J.M.Industries Mech-el 907 wedge bonder

This is a supplement to the machine manual to explain what has been added, changed, or removed. For all things not referenced in this document please see the Mech-el 907 user manual.

Section 1: What is new?

The biggest change is the replacement of all old PCB boards with modern electronics, specifically a touch screen HMI and a new contact sensor.

The HMI or PLC is in control of all the solenoids, and sends signals to the Uthe Generator to fire when the bond tool has made contact. You can use the touch screen to adjust parameters.

STOP and RESET: On the main menu there are several features to take note of (see fig. 1.0 for main menu), such as in the top left corner where there are large STOP and RESET buttons. These disengage all solenoids and set the bonder for the first bond respectively. When used in sequence (STOP, RESET, STOP, RESET, etc) the wire will be fed through the tool as the clamps recollect the wire and move into position.

IMPORTANT: Do not use reset as a stitch function. The chessman button should be used to call for a stitch.

I/O: Below the Stop button is a small I/O button, see testing and trouble shooting for more details on this function.

Heat indicator: To the right of the I/O button there should be a small circle that is either red or green. This indicates whether there is power being supplied to a heated work holder. If this indicator is green the PLC is attempting to apply power. If this indicator is alternating back and forth in quick succession do not worry, especially if the heated work holder is at or close to the preset temperature, for more consistent output of temperature the PLC modulates the heat siginal based on it more recent auto tune.

Auto tune and Run: These buttons sit just below the I/O and Heat Indicator, whenever connecting a new or different heated work holder it is recommend to run an auto tune procedure. The auto tune will take approximately 1-2 hours but times may vary based on size and heater output of the work holder. During this stage the PLC will heat and monitor the rate at which the work holder warms and cools. This is to help keep consistent temperature in the future. The values gained from the auto tune feature will be maintained until another auto tune is run. The Run button will use the pervious values and will begin the process of bringing the work holder up to temperature.

IMPORTANT: To keep the heat from running away with poor values auto tune cannot be interrupted. The rest of the machine will function as normal but the Run button will become unresponsive.

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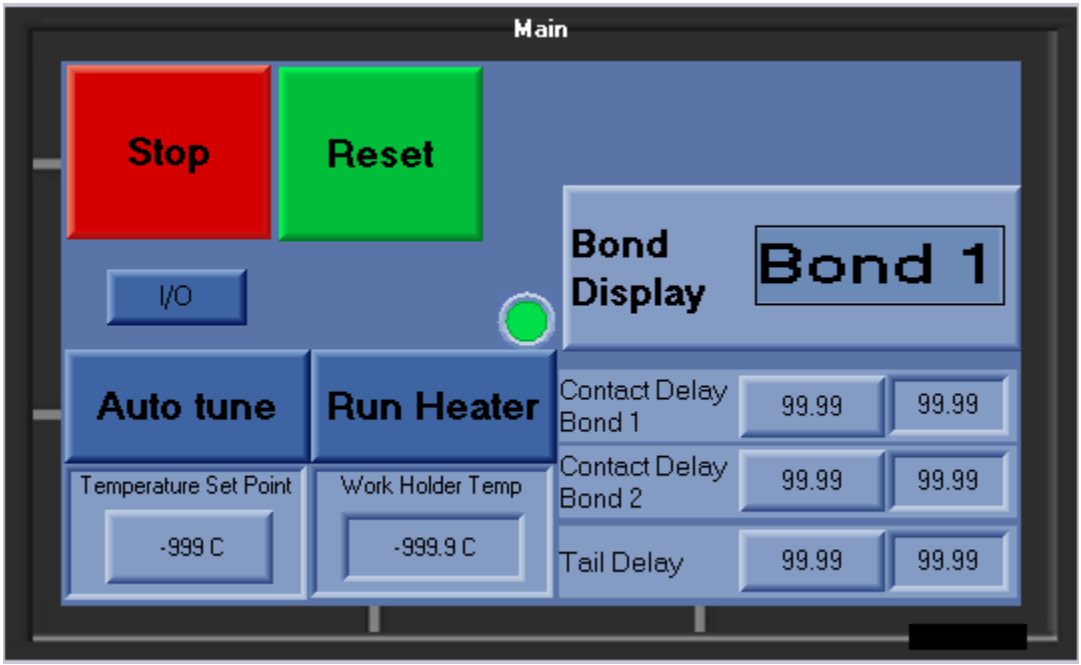
Temperature Set Point and Read Out: The two sections below the Auto-tune and Run buttons are the Set Point and Read Out of the work holder. To adjust the Set Point, simply press on the displayed number under Set Point, this will bring up a screen to input a new value. If the Read Out for the work holder temperature appears inaccurate, please check that the thermocouple in your work holder is in fact a K type thermocouple and is functional. If it does not give a number value there is no connection to a Thermocouple.

Bond Display: On the right side of the screen there should be a large read out of Bond 1 or Bond 2. This is more for clarity sake, but it is meant to display which bond the machine plans to make on next contact. See Chessman button section in Section 2 for more details.

Timers: Below the Bond Display there is three separate Timer inputs and read outs. The values on the left display the timer value and by pressing them you can input new durations. Note that the timers are in SS:mm format for seconds: mili-seconds. To the right of the time displays are the time read outs. As these timers count down they will display that information in those locations respectively. The top two timers are contact delays, meaning when the bond tool makes contact these timers will start. Only upon completion of these timers will the bond actually fire. While not necessary it is recommended that these timers are used even if set as low as 00:05 in order to ensure the bond tool has full contact with the wire. Below the Bond Delay timers there is a Tail Delay timer. This is to ensure the bond arm is clear of the substrate before the Clamps feed the wire through the tool. It is recommended that this timer is also not reduced below 00:05 but it is up to the speed of the operator as to what is the optimal delay.

FIGURE 1.0



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Trouble shooting

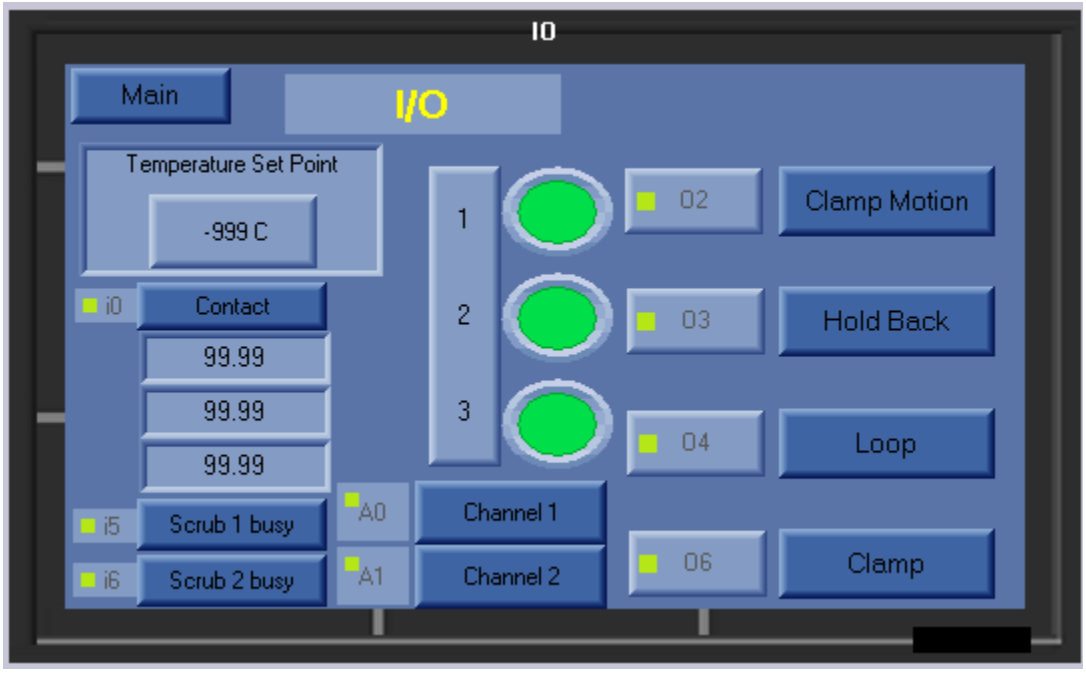
I/O Screen (see figure 2.0): When investigating an issue the I/O screen can be a valuable tool for isolating an issue. On this screen there are several manual overrides and indicators that will be described in this section.

Manual Contact: below the Temperature set point display in the upper left hand corner there is a small button labeled contact. Pressing this button will override the contact switch and have the PLC move to the next step.

Step Display: To the right of the manual contact button and timers there are three large indicators numbered 1,2,and 3. These are indicators as to which step the machine is in. Step 1: awaiting first bond, after the first bond is fired the machine will progress to step two. Step 2: awaiting second bond, while in this state the loop solenoid is on, and all other solenoids should be off. After bond two is fired proceed to step three. Step Three: tear wire, wait for tail delay, feed wire through tool, when sequence is done return to step one. If there is an issue with this sequence of events it is possible to use the aforementioned Manual Contact button to cycle through these steps to help specify the issue.

Solenoid Display and Manual Overrides: To the right of the Step display is a series of indicators and buttons. These all correlate to the different solenoids that control the machine. These buttons should activate their respective solenoids, if the red indicator goes yellow that indicates the machine is sending the appropriate signal. If the indicator changes but the solenoid is not responsive check hardware first and confirm the movement is not impeded.

Figure 2.0



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Additional troubleshooting

If the bonder is firing inappropriately

First, check the blue green sensor on the back of the machine arm, at rest it should have a silver fin resting straight inside it. If the blade is turned or is in far enough to be resting on the sensor itself, adjust it accordingly. There should be a faint visible light when the sensor detects a metal object.

If the Z lever is released from its down position and allowed to come up freely the bonder may register the bounce/crash as a contact made. Either guide the arm back up more carefully or increase bond delay timer so the machine will ignore these small interruptions.

If the bonder appears to skip steps or proceeds to fast, the PLC is receiving contact signal(s) , the sensor may need to be replaced. If the program seems unresponsive please contact J.M.Industries for technical support.

If the bonder is not firing at all

Please refer to the I/O screen, the indicator to the left of the Manual Contact Button should change when the bonder arm is either lifted or the lever is depressed while the arm is held up. If this indicator does not change, use the Manual Contact Button to see if the bonder will cycle. If the software will cycle normally with the manual over ride test the sensor again.

If the Heated Work Holder in not working

Confirm that the PLC is receiving a reading from the thermocouple on the main menu, that a reasonable temperature is set for the work holder and take note of the Heat Indicator state (Red:off Green:on).

Accurate reading, Indicator is off, work holder is not at temperature: turn the machine off and on again. After boot up press the Run button. If the problem persists, power cycle again and press the Autotune button.

Inaccurate reading but still give number: confirm what kind of thermocouple is connected (PLC programed to read K type) and that the thermocouple is wired correctly. Confirm the work holder is plugged all the way in.