



INDUSTRIAL SYSTEMS SERVICE, INC.

1610 LINDEN AVENUE • ERIE, PENNSYLVANIA 16505
TEL: (814) 838-8660

MINI II COMBINATION SYSTEM

General Installation Instructions

A full board will control 24 stops with 16 pistons. The other models are for lesser stop and piston inputs. The first number in the model number represents the number of stops; the second number is the sum of both divisional and general pistons. Other input functions are set, general cancel and divisional cancel.

All the stop, piston, set and cancel piston inputs are on one end of the board. All the stop outputs are on the other end, with the "ON" coil connections located on the component side and the "OFF" coil connections on the back side.

The input connector also has the terminals for +6 and 0 VDC power supply. The output connector has terminals for the organ rectifier connections labeled NEG for the 0 or negative and POS 12 for the positive organ rectifier. Although labeled POS 12, the organ rectifier may be set from about 10 to 15 volts.

The negative conductor from the board carries all the current used by the stop solenoids controlled by that board; therefore, it should be a short run of #16 to a common point and then a heavier conductor to the organ NEG.

Since the memory uses integrated circuits, the memory will be lost if a power failure should occur; therefore, the 6 volt power supply must be connected to an ALWAYS "HOT" receptacle in the console. An average installation of five (5) boards will draw about .2 amps at 5 Volts. With losses in the power supply and this load, the total 115 AC current is about the same as an electric clock.

A rechargeable battery is supplied to maintain the memory for about twenty (20) hours. When the power is restored, the battery will recharge automatically.

Each board is essentially a divisional control. The inputs may be paralleled. The transistor outputs may be considered switches from the organ negative to the coil of the stop and may therefore be paralleled as required.

General Installation Instructions

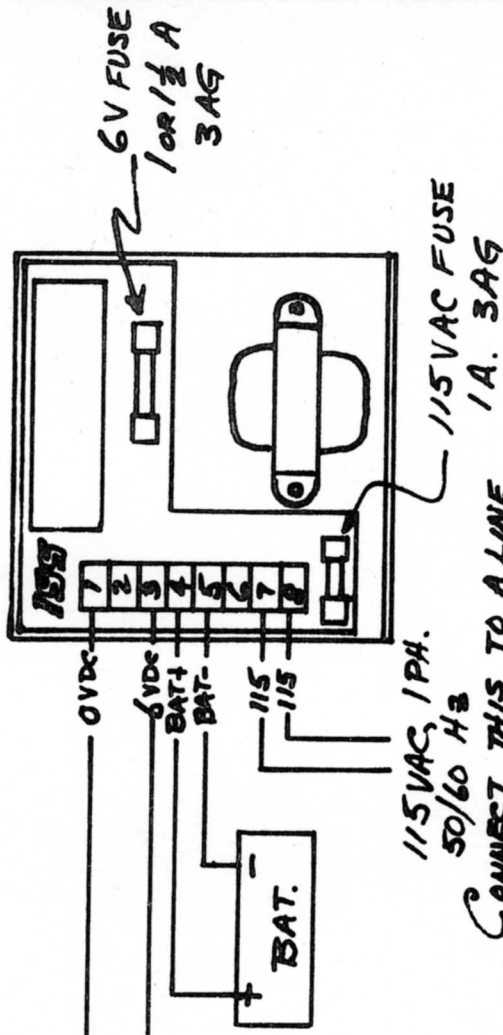
As a matter of practice, the first pistons wired on each board should be the generals. Piston 1 input on each board will be general 1, etc. The remaining pistons are then the divisional pistons and are connected to only that divisional board.

If a division exceeds 24 stops, a second board will be required for that division. For example, if 28 stops were specified, a Model 16-10 and a Model 12-10 would be required for that division. The piston input for the two (2) boards must be paralleled on the divisionals and generals.

If the total piston count (divisionals and generals) is greater than 16, then we can parallel the outputs (the off coil of stop 1 on board 1 with the off coil of stop 1 on the second board), and go up to 32 pistons.

The system can be expanded in both ways. If the console, however is small, the total number of boards may be cut down providing pistons are all generals. In a console with stop count of 24 or less, one board will handle the stops regardless of how they are broken up into divisions if the pistons are generals. From 24 to 48 stops, two (2) boards will suffice.

STAMPED COVER TO
PROTECT EXPOSED
115 VAC COMPONENTS



CONNECT THIS TO A LINE THAT IS ALWAYS "ON" EVEN IF THE ORGAN IS TURNED OFF.

CAUTION: POLARITY MUST BE OBSERVED OTHERWISE, EQUIPMENT DAMAGE WILL RESULT.

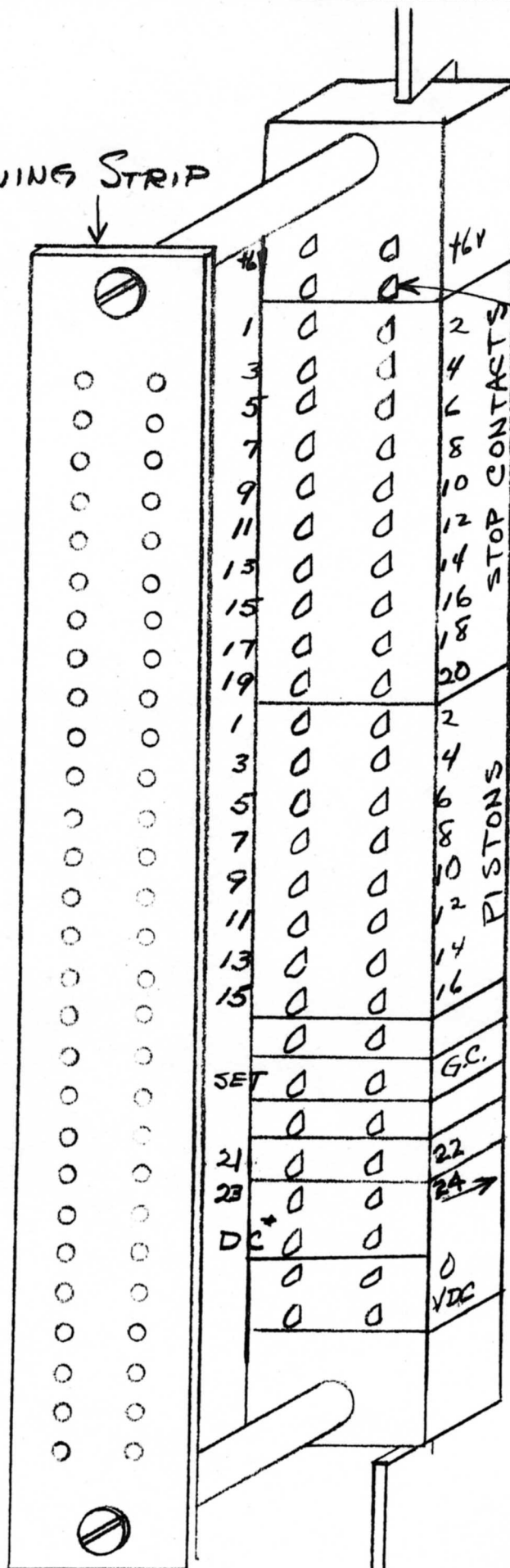
SHORT CIRCUIT ON 6V LINE WILL BLOW THE 6V FUSE.
115V FUSE FOR TRANSFORMER FAILURE.
ADJUSTMENT FOR BATTERY FLOAT VOLTAGE ONLY. 6.75 ± 0.02 VDC

ISS INDUSTRIAL SYSTEMS SERVICE
ERIE, PA. U.S.A.

SCALE: ~	APPROVED BY	DRAWN BY <i>EA</i>
DATE: 12-9-74		
MINI POWER SUPPLY HOOK-UP		
		DRAWING NUMBER A4065-05

FANNING STRIP

COMPONENT
SIDE OF
BOARD



THIS TERMINAL FOR BATTERY CONNECTION. JUMPER ON BOARD MUST BE CUT OR REMOVED.

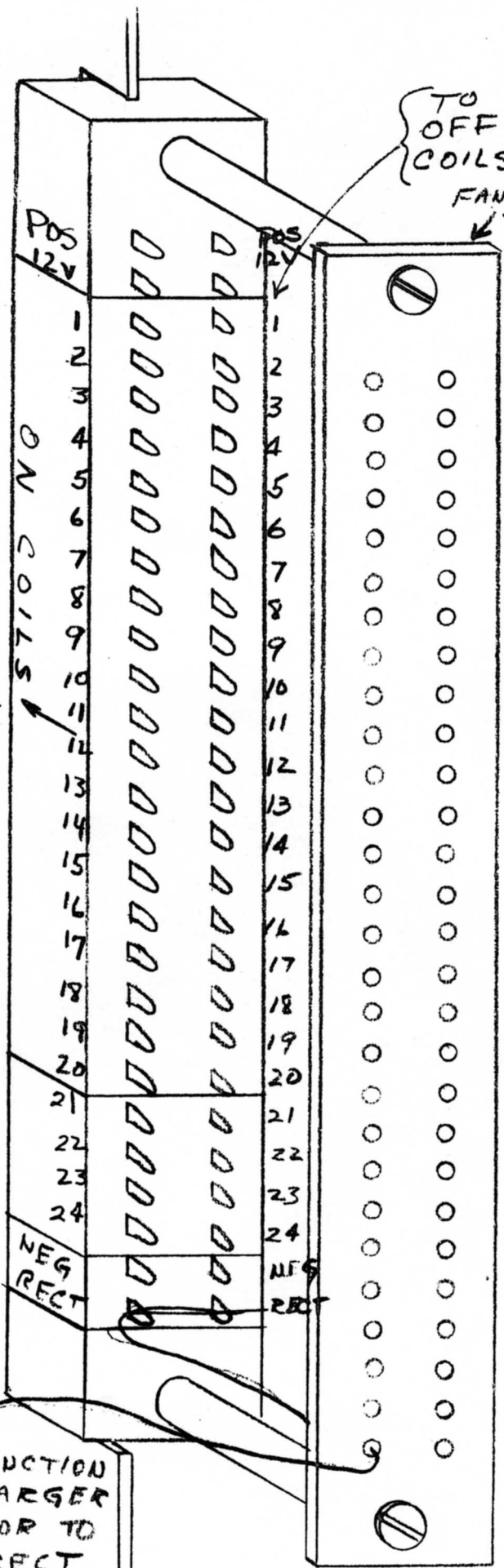
KEY LOCATED BETWEEN THESE 2 FINGERS

* DC = DIVISIONAL CANCEL

ISS ORGAN DIV

INPUT CONNECTOR

COMPONENT
SIDE OF
BOARD



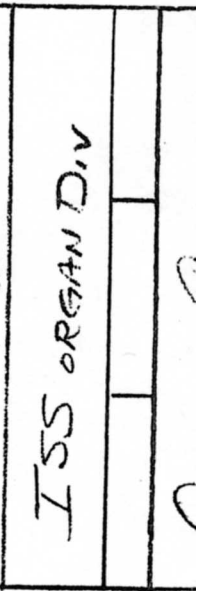
TO OFF
COILS
FANNING
STRIP

KEY BETWEEN
THESE 2
FINGERS

OUTPUT
CONNECTOR

STOP COIL
CURRENT
CARRIED
IN THIS
WIRE

#16 TO JUNCTION
THEN LARGER
CONDUCTOR TO
ORGAN RECT
NEG.



ISS ORGAN DIV

ISS MINI-COMBINATION NEW INSTALLATION

A. WIRING

1. Pistons

- a.) Use the first piston inputs for generals. Each general must be wired to each board. (General #1 is piston input #1 on each board, etc.).
- b.) Each divisional piston is wired to only the board for that division.
- c.) The General Cancel and Setter must be wired to each board.

2. Stop Inputs

- a.) Make a list of the stops in each division and assign a number to each of the stops. Wire the stop "on" contacts to the appropriate "on" contact inputs.
- b.) Wire the stop coils to the output connector, again using the list to determine which number to use. (#1 "on" contact corresponds to #1 "on" coil and #1 "off" coil).

3. Power Connections - Polarity Must Be Observed

- a.) The +6 VDC, + Rectifier, and 0 VDC (on the input connector) can be one line each of #16 guage wire from connector to connector.

The rectifier negative line should be short pieces of #14 or #16 guage wire from each board to a common point; then heavier wire to the rectifier negative. This line carries the entire current required by the stop coils.

- b.) Connect the battery to the terminals marked BAT + and BAT - only. Observe Polarity.

B. INITIAL TESTING

1. Disconnect Input and Output Connectors from all Boards.
2. Turn on the Rectifier.
3. Manually Turn off all Stops.

4. Check Coil Wiring.

- a.) Connect one end of the resistor wire supplied with the combination to the organ negative. Touch the other end to each of the "on" coil connections on the board connector. This should turn each stop on. If the stop does not move, check and correct the wiring. (If the resistor gets very hot, the wire is going directly to the rectifier Positive somewhere in the wiring).
- b.) Check each "off" coil in the same manner.

5. Stop "On" Contacts and Piston Inputs

If a buzzer, without a transformer or battery, is available, use it for the following tests. Otherwise, connect wires to a pilot light or use a voltmeter.

- a.) Turn all the stops off.
- b.) Connect one side to the rectifier negative.
- c.) Touch the other end to each of the stop "on" contact inputs at the board connector. The light or buzzer should NOT be on.
- d.) Turn all the stops on. The light or buzzer should now be ON.
- e.) Correct the wiring or stop contacts if either of these conditions are not met.

6. Piston Inputs

Use the buzzer or light for the following test:

- a.) Connect one end of the buzzer or light to the organ negative.
- b.) Touch the other end (or use a small alligator clip to clip on) to each of the piston inputs on the board connectors. The buzzer or light should NOT be on.
- c.) Push the piston and the buzzer or light should go on.
- d.) Check all the piston inputs and correct if required.

7. Power Connections

Use a D.C. Voltmeter

- a.) Connect the Common of the meter to the organ rectifier. Set the meter to read the rectifier voltage and check the rectifier Positive on each board output connector. It should read the rectifier voltage.
- b.) Turn the combination power supply on.

Connect the Common of the meter to the 0 VDC on the board connector input and check the + on the same connector. It should read + 5.3 to 5.8 VDC.

- c.) Double Check Polarities (CAUTION)
 - (1) Reversed rectifier voltage will destroy the output transistors.
 - (2) Reversed combination power supply voltage will destroy the integrated circuits on the boards.

8. Turn off the Rectifier and Combination Power Supply.

Put the connectors on the boards. Turn on the power supplies and things should go.

CAUTIONS

1. CHECK ALL POLARITIES BEFORE PLUGGING IN THE BOARDS !

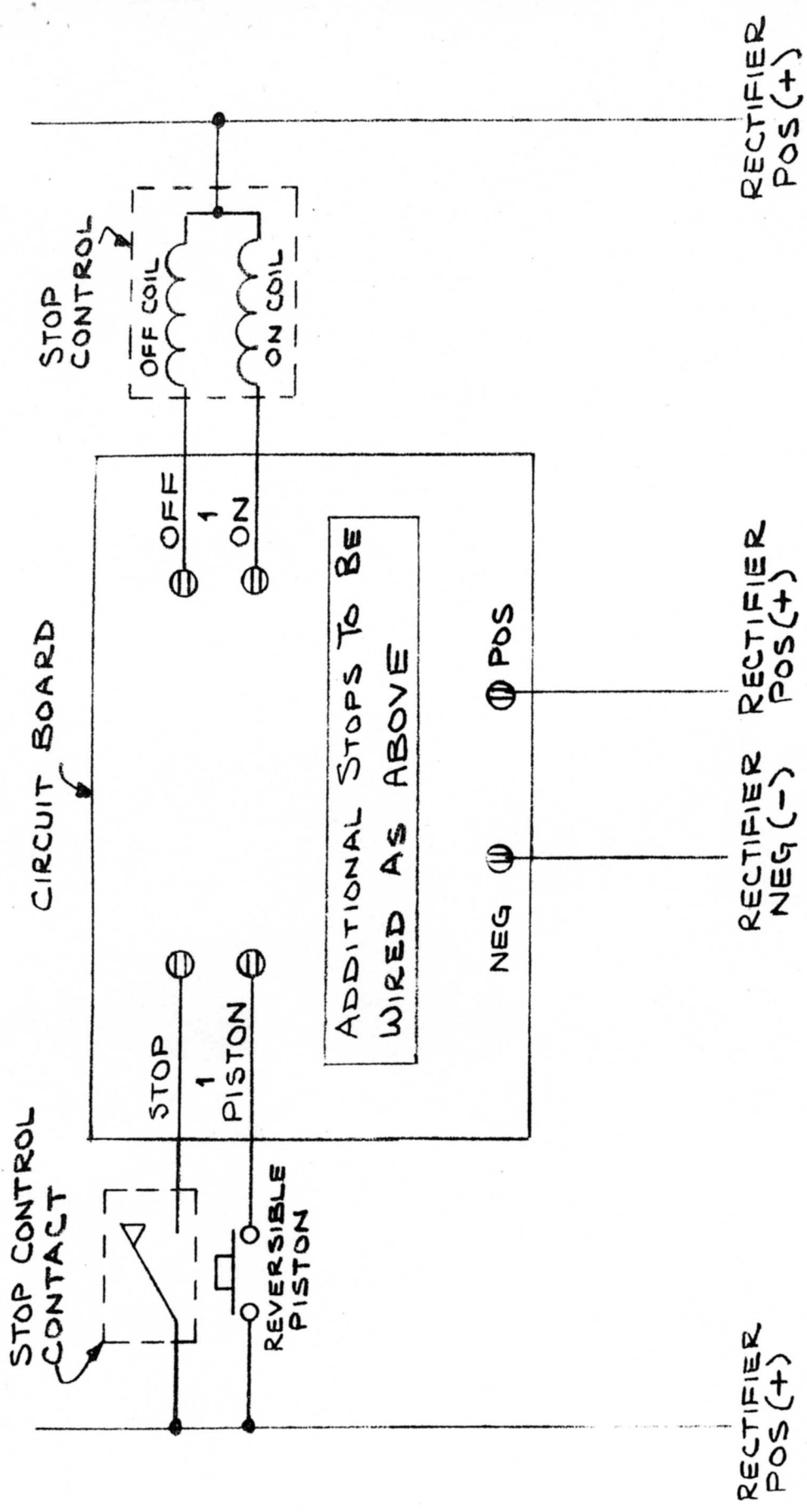
Rectifier polarity reversed will destroy the output transistors.
Reversed 0 and +6 VDC will burn out the integrated circuits.
The connectors and boards are indexed to prevent input and output reversal as well as up-side-down insertion.

2. DO NOT FLEX THE BOARDS !

The boards can withstand shock and vibration, but flexing may break leads on various components.

3. DO NOT ADJUST THE 6 VOLT POWER SUPPLY !

The adjustment on the power supply is only for setting the float voltage of the battery. With the battery leads disconnected, this voltage is set to 6.82 ± 0.02 VDC. This adjustment is made at the factory and usually does not need re-adjustment.



ISS, ORGAN DIV.
 ERIE, PA. U.S.A.
 STANDARD STOP CONTROL



INDUSTRIAL SYSTEMS SERVICE, INC.

1610 LINDEN AVENUE • ERIE, PENNSYLVANIA 16505
TEL: (814) 838-8660

December 1, 1974

MINI II SPECIFICATIONS

(Blue Boards)

Physical - 9.0" W (22.9 cm) x 12.0" L (30.5 cm) x 0.60" D (1.5 cm)

With connectors 14.7" long (37.3 cm)

Mounting - Any position, minimum spacing 1", connector ends open for ventilation.

Connectors - Amphenol 225-22821-401-117 with spacers and fanning strip.

Ambient Temperature - (operating) - 0 to 65° C (32 to 149° F)
(non-operating) - -65 to +125° C (-85 to 257° F)

Electrical - Logic Input - 5.10 to 5.85 VDC
Driving Transistors - 9.0 to 16.5 VDC

Current Required -

<u>Model</u>	<u>Logic Quiescent</u>	<u>Quiescent Power (Max.)</u>	<u>Pulsed Current * 13.0 VDC</u>	<u>Pulsed Power *</u>
8-	17-25 Ma	.125 Watts	.32 Amps	4.16 Watts
12-	26-37 "	.185 "	.48 "	6.25 "
16-	34-50 "	.250 "	.64 "	8.32 "
20-	42-62 "	.310 "	.80 "	10.40 "
24-	51-75 "	.375 "	.96 "	12.48 "

* Pulsed power is during the time the stops are activated with a piston; otherwise, there is no current required from the rectifier.

Piston action timed for approximately 1/2 second.

Determination of power supply requirements:

1. Add total number of stops (1st number in the model number).
2. This number must not exceed 250 for one power supply.

MINI II POWER SUPPLY

Operating Voltage	- 85 to 135 VAC, 50 or 60 Hz, 0.1 Amp max. 115 VAC fused at 1 Amp for inrush and transformer failure. 6 VDC fused at 1 Amp.
Output Voltage	- 5.10 to 5.7 VDC, depending on loading and circuit components. 6.77 \pm 0.02 VDC battery float voltage (battery disconnected) Charge current into fully discharged battery 0.2 A. Charge time for fully discharged battery - Approx. 48 Hrs.
Output Current	- Limited to approx. 1 Amp.
Over-voltage Protection	- Crowbar to blow 1 or 1-1/2 amp fuse (6 V)
Physical	- 6" L x 2-1/4" W x 5" H
Termination	- RD1 barrier strip, will accept bare wires or crimp terminals.
Cover	- Over 115 VAC portion of barrier strip and 115 VAC line fuse.
Mounting	- Any position, two 1/4" holes on the bottom for screws.
Heatsink	- (Aluminum Bracket) electrically isolated.

BATTERY

Elpower Model EP-675C

Rechargeable Solid-gel Battery

Physical

- 6" x 2" x 4" high

The cell may be shipped in any position. It should be mounted in the upright position in service.

Termination - Quick disconnect - Amp Faston or equivalent

Operating Temperature - -40° to 60° C (-40° to 140° F)

Capacity - 7.5 AH

Typical Condition - 100 stops - (five - 20 stop boards)
Battery will hold memory about 24 hours.

TROUBLE SHOOTING

1. Initial installation - See Installation Instructions.
2. Do not remove IC's from their sockets. Static charge will destroy them out of their sockets. Warranty is voided if IC's are removed from the sockets.
3. Problems after installation and checkout
 - A. All stops and pistons inoperative
 - 1.) Any general, general cancel, or setter piston stuck on.
 - 2.) 6 Volt power supply off or low voltage at output. Out put should be 5.15 to 5.7 VDC.
 - 3.) Rectifier voltage not at the output connector.
 - 4.) Rectifier voltage not present at the stop coils.
 - 5.) Loose wire.

In general, each division is a separate card and there has to be a common problem to disqualify the entire combination. Since each card has a timed output, a stuck general, general cancel or setter piston will hang the system up.

Other common areas are: positive 6 VDC, rectifier positive, 0 VDC from the power supply and negative from the rectifier.

B. Division Inoperative

- 1.) Divisional piston or cancel stuck on.
- 2.) Loose or disconnected connector.
- 3.) CAUTION: Turn rectifier off before disconnecting or connecting boards.
Exchange boards with a division that is working. (If a board of the same or larger model number is used, all the stops should work. If a smaller model number is used, only that number of stops will function.)
- 4.) If the exchange board does work, return the defective board to the factory.
- 5.) If the exchange board does not work, check the + 6 and 0 V on the input connector, and the pos. and neg. rectifier voltage on the output connector. They must be there.
- 6.) Push all stops off and check the input connector for any rectifier voltage on the input connector. It should not be there.
- 7.) The output transistor is a switch to the rectifier negative; therefore, rectifier voltage should be present at each of the "on" and "off" pins on the output connector (on and off coils). If there is no voltage here, check the common pos. to the stops in this division.

C. Stops in a division not setting or always setting on.

- 1.) CAUTION: Turn rectifier off before connecting or disconnecting boards.
Exchange boards (depending on how the console was wired and where the stop is; a smaller model number board may not operate this stop. A model number equal or greater will affect all the stops in the division).

- 2.) If the substitute board does work, return the defective board to the factory for repair.
 - 3.) If the substitute board does not work, check the input voltage from the stop action contact and the wiring to the connector.
- D. Stops in a division always energized when the rectifier is turned on.
- 1.) Turn rectifier off, disconnect the output connector from the card. Turn the rectifier on. If the stop is still energized, look for a short in the wiring or on the stop or junction board.
 - 2.) If the stop is not energized with the output connector off, the output transistor is shorted and must be returned to the factory for repair.
- E. Stops dead on or dead off.
- 1.) CAUTION: When exchanging boards, turn rectifier off. Exchange board with one that is working. If the exchange board works, the output transistor on the defective board is open. Return the board to the factory for repair. Check this coil for a minimum resistance of 20 ohms. A shorted or partially shorted coil will blow out the output transistor.
 - 2.) If the exchange board does not work, check the wiring and the coil of the stop.
- F. Slow or sluggish stops.
- 1.) This is usually a mechanical problem in the stop. Dust, dirt or mechanical wear may cause the armature to rub on the pole piece. This may not be obvious until voltage is applied to the stop. Lightly hold the stop and activate the piston.
 - 2.) Use the test wire (a length of wire with a 4.7 ohm 1/2 watt resistor, supplied with the combination) from rectifier negative to the combination output for that stop. If the stop works snappy, the output transistor should be replaced. Return it to the factory for replacement. Put a note on the board when it is returned. Also, check the resistance of the stop.