

OPERATING INSTRUCTIONS

Short-blank Detector Model SBD-1



OPERATING INSTRUCTIONS FOR HELM SHORT BLANK DETECTOR MODEL SBD-1

(Revised November 4, 1986)

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A.C. RELAY:

D.C. RELAY:

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HOW THE INSTRUMENT WORKS

The HELM Model SBD-1 is designed to detect when a proper feed length is achieved in a forming machine. A HELM force sensor is located at a strategic point on the stock gage stem assembly. When the wire hits the stock gage tip the sensor will put out a signal.

The sensor signal output is directly proportional 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 used indirectly to control a solid state relay in the instrument. The output of this relay may be used to either give a warning, control accessory blank-drop mechanisms, stop the feed or stop the machine.

Most of the functions of the SBD-1 instrument are automatic. For this reason there are very few controls to be adjusted. To provide versatility the instrument has been provided with some simple to use selectors and switches.

In many cases you will find that the instrument will need to be adjusted only once for the particular machine that it is used on. Future adjustments will generally be needed only if there is a major change in the operating conditions of the machine.

NOTE.....Although the popular name for the SBD-1 is "SHORT BLANK DETECTOR", it is actually a FULL FEED DETECTOR. That is, the only time a signal is put out by the sensor is when there is a full feed and the wire hits the stock gage tip. This is important to remember when figuring out external circuit logic.

If the wire does not hit the tip there will be no signal from the sensor. No signal means the blank is too short. If there is no sensor signal the relay will not change state. In other words, the instrument relay will only change state if the wire hits the tip with enough force.

SEQUENCE OF OPERATION

The following is the basic sequence of operation for the Model SBD-1:

- The wire will feed and will reach the stock gage tip.
- When the wire bumps against the tip the sensor will detect the bump.
- The bump will cause the sensor to put out a signal. The harder the bump the larger will be the signal.

- A SENSITIVITY selector controls how much the sensor signal will be amplified. (If the sensor signal is not amplified enough the panel light will not blink.)
- The sensor signal will be amplified enough to actuate a solid state relay. The relay can be used to control an external circuit.
- Depending on how the relay "NORMAL" switch is set, the solid state relay will have the effect of either relay contacts opening or relay contacts closing.
- If the relay "NORMAL" switch is set for the normally open contact condition the front panel light will turn on when the wire bumps the tip. If the switch is set for a normally closed condition the front panel light will turn off when the wire bumps the tip.
- Depending on how the relay "DWELL" switch is set, the solid state relay will remain energized for either 10 milliseconds or for 50 milliseconds.
- When the control relay de-energizes at the end of the time delay period (either 10 milliseconds or 50 milliseconds) the front panel light will change state. For example, if the light was on while the solid state relay was energized, it will go off. If it was off, it will turn on.
- A new cycle will begin.

CONTROLS AND FEATURES

FRONT PANEL LIGHT

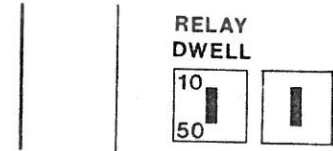
The front panel light is an LED (Light Emitting Diode). Depending on what operating conditions you have selected for the solid state relay this LED will either turn on or will turn off every time a good blank is detected. For more details about the front panel light read the section titled "SENSITIVITY SELECTOR ADJUSTMENT".

RELAY "DWELL" SWITCH

The DWELL switch will dictate how long the solid state relay will remain energized after it is actuated. Solid state relays are extremely fast acting. The short duration signal from the sensor indirectly actuates the relay. Therefore, a time delay is necessary to keep the relay energized for a usable length of time.

The relay DWELL switch is located on the left side of the printed circuit board on the inside of the enclosure door. The DWELL switch is the left small DIP (Dual In-line Package) "rocker" type switch. The switch selects a relay time delay of either 50 milliseconds or 10 milliseconds.

- For a 10 millisecond relay delay, push in on the top of the switch rocker.
- For a 50 millisecond relay delay, push in on the bottom of the switch rocker.

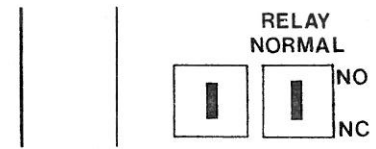


NOTE.....D.C. relays do not need long delays so you may use either position. A.C. relays need long delays so push the switch in at the top (50 millisecond delay).

RELAY "NORMAL" SWITCH

The relay NORMAL switch is the right side switch located on the printed circuit on the inside of the enclosure door. This switch dictates whether the relay acts as a Normally Open or Normally Closed relay. The NORMAL switch is a small "Dual In-line Package" (DIP) type "rocker" type switch.

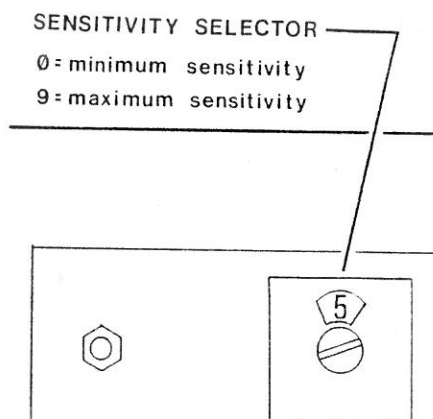
- If you want the solid state relay to operate as a normally open relay, press in the top of the switch rocker. (The relay will conduct when the wire hits the tip.)
- If you want the solid state relay to operate as a normally closed relay, press in on the bottom of the switch rocker. (The relay will stop conducting when the wire hits the tip.)



SENSITIVITY SELECTOR

The sensitivity selector will control how much the sensor signal is amplified. The switch must be set high enough to dependably operate the relay but not so high that the instrument is erratic. For example, position nine could be necessary if the wire does not hit the tip very hard. Position zero may be needed if the wire is hitting the tip with a great amount of force. Use the following adjustment procedure:

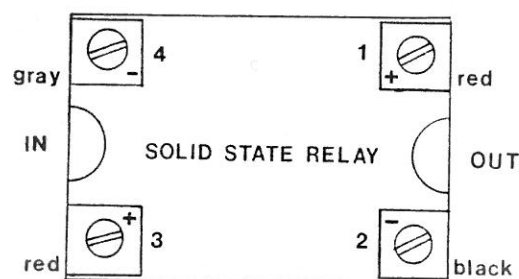
- Have the machine running and cutting blanks that you are certain are of the right length.
- Put the SENSITIVITY switch to position zero. The front panel light should not be blinking.
- Turn the SENSITIVITY selector to progressively higher numbers while watching the front panel light.
- When the light begins to blink, turn the selector to the next higher number. For example, if the light starts to blink when you get to position #4, turn the selector to position #5.



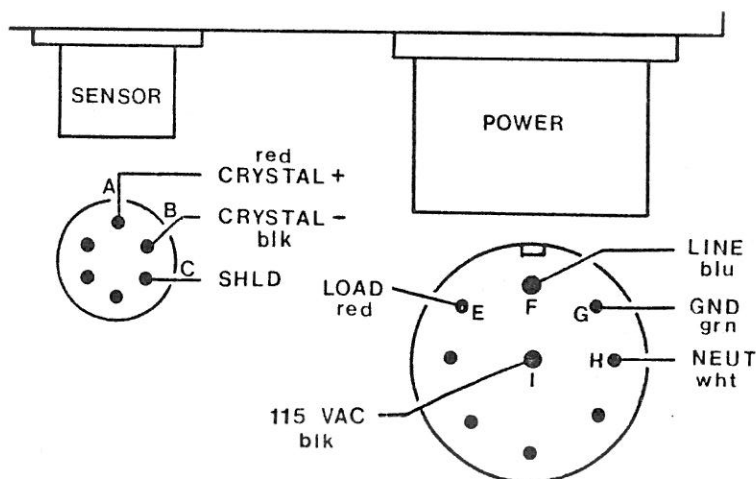
SOLID-STATE CONTROL RELAY

The Model SBD-1 has two relay options. It may have either an A.C. or a D.C. relay. The A.C. type relay would be used for controlling external A.C. circuits. The D.C. type relay would control external D.C. circuits.

- If the control relay is an A.C. type it will turn on relatively slowly. It needs the 50 millisecond time delay position of the relay DWELL switch.
- If the control relay is a D.C. type it will turn on very quickly so either the 10 millisecond or the 50 millisecond position of the relay DWELL switch may be used.



CONNECTORS



WHEN TO CHANGE THE SELECTORS

WHEN TO CHANGE THE SENSITIVITY SELECTOR

The best indication of the need to change the SENSITIVITY selector is whenever you notice that the front panel LED light is blinking in an erratic manner, or is not blinking at all. Check the length of the blanks. Then, readjust the SENSITIVITY selector if the blanks are wrong.

If you make a significant change in your wire feed, it is possible that the wire might be hitting the stop with too small of an impact to give a satisfactory signal from the sensor. If the front panel light either does not blink or blinks in a random pattern, readjust the SENSITIVITY selector. Go through the sensitivity selector adjustment procedure any time the light stays off but you are sure the blanks are the right length.

WHEN TO CHANGE THE RELAY "NORMAL" SWITCH

Typically, the Model SBD-1 instrument is shipped with the relay NORMAL switch set to Normally-Open. The relay will conduct when the wire hits the tip. A proper blank length will cause the relay contacts to close and turn on your external circuit.

After the instrument is installed, and is providing the proper relay logic, it could be necessary to change the relay "NORMAL" switch position if you must change the external circuit logic.

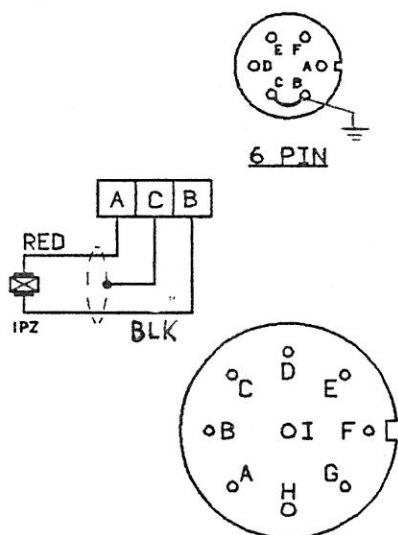
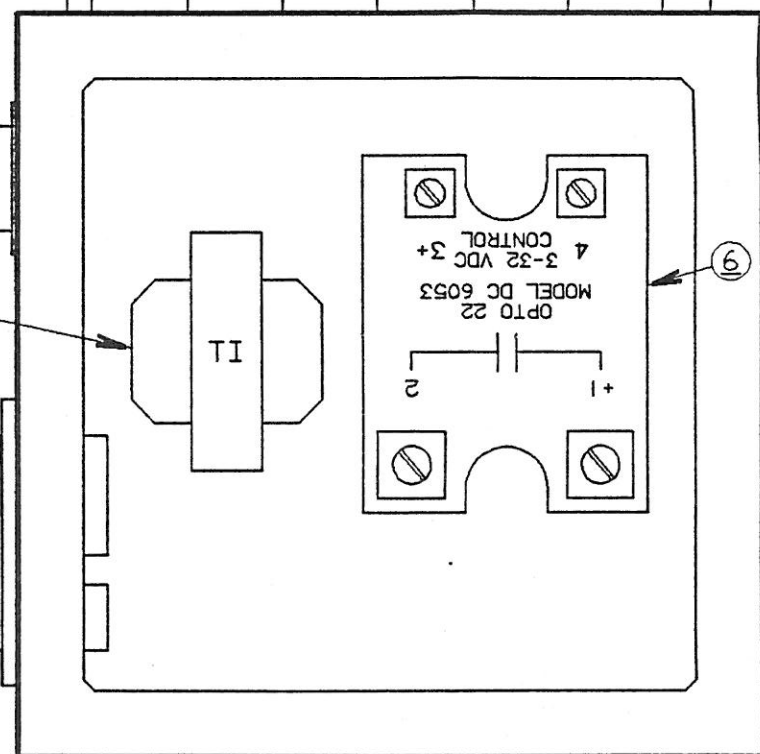
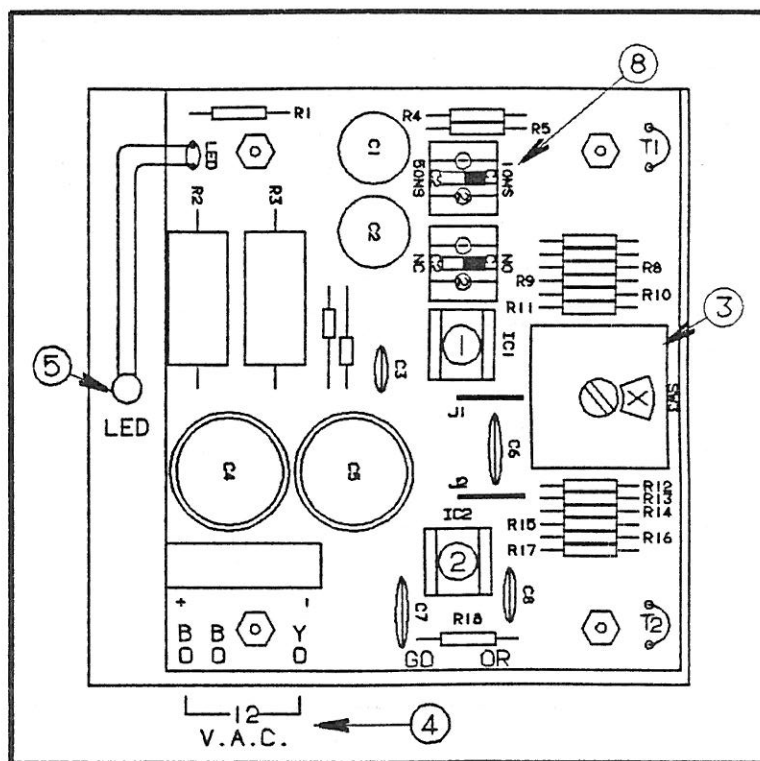
WHEN TO CHANGE THE RELAY "DWELL" SWITCH

Usually the Model SBD-1 instrument is shipped with a D.C. relay, so the DWELL switch is set for a 10 millisecond time delay (rocker pushed in at the top). This delay is only satisfactory for a D.C. relay. If your instrument has a slow-reacting solid state A.C. relay, you will always need to leave the relay DWELL switch in the 50 millisecond position. You will generally get erratic control operation if you try to operate an A.C. relay in the 10 millisecond mode.

- For an A.C. relay: Push the switch rocker in at the bottom for a long delay time (50 milliseconds).
- For a D.C. or an A.C. relay: Put the rocker in either position.

VIEW WITH COVER OPEN

- 1 - IC1=LM 3905N TIMER
- 2 -- IC2=TL288CP OP. AMP.
- 3 -- GAIN CONTROL, TO BE SET PER INDIVIDUAL MACHINE.
0-9 MAX,
- 4 -- 12 V.A.C. SUPPLY
- 5 -- LED IN COVER. LIGHTS EACH TIME OUTPUT RELAY IS CLOSED
- 6 -- OUTPUT RELAY CLOSING WHEN SENSOR (IPZ) STRAINED.
- 7 -- 120V.A.C. TO 24V.C.T. 85MA TRANSFORMER
- 8 -- DIP SWITCHES 10 OR 50MS HOLD TIME OF OUTPUT RELAY N.O. OR N.C.



F	E	G	H	I
N.O./N.C.	COMMON	GND.	NEUT.	120V.A.C.