HSM-WI7
STANDUN BODYMAKER
HIGH SPEED LOGIC MODULE

The Systems Engineering HSM-WI7 Standun Bodymaker High Speed Logic Module is an electronic upgrade which provides:

◊ **Reduced Tooling Damage:** by accurately detecting short can/tear-offs and immediately de-activating the clutch and cupfeed to prevent feeding additional cups.

◊ **Repeatable Air Strip Control:** to prevent air stripping and blow-out problems and thus reduce the occurrence of short cans or tear-offs.

◊ **Accurate Clutch Control:** Incorporates BDC brake wear compensation algorithm to stop press at BDC regardless of actual brake response.

◊ **High Speed:** Module operates at speeds in excess of 500 Cans Per Minute.

Features

- Performs high speed control functions of Standun Bodymaker to speeds in excess of 500 Cans Per Minute (machine mechanically permitting). This includes clutch control, cupfeed control, air strip control, as well as die protection (short can detection).

- Performs the following control functions:

    - Rapid response control of clutch/brake system for emergency stops (die protection) as well as precise BDC stops. **Note: The clutch solenoid outputs of the HSM-WI7 are not intended as safety contacts for the bodymaker clutch and must not be the only interrupt to the clutch solenoids.**
    - Accurate short can detection to a resolution of ¼" can length.
    - Highly repeatable air strip control to reduce can stripping and blow-out problems.
    - Reliable, timed cupfeed control to insure proper cup loading and protection from miss-loads.
    - Brake wear compensation (Auto BDC timing programming) algorithm to stop press at BDC regardless of brake response.
    - Brake response determination allows displaying of actual brake response (in degrees).
    - Brake response alarm to indicate when brake stopping response (in degrees) has exceeded user preset limit.
    - Trimmer speed reference (0-10volt analog output) provides reference to trimmer proportional to speed of bodymaker (user scalable).
    - Alarm detection: short can detection, die sensor fail alarm, timing signal fail detection, clutch output failure detection, no ram motion alarm, resolver failure detection, and brake response too long.
    - Data Acquisition: Total number of good cans produced and total number of short can faults (for both current and last shift).

- Can be used on all Standun Bodymaker models including the B6.

General Description

The HSM-WI7 Standun Bodymaker high speed logic module is an electronic upgrade for the Standun Bodymaker which performs the high speed control functions of the bodymaker including: rapid response clutch/brake control, accurate short can detection, reliable cupfeed and precise air strip control. In addition, the module provides a brake wear compensation feature which automatically adjusts the BDC timing signal to stop the press at BDC regardless of brake stopping response. The module also provides a trimmer speed reference output, alarm detection, and data collection.

The module is not a dedicated "black box", but instead is implemented using the high performance Systems M4503 PLC/PLS module which allows easy customization by either SEA or the end user. 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. The HSM-WI7 contains an integrated keypad and display which can be used by the operator to view collected data and can be used by authorized personnel (passcode or key switch protected) to adjust the timing and all setup parameters.

Clutch / Brake Control

The clutch/brake solenoids of the Bodymaker are activated by the HSM-WI7 through the electro-mechanical two hand safety control circuitry provided externally by the user. The fast 0.5millisecond throughput of the HSM-WI7 along with the fact that the PLS is fully integrated in the module, allows extremely fast and repeatable de-clutching and braking response to be achieved. Normally the clutch is controlled via inputs to the HSM-WI7 that are mapped from outputs on the host PLC. However, detection of any of the alarms (short can, die sensor failure, etc.) results in an immediate de-clutch of the solenoids.

Air Strip Control

The HSM-WI7 provides a repeatability of 0.5 milliseconds for the air strip control thus reducing can stripping and blow-out problems. Both an "Air Strip (Low)" and "Air Strip (High)" timing signal are provided to activate the air strip when running in the low and high speeds respectively. The air strip is enabled when the cupfeed is opened.

Brake Wear Compensation

The HSM-WI7 incorporates a brake wear compensation or automatic BDC timing feature which stops the press at BDC regardless of the actual braking response of the clutch/brake. The stopping compensation is accomplished by automatically adjusting the BDC timing signal based on the previous stop. Any overrun is detected and a new BDC timing signal is computed such that the machine will stop at the desired location on the next stop. Two BDC signals are provided: one for low speed and one for high speed. Both incorporate the brake wear compensation feature.

In addition to the brake wear compensation, the HSM-WI7 also calculates the actual brake response (in degrees). This can then be displayed by the operator or maintenance personnel to determine the condition of the brake.

Short Can Detection

The "Short Can Check" timing signal, along with the machine mounted short can sensor, is used to verify the entire length of the can. The short can sensor must see can the entire time the "Short Can Check" timing signal is *"on"*. If the can is short (tear-off) or any void is detected (to a resolution of ¼"), the *Short Can* alarm is generated. The clutch is immediately de-activated as well as the cupfeed and rotary trip solenoids.

Alarm Detection

In addition to the *Short Can* alarm, the module detects the following alarms*: Die Sensor Failure*, *Timing Signal Fail*, *Clutch Output Failure*, *No Ram Motion Detected*, *Resolver Failure*, and *Brake Response Too Long*. The *Die Sensor Fail* alarm occurs if the "short can" sensor fails *"on"*. 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 *Clutch Output Fail* alarm occurs if either clutch output fails *"on"* or *"off"*. No Ram Motion occurs if no motion is detected after the clutch is activated. The Resolver Failure alarm occurs if motion is detected after the clutch is de-activated. The above alarms immediately de-activate the clutch when any one occurs with the respective alarm message displayed on the HSM-WI7. These alarms are summed into one output that indicates to the host PLC that an alarm did occur.

Data Collection

The following data is collected for both the current shift and the previous (last) shift: Total number of good cans produced and total number of short can faults. This data can be viewed locally on the display of the HSM-WI7 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.

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 HSM-WI7 module is provided for door mounting on the user's control cabinet door or console. The order number for the HSM-WI7 is as follows:

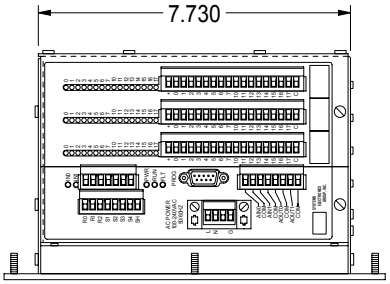
Part Number	***Description***
HSM-WI7	Standun Bodymaker high speed logic module which includes the following: 1ea. HSM-WI7 module (M4503 with required I/O boards) 1ea. HSM-WI7 User's Manual 1ea. HSM-WI7 Keypad Quick Reference Manual 1ea. HSM-WI7 Program Disk 1ea. M4500 User's Manual

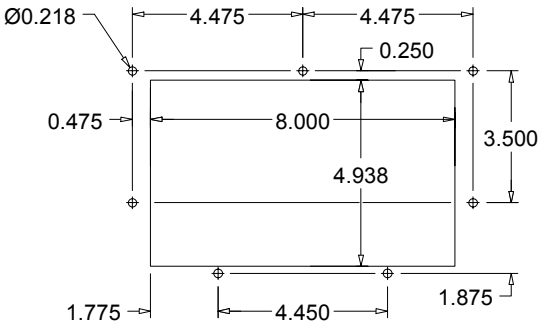
HSM-WI7 Options (*purchased separately)*

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

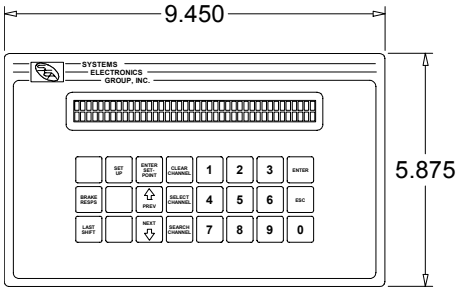
Part Number	***Description***
HSL-DSP	Remote RPM/Position Display
RSV34-MS1	Resolver (required if machine is not already equipped with resolver)
RSV-RSCBLE-XX	Resolver Cable

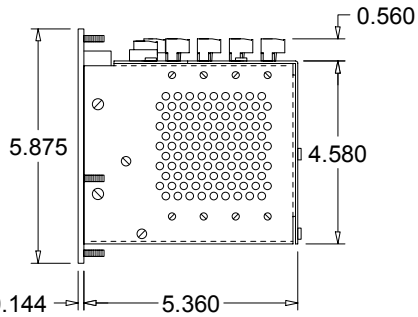
Dimensions





(Recommended Panel Cut-Out)





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