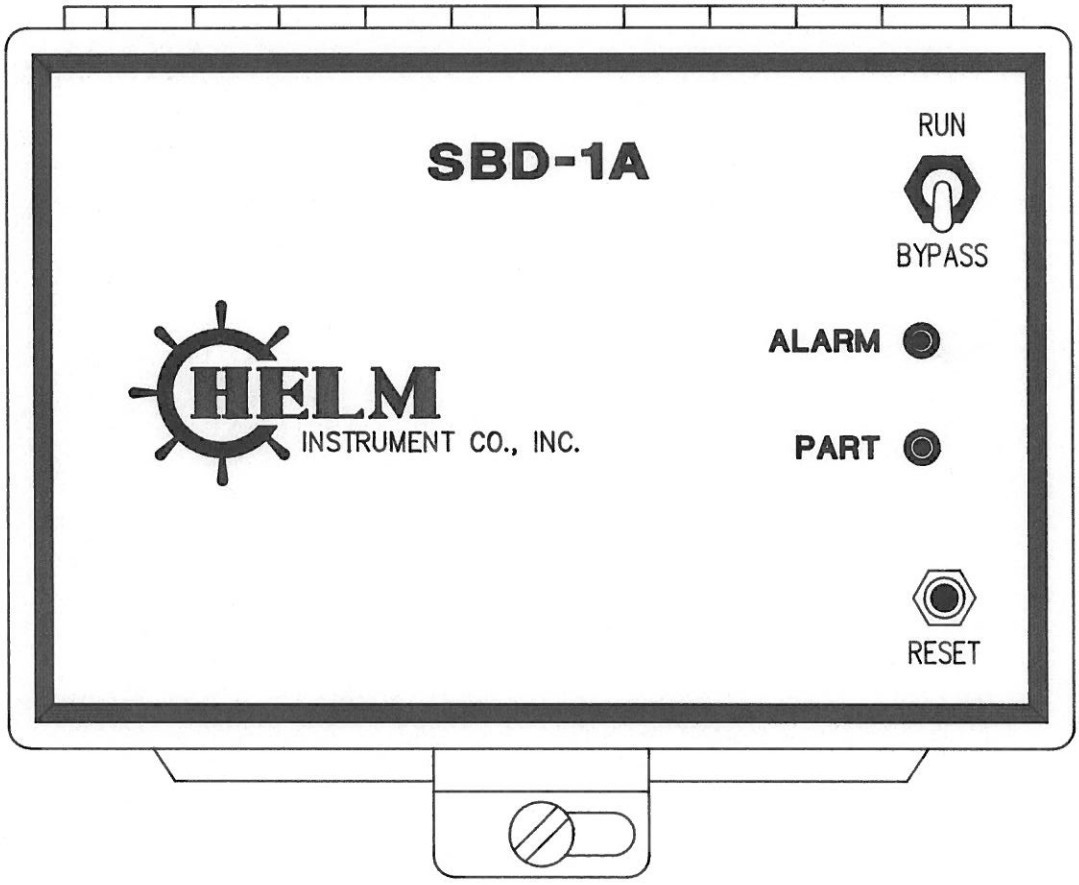
OPERATING INSTRUCTIONS

Short-blank Detector Model SBD-1A



HELM
INSTRUMENT CO., INC.

OPERATING INSTRUCTIONS FOR HELM SHORT BLANK DETECTOR MODEL SBD-1A

(Revised July 23, 1987 and November 13, 1989)

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HOW THE INSTRUMENT WORKS

The HELM Model SBD-1A will detect when a proper wire feed length is achieved in a forming machine. A HELM force sensor must be mounted at a strategic point on the stock gage stem assembly. The sensor will put out a signal when the wire hits the stock gage tip. The signal level out of the sensor is related to how hard the wire hits the tip. A blank that is too short will not hit the tip, so there will not be a signal from the sensor. The sensor output signal is amplified, and used to control a solid state relay which is built into the instrument. The output of the relay can be used for many purposes -- to give a warning of short blanks, control accessory blank- drop mechanisms, stop the feed, and/or stop the machine.

Most SBD-1A instrument functions are automatic so there are very few controls which need adjustment. To provide versatility, the instrument has some selectors and switches that are simple to use. One such control is the SENSITIVITY selector. It is used to select the amplification range (sensitivity) of the instrument. Usually the instrument will need to be adjusted only once, to match the particular feed of the machine. Subsequent adjustments will be needed if the machine operating conditions change.

The popular name for the Model SBD-1A is SHORT BLANK DETECTOR. A normal signal is put out by the sensor when there is a full feed, and the wire hits the stock gage tip.

- When full feed occurs, the wire will bump against the tip and cause the sensor to put out a signal, which will be amplified. A light on the front panel will flash every time there is a full feed.

- The harder the bump is, the larger the sensor signal will be. A strong bump produces a large sensor signal which needs less amplification than a signal caused by a weak bump. The SENSITIVITY selector controls how much the sensor signal is amplified. High sensitivity is needed when you want the relay to operate if the wire hits the tip lightly. If you set the feed so the wire bumps the tip hard, less sensitivity is needed.

- Depending on how the relay NORMAL switch is set, the solid state relay will give the effect of contacts either opening or closing when there is a short blank. If the relay NORMAL switch is set for a normally-open contact condition, the relay will close when there is a short blank. If the NORMAL switch is set for a normally-closed condition, the relay will open when there is a short blank.

CONTROLS AND FEATURES

FRONT PANEL LIGHT

The two front panel lights are LED's (Light Emitting Diodes).

The green LED will light every time a good blank is detected. This will depend on what operating condition that you have selected for the solid state relay. If parts are being formed, and adjustment may be needed if the light is not flashing, or if it is flashing in a random pattern. Read the section titled "SENSITIVITY SELECTOR ADJUSTMENT" for more details about the front panel light.

The red LED will turn on if there is a short blank condition in the machine. The alarm LED will stay lit until the reset push-button is depressed. The alarm LED will operate in either the run or bypass mode.

FRONT PANEL "RUN/BYPASS" SWITCH

With the "RUN/BYPASS" switch in the "RUN" position the HELM SBD-1A has control over the "SOLID-STATE CONTROL RELAY". When an amplified signal that is under the preset threshold is detected the red "ALARM" LED and the "SOLID-STATE CONTROL RELAY" will activate. The relay can be used for many purposes -- to control accessory blank-drop mechanisms, stop the feed, and/or stop the machine. See RELAY "NORMAL" SWITCH section.

The reset push-button must be depressed to reset the red "ALARM" LED and the "SOLID- STATE CONTROL RELAY".

With the "RUN/BYPASS" switch in the "BYPASS" position the HELM SBD-1A has no control over the "SOLID STATE CONTROL RELAY". When an amplified signal that is under the preset threshold is detected the red "ALARM" LED will activate. The "SOLID-STATE CONTROL RELAY" cannot be used for control purposes in the "BYPASS" position.

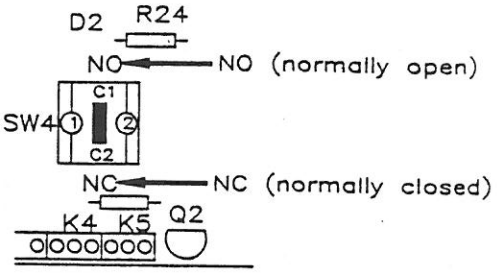
The reset push-button must be depressed to reset the the red "ALARM" LED.

RELAY "NORMAL" SWITCH

The solid-state machine control relay acts as a single-pole/single-throw relay. You may select what the "normal" condition should be. The normal (not-energized) condition can be either closed (conducting). or open (non-conducting). This selection is made with the NORMAL switch, located on the printed circuit on the inside of the enclosure door. It is the small DIP (Dual In-line Package) "rocker" type switch on the right. See drawing SBD-1A.

- If you want the solid state relay to operate as a normally closed relay, move the switch to the C2 position.

- If you want the solid state relay to operate as a normally opened relay, move the switch to the C1 position. (The relay will conduct when the wire hits the tip).



SENSITIVITY SELECTOR ADJUSTMENT

The strength of the sensor output signal depends on how hard the wire hits the tip. The signal must be amplified to exceed a minimum threshold level. If a hard bump causes a large signal, less amplification is needed. More amplification is necessary if the bump is light. The amount of amplification is controlled by a SENSITIVITY selector on the inside of the front panel. The switch must be set high enough to dependably operate the relay, but not so high that the instrument is erratic. For example, using position nine (high amplification) could be necessary if the wire does not hit the tip very hard. Position zero (low amplification) may be adequate if the wire is hitting the tip with a large amount of force. Use the following adjustment procedure:

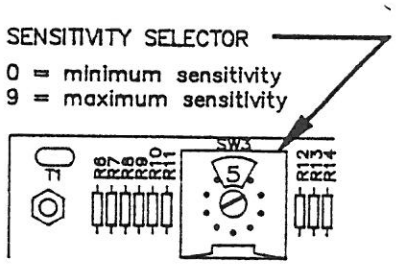
Have the machine running and cutting blanks that you are certain are of the right length.

- Place the Run/Bypass switch in the run position.

- Put the SENSITIVITY switch to position nine. The front panel "PART" light should be blinking.

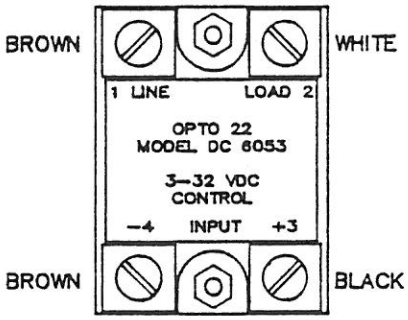
- Turn the SENSITIVITY selector to progressively lower numbers while watching the front panel light.

- Note the first switch position where the alarm light comes on. Turn the selector to the next higher number and reset the alarm. For example, if the "ALARM" light comes on when you get to position #4, turn the selector to position #5.



SOLID STATE CONTROL RELAY

- The Model SBD-1A has two relay options, it may have either an A.C. or a D.C. relay. The A.C. type relay can control external A.C. circuits. The D.C. type relay can control external D.C. circuits.



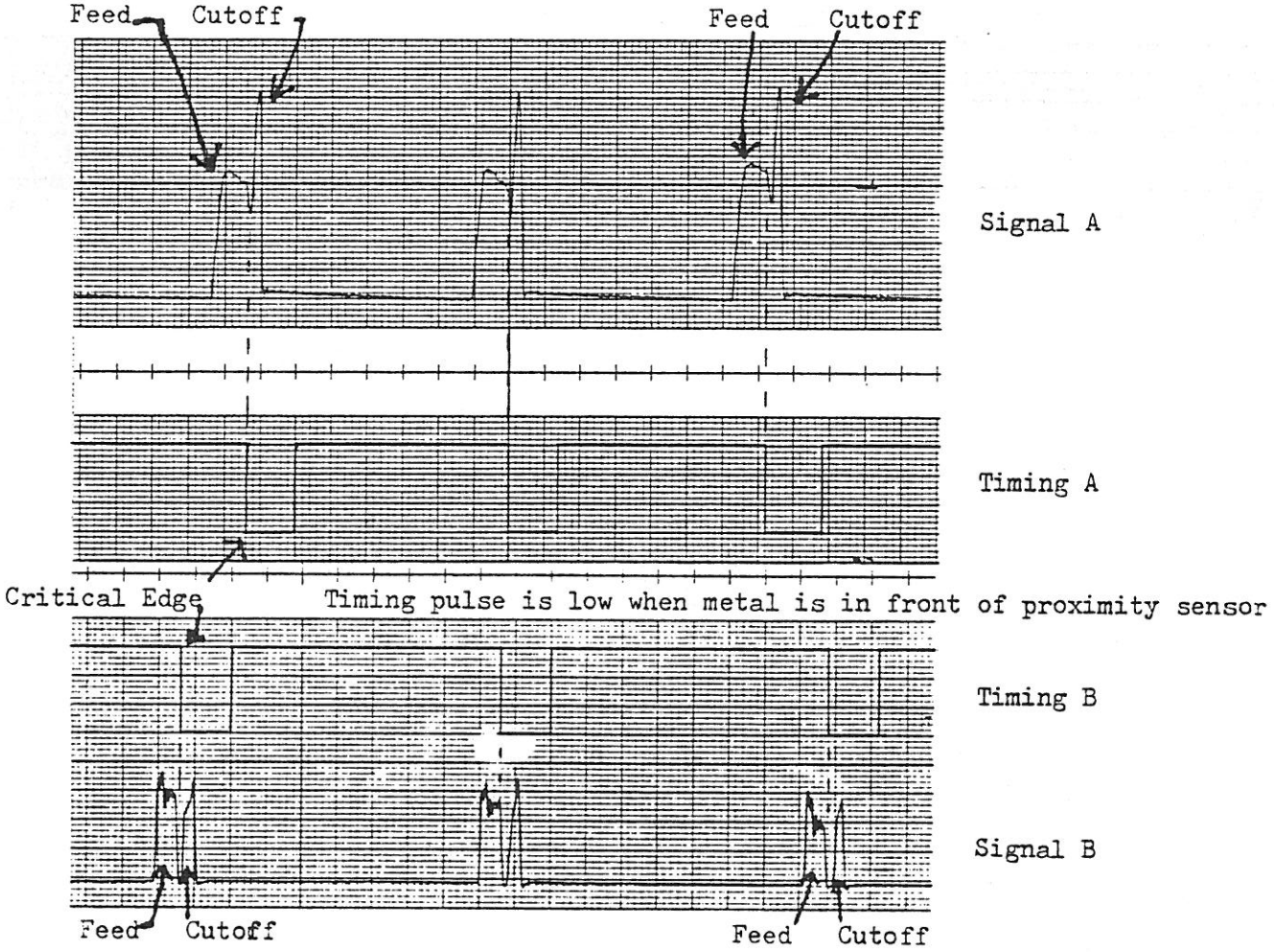
PROXIMITY SENSOR

The "PROXIMITY SENSOR" acts like a trigger that allows the HELM SBD-1A to measure the amplified output of the "SHORT BLANK SENSOR".

The relationship between the "PROXIMITY SENSOR" and the "PROXIMITY TARGET" is critical in obtaining satisfactory output from the SBD-1A. When the "PROXIMITY TARGET" is not in front of the "PROXIMITY SENSOR" the SBD-1A will measure amplified voltages. When the metal of the target is in front of the sensor the SBD-1A cannot measure voltages. This is necessary so that the force of cut-off does not give the instrument a false signal.

The "PROXIMITY TARGET" is adjusted so that the metal of the target is positioned in front of the "PROXIMITY SENSOR" just before the cut-off operation begins. Metal must remain in front of the sensor during the entire cut-off period.

The air gap between the "PROXIMITY SENSOR" and the "PROXIMITY TARGET" should be no more than 1/8".



WHEN TO CHANGE THE SELECTORS

WHEN TO CHANGE THE SENSITIVITY SELECTOR

You should change the SENSITIVITY selector whenever you notice that the front panel "part" LED light is not blinking, or blinking at random. It is possible that the wire will hit the stop with a different amount of impact when you make a change in your wire feed. The signal from the sensor could be larger or smaller than before the change, so amplification (sensitivity) should be changed. Adjust the SENSITIVITY selector when you are sure the blanks are the right length, but the light-flashing seems odd.

WHEN TO CHANGE THE RELAY "NORMAL" SWITCH

The instrument is usually shipped with the NORMAL switch set so the relay will operate as normally-closed (conducting). A blank that is not the proper length will cause the relay to open (non-conducting) and turn off your external circuit. Change the NORMAL switch if you need the contacts to close when a short blank is detected.

TYPICAL SPECIFICATIONS

A.C. RELAY

TYPE.....Potter & Brumfield solid state Model EOM1DA74 or equivalent
TURN-ON TIME.....0.0083 seconds maximum (8.3 milliseconds max)
TURN-OFF TIME.....0.0083 seconds maximum (8.3 milliseconds max)
OPERATE VOLTAGE.....3 Volts D.C. to 32 V.D.C.
MINIMUM A.C. CONTROL.....No minimum A.C. control limit
MAXIMUM A.C. CONTROL.....25 amps @ 240 Volts A.C. (1hp @ 240 VAC)

D.C. RELAY

TYPE.....OPTO solid state Model DC-60S3 or equivalent
TURN-ON TIME.....0.0001 seconds (1 millisecond)
TURN-OFF TIME.....0.00075 seconds (7.5 milliseconds)
OPERATE VOLTAGE.....3 to 32 Volts DC
CONTROL RANGE.....From 4 to 60 Volts D.C. @ 3 Amps

ENCLOSURE:

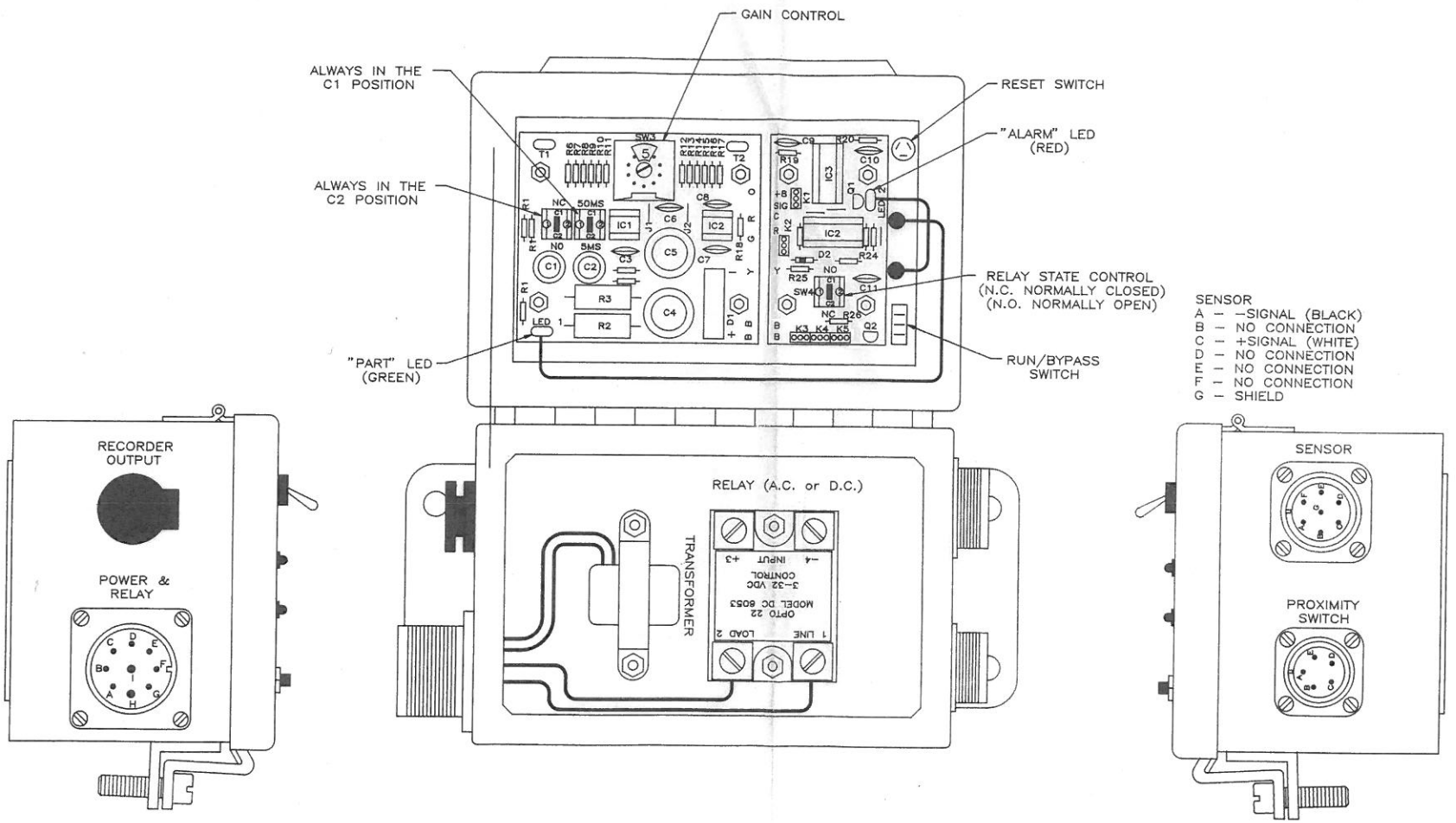
Of stamped steel to JIC specifications. Dust-tight with foam-gasketed door, with hinge on the top. Welded mounting tabs provided for mounting the instrument with four 1/4" bolts. Outside dimension of the box, 4 1/4" H x 6 1/4" W x 3 1/4" D (not counting mounting tabs, door clamp and connectors). Weight approximately 3 pounds.

POWER REQUIREMENTS: Input power, 117 Volts AC @ 60 Hz

SIGNAL CONNECTOR: Type MS 3116F10-6S

POWER AND RELAY CONNECTOR: MS 3106A-20-16S, with MS-97-3057-1012-1 boot & clamp.

SENSOR (TYPICAL): HELM SHORT BLANK SENSOR Model T-1709.



SENSOR
A – –SIGNAL (BLACK)
B – NO CONNECTION
C – +SIGNAL (WHITE)
D – NO CONNECTION
E – NO CONNECTION
F – NO CONNECTION
G – SHIELD

A – NO CONNECTION
B – NO CONNECTION
C – NO CONNECTION
D – NO CONNECTION
E – RELAY CONNECTION
F – RELAY CONNECTION
G – GND
H – NEUTRAL
I – 110 VOLTS A.C.

PROXIMITY SWITCH
A – +SIGNAL (WHITE)
B – +V.D.C. (RED)
C – COMMON (SHIELD)
D – NO CONNECTION
E – NO CONNECTION

SCALE: 3/4	DESIGNED BY: W.J.J.	DRAWN BY: R.S.G.	
DATE: 7-2-87	CHECKED BY: M.R.D.	APPROVED BY:	
TITLE: *SBD-1A WIRE CONNECTIONS AND INTERNAL CONTROLS*			
DRAWER NUMBER:		DRAWING NUMBER: SBD-1A	

HELM INSTRUMENT CO., INC.
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SS-	DWG. NO.	SBD-1A