

Revision History:

Revision	by	Date	Change
001	ljl	12 Sept. 07	Created
002	ljl	23 July 08	updated text added new pictures
003	ljl	8 Aug 08	Modified Title
004	ljl	23 Oct. 08	Changed: channel 48 definition added: Setup

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Timing Controller (Sequencer) for Press Control Direct Replacement for Sumitech and Others

Current Timing Controllers are past their maintainable life. Several have unusual problems as opens in the multilayer printed wiring board, parts of the firmware (programs) that are contained in their E-Proms have disappeared. These devices were designed for a life expectancy of 10 years and that was almost 20 years ago. Some of these devices have lasted many times their rated life span. If the E-Proms are reprogrammed there is no guarantee how long the data will be retained.

Several problems with the old sequencer are:

Face plate adhesive allowing powder to enter sequencer

Key pad breakage and deterioration.

Power supply regulator failures.

Power supply filter capacitors degrading and failing over time.

Non repairable problems with the Printed Wiring Board.

Solution:

A new sequencer has been designed as a direct bolt in replacement. It is functionally interchangeable with the old device.

The new technology uses a touch screen to program and monitor the state of the sequencer. Front panel controls are a power switch and a touch screen. The input and output connectors are the same as the old one - plug for plug. A new power connector with plug in power cord, fuse, line filter all contained in a sealed unit replaces many components. Voltage is selectable as either 115 / 230 volts.

Missing is the key switch allowing access to the program settings.



FIGURE 1 MODEL 00202 Timing Controller

Description:

All of the New Sequencer functions work in the same manner as the original.

The New Sequencer uses a off the shelf SBC (Single Board Computer), a new I/O board, power supplies, and touch screen. Data is displayed and input via a touch screen.



FIGURE 2 REAR VIEW 00202 SEQUENCER

1. Single Board Computer:

The SBC is an off the shelf computer module. The executive is written in "C" and stored in Flash memory. Battery backed up RAM is used to store the user program data. The SBC contains two serial communications ports. One is used to interface with the Touch Screen. The crank angle is read using a absolute encoder that connects to the I/O board. The SBC reads a serial string of data from the I/O board that contains the crank angle. The outputs are to switched ON or OFF at the angle read and the data sent to the I/O board. Accuracy is within a fraction of a degree of crank angle. Speed is much greater than any know mechanical press rotational speed.

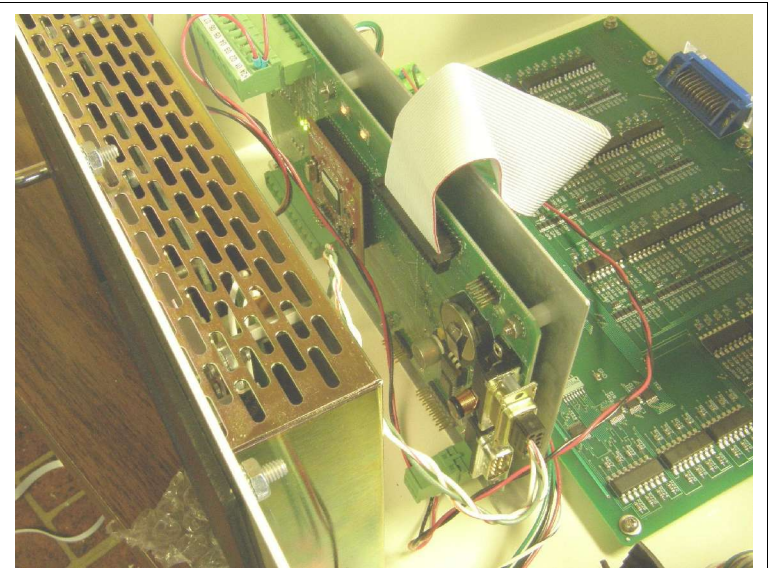


FIGURE 3 SINGLE BOARD COMPUTER

2. I/O Board:

Input from the encoder is read by SBC through the I/O board. The angle is compared to the ON / OFF table entered by the operator and the appropriate outputs are set ON or OFF. This board can be replaced in the field by unplugging the power, data cables, removing a few screws. One of the more common failures of the older design was an output failure due to some other failure in the control system obliterating one or more output transistors.

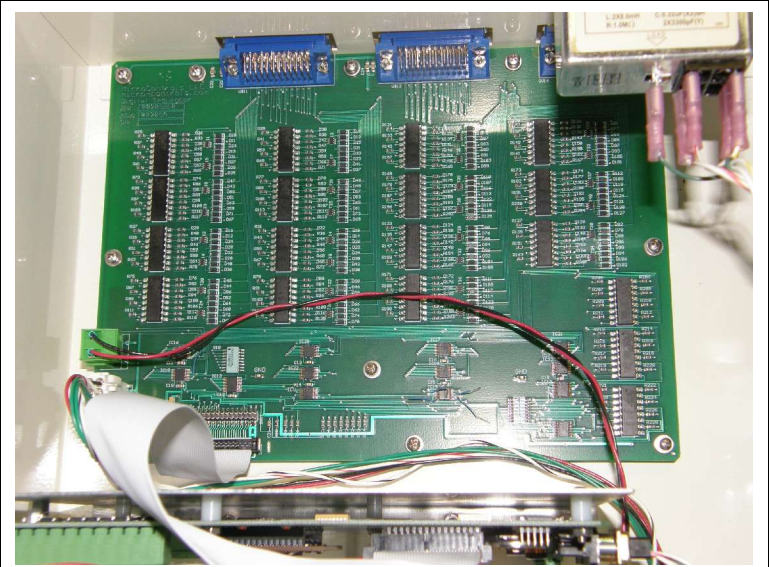


FIGURE 4 INPUT / OUTPUT

3. Power Supply:

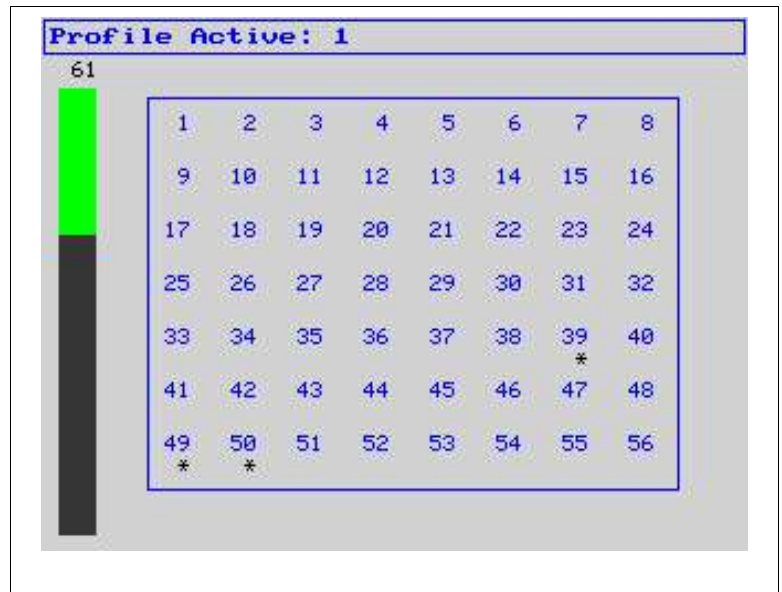
Dual isolated 24 volt power supplies are used one for the outputs and encoder and the other for the SBC, Touch Screen. The power supplies have a greater dynamic input voltage range to accommodate "Brown Outs" or low line voltages. Transorbs are used to remove high voltage spikes at the transformer outputs. The inputs can be changed from 115, to 230 volts, EMI / RFI line filter, the fuse and ON/OFF power switch are located in the rear panel mounted input power filter module.



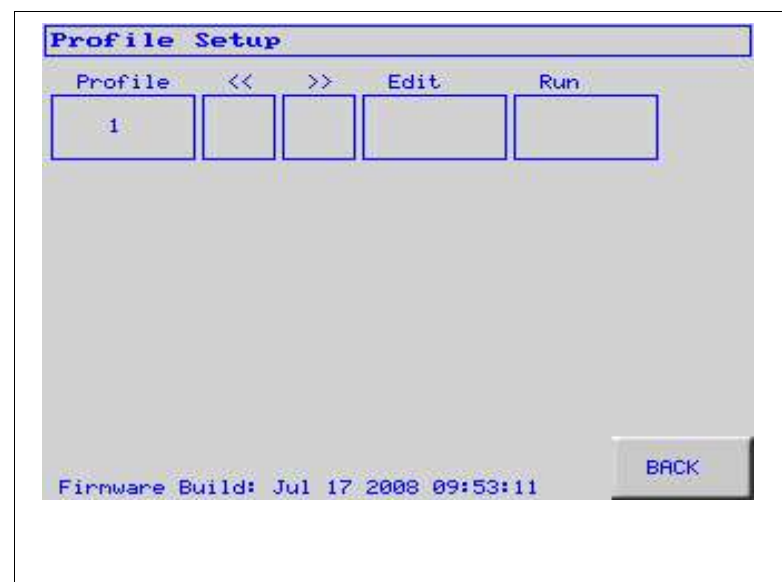
FIGURE 5 POWER SUPPLY

4. OPERATION:

The touch screen is arranged in pages that allow the user to observe press angel, and important data while running.



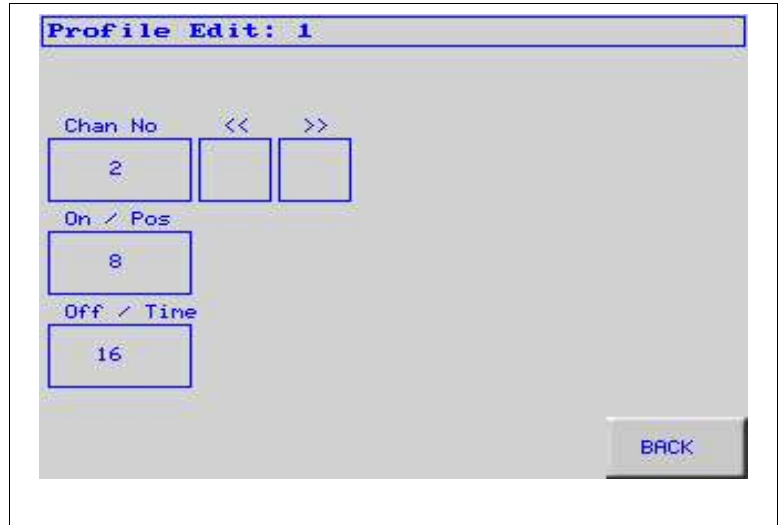
16 Profiles, independent sequences, can be kept in memory. Select profile by pressing << or >>. Press Edit to modify profile. Press Run to select this profile to be the active profile.



Data for a profile can be set up using this screen. Increment or Decrement the “Chan No” by using << or >>.

Press the “ON / Pos” button and enter the ON angle and “Off / Time button and enter the OFF angle. This applies to channel 1 - 47. Channels 51 - 55 the time delay is entered.

Data for each profile is entered in this manner. Touch the number and the keypad pops up.



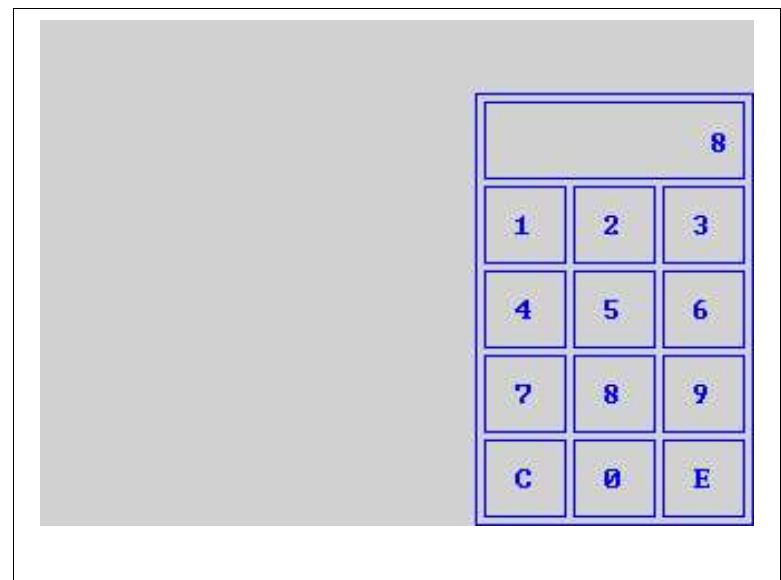
Keypad Screen

Change only numbers as necessary.

Press C to clear all numbers

Press Numeral to enter Data in Register.

When data is complete Press E to enter new number. It will return you to the page you started from.



Setup:

1. Copy all settings from old sequencer to a tablet or verify that they are as stated on machine mounted sequencer settings plate.
2. Note crank angle as displayed on current machine.
3. After installation:
 1. Crank angle displayed is 180 deg. from press angle.
 2. Touch the top level screen at the middle of the right hand side.
 3. A screen will allow you to change the rotation angle of the encoder.
 4. Change the encoder direction and return to main screen.
4. Select the profile page you want to setup and run.
5. Install all of the settings required by the press into this profile.
6. Press the run button and the profile selected will run.
7. The sequencer is now ready to run.

Specifications:

1. Power Required:

Voltage Selectable as 115 / 230 single phase.

Line current: Less than 4 amps depending on how many outputs are "ON" and Output load.

2. Programmed Sequence:

- | | |
|--|-----------------------------------|
| 1 - 47 Channels with ON-OFF programming | 0 to 359 degrees. |
| 1 48 Dead Man | 50 % duty cycle 0.020 sec. ON/OFF |
| 50 Clutch Over run. | fixed 355 - 005 degrees. |
| 51 - 55 timers that can be set to 0.01 sec accuracy. | 0 to 99 seconds. |

3. Input:

Absolute Encode as currently used in these presses.

4. Outputs:

56 Optically coupled NPN output transistors rated at 0.4 A at 40 V

5. Programming:

Touch Screen. 1/4 VGA Monochrome (shades of blue)

6. Outside Mounting Demensions:

Height	6.25"	
Width	13.87"	15.75 " at Flange.
Depth	12.0"	

7. Support:

With new modular design the units can be quickly be repaired and returned in 1 working day.

100 % spare parts are stocked. Your unit if sent in the next day air AM delivery can be returned the same day next day air at 4:30 PM.

8. Delivery is 30 days ARO.

Options: A02

1. RS232 interface to PC for getting data and saving to a laptop, putting data from laptop into Timing Controller. Interface is via a 9 pin D connector located on the front panel. Internal software and an application to run on your PC are included in the option.