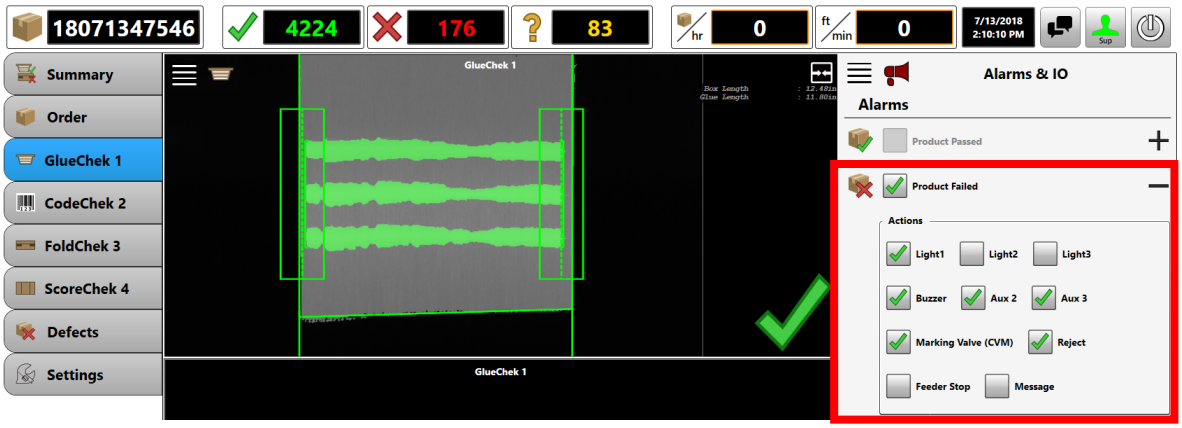
CAUSE: Damaged cables, disconnected cables, or a software setting may have been changed.

REMEDY:

- Check cables for damage.
- Check cables are connected.
- Test outputs
- Check that rejection is enabled in the testsuite (**Alarms & IO** menu).

In the alarms & IO menu there are two places where the ejector/aux2/aux3 box needs to be enabled. One is under Outputs section, the other one is under the product failed section.


18071347546
4165
176
83
0
0
7/13/2018
2:09:24 PM
Summary
Order
GlueChek 1
CodeChek 2
FoldChek 3
ScoreChek 4
Defects
Settings
GlueChek 1
GlueChek 1
Alarms & IO
PhotoEye Blocked
Order Setup
Outputs
Buzzer
Light3
Light2
Light1
Marking Valve (CVM)
Reject
Aux 2
Feeder Stop
Aux 3
CLEARVISION
Company Name
Plant Name
Machine Name
Support contract will expire 12/31/2019


18071347546
4224
176
83
0
0
7/13/2018
2:10:10 PM
Summary
Order
GlueChek 1
CodeChek 2
FoldChek 3
ScoreChek 4
Defects
Settings
GlueChek 1
GlueChek 1
Alarms & IO
Alarms
Product Passed
Product Failed
Actions
Light1
Light2
Light3
Buzzer
Aux 2
Aux 3
Marking Valve (CVM)
Reject
Feeder Stop
Message

8.2 System Falsely Detecting Gluing Problems

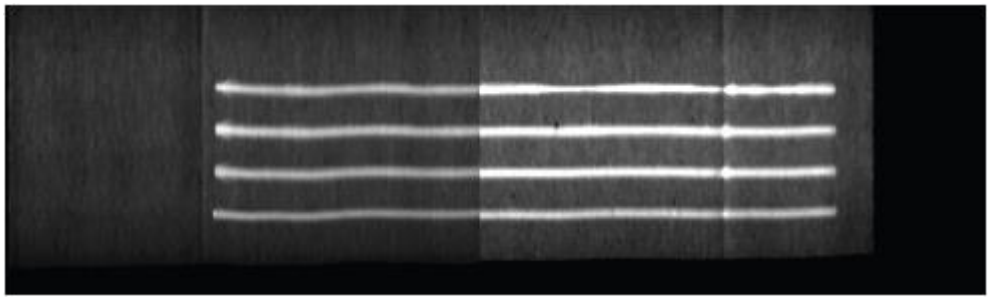
False alarms arise for primarily two reasons:

A. Image quality has deteriorated or changed.

B. Current box does not match Standard box selected.

8.2.1 Symptom: Image of Glue Tab is too dark

Shown below is the overlay of an image, with dark glue on the left side and an image with sufficient brightness on the right.

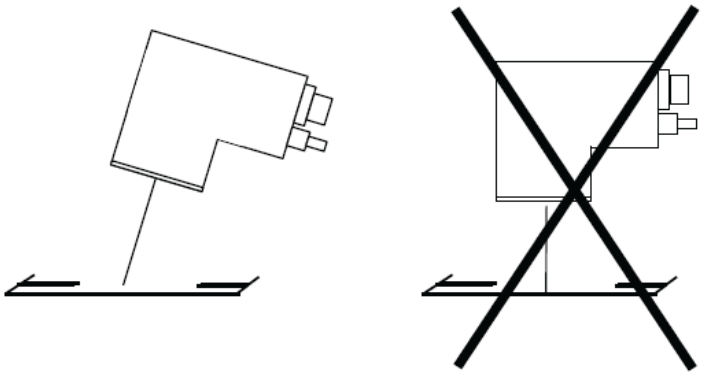


CAUSE 1: Protective glass cover is partially blocked with glue or debris.

REMEDY: Clean glass with a wet cloth. Make sure that the air cleaning system is functioning properly. Re-set the Standard for the order.

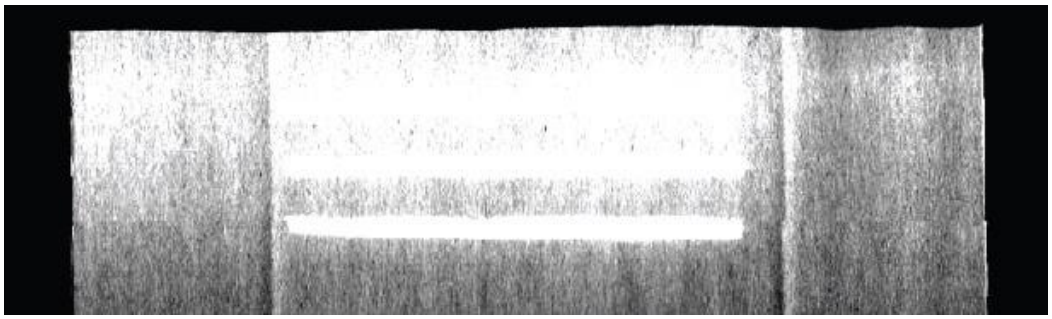
CAUSE 2: Camera position has changed.

REMEDY: Check if the position of the camera is correct. The camera normally is mounted at an angle of about 10º. It should not be pointed straight at the glue tab. Ensure the distance from the camera to the board is still 4.5″ / 114.3mm. If it has changed, adjust camera back to its original position. Please call ClearVision to assist with repositioning of the camera.



8.2.2 Symptom: Image of Glue Tab is Too Bright

Shown below is the overlay of an image, of the gluetab with too much brightness.

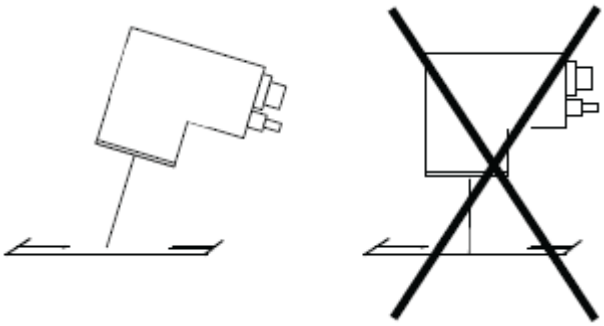


CAUSE 1: Incorrect camera settings (e.g., white boxes are being run, while the operator selected “brown boxes” in the software while setting up the order).

REMEDY: Ensure correct camera settings are entered. Use the **Reconfigure Order** button if in the middle of a current production run. Re-set the Standard.

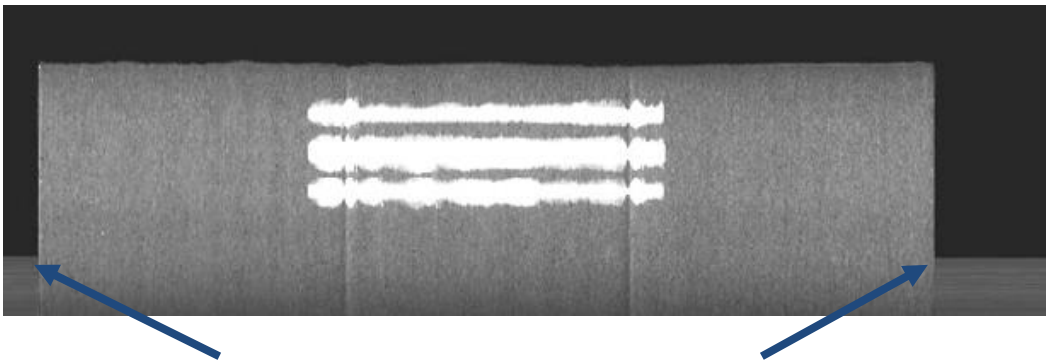
CAUSE 2: Camera position has changed.

REMEDY: Check if the position of the camera is correct. The camera normally is mounted at an angle of about 10º. It should not be pointed straight at the glue tab. Ensure the distance from the camera to the board is still 4.5″ / 114.3mm. If this has changed, adjust camera back to its original position. Please call ClearVision to assist with repositioning of the camera.



8.2.3 Symptom: Image of Glue Tab has Horizontal Lines

This is an example of an image with additional horizontal lines in view. In this case, there is a guide rail behind the glue tab that should simply be moved out of view of the camera.

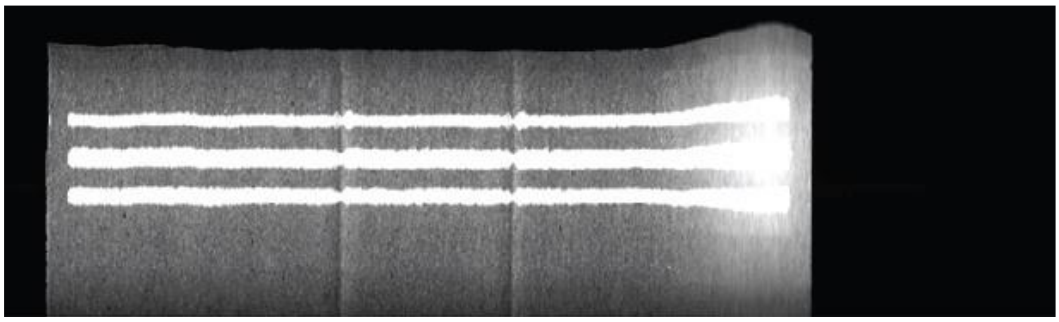


CAUSE: Objects are in the field of view of the camera.

REMEDY: Whenever this happens, there is something stationary in the field of view of the camera. This can either be glue on the camera's protective glass (which would appear cloudy) or dried glue trailing from the extruder. It is also possible that a guide rail is in the field of view of the camera. Clean glass and remove any other objects which could be an issue.

8.2.4 Symptom: Jump

The box is moving up or down as it is passing by the camera, rather than remaining on a horizontal plane. Shown below is an image of a glue tab with jump at the end. In this case, the image gets brighter as the box "jumps" closer to the camera.

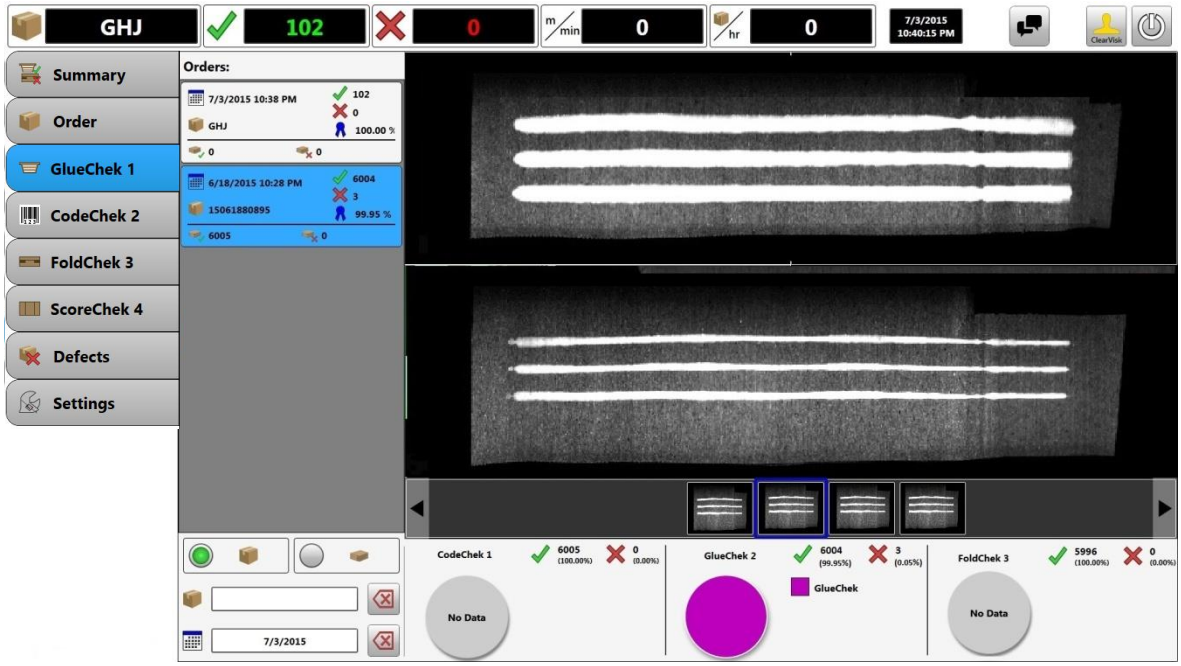


CAUSE: Folding rails are causing the box to fold prematurely or are not supporting the box, resulting in the front or back of the box moving vertically.

REMEDY: Re-adjust the guide rails so that the box travels at a close-to-straight level.

8.2.5 Symptom: Glue Pattern Has Changed but Is Still Acceptable

The screenshot below shows an order which has been taught a certain glue pattern (top), but a change in speed has caused the glue extrusion system to dispense less glue. Depending on the system sensitivity settings, the system detects this as a problem. However, sometimes the new pattern is still acceptable.



CAUSE: Glue pattern has changed, and the system is recognizing it as faulty, even though it may be acceptable.

REMEDY: Re-set the Standard to the new pattern that is now being applied to the order.

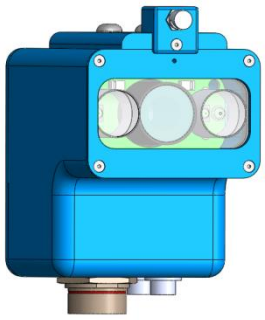
9. Support

The ClearVision system is equipped with remote access software which allows ClearVision staff access to the system at anytime. Please do not hesitate to contact ClearVision if there are any issues with the ClearVision system. You can contact ClearVision support either by phone at 1-866-528-0212 ext. 4 / +1513-881-7132, or by email at support@clearvisionboxes.com.

10. Replacement Parts

The most common replacement parts for BC7 are listed in the Parts Catalogue; find it as Appendix I. Parts Catalogue in this Manual and contact ClearVision Customer Support to confirm that the replacement part matches with your BC7 system. Our contact information can be found in Chapter 9: Support on pg. 92.

GlueChek / FoldChek Specifications



Description

The GlueChek & FoldChek system consists of the camera modules, a control cabinet, an encoder, a marking system, an alarm/indicator, and at least one photoelectric sensor.

The ClearVision **GlueChek** system checks that the correct amount of glue has been applied to every box, in real-time.
Incoming glue tabs are compared against a learned standard. If a defective box is found, the operator is alerted, and the defect is imaged and marked for removal.

The ClearVision **FoldChek** system checks that the final gap sizes on all boxes are within the customer's specifications.
Gaps on incoming boxes are compared against a learned standard. If a defective box is found, the operator is alerted, and the defect is imaged. The box after the defective box is marked as an indication that the previous box is to be removed.

Specifications

Max. Boxes / Hr:	36,000 boxes / hr	
Cabinet Electrical:	100 - 240 V AC, 50 - 60 Hz	
Cabinet Weight:	50 lbs / 23kg	
Cabinet Dimensions:	20″ x 27″ x 10.5″ / 490 x 665 x 265mm (W x H x D)	
Detected Defects:	**GlueChek** • No glue • Missing glue lines • Glue registration • Attached scrap • Skewed sheets • Glue Volume • Z- Fold Inspection	**FoldChek** • Squeeze Out • Die-cut Registration • Sheet Length • Gap too small • Gap too large • Panel fold Order
Measurement Accuracy:	• **Glue registration:** +/- 1.5 mm • **Glue volume:** +/- 1% • **Glue distance to edge of tab:** +/- 0.2 mm • **Skew:** +/- 0.1º • **Sheet length**: +/- 1.5 mm • **Standard Deviation:** 0.5 mm for gap size	

Main Components

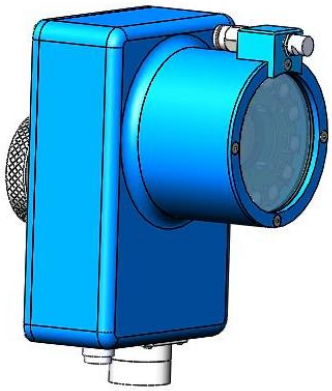
Marking Module	GlueChek - Marks defective box with UV dye. FoldChek- Marks the box after the defective box.
Camera Module	GlueChek - Detects the invisible UV mark on the defective box. FoldChek – Measures gaps and panel folding order.
Encoder	Tracks the position of folding rail belts. The speed and position are used to calculate the timing for imaging and spraying operations.
Control Cabinet	Contains electrical components.
PhotoEye(s)	Detects and counts passing boxes.
Touch Screen	Provides a user interface for operators.
Alarm Beacon	Provides audible alarms and visible status indicator

Installation Prerequisites

Power to Cabinet:	100 - 240 V AC, 50 - 60 Hz
Dye Tank Air Supply:	45 psi / 3 bar min.
Camera Air Supply:	15 psi 1 bar min.
Camera Position:	GlueChek - 4.5″ / 115mm from glue tab, 10º tilt FoldChek – 10-20″ from board. Varies by machine type.

Design specifications subject to change without notice.

CodeChek Specifications



Description

The ClearVision CodeChek system is designed to verify that the barcode printed on a box matches the intended product. During operation, each box is imaged, and the barcode is compared to either a learned standard or a code available from the plant production management software. This provides verification that the correct pre-print sheets or flexographic printing plate is in use for each job. If an incorrect barcode is found, the operator is alerted, and the defect is imaged and marked for removal.

The system consists of a camera module, a control cabinet, an encoder, a marking system, an alarm/indicator, and at least one photoelectric sensor.

Specifications

Max. Boxes / Hr:	36,000 boxes / hr
Cabinet Electrical:	100 - 240 V AC, 50 - 60 Hz
Cabinet Weight:	50 lbs / 23kg
Cabinet Dimensions:	20″ x 27″ x 10.5″ / 490 x 665 x 265mm (W x H x D)
Detected Defects:	• Incorrect or mismatched barcode for product • Unreadable / missing / damaged bar code

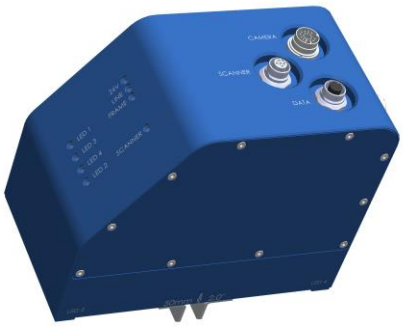
Main Components

Marking Module	Marks the defective boxes with a UV-fluorescent dye.
Camera Module	Images the area on each box containing the barcode.
Encoder	Tracks the position of the belts used in performing calculations and determining when to image boxes.
Control Cabinet	Contains electrical components.
PhotoEye(s)	Detects and counts passing boxes.
Touch Screen	Provides a user interface for operators.
Alarm Beacon	Provides audible alarms and visible status indicator

Installation Prerequisites

Power to Cabinet:	100 - 240 V AC, 50 - 60 Hz
Tank Air Supply:	45 psi / 3 bar min.
Camera Air Supply:	15 psi 1 bar min.
Camera Position:	10.5″ / 265mm from panel with barcode.

Design specifications subject to change without notice.



Description

The **ScoreChek** System is designed to inspect and ensure the integrity of score lines on corrugated sheets.

Main Components

Marking Module	Marks the defective boxes with a UV fluorescent dye.
Camera Module	Images the area on each box containing the scores.
Encoder	Tracks the position of the belts used in performing calculations and determining when to image boxes.
Control Cabinet	Contains electrical components.
PhotoEye(s)	Detects and counts passing boxes.
Touch Screen	Provides a user interface for operators.
Alarm Beacon	Provides audible alarms and visible status indication.

Installation Prerequisites

Power to Cabinet:	100 - 240 V AC, 50 - 60 Hz
Tank Air Supply:	45 psi / 3 bar min.
Camera Air Supply:	15 psi 1 bar min.
Camera Position:	2″ / 50 mm from board directly over the scores

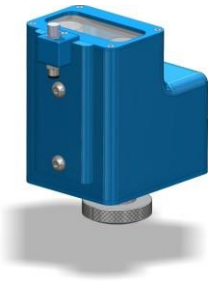
Specifications

Max. Boxes / Hr:	36,000 boxes / hr
Cabinet Electrical:	100 - 240 V AC, 50 - 60 Hz
Cabinet Weight:	50 lbs / 23kg
Cabinet Dimensions:	20″ x 27″ x 10.5″ / 490 x 665 x 265mm (W x H x D)
Detected Defects:	• Missing and Weak Lead and Trail Scores • Incorrect Board Length
Measurement Accuracy:	• **Sheet length**: +/- 1.5 mm • **Score deviation**: +/- 0.5 mm

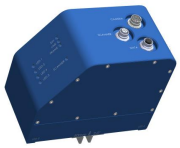
Note: Design specifications subject to change without notice.

Appendix I. Parts Catalogue

Common Replacement Parts - BoxChek 7

GlueChek™ Inspection - camera and camera specific replacement parts			
 GlueChek™ camera	PN	DESCRIPTION	QTY
	Metric (standard) camera		
	131XX177	Camera GlueChek™with the pyranine lens	
	131XX185	Camera Front Glass w/Lens	
	CV10268	Power cable, internal camera, 8-pin	
	CV10276	Light cable, internal camera, 8-pin	
	CV11421	Filter, 590nm, for yellow UV in glue	
	131XX006	Filter, 525nm, for green UV in glue (most common)	
	131XX403	Filter, legacy, IR block, for blue UV in glue	
 Front glass w/lens (GlueChek™)	CV10162	RJ 45 Connector, rear mounting	
	CV10761	Cable assembly, RJ45 Cat6, internal	

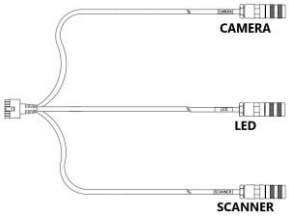
CodeChek™ Inspection - Camera			
 131XX255	PN	DESCRIPTION	QTY
	131XX255	Camera CodeChek™	

ScoreChek™ Inspection – Camera			
 JWT6635	PN	DESCRIPTION	QTY
	JWT6635	Camera ScoreChek™	

FoldChek™ Inspection – Camera Options			
	PN – Metric New Style	DESCRIPTION	QTY
 131xx194	131xx194	Monochrome camera, FoldChek™ with side mount	
 131xx192	131xx192	Monochrome camera, FoldChek™ with internal lighting	
 131xx097	131xx097	Monochrome camera, FoldChek™ low profile	
 131xx328	131xx328	Monochrome camera, FoldChek™ with side entry connection	

Legacy Cables – CodeChek, FoldChek & GlueChek

CV10160
Camera Data Cable



029xx774 / 029xx786
Cable Assembly

CV10164
RJ45 Protector

PN	DESCRIPTION	QTY
CV10160	Camera Data Cable Cat6 5m	
CV10158	Camera Data Cable Cat6 10m	
CV10159	Camera Data Cable Cat6 20m	
CV10133	Camera Data Cable Cat6 30m	
CV10273	System cable, M16 8-Pin 5m	
CV10270	System cable, M16 8-Pin 10m	
CV10271	System cable, M16 8-Pin 15m	
CV10272	System cable, M16 8-Pin 20m	
CV10871	System cable, M16 8-Pin 30m	
029xx774	Cable assembly, BX7 camera, 10m	
029xx786	Cable assembly, BX7 camera, 3m	
131xx324	Cable extension kit, 2m, includes: (3) 131xx322 M16 extension cable, 2m (1) 131xx323 Cable, CAT5E, 2m (1) CV11307 Connector coupler, RJ45, CAT6	
	System Cables - Common	
098xx128	HDMI extension kit, 20m	
098xx129	HDMI extension kit, 30m	
029xx762	HDMI cable, 5m	
029xx759	HDMI cable, 10m	
029xx761	USB cable, 5m	
029xx760	USB cable, 10m	
	Tool & Protectors	
CV11412	Tool, connector insert removal, RJ-45 cable	
CV10164	RJ45 Protector	

System Cables – Mega GlueChek, Narrow GlueChek & ScoreChek

M16 19-Pin Male-Female Cables
"Camera"

M12 5-Pin Scanner Cables
"Photoeye"

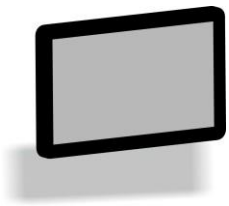
M12 to RJ45 Ethernet Cables
"Data"

M12 Ethernet M-F cables
"Data"

PN	DESCRIPTION	QTY
Power/Trigger Cable Extension (optional)		
029xx835	Cable, M16 19-Pin M-F extension, 2m	
029xx833	Cable, M16 19-Pin M-F extension, 5m	
029xx836	Cable, M16 19-Pin M-F extension, 10m	
029xx831	Cable, M16 19-Pin M-F extension, 20m	
029xx832	Cable, M16 19-Pin M-F extension, 30m	
Scanner Cable (connecting scanner to camera) (1 required)		
030xx592	Scanner cable, 1m	
030xx593	Scanner cable, 2m	
030xx891	Scanner cable, 3m	
030xx594	Scanner cable, 4m	
030xx873	Scanner cable, 5m	
Data Cable (1 required)		
029xx756	M12 to RJ45 Ethernet Cable, 2m	
029xx757	M12 to RJ45 Ethernet Cable, 5m	
029xx758	M12 to RJ45 Ethernet Cable, 10m	
Data Cable Extension (optional)		
029xx653	M12 Ethernet M-F extension cable, 2m	
029xx654	M12 Ethernet M-F extension cable, 5m	
029xx655	M12 Ethernet M-F extension cable, 10m	
029xx656	M12 Ethernet M-F extension cable, 15m	

Common Replacement Parts - GlueChek™ & FoldChek™ Systems

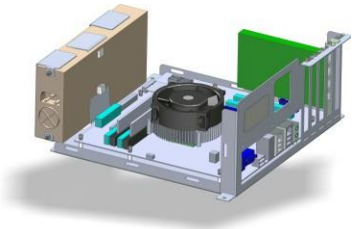
NOTE: Other than the cameras and specific camera related item, most replacement parts are common to both the GlueChek™ & FoldChek™ systems.



137xx026
Control screen

155xx304
Encoder

CV11208
UV Flashlight



074xx082
Module assembly, motherboard/power supply hard drive

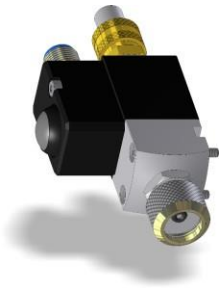
JWT6636

GlueChek™ & FoldChek™ Inspection - common replacement parts		
PN	DESCRIPTION	QTY
137xx026	Control screen	
131xx004	Photoeye Laser M16 Connector	
151xx733	Camera interface card	
074xx081	CVM module	
074xx082	Motherboard module kit, includes motherboard, hard drive, power supply and network card	
155xx304	Encoder	
788xx552	Measuring wheel, metric	
788xx883	Measuring wheel, inch	
030xx633	Encoder cable, 16m	
481xx057	Alarm Buzzer	
UV Marking dye & flashlight		
713xx059	UV Marking Dye (blue) GlueChekTM FoldChek™	
CV11208	UV Flashlight (batteries not included)	
Replacement module, motherboard/power supply/hard drive		
074xx082	Replacement module, motherboard/power supply/hard drive	
JWT6636	Mounting adapter kit, new chassis motherboard assembly to old style BC7	

Marking System Replacement Parts - GlueChek™ & FoldChek™ Systems

NOTE: All new GlueChek™ & FoldChek™ marking systems include the VALCO MELTON 400 series valve/tank combination.

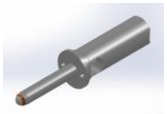
GlueChek™ & FoldChek™ - Marking system replacement parts



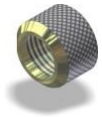
704xx815
Marking valve, 400 series

PN	DESCRIPTION	QTY
VALCO MELTON marking valve		
704xx815	400 Marking Valve Assembly -- Spray	
704xx753	Spray Nozzle	
704xx808	400 Marking Valve Assembly -- Jetting	
704xx554	400 Valve Plunger	
793xx271	400 Valve Spring	
707xx085	400 Valve Seat, spray	
707xx074	400 Valve nozzle/seat, 0.35, jetting	
793xx710	400 Valve Retaining Nut	

704xx753
Spray nozzle



704xx554
Valve plunger



793xx710
Retainer nut

707xx085
Valve seat