

WAS-32 Control Description

175 mm Travel

Introduction

The web advance system is a web manipulation device designed to allow multiple print passes of a traversing printer within the normal dwell time of an indexing packaging machine. The flexible automation device is programmable for the number of print passes per packaging machine dwell period. Based on data entered, the system accurately positions the web material for the printer, the result being a pattern of equally spaced printed lanes. The Web Advance control supervises the activities of the printer and provides a simple communication interface to the packaging machine control. The unit possesses storage capability for up to eight preset "recipes" which may be electronically selected by the host machine control. The recipes include data such as the number of print passes, the web feed length as well as programmable start position which facilitates registration error compensation in the form of a registration offset distance when changing job configurations. This provides total electronic changeover, hereby eliminating human intervention. Estimated changeover time is less than 10 seconds.

A. Machine Guard Safety Interlock

The WAS (Web Advance System) control is designed with operator safety as a primary functional criteria of the device. The lexan guard is provided to allow the operator easy access into the machine for the purposes of threading the web material through the system. There are two positive make/break interlock switches with keyed operators, wired in series, with dual independent circuits. One of the circuits is used by the WAS to control the drive motor power circuit. When the guard is removed, power to the motor drive is turned off, removing any threat to the operator. Program execution also stops and the web advance display will read "Web Advance "!! GUARD OPEN !!". When the guard is secured the system re-energizes the motor drive and resets the control program. The second guard circuit is dedicated for use by the host machine control. A closed circuit indicates the guard is in place and the WAS is in the safe to operate condition. The machine guard should only be removed at a machine stop condition. Removing the guard during a cycle requires the system to re-initialize.

No attempt should be made to defeat the safety interlock system.

B. Operation

B.1. Power-Up Sequence

Apply 230 VAC @50/60 Hz. single-phase power to the control box. Depress the power switch. As the control box powers up the web advance system display goes through a startup self-test and then displays the software version and date. All internal data registers and counters are reset. The control then reads the data input lines which establishes the JOB Number. The previously stored data based on the

job number is loaded into the active data registers. Next the unit executes a home to sensor routine. The WAS display will read:

**MOVING TO HOME
SENSOR POSITION**

Once at the sensor home position is established the registration offset move is executed. The display will read:

**MOVING TO REG.
OFFSET POSITION**

This display will only be active during the actual move to position, so for small values of registration offset this display may not appear.

Before activating the System Ready output to the host machine the WAS control now checks the status of the traverse printer. If the traverse printer is not ready (not in the print-mode) the WAS display will read:

**TRAVERSE PRINTER
NOT READY**

If the traverse printer is a MLP-32, load a label into the MLP control box (EY3200) from either a memory card, or from any of a number of communication methods available. Once the label has been loaded and the MLP is in the printmode, the display will read:

**JOB # READY
F1= VIEW/EDIT**

The # symbol is used here, however it will appear on the display as the job number selected by the host machine.

The system is now ready to accept a print signal from the host machine control. This is also where the job data can be viewed and/or edited. See the section named "Data Input Terminal" later in this write-up.

B.2. Printing Sequence

Upon receipt of a print signal from the host machine the WAS control issues a print signal to the traverse printer control. Once the first row has been printed the web advance moves a controlled loop of web material the programmed distance. This sequence is repeated until the number of print passes is equal to the print pass data entered into the data input terminal. When the traverse printer has completed the last print pass the WAS control issues a System Ready Output signal to the host machine control that the print sequence has been completed thus the web material can be advanced. After a brief delay for the traverse printer to return "home" the system is ready to accept another print signal from the host machine.

C. Data Input Terminal

C.1. Terminal Function

The data input terminal is a dual function device. It provides a means in which to manipulate web advance parameters. The data input into the terminal is used by the WAS control to calculate the web move distance, print spacing, and maximum registration offset.

The terminal also functions as a machine status indicator for the purposes of troubleshooting. The display indicates the control status in the printing sequence.

C.2. Web Advance Parameters

There are three web advance parameters involved in the operation of the web advance system. The first parameter is the number of traverse print passes per host machine feed. The second parameter is the host machine web feed distance. This is the length of web fed by the host machine in millimeters. The web feed distance data placed in the terminal **must** match the data in the host machine in order for the desired print spacing to be accurate. The final parameter is called the registration offset. This allows the system to vary the start position for automating the registration process rather than to have to physically adjust the registration roll. All three parameters are stored for each of (8) eight job numbers.

C.3. Changing Web Advance Data

Data can only be changed when the host machine is in the **Stop Mode** and the display reads:

JOB # READY
F1 = VIEW/EDIT

Press F1 to enter the view/edit mode. The first parameter to be displayed is the number of print passes for JOB X. The display will read:

PRINT PASSES P
F1=NEXT F4=EDIT

Where **P** = the number of print passes, a value from 1 to 6.

To exit without changing data press F1. To change the displayed data press F4. The display will read:

PRINT PASSES [X]
F1=NEXT F4=EDIT

Brackets are drawn around the value and the cursor flashes below the number. Use the F2 key to increase or the F3 key to decrease the number until the desired value is reached. When satisfied, press the F4 key. The display will read:

PRINT PASSES X
F1=NEXT F4=EDIT

Now press F1 to exit the print passes screen. You now enter the web feed distance screen. You may now view/edit the web feed distance data. The display will read:

DISTANCE XXX mm
F1=NEXT F4=EDIT

To exit without changing data press F1. To change the displayed data press F4. The display will read:

DISTANCE [XXX]mm
F1=NEXT F4=EDIT

Brackets are drawn around the value and the cursor flashes below the number. Use the F2 key to increase or the F3 key to decrease the number until the desired value is reached. The rate at which the value changes is proportional to how long the key is depressed. The longer the F2 or F3 key is depressed the faster the value changes. Remember that this value **must equal** the programmed feed distance of the host machine in order for the desired print spacing to be accurate. The value input is limited by the travel distance available in the web advance system based in the number of print passes selected. When satisfied with the input data, press the F4 key. The display will read:

DISTANCE XXX mm
F1=NEXT F4=EDIT

Press F1 to exit. The next web advance parameter to be displayed is the Registration offset data. The registration offset allows the start position to be relocated to compensate for differences in registration alignment for various configurations. The display will read:

REG OFFSET = XXXmm
F1=NEXT F4=EDIT

Press F1 to exit. To exit without changing data press F1. To edit data press the F2 to increment or F3 to decrement the data to the desired offset value. Data is limited by the travel distance available so invalid data can not be entered. When the desired data is entered press F4.

The system then calculates the print spacing from the parameter data previously entered. The value of the print spacing is then displayed for approximately 2 seconds before returning to the system ready screen. The calculated print spacing screen appears as follows:

**CALCULATED PRINT
SPACING = XXX mm**

The system returns to the home sensor position then onward toward the registration position. Now the system is ready for operation.

C.4. Only One Print Pass

If only one print pass is needed then simply enter the value (1) one into the print passes data screen. The system will operate like a stand-alone printer, however the WAS control box still processes all machine interface communications between the printer and the host machine control. The calculated print spacing will be displayed.

C.5. Limitations of Data Entry

Due to limitations of travel in the system the following chart describes the interaction between the number of print passes, maximum web feed distance and the maximum spacing of prints on the web material. **Based on 175 mm Travel.**

Number of Print Passes	Maximum Web Feed Length	Maximum Print Spacing
1	ANY	ANY
2	700 mm (27.6 in.)	350 mm (13.8 in.)
3	525 mm (20.6 in.)	175 mm (6.8 in.)
4	466 mm (18.4 in.)	116 mm (4.5 in.)
5	437 mm (17.2 in.)	87 mm (3.4 in.)
6	420 mm (14.1 in.)	70 mm (2.8 in.)

Data entry is limited based on the maximum values as shown in the above chart. There is no way to enter invalid data, since based on the value of the number of print passes, the data input is limited to the maximum values shown above. Whenever any data is changed, the system must also return to the home position. This occurs automatically without operator intervention. When operating at the maximum print spacing the value of the registration offset will be zero since there is no travel left in the system to offset the print pattern.

C.6. Job Number Selection

The host machine has direct control access to the configuration data lines for selecting the job number and the stored data. The job number is determined by the bit value of the three input lines shown below in the following truth table.

Truth Table for Job Number Selection

Job #	Input One	Input Two	Input Three	BCD Equivalent
1	OFF	OFF	OFF	0
2	ON	OFF	OFF	1
3	OFF	ON	OFF	2
4	ON	ON	OFF	3
5	OFF	OFF	ON	4
6	ON	OFF	ON	5
7	OFF	ON	ON	6
8	ON	ON	ON	7

The data lines must be maintained in the bit values specified for each job number. When changing the job number all data lines must be changed within 200 milliseconds.

C.7. Machine Status Display

As previously stated the data input terminal also functions as a machine status indicator. The display shows the status of the system as it proceeds through the printing sequence. This can be a valuable tool for troubleshooting, since each step of the sequence is displayed while being executed.

C.8. Machine Faults

C.8.1 WAS Drive Fault

A web advance Drive Fault is generated when there is a positioning error or a motor stall condition exceeding 5 seconds. If a drive fault is generated determine the cause before proceeding. Check the ball-screw assemblies. They should operate smoothly throughout the entire travel. Check for obstructions. The system requires power to be cycled to restore the drive from a drive fault.

C.8.2 Check Printer for Faults

When the printer has a fault condition the web advance temporarily suspends print sequence operation and the fault output is activated to the host control. Once the fault condition is corrected and the printer is ready for operation the web advance resumes the suspended print sequence. An example would be a broken ribbon fault condition, with an MLP. Once the ribbon is re-threaded and the guard is closed, press the red/green button on the EY3200 and the system shall finish the interrupted print sequence. Please note that when this condition occurs the lane where the ribbon broke will be reprinted.

D. Notes on MLP Set-up Parameters

In order to insure proper machine operation the following parameters **must** be set-up in the MLP EY3200 control box under "Print Parameters".
Set trigger signal to be level trigger.

E. PERFORMANCE SPECIFICATION

Mechanical

Travel length = 175mm (6.88 in.)

Maximum Speed = 240mm/sec, 480mm/sec Web Speed

Positioning Resolution = .02mm (.0078 in.)

Home Repeatability = +/- .15mm (.006 in.)

Electrical

Input Voltage = 220/240 VAC, 50/60 Hz., single phase. Voltage **must** be supplied through normally closed Emergency Stop contacts of the host machine. An emergency stop condition of the host machine shall cause a loss of power to the WAS control box.

Current Consumption = 5 AMPS Max. @230 VAC

Operating Temperature = 0 C – 45 C (32 F – 113 F)

Machine Interface = Electronically isolated "dry" relay contacts rated
1 Amp @ 24 VDC

