Technician Training - ELVS

Name: _____

Date: _____

Basic machine setup

Power

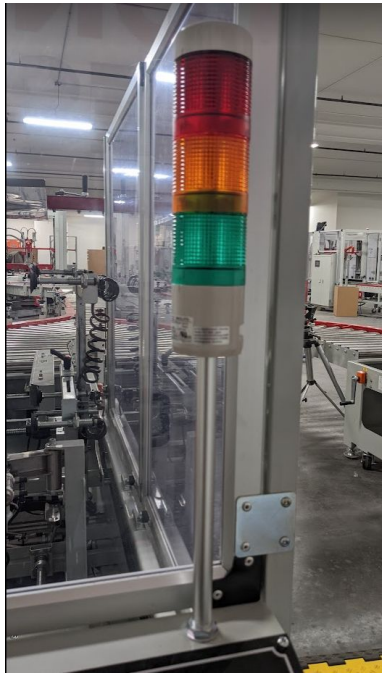
1. Standard machine - 110V 3 prong plug
2. 220V Single phase with 3 leads (R, S, E)
3. 208V 3PH - cable with 4 leads (R, S, T, E)
4. 480V 3PH - cable with 4 leads (R, S, T, E)

Compressed Air

1. Must supply dry air
2. 100 PSI, 10+ SCFM
3. Air hose ID must be at least 1/2”
4. Inlet air fitting is ⅜ male quick-disconnect plug

Machine Status Indicator

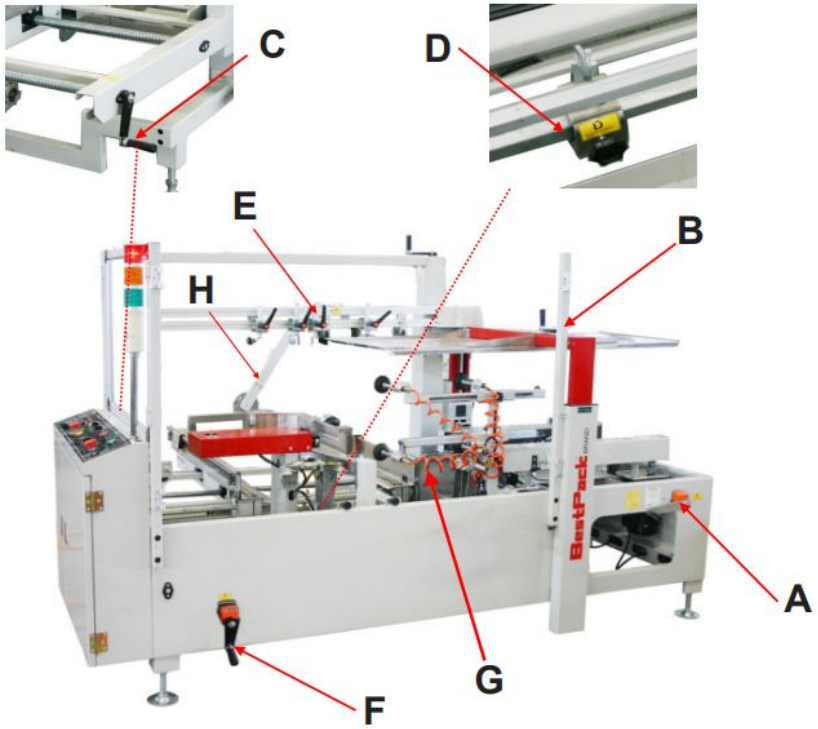
1. Blinking Green - Ready to Operate
2. Steady Green - Machine operating
3. Blinking Yellow - Low on tape/carton
    a. It does not stop the machine from operating
4. Blinking Red w/ Buzzer - Machine Faulted
    a. See PLC screen for machine fault messages
5. Green, yellow, red blinking in sequence - Maintenance mode



Setup -
Box Changeover

Follow the alphabetical order to go through the labels on different areas of the machine

A. Sealing area side drive width
B. Sealing area height (*check suction cups location G before adjusting)
C. Hopper width (*check Stopper for bottom slot D before adjusting)
D. Stopper for bottom slot
E. Stopper for top slot (*alongside with all adjustments next to it)
F. Forming arm location
G. Suction cups location
H. Hopper push arm

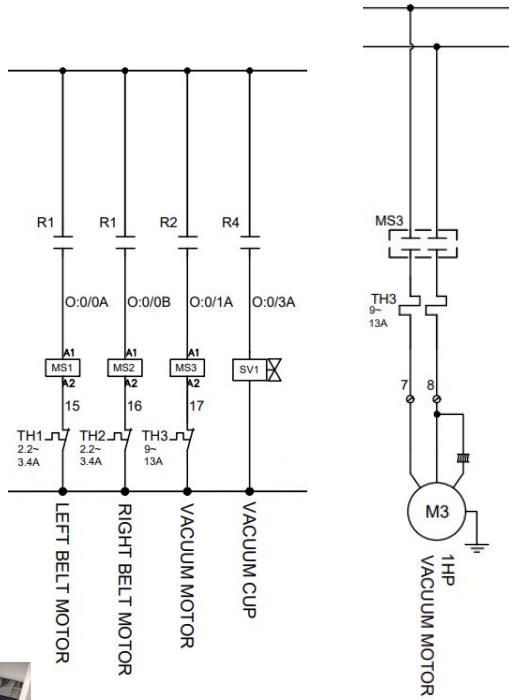


Setup - Manual mode
Verifying adjustment

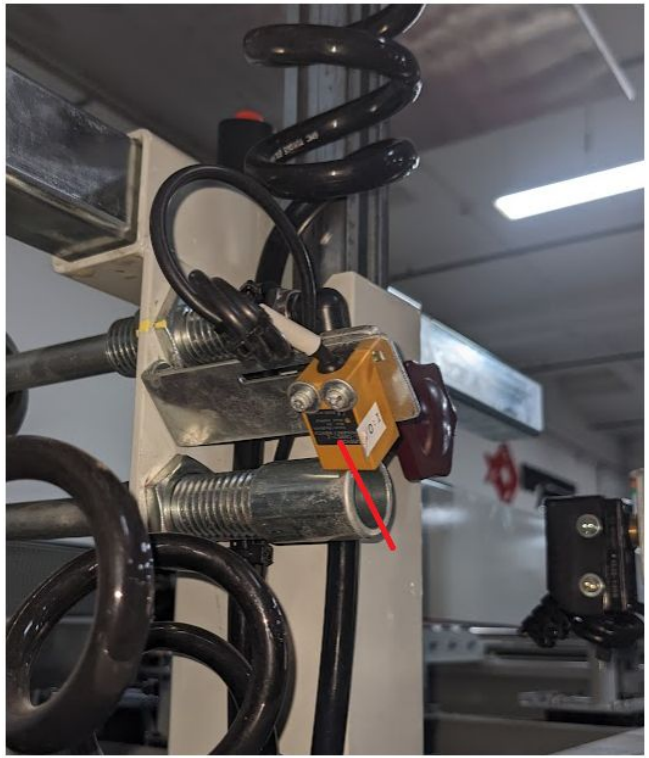
1. Switch to manual model
2. Press Start
3. Press jog one at a time to go through each step
    a. Press jog - Pick-up arm reaches out to the carton at the hopper
    b. Check if suction cups land on any scoreline or slots
    c. Press jog - Retract and open the carton to form 90 degree (adjust the handle F if needed)
    d. Press jog - Close front and minor flaps at the same time
    e. Press jog - Close major flaps
    f. Carton released from the suction cups
    g. Check if carton is center between side drive from the exit
    h. Press jog - Carton is pushed to the sealing area
    i. Press jog - Push arm and major flap folder retract
4. Switch to Auto

Setup/Troubleshoot - Manual mode
No Suction

1. Vacuum motor is not running
   a. Check Relay 2
   b. Check Motor starter 3
   c. Check thermal relay 3
2. Vacuum motor is running but no/low suction
   a. Check Relay 4
   b. Check Solenoid 1 - this is near the bottom of the sealing area
   c. Check intake air filter - too much carton dust collected
3. Vacuum pump is making a lot of noise
   a. Check oil level
   b. Check exhaust filter inside the pump



Setup/Troubleshoot - Manual mode
Pickup failure



1. Suction leaks through the scoreline
    a. Solution: relocate suctions cups
2. Proximity switch is not at the correct position
    a. Solution:
        i. Engage the limit switch by the safety gate hinge to make sure power is not cut off during this adjustment process
        ii. Move the proximity switch towards the spring loaded shaft
        iii. It should be at a location that as long as you push the spring loaded shaft slightly, the prox switch activates (red LED light)
        iv. Should not light up constantly
3. Wire of the proximity switch/proximity switch is damaged
    a. Solution:
        i. If you try the steps above and the prox switch is still not activating, check for visible damage and replace the damaged part if needed

Setup/Troubleshoot - Manual mode
Push arm is crushing the box towards the sealing area

1. Carton is not formed in the center of the side drives
    a. Solution:
        i. Use manual mode to jog through each step until carton is folded and suction cups release
        ii. Go to the exit and inspect which direction the carton needs to be adjusted to
        iii. Loosen the two screws holding the bracket that the pick-up arm home sensor is mounted on
        iv. Move the bracket slightly towards the direction to the same direction you would want the carton to move towards
        v. Repeat step i until carton is centered within the side drives

Troubleshoot - Manual/Auto mode
Machine pausing after folding

***Machine intentional pauses when the downstream conveyor is full.**

If downstream photo eye is not connected, the machine will make boxes until they run out.

***Sensitivity adjustment range from Min to Max (ONLY about 3 quarters of a complete rotation)**

1. Downstream photo eye is blocked
   a. Solution: check photo eye alignment and sensitivity to make sure it's not activated at all time
2. Sealing area entry photo eye alignment or sensitivity is off
   a. Solution:
      i. secure the photo eye bracket and make sure it only activates when a box is present
      ii. Photo eye should set at Light mode. Photo eye sensitivity can be adjusted by using a small flat head screwdriver. When nothing is present in front of the photo eye, you should see a green indicator light. As you place your hand in front of it and aligned with the belt, you should see both green and orange light are on. Adjust sensitivity until the behavior matches as describe

Troubleshoot - Manual/Auto mode
Carton is stuck in the sealing area before the tape head

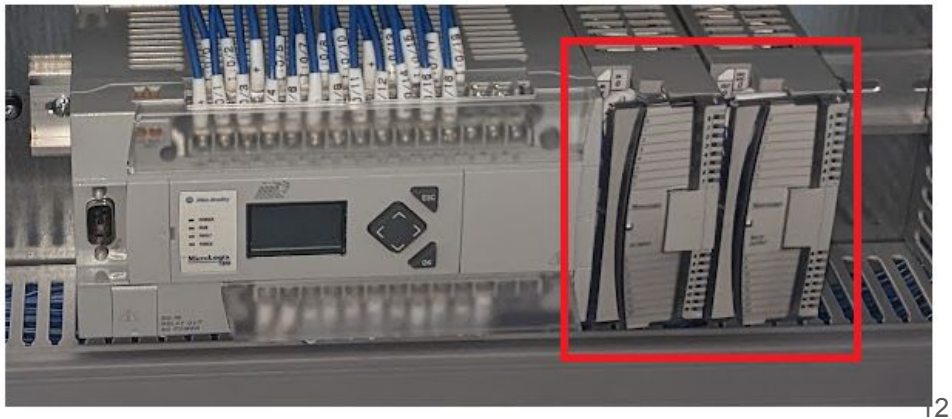
1. Side drives are too loose
    a. Use handle A to narrow the side drive to provide more grip onto the carton
    b. Belts are worn out/degraded
        i. Replace the belts
2. Tape head is not set right
    a. Make sure the tape head is sat correctly in the machine cavity
    b. The bottom of the side plates should not exceed the top of the bed rollers
    c. Mandrel tension was set too tight, loosen the mandrel until tape can dispense smoothly
    d. Ensure tape is threaded correctly.

Troubleshoot -
Machine will not start after start is pressed

1. Pressure is too low
    a. Solution:
        i. look into the air cabinet
        ii. Check pressure gauge at the main air regulator
        iii. Red LED on = air supply is lower than set pressure
        iv. Green needle indicate the set pressure, you can manually adjust it by remove the cover gauge (usually set at 0.3 or 0.25 Mpa)
        v. Check air compressor setting and increase pressure
2. Cylinder is not at home position
    a. Solution:
        i. Reference page 14 to identify misaligned reed switch
        ii. Adjust the location of the reed switch until red light is on
3. Pick-up arm is not at home position
    a. Solution: use the suction cup control knob to manually move the pick-up arm close to home position

Troubleshoot -
Utilize PLC Input and output indicators

1. I:1/__ and O:2/__ can be seen from the input and output module outside of the PLC.
2. I:0/__ and O:0/__ can be seen from the PLC screen
3. I/O status navigation
    a. Hold ESC
    b. Go to I/O status, press OK



Troubleshoot - Utilizing Maintenance Mode
Setting Up Maintenance mode

1. Switch from Auto to Manual
2. Press and hold RESET, PAUSE and JOG at the same time for 3 seconds
3. Each cylinder will be extended and retracted in sequence.
4. This process will allow you to adjust cylinder flow control valve, air cushion, and reed switches location.
5. Press E-stop to end the Maintenance mode at any time

Troubleshoot - Utilizing Maintenance Mode
Machine pausing at different stage of forming/ time out

1. Home position check
    a. I:0/18 - 90 degree Forming
    b. I:1/2 - Rear Minor
    c. I:1/0 - Front Minor
    d. I:1/4 - Major
    e. I:1/6 - Push arm
    f. I:0/16 - Pick-up arm
2. Extended position check
    a. I:0/17 - 90 degree Forming
    b. I:1/1 - Rear Minor
    c. I:0/19- Front Minor
    d. I:1/3 - Major
    e. I:1/5 - Push arm
    f. I:0/14 - Pick-up arm

Troubleshooting - Utilizing Maintenance Mode
Machine pausing at different stage of forming/ time out

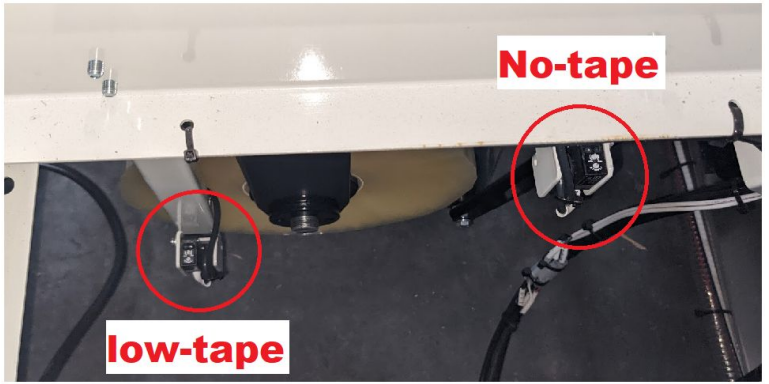
1. Reed switches are not at the correct position
    a. Two reed switches on almost each cylinder
    b. Home position & extended position
    c. Reed switches are to let program know the actual status of the cylinder
    d. Reed switch should light up at the end of each stroke on each cylinder
    e. Machine will not start if some of the reed switches at home position are not activated.
    f. Machine will pause and timeout when the reed switches at extended position are not activated.

Troubleshoot - Utilizing Maintenance Mode
Pickup arm is hitting the safety gate

1. Pressure is not set correctly
    a. Solution:
        i. Start with main air regulator: 0.3MPa
        ii. 25 psi for the regulator towards the top
        iii. Use maintenance mode to fine tune pickup arm
        iv. Adjust pressure accordingly and pickup arm should be traveling the full length from home sensor position to hopper
2. Pickup arm would not activate
    a. Use the suction cups knob to manually move the pick-up arm towards the hopper
    b. Press reset and start

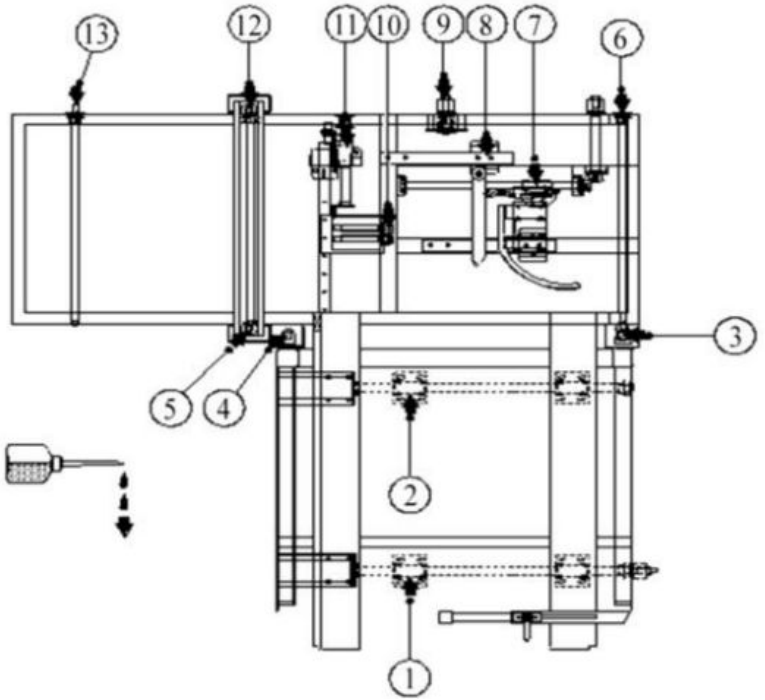
Troubleshoot - Tape Faults

1. Tape monitoring provide feedback on 3 aspects
    a. No Tape - No Tape is applying
    b. No Cut - Tape did not get cut after a box leaves
    c. Low Tape - Tape is running low
2. No-tape faults triggered but tape was applying
    a. Solution:
        i. make sure no-tape sensor are looking at the encoder, no-tape sensor indicator should be blinking (steady green & blinking orange) as you manually dispense tape from the tape head
        ii. Check the sensitivity of the sensor
        iii. Check for wire connection make sure sensor has power
3. Tape is not applying
    a. Please check if tape is threading correctly
    b. Is the tape erector plate holding up the tape?
4. How to turn off tape monitoring from the PLC
    a. Hold ESC
    b. Go to Monitoring, press OK
    c. Change the File Num? to 013 by pressing the up or down arrow.
    d. Make sure Data Type: N and press OK.
    e. Make sure the screen shows N13:4
    f. The second line should be =+00000 and press OK
    g. Press ESC until you see I/O Status again
    h. Go to User display, press OK



Preventive Maintenance -

1. Daily / Weekly
   a. 2-minute Maintenance
2. Monthly
   a. Check all chains and shafts
   b. If needed apply grease to chains and shaft
   c. Inspect Wires and components
   d. Check Vacuum pump oil / filter
3. Semi-Annually
   a. Apply grease to chains and shaft
   b. Check the Frame
4. Annually
   a. Remove grease with degreaser and reapply
5. Recommend:
   a. Grease: LUCAS Heavy Duty Grease
   b. Lubrication Oil : 3 in 1 Silicone Oil or Motor oil
   c. Cleaner & Degreaser: WD-40
   d. Vacuum Pump Oil: Mobil Vacuum Pump Oil 20 SAE



Preventive Maintenance - 2-minute Maintenance

Recommended: 3 in 1 silicone oil or motor oil.

STEP 1:

Clean The Machine

Blow the machine with dry air, paying special attention to all moving parts.

STEP 2:

Water Reservoir

Bleed off any moisture that has gathered in the main regulator, by pushing the button located at the bottom of glass reservoir.

STEP 3:

Clean & Oil Blade

A) Remove any glue and plastic film that may have adhered to the cutting blades. Wipe the blades with a clean rag.

Note: For stubborn glue accumulation, apply WD-40 to a clean rag and wipe the blades.

Do **NOT** use any hard objects to scrape accumulation from the blade as it could damage the blade.

Caution: Blades are very sharp and should be handled with care.

B) Lubricate the blade, by applying oil to the blade guard. This keeps the adhesive from sticking to the blade.

STEP 4:

Adjust Tension Knob

Check the tension knob on the mandrel to ensure the tape is feeding correctly through rollers.

A) Make sure tension is not too tight, as it will stretch the tape tabs and will not adhere to the carton correctly.

B) Loosen Tension - Turn the knob left. If the tension is too loose turn knob right and adjust accordingly.

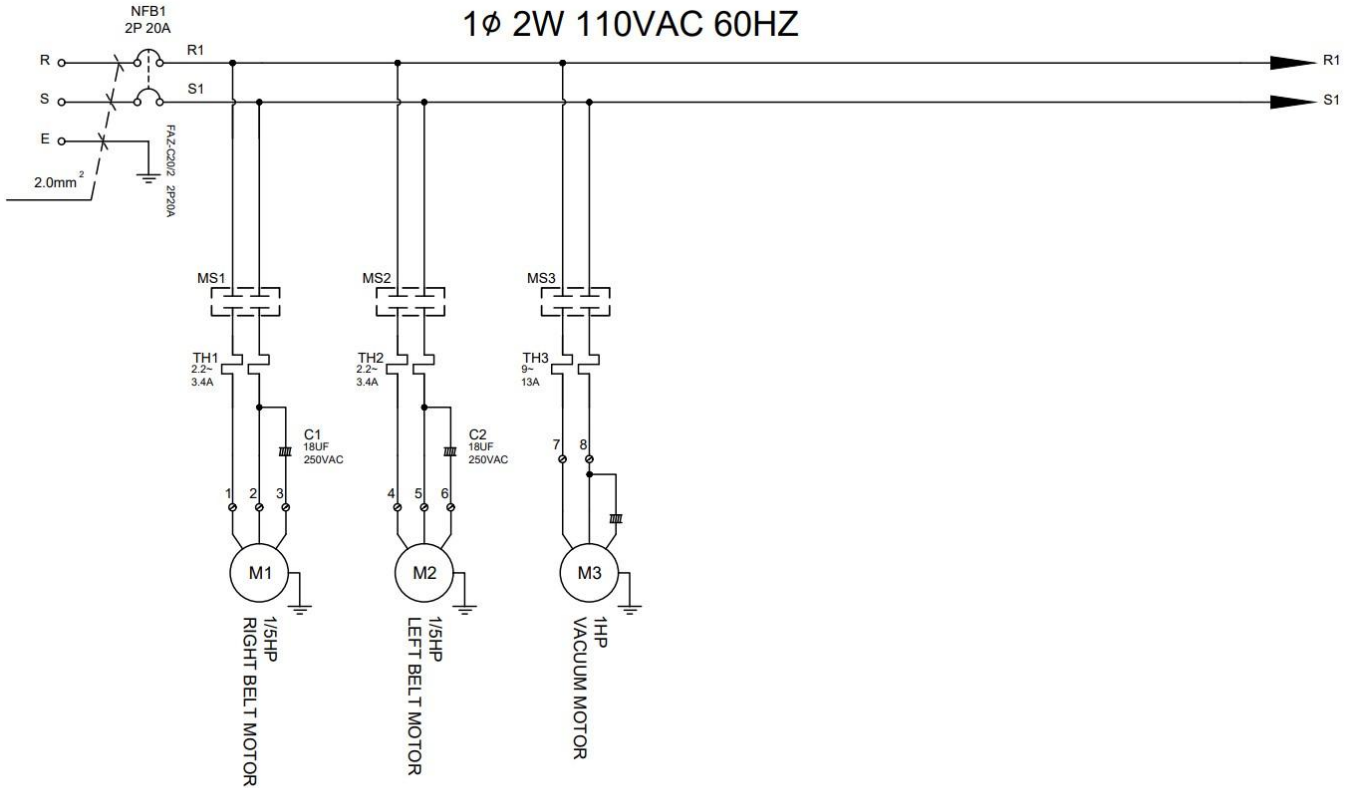
Note: Improper adjusting of tension knob, may lead to poor carton sealing.

ELVS Preventive Maintenance Checklist

- ❑ Blow off all carton dust throughout the machine and inside the side belts with dry air
- ❑ Bleed off any moisture that has gathered in the main regulator. Water in the airline system will damage the cylinders
- ❑ Tape head Maintenance
- ❑ Apply grease on the linear bearing for the pick up arm and to non cylinder shaft and chains at least every 6 months(**DO NOT add any on the cylinder rods**)
  - ❑ Use Maintenance mode to allow pick-up arm to travel back and forth for 1 minute to spread grease across the rail
- ❑ Clean all lubrication points at least once a year with WD40 or degreaser then apply lubrication
- ❑ Inspect all lead screws and chain, lubricate them if they are dry
- ❑ Check the condition of the vacuum pump
  - ❑ Oil level
  - ❑ Air Filter condition
  - ❑ Pump exhaust filter condition
- ❑ Listen and inspect cylinder motions
  - ❑ Use maintenance mode to tune the cylinder speed and behavior
- ❑ Mechanical parts inspection
  - ❑ Sealing area top plate
  - ❑ Flap folders
  - ❑ Box support stoppers
- ❑ Check if any air fitting leaks or air hoses are pinched
  - ❑ Push arm red cover should not be pressed onto air hose inside
- ❑ Inspect all wire condition
  - ❑ Motor
  - ❑ sensors
- ❑ Belt tightness and wear condition
  - ❑ Video on how to replace belts and adjust belt tension - https://youtu.be/AsqtsigY8co

ELVS Maintenance Youtube Video: https://youtu.be/4h5v1joh0Es

Appendix - STD 110V ELVS Electrical



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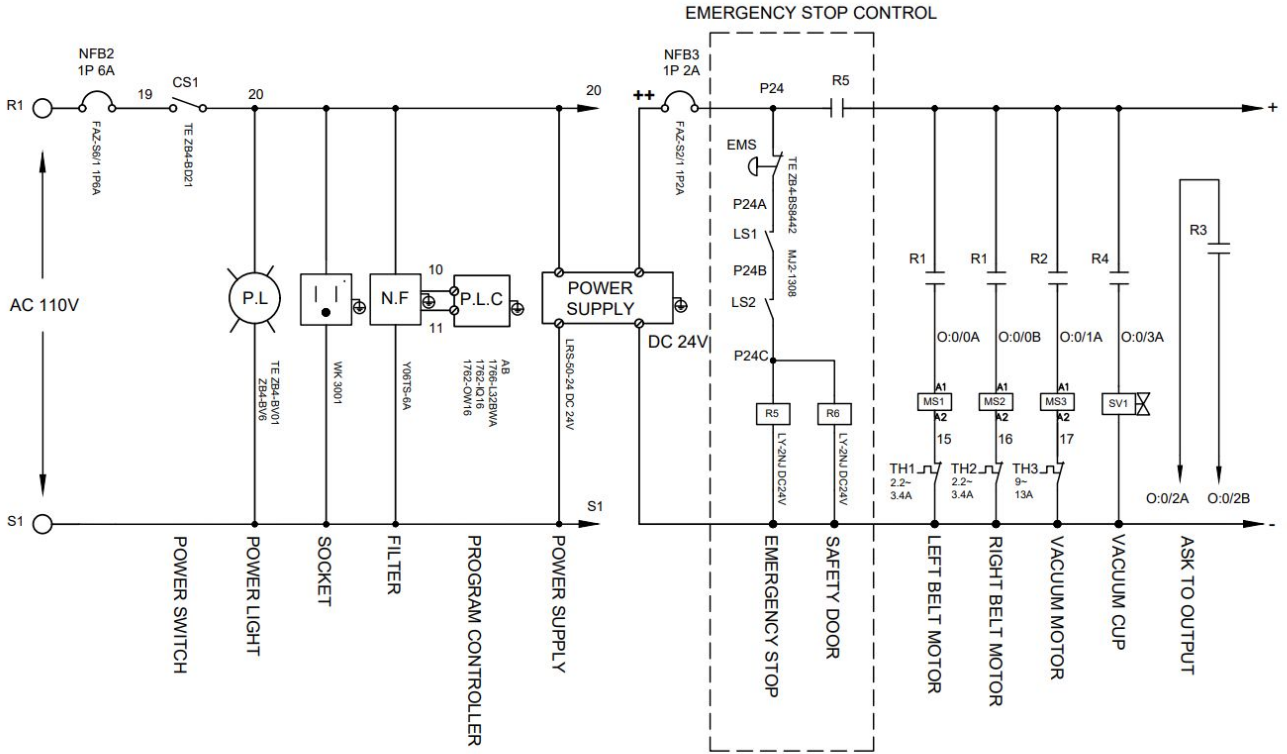
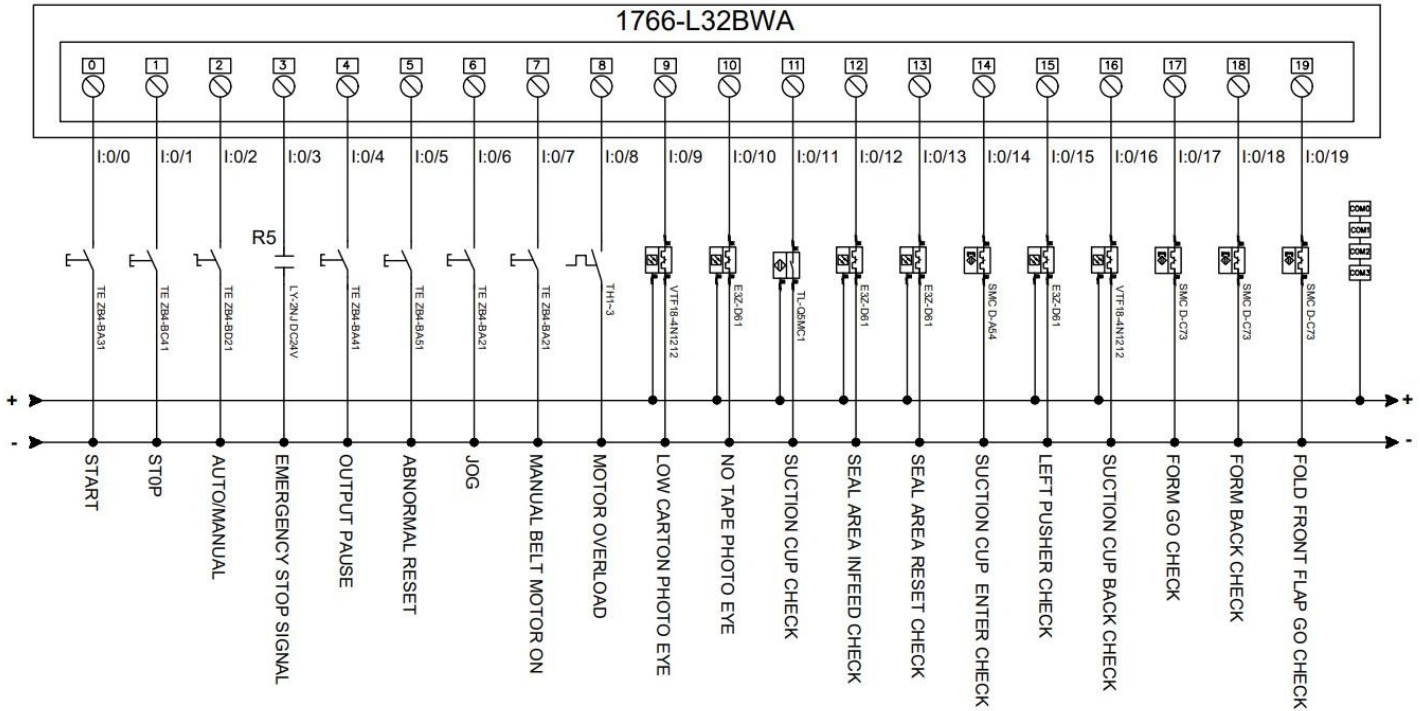
Appendix - STD 110V ELVS Electrical



ELVS22_AB-110V-P24V_1P_P02_0220

Appendix - STD 110V ELVS Electrical



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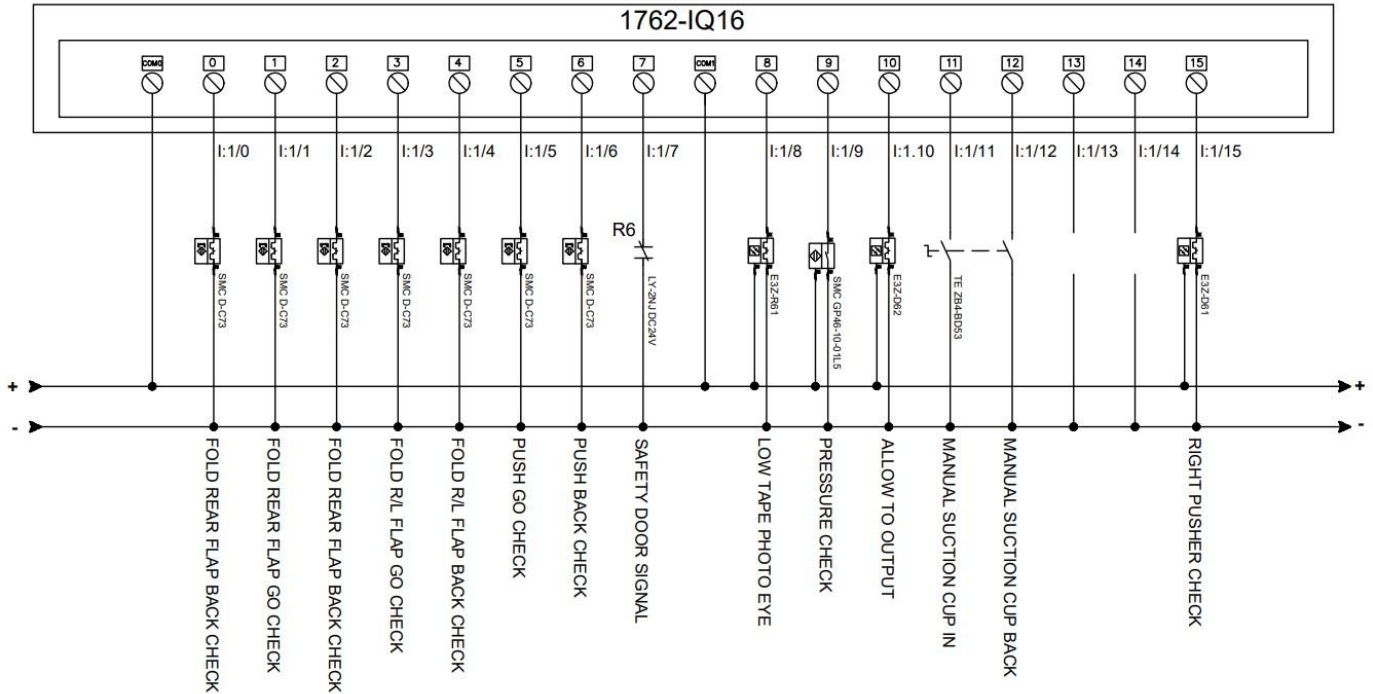
Appendix - STD 110V ELVS Electrical



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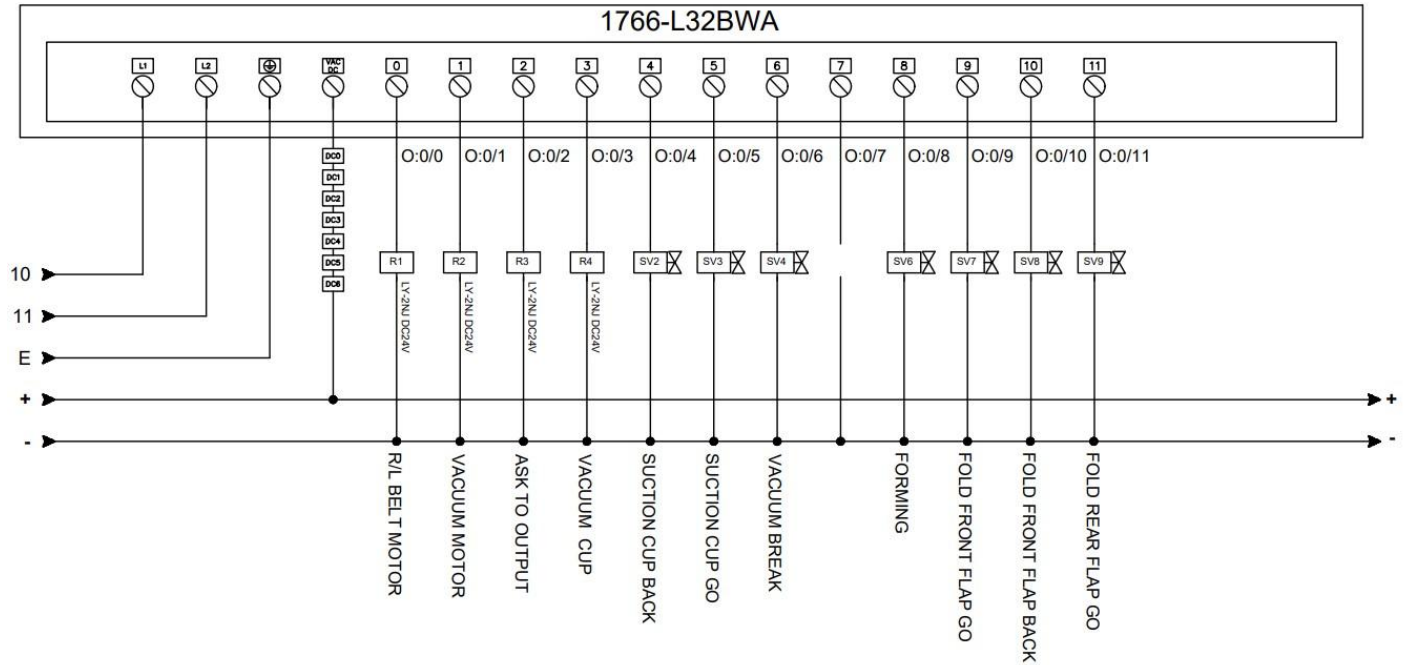
Appendix - STD 110V ELVS Electrical



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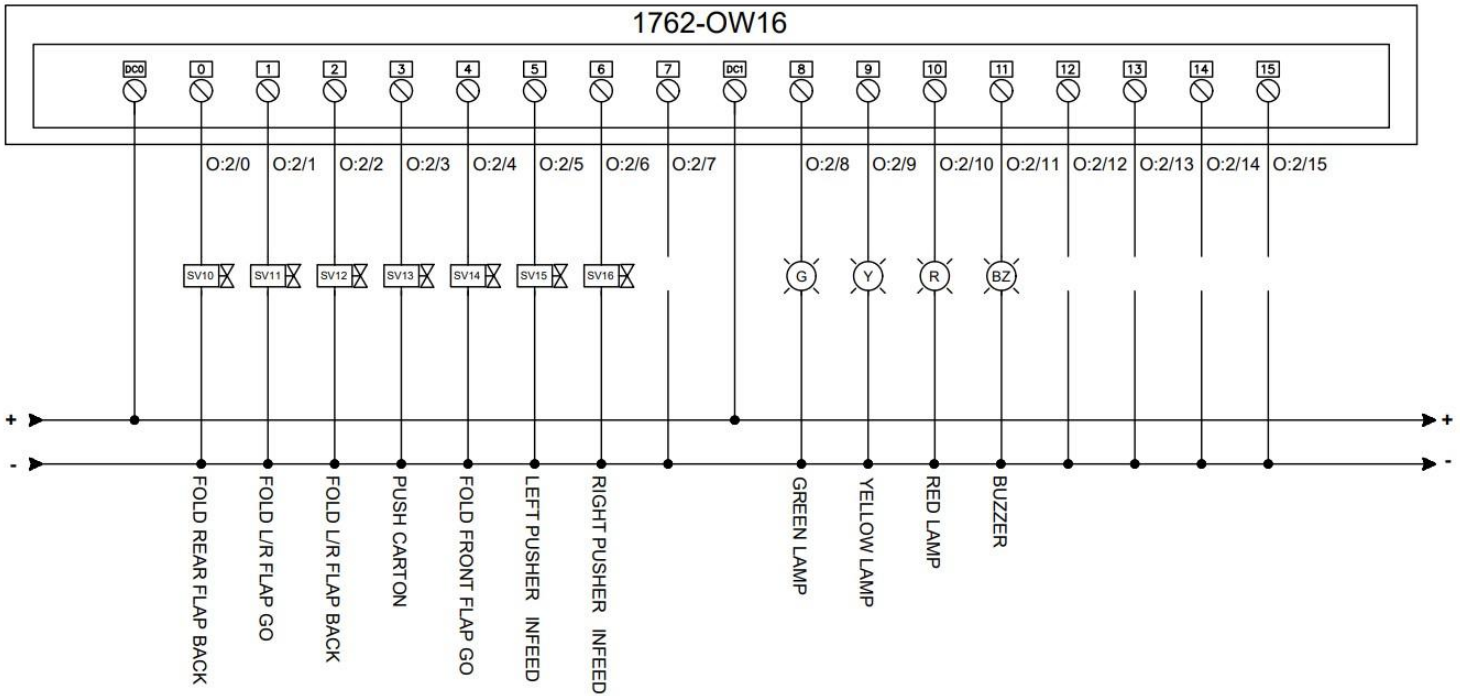

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Additional Support

ELVS – BestPack

(https://support.bestpack.com/elvs/)