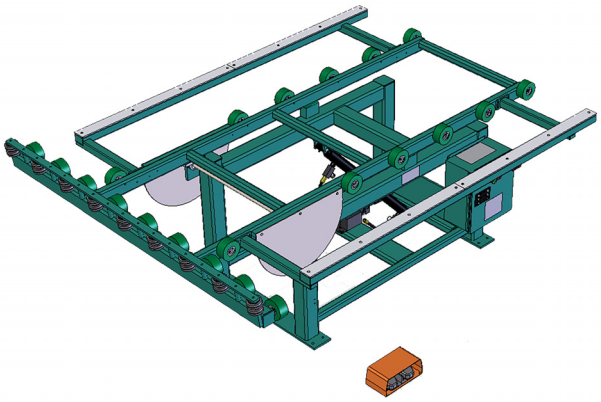
Innovation, Quality & Honesty

RKG Series Lift Station

Operation and Service Manual

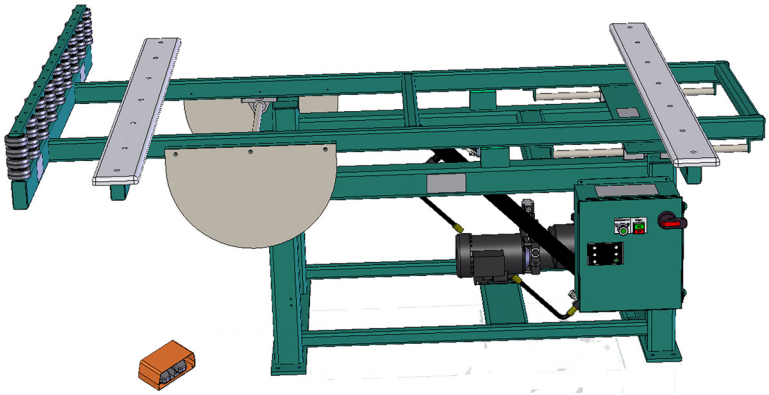
Published: 7/25/16

RKG-3



RKG-3A

RKG-5



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Manual Part Number: OPSRV_RKG-Series_V1

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Table of Contents

CHAPTER 1 Introduction to the RKG Series

This chapter provides an overview of the KVAL RKG-Series Door Hanging System and important safety information to follow when operating the machine.

Chapter 1 at a Glance

TABLE 1- 1.

Section Name	Summary	Page
Safety!	IMPORTANT safety information is described in this section	Page 1-3
Zero-Energy to Start-Up	Procedure to power up your machine for the first time.	Page 1-10
Getting Help from KVAL	This section describes the method to contact the KVAL service center for help. The section includes how to get information from the specification plate tor provide to KVAL, service center hours, and return procedures	Page 1-12
Safety Sign-Off Sheet	A record to track operators that are trained on the machine.	Page 1-15

About this Manual

This manual contains operation information and service and maintenance information.

It includes identification of machine assemblies, power-up and power-down steps, and information about using the user interface.

The Troubleshooting and Maintenance sections are directed toward qualified service technicians

TABLE 1- 2.

Title	Part Number
RKG-Series Operation and Service Manual	OPSRVDOC_RKG-Series

Safety First!

This machine is a powerful electro-mechanical motion control system. You should test your motion system for safety under all potential conditions. **Failure to do so can result in damage to equipment and/or serious injury to personnel.**

Safety Sheet Sign-Off Sheet

At the end of this chapter, there is a safety sign-off sheet. It lists personnel and machine safety criteria to understand before operating the machine. It is highly recommended that personnel operating, working on a machine meet the criteria listed in this sheet. It is recommended the sheet be signed and kept for records. See “Safety Sign-Off Sheet” on page 1-15.

Safety Terminology of Labels

In addition to the nameplate, KVAL machines may have other warning labels or decals that provide safety information to operators. Safety labels should be clearly visible to the operator and must be replaced if missing, damaged, or illegible.

There are three types of warning labels or decals:

- **DANGER** means if the danger is not avoided, it will cause death or serious injury.
- **WARNING** means if the warning is not heeded, it can cause death or serious injury.
- **CAUTION** means if the precaution is not taken, it may cause minor or moderate injury.

Safety Guidelines

In addition to the caution and warning labels affixed to this machine, follow the guidelines below to help ensure the safety of equipment and personnel.

Training

Ensure that all employees who operate this machine are aware of and adhere to all safety precautions posted on the machine and are trained to operate this machine in a safe manner.

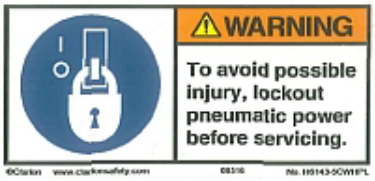
Protective Gear

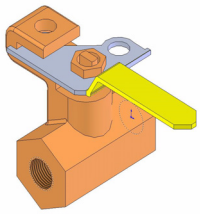
Never operate the machine without proper eye and ear protection.

When the Machine is ON

- **Never** reach hands beyond safety cage. Servo motors can unexpectedly move quickly.
- **Never** clear screws or hinges out of the machine while it is running.
- **Never** reach into the router area to retrieve a hinge. The router may still be running down after shut down.
- **Never** perform any maintenance unless machine is at zero state.
- **Never** clean the machine while it is running.
- **Never** walk away from the machine while it is running.

Compressed Air





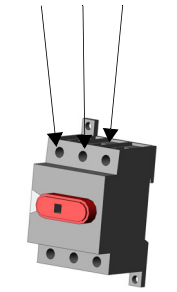
The compressed air system connected to this machine should have a three-way air valve for shut-off and pressure relief.

All cylinders on machine are under high pressure and can be very dangerous when activated. Before performing any maintenance or repairs on this machine turn off the main air disconnect. **Lockout and tagout this connection**.

See “Lockout Tagout Procedure” on page 1-8.

Electrical

Electrical circuitry on this machine is protected by an approved lockable disconnect circuit. In addition to this equipment, you must install an approved disconnect for the electrical power supplying this machine.



When opening the cabinet you must first turn off the disconnect switch. When the cabinet door is open there is **still power on the top side of the disconnect switch**. Some machines are powered by more than one supply located at different locations. Before performing any repairs or maintenance, lockout and tagout **must be installed at all locations**

All maintenance and repairs to electrical circuitry should only be performed by a qualified electrician.

Before Conducting Maintenance

Prior to performing any maintenance, repairs, cleaning or when clearing jammed debris, you must disconnect, tag out, or lock out the electrical and air pressure systems. This should be done in accordance with applicable state and/or federal code requirements.

Laser Warnings

On some machines, laser indicators are used to set boundaries. Follow the manufacturers safety precautions.

Class 2
Lasers that emit visible radiation in the wavelength range from 400 nm to 700 nm where eye protection is normally afforded by aversion responses, including the blink reflex. This reaction may be expected to provide adequate protection under reasonably foreseeable conditions of operation, including the use of optical instruments for intrabeam viewing.
Reference 60825-1 Amend. 2 © IEC:2001(E), section 8.2.

Compliance with Codes and Regulations

KVAL advises that you request an on-site state safety review of your installation of this machine. This is to ensure conformance to any additional specific safety and health regulations which apply in your geographic area.

Other Hazard Control Action

Report a Hazard
Before You Report an Accident

If you believe any part or operation of this machine is in violation of any health or safety regulation, **STOP** production. It is your responsibility to immediately protect your employees against any such hazard.

Additional detailed safety guidelines are included in the operating instructions of this manual. KVAL will be pleased to review with you any questions you may have regarding the safe operation of this machine

Follow Your Company's Safety Procedures

In addition to these safety guidelines. Your company should have on-site and machine specific safety procedures to follow.

Lockout-Tagout Guidelines

- Place a tag on all padlocks. On the tag, each operator must put their own name and date. **(These locks are only to be removed by the person who signs the tag)**
- If more than one person is working on the machine, each additional person places a lock and tag on each disconnect.
- Only each operator may remove their own lock and tag.

Important: When many people are all working on the same machine you will need a multiple lockout device, such as the one shown here.

Follow the P-R-O-P-E-R lockout rule of thumb.

P..... Process shutdown

R ..... Recognize energy type (electrical, pneumatic, mechanical, etc.)

O..... OFF! Shut off all power sources and isolating devices

P..... Place lock and tag

E..... ENERGY: Release stored energy to a zero-energy state

R ..... Recheck controls and test to ensure they are in the “OFF” state

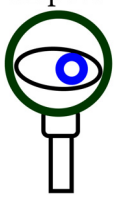
Lockout Tagout Procedure

This policy is required by OSHA regulation 1910.147 and Cal OSHA'S SB198 ruling of July 1991.

Use the following lockout procedure to secure this machine while it is powered down. During a lockout, you disconnect all power and shut off the air supply. Be sure to use the tagout guidelines noted below.

Pre-Steps Before Lockout Tagout

Inspect



1. Evaluate the equipment to fully understand all energy sources (multiple electrical supplies, air supply and pressure, spring tension, weight shifts, etc.).
2. Inform all affected personnel of the eminent shutdown, and the duration of the shutdown.
3. Obtain locks, keys, and tags from your employer's lockout center.

Lockout Tagout Power

Power

4. Turn off machine. See Chapter 2 for power down and power up procedures.
5. Turn the disconnect switches on **ALL** electrical and frequency panels to the OFF position. Then push the red tab to pop it out. Place a padlock through the hole. Place your tag on the padlock, as per the tagout guidelines below. (see illustration below).

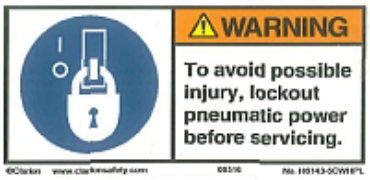
Turn Switch to the OFF position

Insert Lock into hole.

Lock and Tag out

Note: When multiple people are working on the machine, each person needs to have a lock on the handle in the extra holes provided.

Lockout Tagout Air Supply



6. Turn all air valves to the OFF position and place a padlock through the hole (see illustration below).
NOTE: Place your tag on the padlock, as per the tagout guidelines.

Start Maintenance

7. Once the locks and tags are in place and all personnel are clear, attempt to operate the machine to ensure equipment will not operate.

8. Maintenance or repairs may started.

Post Maintenance Steps

9. After maintenance is completed, the person performing the work must ensure all tools, spare parts, test equipment, etc., are completely removed and that all guards and safety devices are installed.

10. Before removing the locks and tags, the person who attached them shall inspect the equipment to ensure that the machine will not be put in an unsafe condition when re-energized.

11. The lock and tag can now be removed (only by the person(s) who placed them), and the machine can be re-energized.

12. The tags must be destroyed and the locks and keys returned to the lockout center.

Zero-Energy to Start-Up

Starting the equipment properly is just as important as the lockout/tagout guidelines in terms of safety.

Start-up Guidelines

The following guidelines below should be followed to start the equipment.

Inspect

The equipment must be inspected for proper adjustment before starting equipment.

Clean Up

All materials and debris must be cleaned up. Any combustible materials or old parts used during repairs must be cleaned up and/or properly disposed of.

Replace Guards

Replace all equipment guards. If part of equipment cannot be properly adjusted after start-up with guard on, contact the KVAL Service team. See “Getting Help from KVAL” on page 1-12.

Check Controls

Confirm that all switches are in the “OFF” position. Please be advised that some components of the machine may start automatically when energy is restored.

Remove Locks

Each operator must remove his or her own lock and tag. This will ensure that all operators are in a safe place when the equipment is started.

Perform Visual Checks

If the equipment is too large to see all around it, station personnel around the area and sound the personnel alarm before starting the equipment. If your operation is more complex, your company’s comprehensive safety procedure may involve additional steps. You will need to ask your supervisor about these procedures. The company’s lockout procedure should be posted at each machine. On larger or long-term maintenance or installation projects, the company’s procedures must be explained to all new operators and a copy of the company’s procedures should be posted on-site for the duration of the work.

The Company’s procedures should also include provisions for safely handling shift changes and changes in operators or new operators.Comprehensive lockout/tagout may use a gang box or other system to ensure that locks are secure and not removed without authorization.

Remember, lockout/tagout procedures work because you are the only one with the key to your lock. Proper lockout/tagout can save lives, limbs, and money. Help make your work environment safe for you and your fellow workers. Be sure to follow the P-R-O-P-E-R lockout/tagout procedures, and that those around you do also.

Close the Cage Gate

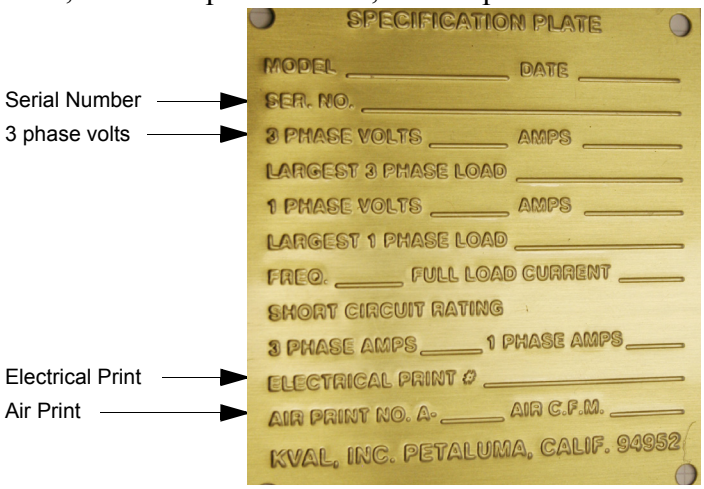
Verify all cage gates are securely closed. Ensure all safety protocols are in effect.

Getting Help from KVAL

Before you seek help, first try the troubleshooting procedures. Follow the procedures below.

If you are unable to resolve the problem:

1. Locate the machine's Specification Plate and record the serial number, 3 phase volts, electrical print number, and air print number.



2. Contact our customer support team:

- In the U.S and Canada, call (800) 553-5825 or fax (707) 762-0485
- Outside the U.S. and Canada, call (707) 762-7367 or fax (707) 762-0485
- Email address is service@kvalinc.com
- Hours:

  6:00 AM to 4:00 PM Pacific Standard Time, Monday through Thursday

  6:30 AM to 1:30 PM Pacific Standard Time, Friday

On-Line Help

On machines with a Beckhoff® PLC and an internet connection, our service team are able to connect, run, and troubleshoot your machine. Ask about this procedure when calling are service team

Product Return Procedure

If you've contacted Kval for help and it is determined that a return is necessary, use the procedure below to return the machine or part.

Note: Non-Warranty returns are subject to a 15% restocking charge.

1. Obtain the packing slip and/or invoice numbers of the defective unit, and secure a purchase order number to cover repair costs in the event the unit is determined to be out of warranty.
2. Reason for return: Before you return the unit, have someone from your organization with a technical understanding of the machine and its application include answers to the following questions:

- What is the extent of the failure/reason for return? What are the relevant error messages or error codes?
- How long did it operate?
- Did any other items fail at the same time?
- What was happening when the unit failed (e.g., installing the unit, cycling power, starting other equipment, etc.)?
- How was the product configured (in detail)?
- Which, if any, cables were modified and how?
- With what equipment is the unit interfaced?
- What was the application?
- What was the system environment (temperature, spacing, contaminants, etc.)?

3. Call Kval customer support for a Return Material Authorization (RMA). When you call:

- Have the packing slip or invoice numbers available.
- Have the documented reason for return available.

4. Send the merchandise back to Kval.

- Make sure the item(s) you are returning are securely packaged and well protected from shipping damage
- Include the packing slip or invoice numbers.
- Include the documented reason for return.
- Include the RMA number with the parts package.

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Safety Sign-Off Sheet

Machine Model Number:_____

A Note to the Operator

This machine can help you be highly productive only if you understand how to use it properly and follow the safe operating practices described in this document and the machine's manual. If you do not understand the machine's proper operation or ignore the safe operating practices, this machine can hurt or kill you. It's in your best interest to safely and properly operate this machine.

Personnel Safety Concerns:

- I have been properly trained in the operation of this machine.
- I will always wear ear protection when operating this machine.
- I will always wear eye protection when operating this machine.
- I will never wear loose clothing or gloves when operating this machine.
- I will watch out for other people. Make sure everyone is clear of this machine before operation.
- I will always follow my company's safety procedures. I have read and understand these guidelines.

Machine Safety Concerns:

- I have been given a tour of the machine and understand all the safety labels, E-Stops and the actions to take in case of an emergency.
- I will make sure all guards are in place before operation
- I will turn off the compressed air, before loading hardware (staples, screws, etc)
- I will turn off the electrical power, for setup
- If the machine should operate in an unexpected manner stop production I will immediately and notify a manager, a supervisor, or a qualified service technician.

I have read and understand this document and agree to operate this machine in a safe manner as described above.

Employee

Name (print):_____ Signature: _____ Date:____/____/____

Supervisor/Safety Officer/Trainer

Name (print):_____Signature: _____ Date:____/____/___

Note: It is recommended you make a copy of this sheet for new operators. If a copy is needed, you may download a PDF at the KVAL website (http://www.kvalinc.com). You may also contact our Service Department at (800) 553-5825 or email at service@kvalinc.com.

CHAPTER 2 Operation of the RKG-Series

This chapter describes components, assemblies, and the user interface of the *KVAL RKG-Series* . The content is geared to help operators understand the basic operation of the RKG-Series. Included are instructions to calibrate the machine and run a door.

Chapter 2 at a Glance

Section Name	Summary	Page
Operator's Tour	Descriptions of the operation of the parts and assemblies of the machine	Page 2-2
Powering Operations	Descriptions of power up, power down, homing, and emergency stops	Page 2-5
RKG-3 Entry Door Upright Conveyor	Description of the machine	Page 2-7
RKG-3A Entry Door Upright Conveyor	Description of the machine	Page 2-9
RKG-5 Tilt and Package Station	Description of the machine	Page 2-10

Operator's Tour

This section describes controls and Assemblies on the RKG series machines.

Foot Pedal and Control Box

Use the **Foot Pedal** to move the tables up or down. Press the desired foot switch to move the table to the desired position.

The RKG-Series has a Main Electrical Panel

Figure 2- 1 below, is an overview of the location of assemblies in the panel

Warning: High Voltage is present in this panel at the top of the Three Phase Input **even with the disconnect off**. If working on the panel, follow safety protocol as described in Chapter 1.

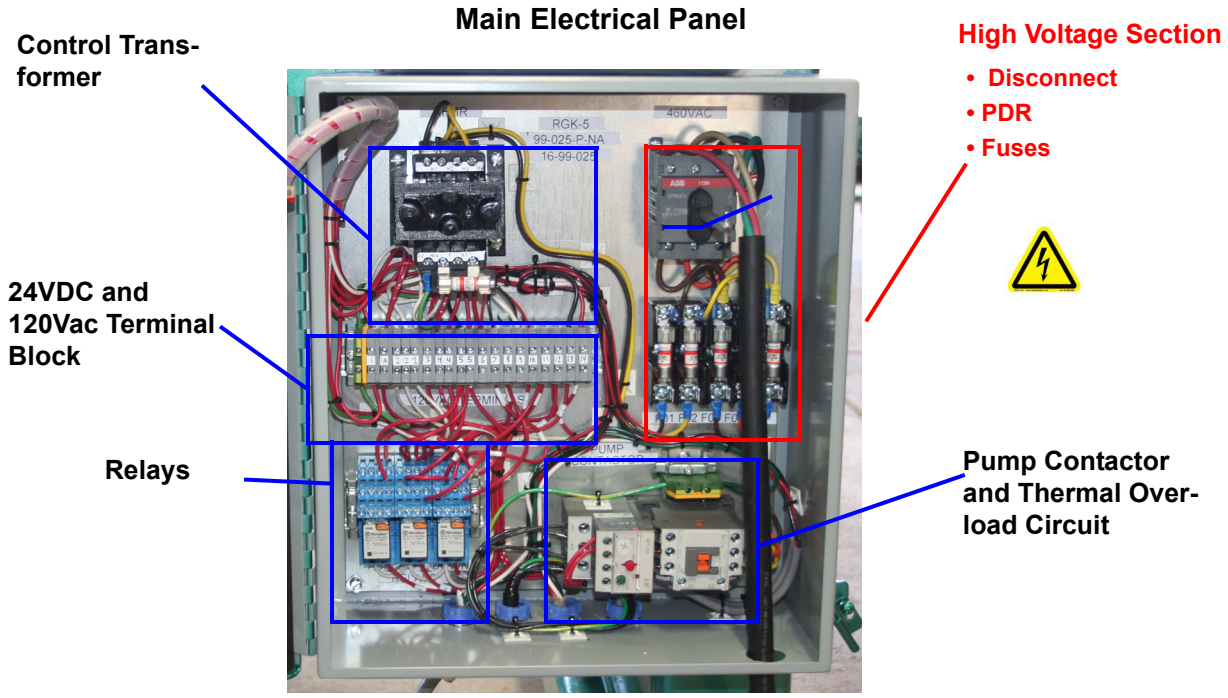


FIGURE2- 1. Overview of Main Electrical Panel and High Frequency Panel

Description of the Six Light Panel

The six lights on this panel indicate the status of the RKG-Series system.

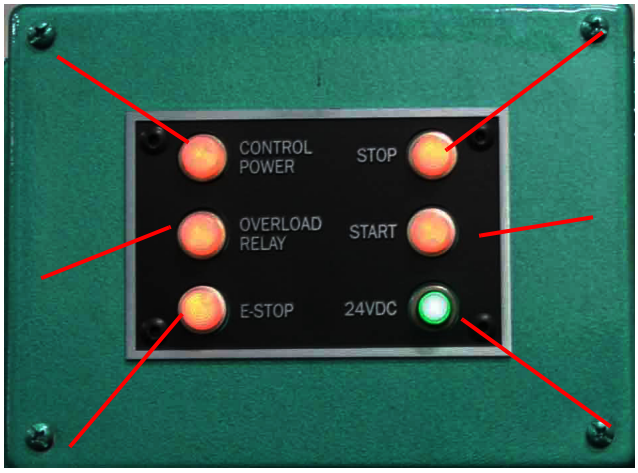
The Sequence that the lights activate is as follows:

1. Control Power
2. Overload Relay
3. E-Stop
4. Stop
5. Start
6. 24VDC

Control Power – light illuminates when the Control Transformer is pulled out and the power is working on secondary side-of transformer

Overload Relay – The overload circuit is working when light is on

E-Stop – The back gate is closed and Frame E-stop is not activated when this light is on.



Stop – This light will be on if Machine Stop button is deactivated.

Start – This light will be on once the Machine Start button is pressed and the ACR Relay is latched.

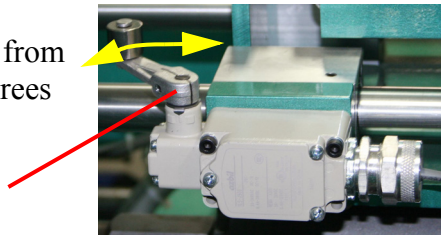
24VDC – light comes on once the ACR is latch and the 24VDC power Supply is working

About Limit Switches

Limit switches are mechanically tripped to identify the maximum and minimum limit of the lift.

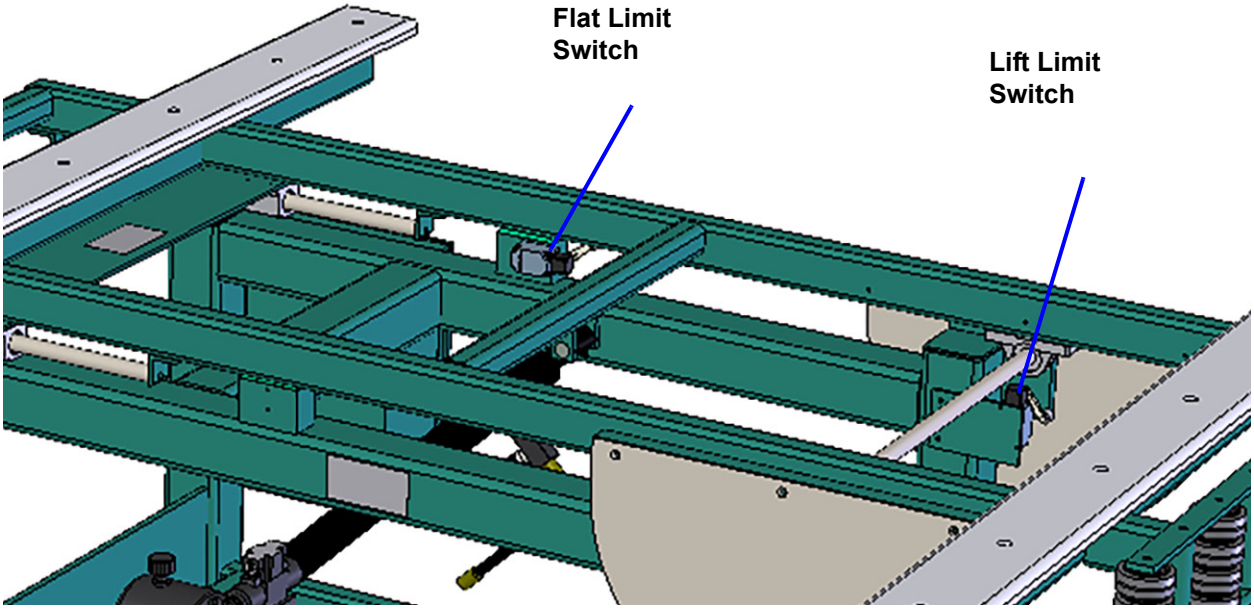
.
The L**imit Switch** is activated by an assembly moving a switch arm.

- .Depending on the model of limit switch, the amount of “pre-travel” (amount of movement from the arms resting position) is either 5 or 20 degrees before the limit switch actuates (Clicks).



Switch Locations

The RKG-3 and RKG-5 have Limit Switches for the Flat Location and Tilt locations. Below is an example of switch locations on the RKG-5.



Powering Operations

This section describes how to power up and to power down the RKG-3 and RKG-5.

Powering up the system includes:

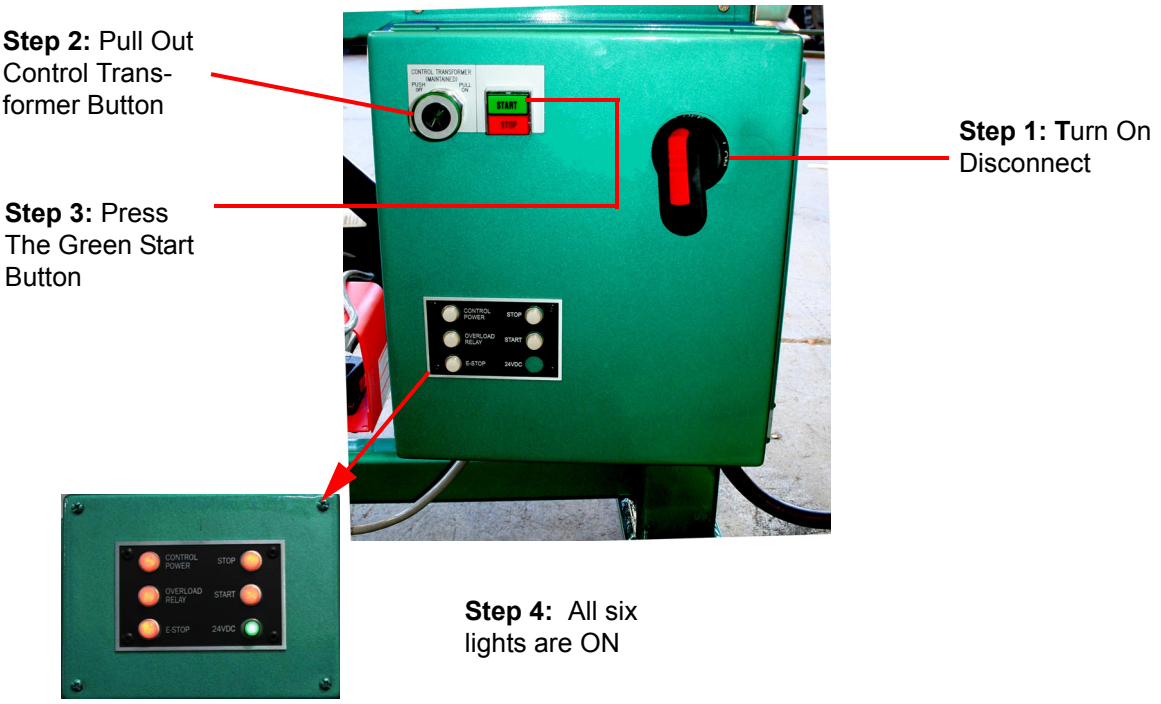
- Applying power to the entire system
- Starting the Control Circuit

Powering down the system includes:

- Shutting down the control power
- Removing power from the entire system

How to Power Up the Machine

1. Ensure factory air is applied to machine and main air supply is turned on.
2. Make sure the electrical disconnect the electrical cabinet is turned to the ON position.
3. Pull the green **CONTROL TRANSFORMER** button out to the ON position. It should light up.
4. Push the green **START MACHINE** button to initialize the machine.
5. The Six Lights will turn-on.



Step 4: All six lights are ON

How to Power Down the Machine

1. Push the **Stop** button, located on the Electrical Panel.
2. Push the green **CONTROL TRANSFORMER** switch to the OFF position.
3. KVAL also recommends that you turn the disconnect switch on the electrical cabinet to OFF; this helps reduce possible damage resulting from power surges from electrical storms.

RKG-3 Entry Door Upright Conveyor

The RKG-3 Entry Door Tilt Up Station is designed to raise assembled entry door units from a horizontal to a vertical position, for feeding into a RKG 4, RKG 3-A Upright Clamp Conveyor. This station is designed with non-marking polyurethane wheels to support the door on the top and bottom rails. The wheels are positioned so door light frames and raised moldings will not be damaged. There are also rolls on the sill support plate. These wheels enable one operator to safely and easily move the door unit to the next station. The tilt table utilizes a hydraulic tilt cylinder, electric pump, and foot switch for control.

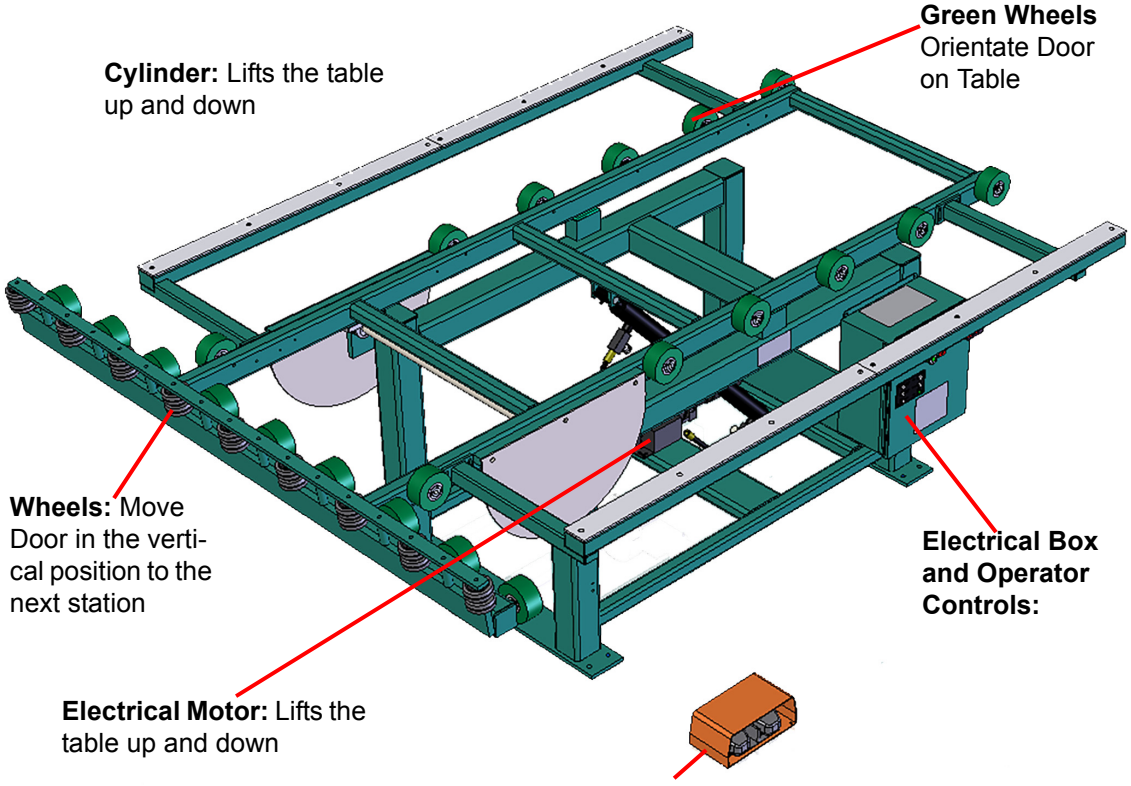
A three-phase electric supply, in addition to the air supply, must be provided for the RKG-3.

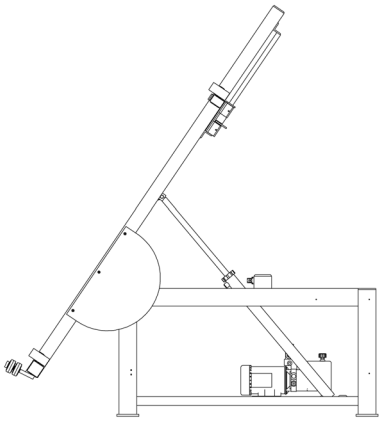
The standard machine will accommodate doors that are 6’8” high only, and doors that vary in width from 2’6” to 3’0”. With the optional 8’0” door capacity option, the machine can be set up to accommodate doors that vary in height from 6’8” to 8’0”. The RKG-3 will accommodate jamb widths up to 6-9/16”.

Available Options

For detailed information about available options, please contact our KVAL Sales and Service department.

Option	Title	Description
Option A:	8'0" Door Capacity	Allows door units up to 8'0" to be assembled and transferred.
Option B:	9'0" Door Width Option	Allows door units up to 9'0" to be assembled and transferred.
Option C:	Frame Extension	Allows for a 98”-wide door frame with double sidelights.
Option	Tooling and Lubricant	Please review with your KVAL consultant to determine your needs.



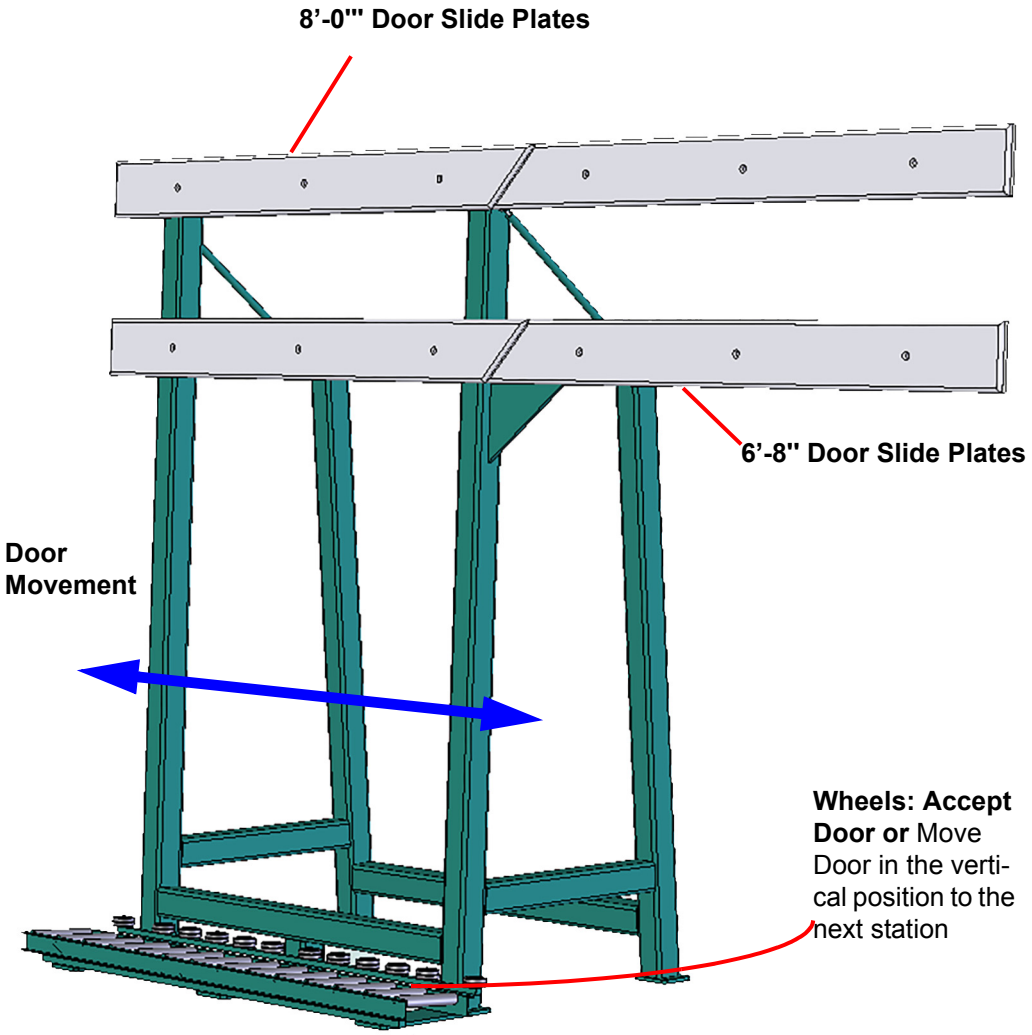


Example of a Lifted Table

RKG-3A Entry Door Upright Conveyor

The RKG-3A Entry Door Upright Conveyor is used to receive the door unit after it has been raised to a vertical position by the RKG-3 and to align the door unit with the RKG-4 or RKG-5 Entry Door Upright Clamp/Conveyor.

The RKG-3A may be used as a work station to install caulking in the sidelight frames and to set the sidelight panels into the frames. The RKG-3A will accommodate entry door units from 6'-8" high to 8'- 0" high.



RKG-5 Tilt and Package Station

The RKG-5 Tilt & Package Station is designed to receive entry door units in a vertical orientation from the RKG-4 or RKG-3A, and gently lower them to a horizontal position.

The RKG-5 is designed with non-marking slide plates on the top and bottom for the brick mold to slide on. The sill plate on the machine is equipped with ball bearing wheels. These wheels support the weight of the door unit so one operator can safely move the door unit onto this station. After the door unit is on the machine, the operator can easily tilt it to a horizontal position with the aid of a hydraulic cylinder.

In this position the operator can apply the inside stops to the sidelight panels and any necessary packaging to the inside of the door unit. The completed door unit can then be tilted back to vertical so it can be rolled off this station.

A three-phase electric supply, in addition to the air supply, must be provided for the RKG-5.

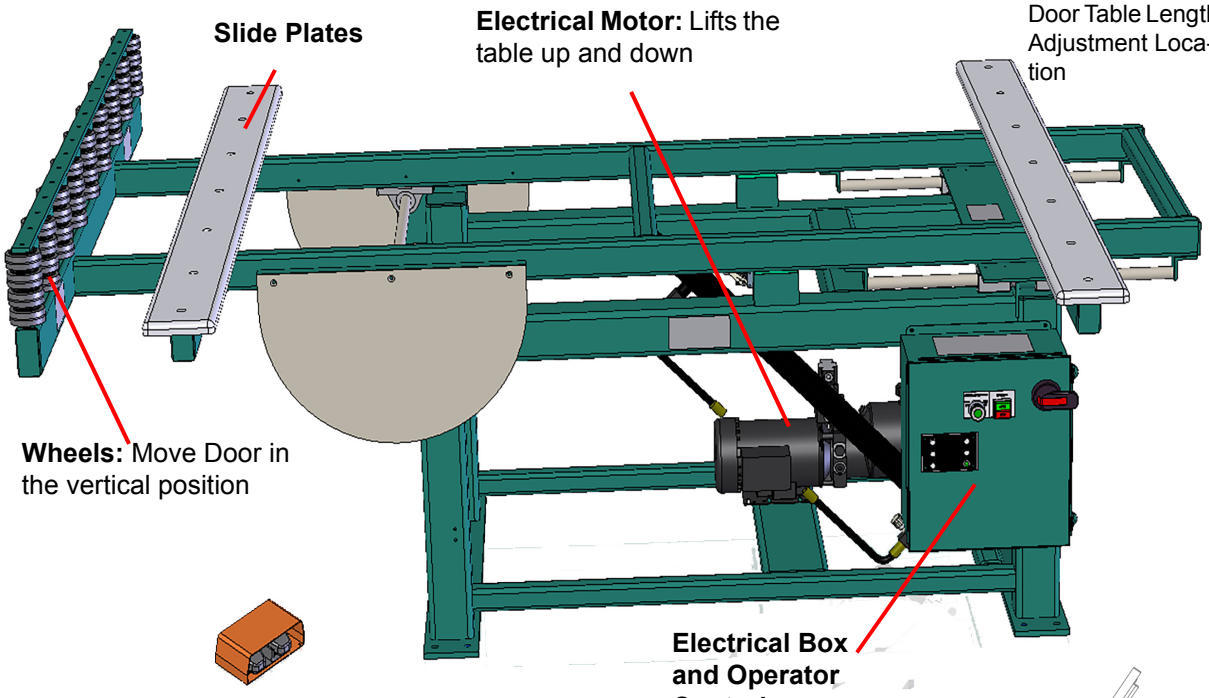
The standard RKG-5 will accommodate doors 6’8” high and doors that vary in width from 2’6” to 3’0”.

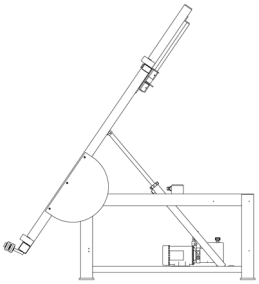
With the 8’0” door capacity option, this station can be set up to accommodate doors that vary in height from 6’8” to 8’0”. The RKG-5 will accommodate all jamb widths.

Available Options

For detailed information about available options, please contact our KVAL Sales and Service department.

Option	Title	Description
Option A	8'-0" Door Height Capacity	Allows door units up to 8'0" to be assembled and transferred.
Option B	Lifting Mechanism	To raise sill up to a maximum of 9-3/4" above floor when door unit is in the vertical position. For door units up to 6'0" wide. For door widths over 6'0" wide, please call for quote.
Option C	9'0" Door Width	Allows door units up to 9'0" width to be assembled and transferred.
Option D	Transom Access & Mounting Feature	Provides frame extensions to support transoms and attach them by practiced methods, then tilt up the assembled unit to a near vertical position. Size limitations apply for transoms; maximum width for nominal 6' entry and maximum height for 3' tall round or rectangular transom on a 6'8" door.
Option	Spare Parts Package	Please review with your KVAL consultant to determine your needs.
Option	Tooling and Lubricant	Please review with your KVAL consultant to determine your needs.

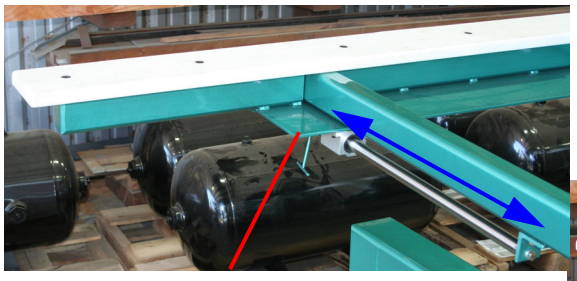




Example of a Lifted Table

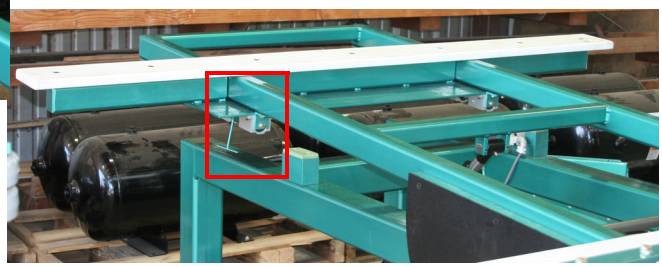
Adjust the Table from 8’-0" to 6'-8"

8’-0" Position



Loosen Handle and slide the End of the Table to the Stop

Re tighten the Handle



6’-8" Position

CHAPTER 3 Maintenance of the RKG Series

This chapter describes preventative maintenance steps for *KVAL RKG Series.* The content is geared to guide technicians to keep a regular maintenance schedule for your KVAL machine. Keeping your KVAL machine maintained is an important piece for successful operation of your door production process.

Chapter 3 at a Glance

Maintenance Schedule	This section describes the assemblies to schedule for maintenance. • Daily • Weekly 5 • Six Month Checkups	Page 3-2
Lubrication Requirements	This section describes the lubrication requirements for the machine, including types of lube to use. This section includes: **• Linear Bearings, Flange Bearing, and Pillow Blocks** **• Gear Motor Lubrication Requirements** **• Ball Screws** **• Description of Air Input System** **• Adjusting the Air Line Lubricator** **• Priming the Air Line Lubricator**	Page 3-4

Maintenance Schedule

KVAL recommends the following maintenance schedule to ensure that the machine operates properly.

Daily, Monthly, Six Month Maintenance

Daily Preventive Maintenance	
Op	**Operation Description**
Clean	Blow off dust from the entire machine.Wipe down the outside of the machine with a clean dry cloth.
Check	Check tooling for wear.
Clean	Wipe off the photo eyes with a clean dry cloth, and check to ensure that all fastening nuts are snug.
Check	Check the air pressure to make sure it is set at 80 psi to100 psi.
Clean	Empty any Dust Collection Units.
Check	Check for obstructed flow when excessive sawdust appears.
Check	Check the air filter water trap. Empty if full.

Weekly Preventive Maintenance	
Op	**Operation Description**
Check	Check the machine for smooth motion through a complete door cycle
Clean	Clean linear bearings and the chrome shaft with a clean dry cloth, then lubricate.
Check	Check all air lines & electrical wiring for kinks or rubbing.
LUBE	Refill lubricator with an ISO 32 standard hydraulic oil (KVAL part# SYSLUBG)

Six Month Preventive Maintenance	
Op	**Operation Description**
Clean	Wash filter and lubricator bowls with soapy water.
LUBE	Grease all bearings and tighten all bolts. Access to some grease fittings is difficult and will require a special needle point grease tip (supplied with your system).
Clean	Clean and lubricate all slides and cylinder rods with dry silicone spray.
Tighten	Tighten all bolts.
Back-up	Backup computer software.
LUBE	Lubricate linear bearings and chrome shafts with silicone.

Lubrication Schedule

KVAL recommends the following lubrication schedule to ensure that the machine operates properly.

TABLE 3- 3. Recommended Lubrication Schedule

Type of Assembly	Recommended Schedule	Recommended Lubrication Type
Linear Bearing	Every 250 Hours of Machine Operation	Dura-Lith Grease (KVAL P/N Lube EP-2)
Pillow Block Bearing		
Flange Block Bearing		
Ball Screw	Every 80 Hours of Machine Operation	
Air Line Lubricator	One drop of oil every 2 or 3 cycles Check the lines every week to two weeks	Either lubricant listed below is approved to use. • KVAL P/N SYSLUBG • Chevron AW Hydraulic Oil 32 • G-C lubricants light AW R&O • Mobile DTE 24 • Shell Tellus32 • Gulf Harmony 32
Gear Box	2000 Hours of Machine Operation or six months of operation	• AGMA #8 gear lube • MOBILUBE HD 80 W-90 • or equivalent

Lubrication Requirements

This section describes the parts of the machine that require periodic lubrication, and specifies the lubricants. In addition, it explains how to maintain the lubrication systems on the machine.

Linear Bearings, Flange Bearing, and Pillow Blocks

If the bearing is equipped with a grease fitting (Zerk Fitting), it should receive 1 Gram (one pump from grease gun) of Dura-Lith Grease (KVAL P/N Lube EP-2) every 250 hours of operation.

Note: Bearings without grease fittings have been pre-lubricated at the factory and do not require further lubrication.

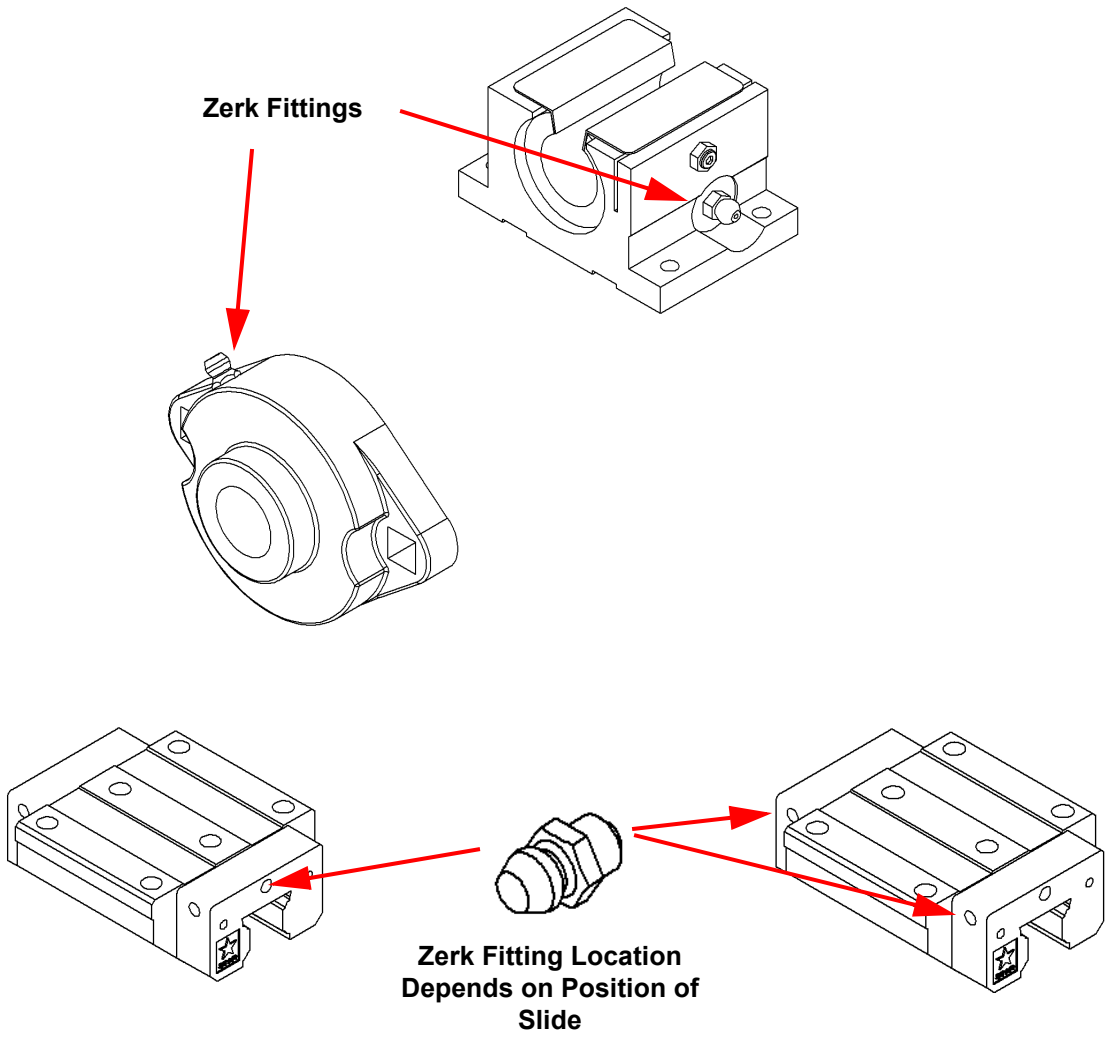


FIGURE3- 2. Zerk Fittings

Gear Motor Lubrication Requirements

Oil change is recommended after 2000 operation hours of operation. Use AGMA #8 gear lube or MOBILUBE HD 80 W-90 or equivalent.

Ball Screws (If Applicable)

All ball screws should be lubricated Dura-Lith Grease (KVAL P/N Lube EP-2) for every 80 hours of operation. At each lubrication grease should be pumped into the fitting until clean grease comes out around the ball screw.

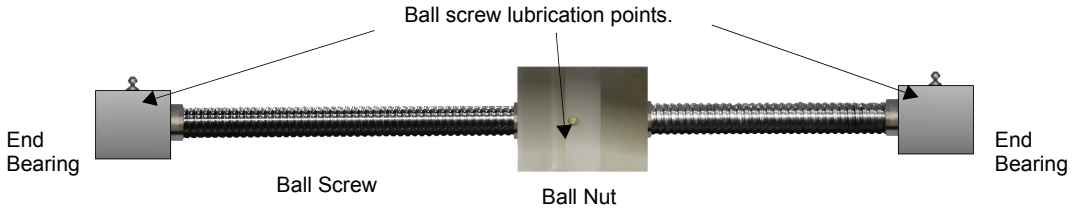


FIGURE3- 3. Example of a Typical Ball Screw

Important: Make sure to clean excess grease to avoid contact with feed belts, clamping areas, or the door.

Description of Air Input System

The air input system takes in shop air and supplies clean dry air (CDA) and lubricated air to the machine. The clean dry air is diverted to blow off nozzles. The lubricator, located after the CDA filters, delivers the lubricated air to valve banks and air cylinders.

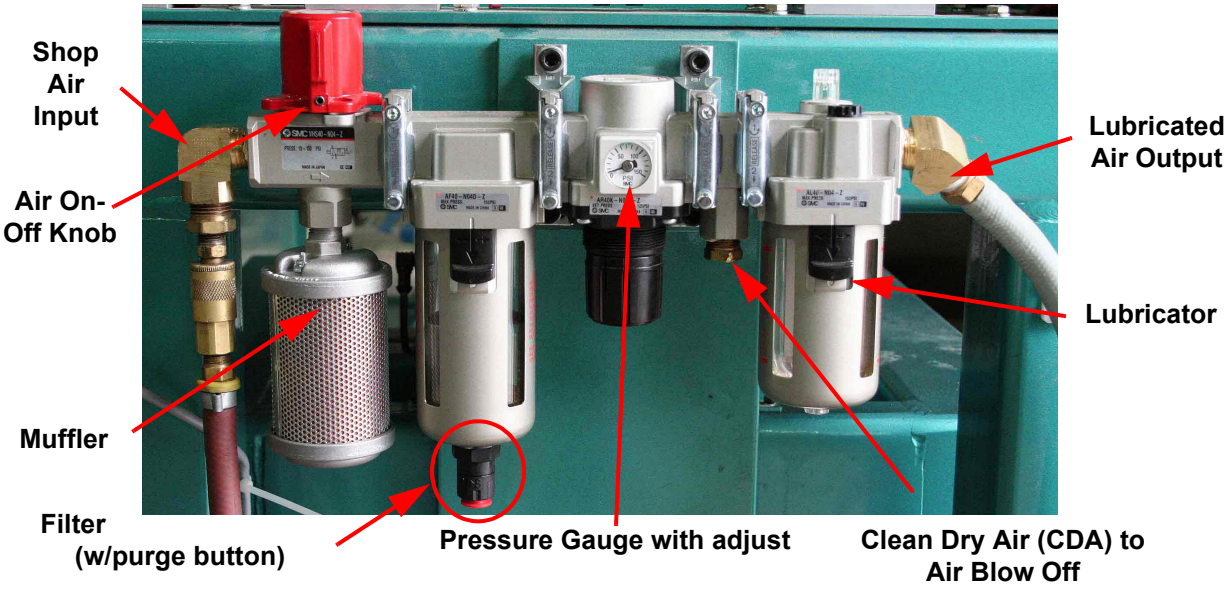


FIGURE3- 4. Typical Air Line Filter and Lubrication System

CHAPTER 4 Troubleshooting the RKG Series

This chapter describes troubleshooting steps to help technicians solve issues that may occur with your KVAL machine. If help is needed, call or contact our KVAL Service team at (800) 553-5825 or http://www.kvalinc.com.

Note: Refer to the Air and Electrical drawings provided with delivery of the machine. The drawings are normally located in the Electrical Panel. If copies are unavailable, contact the KVAL Service Department. Have drawings numbers, model number, and serial number of machine readily available.

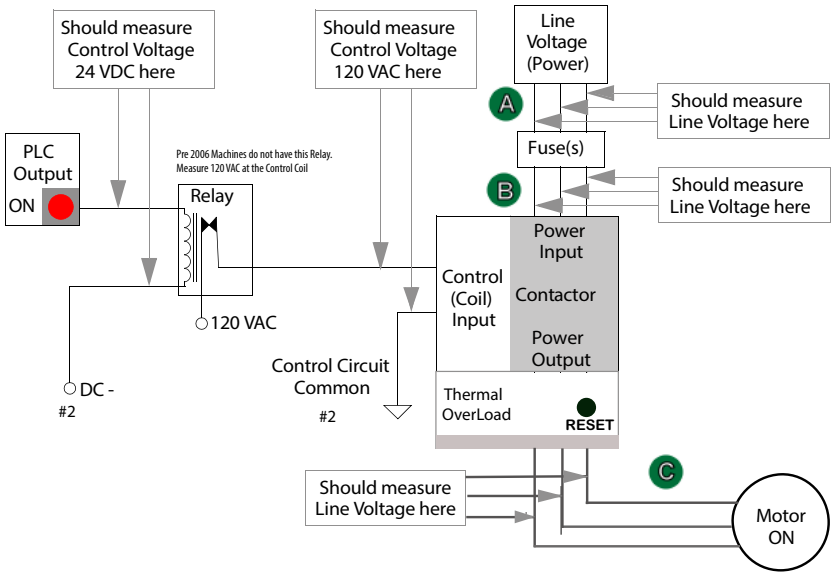
Chapter 4 at a Glance

Section Name	Summary	Page
About Contactor Control	Describes a typical contactor control circuit.	Page 4-2
Limit Switches	Troubleshooting Limit Switches	Page 4-4
Troubleshooting Electrical Problems	Includes voltages in the electrical panels, using the Status Light panel to troubleshoot	Page 4-5

About a Typical Contactor Control

Unlike general-purpose relays, contactors are designed to be directly connected to high-current load devices. Contactors are designed to control and suppress the arc produced when interrupting heavy motor currents.The figure below shows a block diagram of a typical contactor circuit with typical voltages.Thermal overload relays are commonly attached to the contactor. They offer protection for motors in the event of overload or phase failure. A Reset button is included to clear an error in the relay.

High Voltage may cause personnel **injury or death.** Troubleshooting checks *must* be performed by a Qualified Electrical Technician**.**



Note: Pre-2006 machines may not contain the 24 Volt relay. 120 Vac is directly fed into the Control Coil. Check the input circuitry to the Control Coil for 120 Vac.

Schematic Drawing of Contactor and Thermal Overload

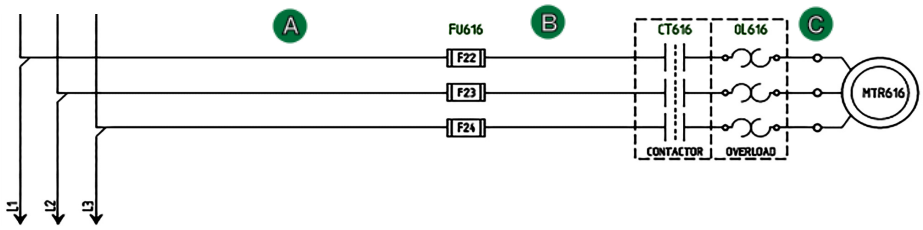


FIGURE 4- 5. Block Diagram of a Common Contactor Circuit

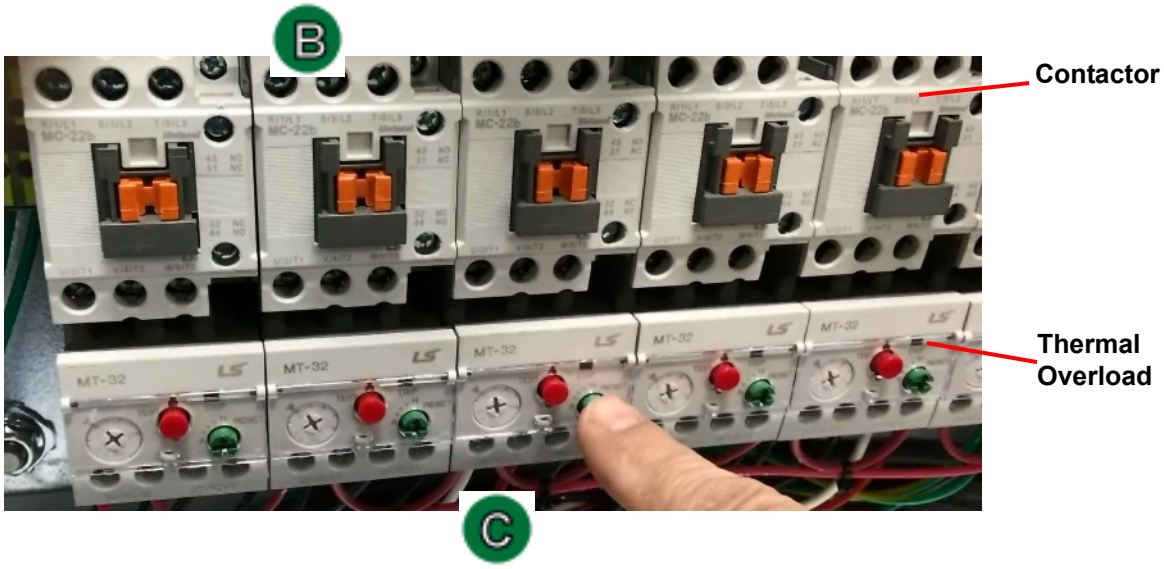


FIGURE 4- 6. Contactor Bank

About Contactor Troubleshooting

The Thermal Overload Circuit opens the motor circuit when current draw causes the motor to run too hot. The overload limits are set at the factory, do not adjust the limits.

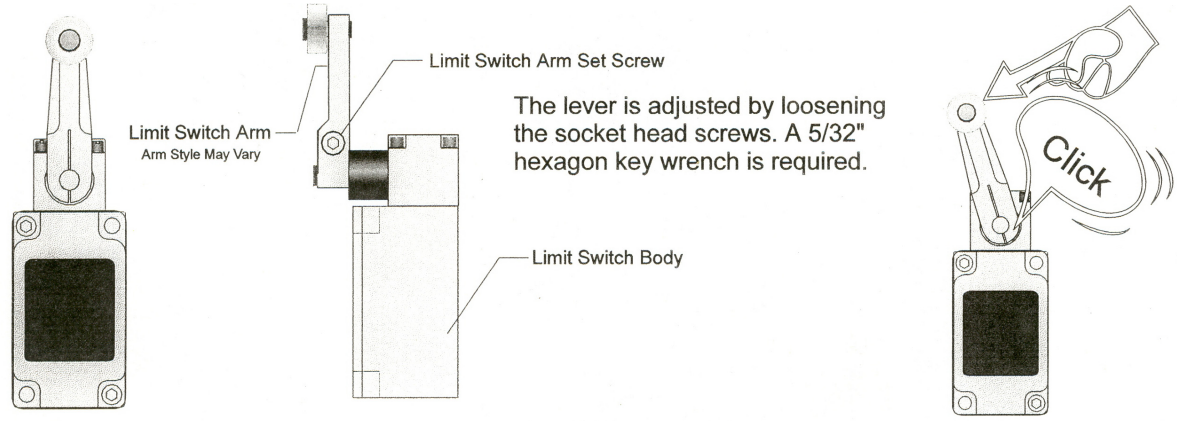
The overloads are normally in series, therefore if one trips, all on that circuit stop working.

Use the Six Light panel as a trigger to check the circuit. See “Troubleshooting with the Status Light Panel” on page 4-7 .

1. Open the Main Electrical Cabinet to find the Contactor /Thermal Overload Assembly
2. Press each ‘Green” Reset button on the Thermal Overload. An audible click will be heard on the tripped circuit. (Take note of tripped circuit.)
3. Once the overloads are reset, verify LED’s are on.
4. Rerun the machine and verify that motor runs without tripping the circuit.
5. If the same overload keeps tripping, verify condition.
6. Follow circuit path using the E-Drawing as a reference.
    a. Common issues: Check for bad wire, bad motor, or if load is too great for current draw.

Limit Switches

If a machine suddenly stops in mid cycle check the limit switches, a worn limit switch arm or a misadjusted limit switch is more than likely the cause. Depending on the model of limit switch you receive the amount of "pre-travel" (amount of movement from the arms resting position) is either 5 or 20 degrees before the limit switch actuates (Clicks). If the arm is moved to the full extents of its travel and you do not here the limit switch "Click", the switch needs to be adjusted here is how you adjust it follow the following drawings.



Troubleshooting Electrical Problems

NOTE: Refer to Air and Electrical Schematics provided with delivery of the machine. Schematics are located in the Electrical Panel. If copies are unavailable, contact the KVAL Service Department. Have model number and serial number of machine readily available.

Warning The following checks require the electrical panel to be energized. These troubleshooting checks *must* be performed by a **Qualified Electrical Technician.**

The electrical component systems are designed to expedite the troubleshooting process and minimize "down time". In general, component systems have the input or feed functions at the top. Output or load functions are positioned at the bottom. Most two-voltage electrical panels are designed with the LOW VOLTAGES on the LEFT, and the HIGH VOLTAGES on the RIGHT. The majority of the system components are labeled with numbers that correspond with the electrical prints included in the electrical box door.

Computer controlled machines have signals on the computer that light up when the input or output functions are energized, respectively. Computer controlled as well as non-computer controlled machines have white 120V control power terminal strips. This will indicate power supply from the respective circuits.

PLC controllers also have lights on them for the input and output functions. You can easily find out which circuits are failing by watching the lights turn on or off. Compare the lights on the IDEC or Beckhoff controllers to the electrical print to determine what systems are being affected.

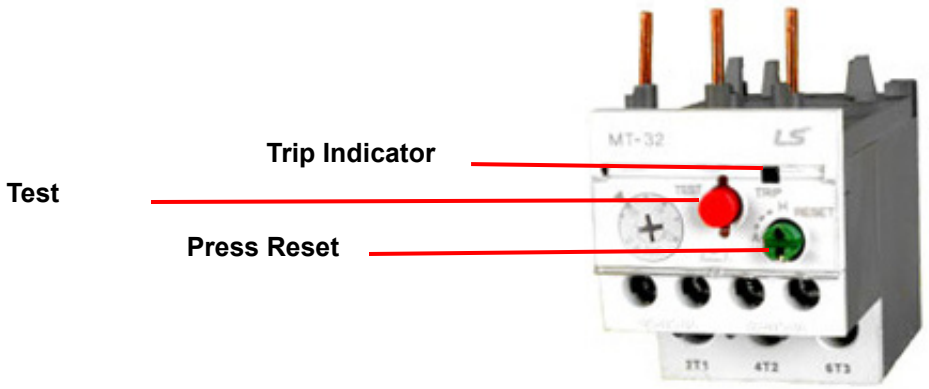
If the Power Stops During Normal Operation

1. Check that the input power disconnect switch is not turned off.
2. Check that all of the emergency stop buttons are in the normal position.
3. Check the Six Lights on the Electrical Panel. See "Troubleshooting with the Status Light Panel" on page 4-7.

Lockout and Tagout the main power source.

1. Turn the panel disconnect switch in the off position, open the electrical panel door.
2. Observe the disconnect switches. Look for loose or broken wires at the disconnect then at all of the components.
3. Check for continuity of all fuses with an OHM meter. (Fuses need to be removed from the bottom side of the fuse holder before measuring the fuses)

4. With the power off, check for motor overloads by pressing each reset button (usually at the bottom of the panel) in SEQUENCE. If one is tripped there will be a slight resistance to touch and a “click” sound as it is reset.



Thermal Overload Relay

Check for Tripped Circuits

1. Remove lock and tag outs on the main power sources.
2. Manually close disconnect sensors and energize the control circuit or transformer with its respective sensor. Check the Status Light Panel,. If all lights are observed, there are no overloads or emergency stops tripped.

Note: Most electrical problems are related to mechanical malfunction (e.g., stuck motors, jammed chain, blocked photo sensors etc.)

Note: If a solenoid valve is suspected, and not cleared in the air checks section , it can be electrically jumped to check operation.

Troubleshooting with the Status Light Panel

The Status Light Panel is located on the Electrical Panel. All six lights are illuminated when the system is in proper working order. The lights turn on in a sequence and will stop at the point where a fault is first detected.

The sequence that the lights turn on are as follows:

1. Control Power (Amber)
2. Overload Relay (Amber)
3. E-Stop (Amber)
4. Stop (Amber)
5. Start (Amber)
6. 24VDC (Green)

If one or more lights are OFF, follow the process below to isolate the cause.

NOTE: Be sure to proceed down the table, starting with the CONTROL POWER light.

STEP 1:Control Power (Amber). If light is OFF go to item **A** on Page 4-8.

STEP 2:Overload Relay (Amber) If light is OFF go to item **B** on Page 4-9.

STEP 3:E-Stop (Amber) If light is OFF go to item **C** on Page 4-9.

STEP 4: Stop (Amber) If light is OFF go to item **D** on Page 4-9.

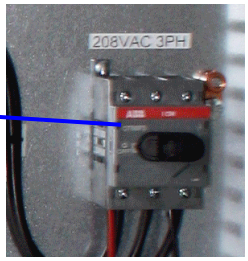
STEP 5: Start (Amber) If light is OFF go to item **E** on Page 4-10.

STEP 6: 24VDC (Green light is OFF go to item **F** on Page 4-10.

A Control Power Light OFF

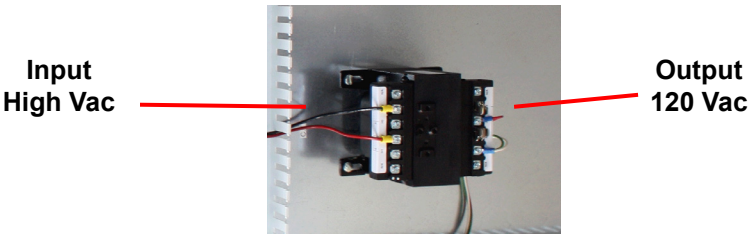
1. Check if the Control Transformer button is pulled out.

2. Is the Disconnect Switch on the main electrical cabinet set to ON?



3. Is there 208, 220, 440, or 575 VAC to the top side (input) of the Control Transformer? If not, check the fuses at the Fuse Block, and the contacts on the Control Transformer button on the switch panel.

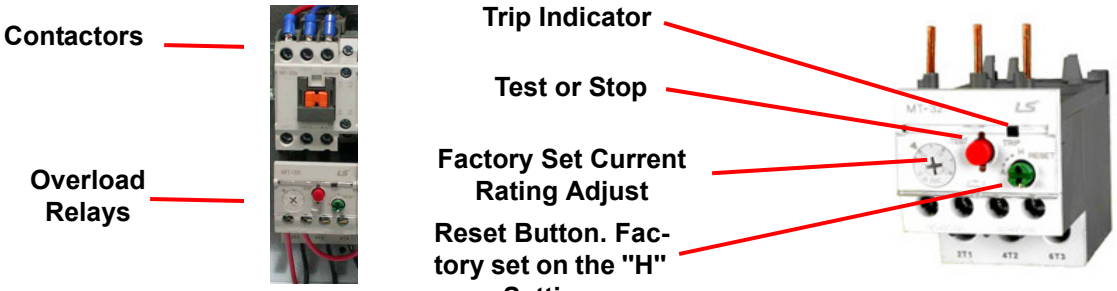
Typical Control Transformer



4. Is there 120 VAC between #1 & #2 on the 120 VAC Terminal Strip? If not, check the fuse on the output side of the Control Transformer. If fuse is good, check power coming out of Control Transformer.
5. If no power on the output side, and there is power going into the top of the Control Transformer, replace the Control Transformer.
6. If there is power at the Control Transformer, check the wiring of the black and white wire going from the Control Transformer to the 120 VAC Terminal Strip.
7. If there is no power between #1 and #2, check the secondary side of the transformer.
   a. Check between X1 and X2. If no power is measured it is a bad transformer.
   b. If there is power at X1 and X2, check the other side of the fuse. If now power, replace the fuse.

B Overload Relay Light OFF

1. Check Motor Overload Circuits
2. With power on, check the trip indicator LED on the overload. If indicator is orange, press the Reset Button to reset the overload circuit. Retest the Machine.



C E-Stop Light OFF

Check if any E-Stop buttons are pulled out.

NOTE: Location and quantity of E-Stop buttons varies depending on customer need. Typical locations for E-Stop buttons are near the Rear Access Gate and near the Tool Changer Access Gate

D Stop Light OFF

Check for 120 VAC between #2 and #4 If there is voltage, press the Start button. If no voltage, check the Stop button to make sure it is all the way out and not stuck in, then check the contact to make sure it is closed. If still no voltage, check the wiring.

Start Light OFF

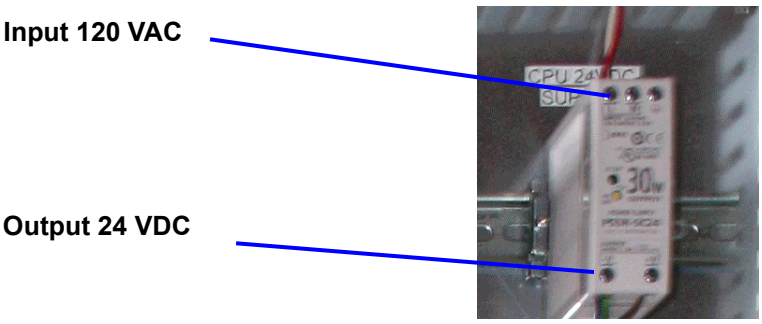
If the Start light remains unlit, push in the Start button and hold it in while a second person checks for voltage between #2 and #5. If there is 120 VAC, replace the ACR relay. If there is no voltage while the button is held in, check the wiring or the contact on the **Start** button.

24VDC Light OFF

First isolate the power supply. Check between DC+ and DC- for 24VDC. If no DC voltage, disconnect the output (V+) wire from the 24VDC power supply and check for DC voltage where those wires were disconnected.

If no voltage:

Check the input side for 120 VAC. If no 120 VAC, check the fuse. If there is 120 VAC and no 24VDC, replace the 24VDC Power Supply.



If there is 24VDC:

Reconnect the (V+) wire to the 24VDC power supply.

Trace the output wire to the DC terminal block.

Disconnect all (+ 24V positive) wires from the + DC from the DC terminal block except the + output wire from the + 24VDC power supply.

Check for +24VDC at between any –DC and +DC terminal on the DC Terminal block.

Reinstall the (+ 24V positive) wires one by one, checking for +24VDC after installing each. If at any point no voltage is found trace the last reinstalled wire and check for shorts.

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Notes:

http://www.kvalinc.com

Contacting KVAL

Phone and Fax:

In the U.S and Canada, call (800) 553-5825 or fax (707) 762-0485

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