HSL-CD4
RUTHERFORD DECORATOR/BASECOATER
HIGH SPEED CONTROL PACKAGE

The Systems Engineering HSL-CD4 Rutherford Decorator / Basecoater High Speed Control Package provides:

◊ **Reduced Scrap:** Accurate miss-loaded can print trip and blow-off reduces number of good cans blown-off for every miss-load by 50% or more.

◊ **Improved Quality:** Eliminates silver cans, partially printed cans, and partially varnished cans from going down the line. Eliminates inside Litho problems (printed mandrels) as well.

◊ **Quality Control (Select-A-Can) Blow-off:** Allows verification of print quality for each blanket and mandrel by allowing the operator to blow off a can from a selected mandrel. Allows trouble-shooting cut blankets, etc.

◊ **Quick Pay-off:** With the reduction in spoilage incurred, the HSL-CD4 typically pays for itself in just a few months.

Features

- Performs high speed control functions of Rutherford Decorator / Basecoater up to 2,400 Cans Per Minute. This includes speed compensated print carriage and varnish unit trip which eliminates inside deco and varnish problems, and three can pin chain (bad can) blow-off which reduces scrap.

- High speed front-end upgrade package which interfaces with existing control system.

- Performs the following control functions:

  - Detection of miss-loaded cans.
  - Damaged can blow-off.
  - Speed compensated print carriage trip control.
  - Speed compensated varnish unit trip control.
  - Three can (bad can) pin chain blow-off.
  - Single select-a-can QC pin chain blow-off.
  - Can gate open/close control.
  - Alarm detection: infeed track jam, no can transfer (can on mandrel), and timing signal fail detection.
  - Data Acquisition: Total number of good cans printed, total number of blow-offs, trips per spindle, etc. (for both current and last shift).

- Can be used on all Rutherford Basecoaters (both carriage trip models and two coater roll models) as well as all Rutherford Decorator models.

General Description

The HSL-CD4 Decorator / Basecoater high speed control package is an electronic upgrade for the Rutherford Decorator / Basecoater which reduces excess blow-offs (scrap) by tripping and blowing off the minimum number of cans for each miss-load. In addition, it improves quality by eliminating silver and partially printed cans down the line as well as eliminating inside litho problems. The package detects miss-loaded cans, performs speed compensated print trip, varnish trip, and three can (bad can) blow-off at speeds up to 2,400 CPM. The package also provides select-a-can pin chain blow-off for print quality verification, alarm detection, and data collection.

The package is not a dedicated "black box", but instead is implemented using the high performance Systems M4500 PLC/PLS module which allows easy customization by either SEA or the end user. The module is programmed using the DOS based SYSdev software programming package which allows programming in any combination of Ladder Logic or high-level (subset of "C"), as well as perform on-line monitoring and trouble-shooting. The module incorporates a built-in PLS which interfaces directly with the machine mounted resolver and provides all machine timing, eliminating the need for an external PLS.

Print Carriage / Varnish Unit Trip

Speed compensated print carriage trip at speeds up to 2,400 CPM is incorporated in the HSL-CD4 module to compensate for the mechanical/pneumatic trip response of the carriage. The carriage is accurately retracted *"out"* on the spindle ahead of the miss-loaded can and extended back *"in"* on the spindle following the miss-loaded can at all speeds. This reduces scrap by reducing the number of spindles the carriage is tripped *"out"* for and also eliminates inside litho problems by assuring that the miss-loaded spindle is completely skipped. Note that a single mandrel , "off-image", trip is possible at speeds up to 1,200 CPM. A two station trip is recommended for speeds above 1,200 CPM. The varnish unit control algorithm incorporates the same speed compensation algorithm incorporated in the print carriage control.

Bad Can (Pin Chain) Blow-off

The bad can pin chain blow-off incorporates speed compensation to compensate for the response time of the blow-off solenoid regardless of machine speed. This allows the accurate rejection of both miss-loaded (silver) and partially printed can from the pin chain at speeds up to 2,400 CPM. This eliminates silver and partially printed cans down the line.

QC (Select-A-Can) Blow-off

The Quality Control (select-a-can) feature allows the operator to dial in a mandrel number, either at the remote PB station or from the keypad of the HSL-CD4, and blow-off one can printed on that mandrel. Mandrels 1 through 24 can be individually blown-off this way to verify the print quality of each mandrel. This allows the quick determination of a cut blanket, etc.

Two other select-a-can blow-off modes are also available: 8 or 24 can blow-off. These modes blow-off 8 or 24 consecutive cans starting with blanket #1. This allows all 8 blankets or all 24 spindles to be checked at one time. In addition, the HSL-CD4 can be set up to automatically blow-off 8 consecutive cans, starting at blanket #1, on a periodic basis (i.e. once every hour).

Alarm Detection

The module detects the following alarms: *Infeed Track Jam*, *No Can Transfer* (can on mandrel), and *Timing Signal Fail*. The *Infeed Track Jam* alarm occurs when 6 consecutive empty mandrels are detected by the "can/no can" sensor after the can gate is opened. The *No Can Transfer* alarm occurs when the "no can transfer" sensor detects a can on a mandrel after the disc transfer location. The *Timing Signal Fail* occurs when any of the timing signals generated in the PLS section fail to change state periodically while the machine is running. The above alarms can be used to stop the machine when the respective alarm occurs.

"HSLCD4" SETUP PROGRAM

The "HSLCD4" setup program is a DOS based menu driven program which allows the user to easily view the HSL-CD4 data or alter the HSL-CD4 setup variables using an IBM PC or compatible. These variables include the carriage/varnish response times and the pin chain/QC blow-off parameters. In addition to setting the variables, "HSLCD4" can be used to set the machine timing, view the current and last shift data, view the trips per spindle, download the HSL-CD4 application program to the M4500 as well as download and upload the setup data to the M4500.

Data Collection

The following data is collected for both the current shift and the previous (last) shift: Total number of good cans printed, total number of cans blown-off, total number of miss-loaded cans (bad cans), total number of restart blow-offs, total number of manual blow-offs, total number of select-a-can QC blow-offs, and the total trips per spindle. This data can be viewed locally on the display of the HSL-CD4 by either the operator or production control personnel. This information is updated ("current" shift transferred to "last" shift) based on the change of state of a discrete input.

In addition to the shift data collection, a separate buffer is available to collect trips per spindle counts as a diagnostics aid to the operator for trouble-shooting a loading problem on a specific mandrel. Unlike the shift data, these counts can be reset manually by the operator at will.

An optional communications board (S4516) is also available such that this data can be transferred to a host A-B PLC using the DF1 protocol, a MODICON PLC using the MODBUS protocol, or a Siemans (545) PLC using the S3000 network.

HSL-CD4 Keypad / Display

The keypad of the HSL-CD4 contains 24 keys consisting of data display commands, setup commands, and a numeric keypad. The display of the HSL-CD4 is a 2 line by 40 character back-lit LCD display which displays the selected data and setup menus. The keypad/display can be used by the operator to view the current and last shift data as well as the trips per spindle diagnostic data. In addition, the keypad/display is used to activate the select-a-can QC blow-off feature and can be used by authorized personnel (passcode or key switch protected) to adjust the timing and all setup parameters.

Specifications

Power Requirements:
Voltage: 100-240VAC, 50/60HZ
Current: 0.5 Amps @ 115VAC
0.25 Amps @ 230VAC

Temperature Ranges:
Operating: 0 to 55°C
Storage: 0 to 70°C

Resolver Interface:
Resolver Type: Systems Electronics Group
RSV34-MS1 or equivalent (also can be
paralleled with existing resolver/PLS)

Resolver Cable: Systems Electronics Group
RSV-RSCBLE-XX

Control Inputs:
Voltage Range: 10-30VDC
Input "On" Voltage (min):   10.0 volts
Input "On" Voltage (max):   30.0 volts
Input "Off" Voltage (max):   5.0 volts
Input Current (max): 15 milliamps @ Vin=30V
Optical Isolation: 1500 Vrms

Outputs:
Voltage Range: 10-30VDC
Output "On" Voltage (min): VCC-2.00 volts
Output "On" Voltage (max): VCC-0.25 volts
Output "Off" Voltage (max): 1.5 volts
Output "On" Current (max-cont): 0.5 Amps DC
Output "On" Current (100msec): 3.0 Amps DC
Optical Isolation: 1500 Vrms

Ordering Information

The HSL-CD4 package is provided for back-panel mounting inside the existing user's control cabinet. In addition, a
NEMA 12 enclosure can be purchased to house the HSL-CD4 if required space is not available in the existing user's
cabinet. The part number for the optional NEMA 12 enclosure is HSL-CD4-ENCL. The order number for the HSL-CD4
is as follows:

Part Number	*Description*
HSL-CD4	Rutherford Decorator / Basecoater high speed control package consisting of a pre-wired sub-panel (17" X 17" X 8") for mounting in the existing user's control cabinet including the following:

1ea.   M4500 PLC/PLS module (with required I/O boards)
1ea.   D4591 Display/Keypad
1ea.   HSL-CD4 User's Manual
1ea.   HSL-CD4 Keypad Quick Reference Manual
1ea.   HSL-CD4 Program Disk
1ea.   M4500 User's Manual

HSL-CD4 Options (*purchased separately*)

The following items can be purchased separately as required or desired:

Part Number	*Description*
HSL-QCSTA	Remote Select-A-Can PB station
HSL-DSP	Remote RPM/Position Display
HSL-CD4-ENCL	NEMA 12 enclosure for HSL-CD4 (20" X 20" X 10")
RSV34-MS1	Resolver (required if machine is not already equipped with resolver)
RSV-RSCBLE-XX	Resolver Cable
S4516	Communications Board