

# OBSOLETE

## **Time Interval Control Model FET-2**

Part 104 334A



NORDSON CORPORATION • AMHERST, OHIO • USA

OBSOLETE

## CONTENTS

Title Page . . . . .	17-5-0
Contents . . . . .	17-5-00
Description . . . . .	17-5-1
Specifications . . . . .	17-5-2
Installation . . . . .	17-5-3
Photosensor Installation . . . . .	17-5-4
Electro Products Sensor Installation . . . . .	17-5-5
Peco Sensor Installation . . . . .	17-5-6
No Can No Spray and Installation . . . . .	17-5-7
Operation Timing Range Selection . . . . .	17-5-8
Initial Start-Up . . . . .	17-5-14
Daily Operation . . . . .	17-5-15
Maintenance . . . . .	17-5-15
Troubleshooting . . . . .	17-5-16
Electrical Diagram . . . . .	17-5-19
Parts List . . . . .	17-5-22
Recommended Spare Parts List . . . . .	17-5-23
Supplemental Parts List . . . . .	17-5-23

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**Nordson Corporation**  
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SUPERSEDES 9/79

**TECHNICAL PUBLICATION 17-5-1**

ISSUED 5/82

## **MODEL FET-2 TIME INTERVAL CONTROL**

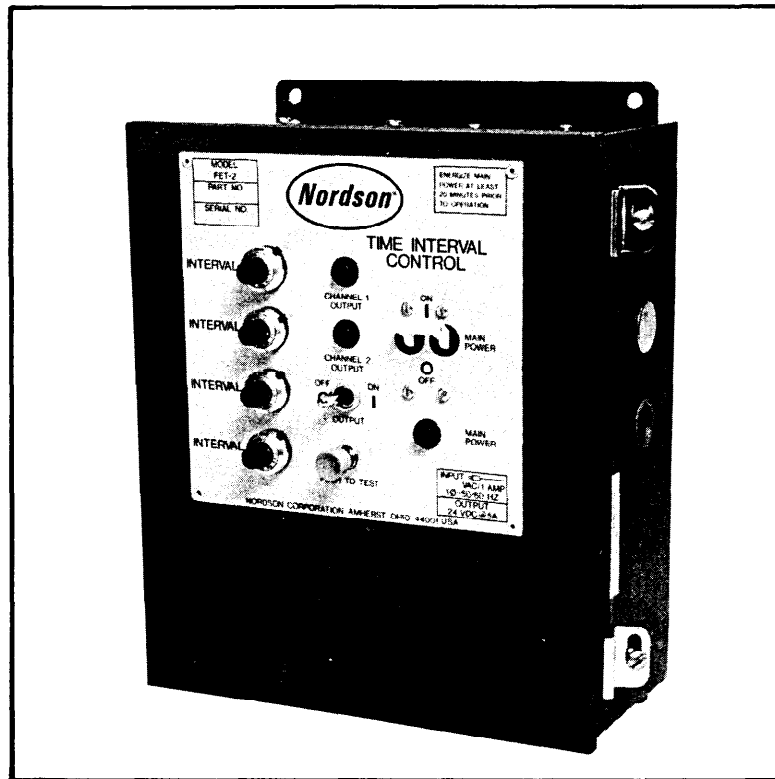


Figure 1 - Model FET-2 Time Interval Control

### **DESCRIPTION**

The Model FET-2 Time Interval Control is a solid-state sequential timing device that has four (4) timers and two (2) output channels that may operate together in a series mode or as two separate channels in a parallel mode. The FET-2 has a no can/no spray feature that assures gun cycling only when a can is on station.

A signal from a triggering device (photocell, limit switch, proximity amplifier) starts the timing sequence which (in the series mode) consists of a delay time interval followed by a pre-set duration time interval which is then followed by another delay and duration sequence.

In a parallel mode the FET-2 will provide two distinct timing intervals each made up of one delay and one duration interval triggered by a single triggering device. (See operating instructions for mode selection information.)

**NOTE:** The FET-2 will operate one or more 24 VDC solenoids or electric guns provided the total current draw does not exceed 4.0 amperes.

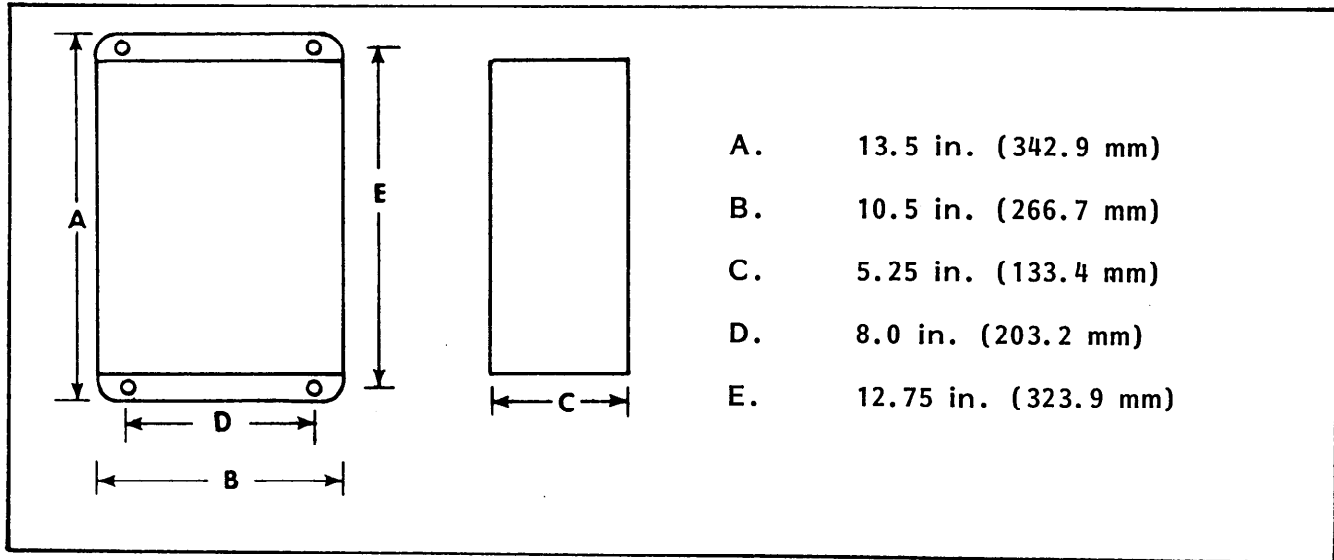


Figure 2 - Model FET-2 Dimensions

## Time Ranges

T1

2-100 milliseconds (low)

T2

20-1,000 milliseconds (high)

## Repeat Accuracy Error

Less than  $\pm 1/4\%$  of set time

## Temperature Drift

Less than  $\pm 2\%$  from 32°F (0°C) to 140°F (60°C)

## Operating Temperature Range

32°F (0°C) to 140°F (60°C)

## Input Trigger

Photosensor/breaklight, photosensor/makelight, contact opening, contact closing, and a positive voltage signal. Triggering level is 14 VDC maximum.

## Output

Operates one or more 24 VDC solenoids provided the total current of all solenoids does not exceed 4.0 amperes; 2.0 amperes per channel.

## Power Requirements

120 VAC, 50/60 Hz, 1 Phase  
240 VAC, 50/60 Hz, 1 Phase



# **INSTALLATION\***

1. Install the timer on the parent machine or separate stand so that the front panel is readily accessible.

**NOTE:** Do not subject the timer to excessive vibration. Use vibration insulators if necessary.

Do not subject the timer to excessive dust or moisture.

2. Open the cabinet door after loosening the two (2) retaining clip screws.
3. Make all electrical connections on the terminal board (TB1) located in the upper right corner of the cabinet.

**NOTE:** There are two (2) models of the FET-2 Time Interval Control available. Be sure to connect the timer to the correct power supply.

 Applying the incorrect voltage may damage the components. Refer to wiring tag on unit for 240 VAC installation.

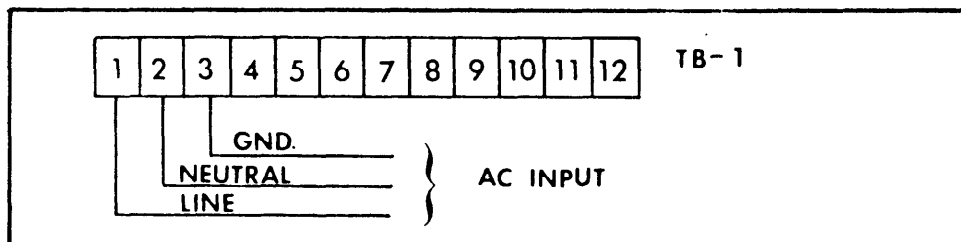
To make the electrical input connections follow these steps:

- a. Confirm the voltage requirements of your FET-2. Check the nameplate for part number and voltage specifications.

**NOTE:** Do not field convert the timer from one voltage requirement to another.

- b. Attach L1 to terminal #1; attach the neutral side of the power supply to terminal #2; secure the grounding wire to terminal #3.

**NOTE:** Make certain the FET-2 cabinet is properly connected to an earth ground. Wiring from the FET-2 to a solenoid or electric gun must be installed in rigid or flexible metal conduit. The conduit must be conductively connected to the grounded metal of the FET-2.



**Figure 3 - Input Power Electrical Connections**



To avoid electrical shock during installation and troubleshooting, install a power isolating device on the service line ahead of the Time Interval Control. Using this device, shut off all power to the timer during installation and service operations.

\*Leave jumpers connected between terminals 1 & 2, 2 & 3 on terminal board #3, whenever no can, no spray feature is NOT being used.

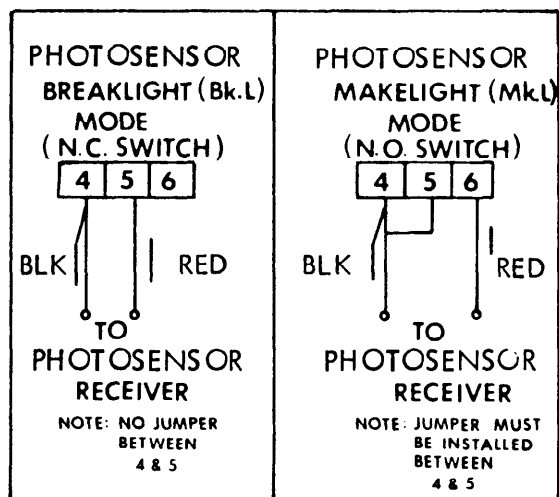
5/82 - Warning changed.

**PHOTOSENSOR INSTALLATION**

The Photocell and light source (see supplemental parts list) have 20 Ft. (6.1 meters) shielded cables. For best response, position the photocell and light source as close together as possible; no more than 6 Ft. (1.8 meters) apart.

1. To connect the trigger input (phototransistor receiver) electrically to the FET-2 use one of the following procedures:

- a. For photosensor breaklight (or normally closed switch) mode connect lead wires to terminals #4 and #5. Then secure the cable shield to terminal #4. Do not ground the shield at the other end - false triggering may result.
- b. For photosensor makelight (or normally open switch) mode connect lead wires to terminals #4 and #6. Then secure the cable shield to terminal #4. Do not ground the shield at the other end - false triggering may result.



NOTE: Install a jumper across terminals #4 and #5 when using the makelight (normally open) mode. Do not remove jumpers 3 and 4 on the Factory side of TB-1.

Figure 4 - Trigger Input Connections



The Black lead must be attached to terminal #4.

2. Connect the light source electrical leads to terminals #7 and #8.
3. Connect the gun solenoids (24 VDC only) to the Timer in this manner:
  - a. Channel 1 solenoids (no more than 2.0 amps total) are connected to terminals #9 and #10.
  - b. Channel 2 solenoids (no more than 2.0 amps total) are connected to terminals #11 and #12.



Do not short out or jumper terminals #9, #10, #11 and #12. Make sure terminals #1, #2, and #3 on TB3 are jumpered.

4. The Time Interval Control is ready for operation.

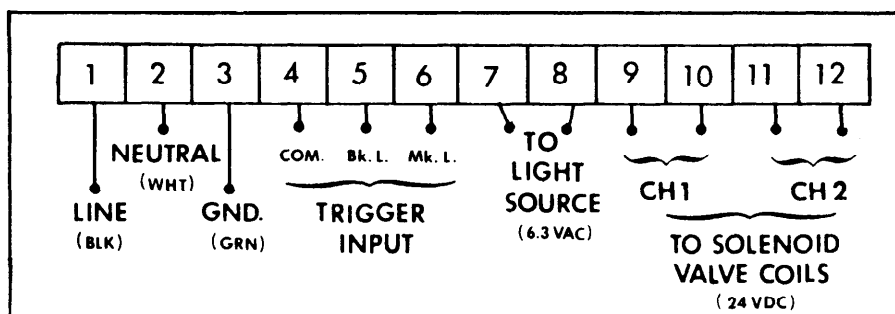


Figure 5 - TB1 Electrical Connections



SUPERSEDES

ISSUED 9/79

## ELECTRO PRODUCTS SENSOR INSTALLATION

The FET-2 may also be triggered by a proximity amplifier and sensor. The proximity switch replaces the photocell in the installation procedure. Refer to Figure 6.

Use these steps to connect a proximity sensor similar to the 120 VAC Electro Products, Inc. Proximity Amplifier (#55141) and Sensor Head (#4943C) to the 120 VAC Time Interval Control.

1. Wire the input power leads of the amplifier to terminals #1 and #2 on TB1.
2. Connect the amplifier to the FET-2 at terminals #4 and #5 (in the break-light mode). The shield is attached to terminal #4. The conductor lead is attached to terminal #5.
3. The remainder of the system is installed as described in Steps 3 and 4 above.

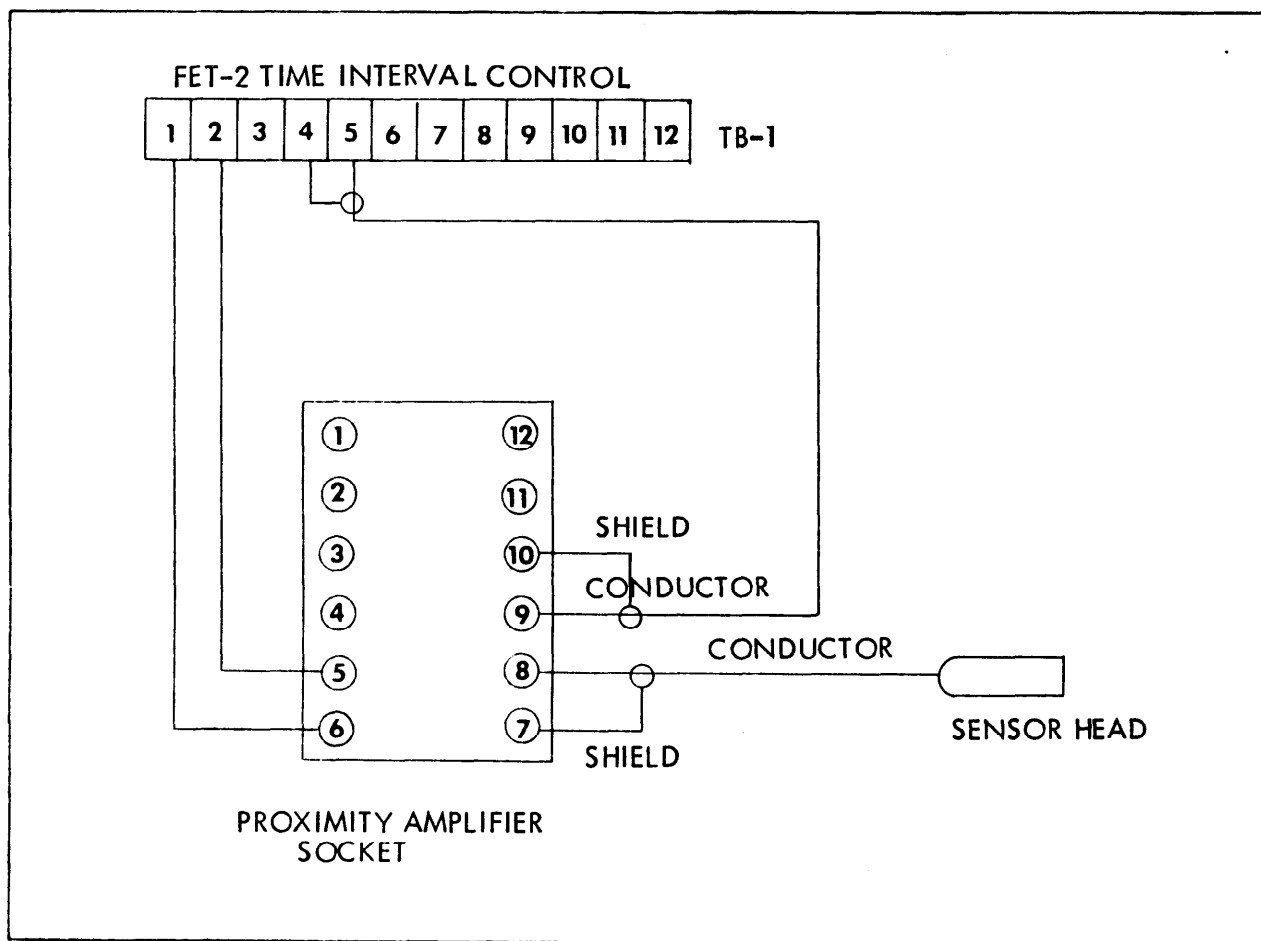


Figure 6 - FET-2 Triggered by Electro Products Proximity Amplifier

**PECO SENSOR INSTALLATION**

Use the following steps to install a proximity sensor similar to the Peco Model PM Proximity Amplifier on the FET-2 Time Interval Control. Refer to Figure 7 and Supplemental Parts List.

1. Wire the input power leads of the proximity amplifier to terminals #1, #2 and #3 on TB1.

**NOTE:** Be sure to use the proper voltage Peco equipment with the FET-2 Time Interval Control.

2. Connect the amplifier to the FET-2 in the makelight mode. The shield is connected to terminal #4; the conductor lead is attached to terminal #6. Then place a jumper across terminals #4 and #5. Do not remove jumpers 3 and 4 on the Factory side of TB-1.
3. The remainder of the system is installed as described in Steps 3 and 4 above.

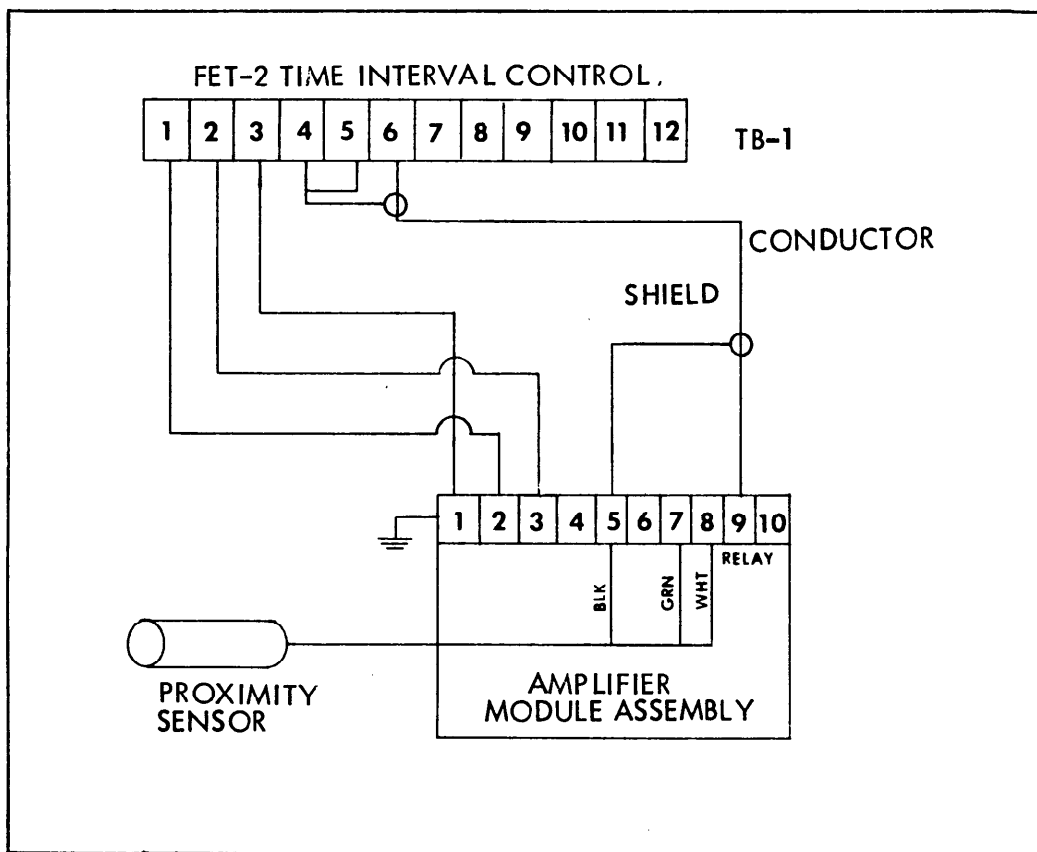


Figure 7 - FET-2 Triggered by a 120 VAC Peco Corporation Proximity Amplifier





# **FET-2 NO CAN/NO SPRAY FEATURE**

The FET-2 is especially suited for dual spray station can lining operations. This system uses the Peco Corporation Model PM proximity amplifiers and sensors. The no can no spray feature prevents the gun from firing if no can passes in front of the sensor.

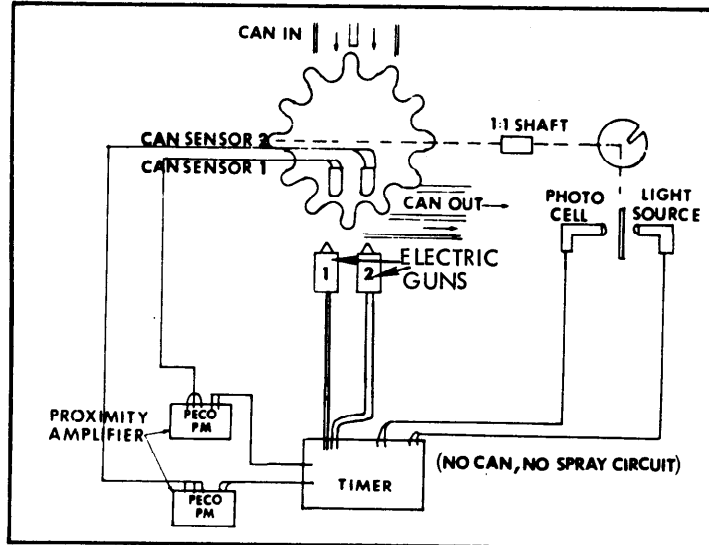


Figure 8 - Typical Internal Can Lining System

Electrical connection of the Peco sensors and amplifiers (one for each channel) is made by following the diagram below.

1. Remove the jumpers from terminal board #3.
2. Install the sensors as shown in Figure 9.
3. Set the series-parallel switch in parallel mode (Figure 10, Key E).
4. Set the output switch (Figure 10, Key F) as follows:

#1 (TI<sub>4</sub>) - "ON"  
#2 thru #5 - "OFF"  
#6 (TI<sub>2</sub>) - "ON"

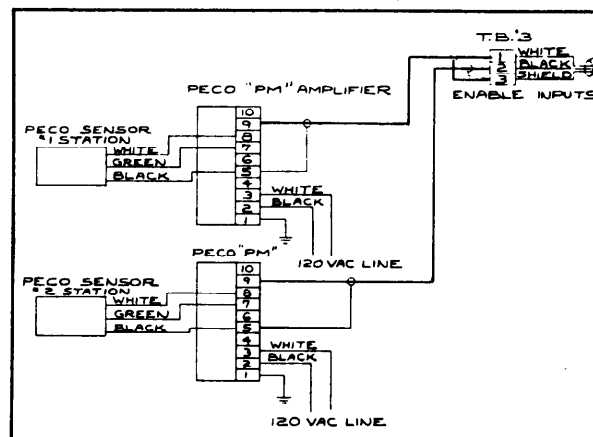


Figure 9 - Peco PM Proximity Amplifier Electrical Installation

## OPERATION

The FET-2 Time Interval Control when signalled by a triggering device (photo cell proximity sensor, limit switch), provides a pre-set delay which is followed by a process that is programmed at the FET-2 circuit board. The gun solenoid or electric gun (24 VDC only) is connected electrically to the timer and controls the firing of the gun.

**NOTE:** Each gun in the system must be activated by its gun solenoid. To improve the gun's response a three-way air relay valve may be installed between the gun and the solenoid. Electric guns are connected directly to the FET-2.

### Circuit Board Controls

The FET-2 offers two timing ranges which are selected by a series of four (4) slide switches located on the lower portion of the circuit board.

Each slide switch corresponds with a timing range dial of the cabinet face.

Switch	Time Interval
A	TI-1
B	TI-2
C	TI-3
D	TI-4

Sliding the switches toward the rear of the cabinet provides the low (short) timing range (2-100 milliseconds).

Sliding the switches toward the front of the cabinet provides the high (long) timing range (20-1,000 milliseconds).

Switch Position	Timing Range
Rear	2-100 ms
Front	20-1,000 ms

The mode switch (E) selects the operation of the FET-2.

Sliding the switch toward the rear of the cabinet provides a series operation.

Sliding the switch toward the front of the cabinet provides a parallel operation.

The output switches (F) select the delay or duration for time intervals 2, 3 and 4. (TI<sub>1</sub> is always a delay interval so no switch is provided).

The fuse (G) protects the circuit board from damage due to electrical failure.

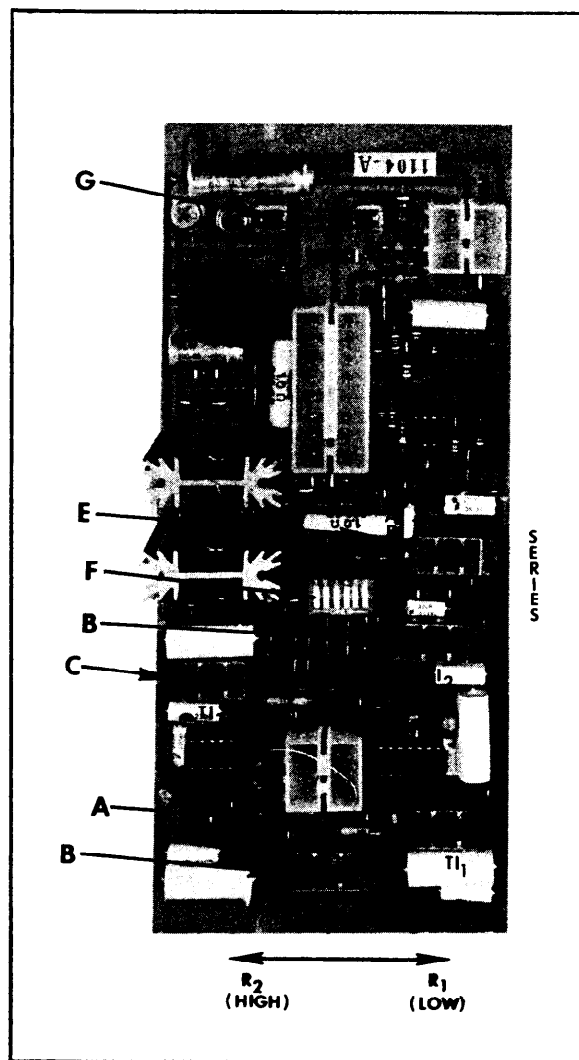


Figure 10 - FET-2 Circuit Board



## OPERATION, (Continued)

The six output slide switches located on the FET-2 circuit board program the Time Interval Control and the firing of the guns. Sliding a switch to the on position provides a duration; with a switch in the off position the guns will not fire during that time interval (a delay).

**NOTE:** To simplify understanding and programming the output switch think of the switch as two switches: Positions #1, #2 and #3 are Channel 2; Positions #4, #5 and #6 are Channel 1. Always program this switch in two steps - Channel 2 followed by Channel 1. (See Figure 11).

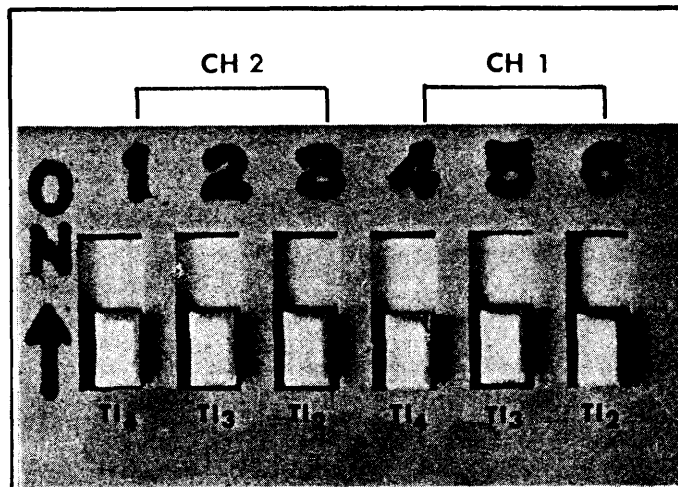


Figure 11 - Output Switch

### Channel 2

Position #1 activates Time Interval 4.  
Position #2 activates Time Interval 3.  
Position #3 activates Time Interval 2.

### Channel 1

Position #4 activates Time Interval 4.  
Position #5 activates Time Interval 3.  
Position #6 activates Time Interval 2.

**NOTE:** Time Interval 1 (TI1) is always a delay interval so no program switch is provided.

### Parallel Mode Programming

Programming the FET-2 in the parallel mode establishes the two output channels as independent circuits that fire the guns from a single triggering device. Each channel will provide one delay interval followed by a duration interval. (See Figure 12.)

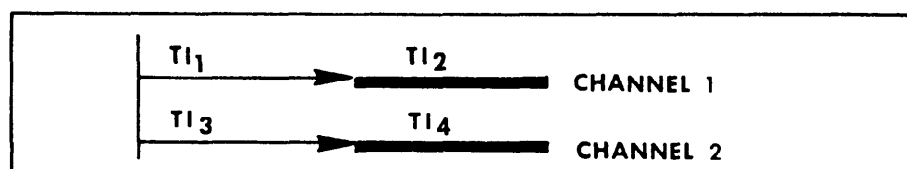


Figure 12 - Parallel Mode

## OPERATION, (Continued)

Programming the parallel mode is simple since there is only one configuration possible.

1. Program Channel 2.
  - a. Slide position 1 switch to on.
  - b. Slide position 2 switch to off.
  - c. Slide position 3 switch to off.
2. Program Channel 1.
  - a. Slide position 4 switch to off.
  - b. Slide position 5 switch to off.
  - c. Slide position 6 switch to on.
3. The parallel mode is programmed.

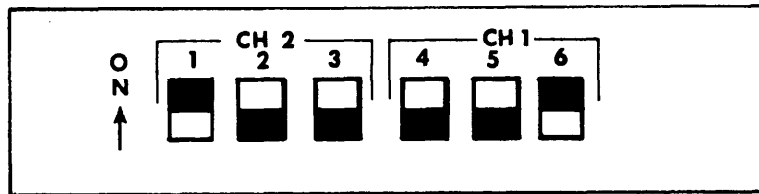


Figure 13 - Parallel Mode Program

NOTE: The ten-turn potentiometers on the cabinet face will determine the actual time interval length in milliseconds.

### Series Mode Programming

Programming the FET-2 in the series mode establishes the two output channels as independent circuits that fire the guns in a sequence of four time intervals.

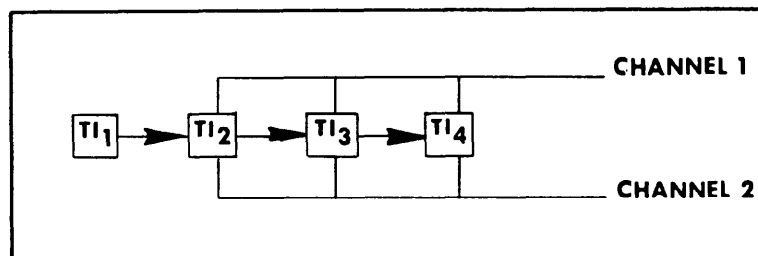


Figure 14 - Series Mode

Using the program switch (see Figure 11) the FET-2 can be set up to apply any one of seven possible bead patterns. Because the two output channels can be programmed independently the timing pattern for one channel can differ from the pattern for the other channel.



SUPERSEDES  
OPERATION, (Continued)

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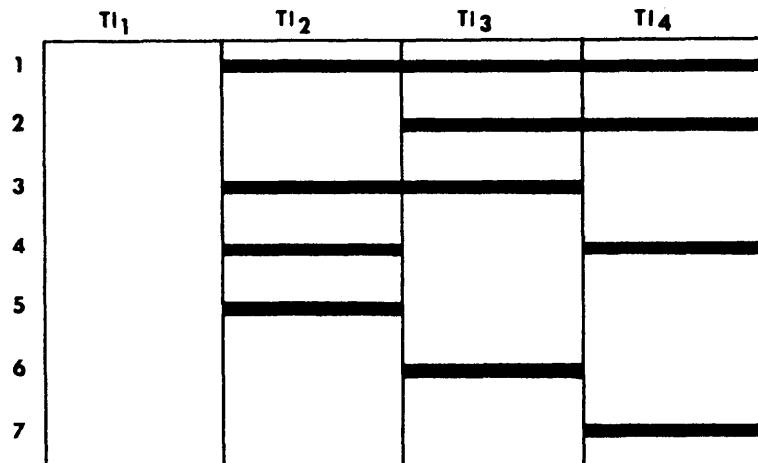


Figure 15 - Series Mode Bead Patterns

Programming the FET-2 in the series mode is more involved than programming in a parallel mode because there is more than one possible timing pattern available.

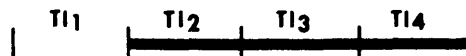
NOTE: To simplify setting up the output switch set up Channel 2 first, then program Channel 1.

1. Program Channel 2.

- a. Decide on the bead pattern to be used.

NOTE: Triggering of a gun occurs during a duration interval only. A duration interval is obtained by moving the correct slide switch to the on position. If all six output switches are off the guns cannot fire.

Example: Desired spray pattern for Channel 2 is a gap followed by a continuous stripe.



- b. Time Interval #1 is always a delay - no programming switch necessary.  
c. Slide switch 3 to on.  
d. Slide switch 2 to on.  
e. Slide switch 1 to on.

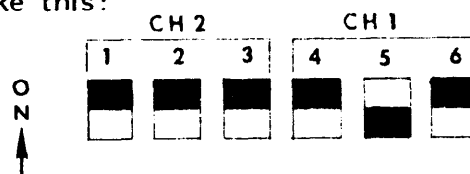
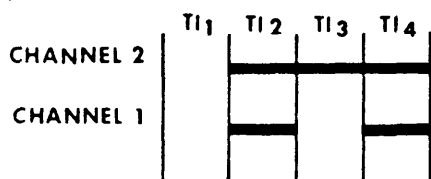
2. Program Channel 1.

- a. Decide on the timing pattern to be used.

Example: Desired spray pattern for Channel 1 is a gap-spray-gap-spray configuration.



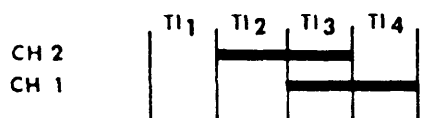
- b. Time Interval #1 is always a delay - no programming switch necessary.
  - c. Slide switch 6 to on.
  - d. Slide switch 5 to off.
  - e. Slide switch 4 to on.
3. The spray pattern will look like this:
  4. The output switch will be programmed like this:



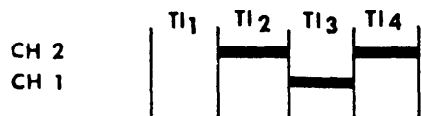
NOTE: The ten-turn potentiometers on the cabinet face will determine the actual time interval length in milliseconds.

#### Spray Pattern

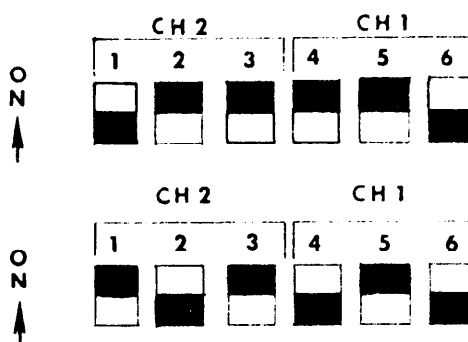
Example #2:



Example #3:



#### Output Switch Programming



#### Summary of Output Programming

Switch positions #1, #2 and #3 control the TI4, TI3, and TI2 of Channel 2 respectively.

Switch positions #4, #5 and #6 control the TI4, TI3, and TI2 of Channel 1 respectively.

Sliding the switch up provides a duration.

Sliding the switch down provides a delay.

The guns will fire in duration position only.

The guns never fire during Time Interval #1.



## OPERATION, (Continued)

### Cabinet Panel Controls

The four (4) ten-turn locking potentiometers on the cabinet face permit adjustment to the time intervals (in milliseconds) desired. The dial readings are only approximate. Fine tuning of the delay and duration dials will be necessary after setting up a timed system. However, once set, repeat accuracy will be within  $\pm 1/4\%$ .

When the FET-2 is used in the parallel mode the two upper dials control the Channel 1 intervals, while the two lower dials control the Channel 2 intervals.

When the FET-2 is used in the series mode the upper dials control Time Intervals 1 and 2; the lower dials control Time Intervals 3 and 4.

The output lamps flash to indicate the Timer is functioning.

A circuit breaker both controls the timer and protects it from damage due to electrical failure. (Old style units have a switch and 1 Amp slow blow fuse.)

A pushbutton is provided to manually test the time settings.

An output switch controls power to the solenoids. This switch is used for warm up of the timer.

### Potentiometer Adjustment

Dial Setting	Low Range (ms) Approximate	High Range (ms) Approximate
0	1.0	10.0
1.0	10.	100.
2.0	20.	200.
3.0	30.	300.
4.0	40.	400.
5.0	50.	500.
6.0	60.	600.
7.0	70.	700.
8.0	80.	800.
9.0	90.	900.
10.0	100.	1,000.

Figure 16

5/82 - Components added.

## INITIAL START-UP

The FET-2 Time Interval Control must be keyed to the line speed of the parent machine. This keying is done during the initial start-up procedure. (Refer to figure 16 for example.)

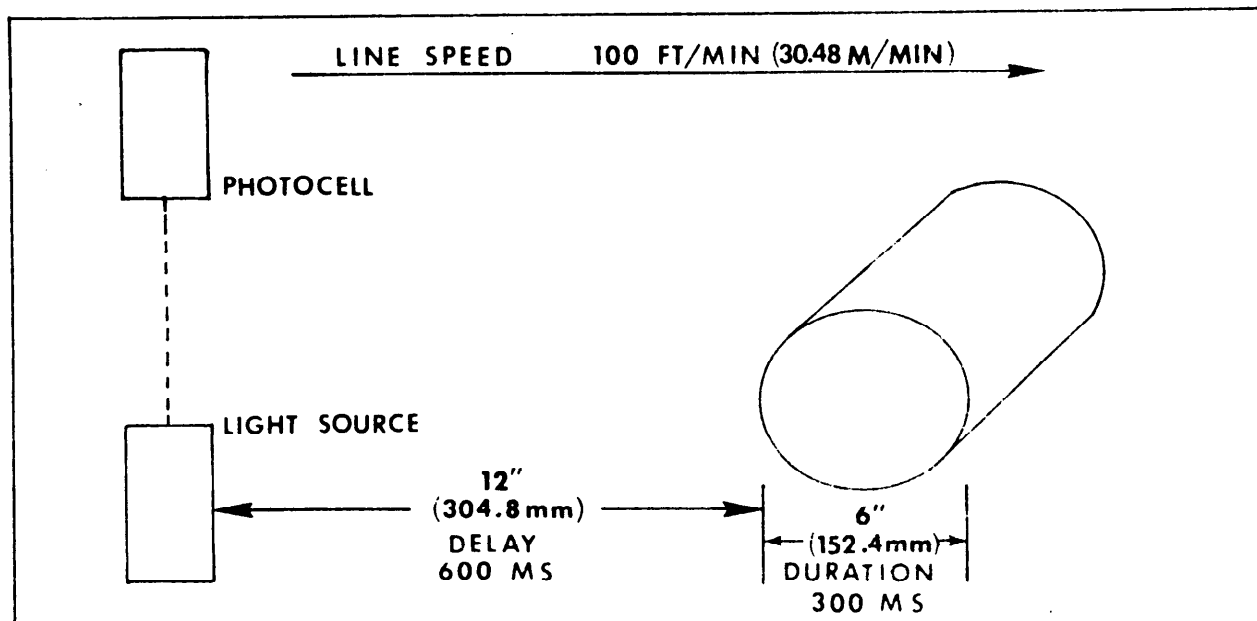


Figure 17 - Time Interval Sequence

1. Determine the DELAY interval in milliseconds using the following formula:

For USA 
$$\text{Time Interval} = \frac{\text{Distance (in inches)}}{\text{Line Speed (FPM)} \times .002} = \frac{12 \text{ inches}}{100 \text{ FPM} \times .002} = 600 \text{ ms}$$

For METRIC 
$$\text{Time Interval} = \frac{\text{Distance (in mm)} \times 60}{\text{Line Speed in MPM}} = \frac{304.8 \text{ mm} \times 60}{30.48 \text{ MPM}} = 600 \text{ ms}$$

2. Determine the remaining time intervals using the same formula as in the previous step.

USA Example

$$\frac{6 \text{ inches}}{100 \text{ FPM} \times .0002} = 300 \text{ ms}$$

METRIC Example

$$\frac{152.8 \text{ mm} \times 60}{30.48 \text{ MPM}} = 300 \text{ ms}$$

3. Using the figures obtained in Steps 1 and 2 compute the dial setting required using the chart (Figure 16) or the following formula:

LOW RANGE setting =  $\frac{\text{Time Interval}}{10}$

HIGH RANGE setting =  $\frac{\text{Time Interval}}{100}$

Example:

HIGH RANGE 
$$\frac{\text{DELAY}}{100} = \frac{600}{100} = 6.0$$

$$\frac{\text{DURATION}}{100} = \frac{300}{100} = 3.0$$





**INITIAL START-UP, (Continued)**

4. Unlock the dials, set them to the determined settings, then lock the dials in place.
5. Slide the switches on the circuit board (see Figure 10) to the correct range position.
6. Turn the output switch to OFF.
7. Turn the FET-2 timer on. The indicator lamp next to the main power switch should glow.
8. Allow a 20 minute warm up, then turn the output switch to ON.
9. Since dial readings are only approximate, fine tuning of the delay and duration will be necessary before starting production line. Once dials are fine tuned additional adjustment should not be needed.

**DAILY OPERATION**

**DAILY START-UP**

Once the FET-2 Time Interval Control has been installed and the timing established, it is not necessary to re-adjust the unit unless the line speed is altered or substrate size is changed.

To activate the timer, turn the output switch to OFF then turn the unit on at the timer circuit breaker. The indicator light should glow. Allow a 20 minute warm up then turn the output switch to ON.

**DAILY SHUT DOWN**

Turn the Time Interval Control off at the timer circuit breaker.

**MAINTENANCE**

**General**

As with any solid-state device, the Model FET-2 Time Interval Control requires no periodic maintenance unless the unit is subjected to adverse environmental conditions such as dust, vibration or moisture. Nevertheless, difficulties may occur with the operation of a timer system. Before troubleshooting the FET-2, determine that the problem does in fact rest with the control.



Servicing the FET-2 must be performed by a qualified electrician familiar with AC and DC circuits. The electrician must use standard and appropriate servicing procedures in accordance with all applicable safety codes.

**Applicator Operation**

The capability of an applicator is also a factor in obtaining satisfactory operation. Insure that air pressures to the pump and the gun solenoids are correct and constant. Erratic gun firing can result if the triggering air pressure is inadequate.

5/82 - Procedure changed.

## MAINTENANCE, (Continued)

Applicator Operation, (continued)

Operating air to the solenoid must be filtered to remove dirt and water. Lubrication usually is not required. A three-way air relay valve between the gun and the solenoid may be needed if the gun is cycling very often.

Physical Conditions

The guns should be mounted securely, and the distance to the substrate should be uniform and constant.

Air movement around the guns can have an adverse effect upon the system's operation. The guns should be shielded from moving air that cannot otherwise be eliminated.

**TROUBLE SHOOTING**FET-2 Operation

Troubleshooting the FET-2 usually can be limited to the terminal board (in the upper right corner of the cabinet) and the potentiometers.

If the output lamps (on the cabinet face) flash, the problem is probably outside the Time Interval Control.

The following chart will help in checking out the FET-2 unit:

PROBLEM	CAUSE
No power to timer (unit on lamp OFF)	Check circuit breaker. (Old style units use a switch and fuse) Check input power connections.
Guns not firing (output light FLASHES)	Check nozzle for clog. Check gun solenoid and coil. Check photocell/light source (or limit switch). Check solenoid circuit voltage.
Guns not firing (output light NOT FLASHING)	Check TB1 and TB3 connections. Check output lamp. Check fuse on circuit board. Check slide switch(s) for continuity. Check transformer secondary. Check potentiometers. Replace circuit board. Check transistor for proper voltage.
Guns fire erratically	Check photocell/light source proximity or limit switch. Check potentiometers. Check gun solenoid coil. Check output filter capacitor. Replace circuit board.

5/82 - Procedure changed.



**TROUBLESHOOTING, (Continued)**



Shut off all power to the FET-2 before opening the control cabinet.  
Use the power isolating device you installed ahead of the timer.  
Conduct all continuity and resistance checks with the power off.

To check the ten-turn dials:

1. Unplug the printed circuit board at J1 (refer to Electrical Diagram).
2. Rotate the dials counter-clockwise to zero.
3. Attach an ohmmeter to the two rear terminals (terminals #1 and #2) on the potentiometer.
4. Set the meter to the 100K scale.
5. Slowly rotate the dial clockwise. The resistance should increase steadily to 100K ohms. If the resistance drops off during the test replace the potentiometer. (A dead spot in the potentiometer may cause erratic gun firing).
6. Repeat this test with each potentiometer.

To check the transformer primary:

1. Turn on the power to the Time Interval Control.
2. A voltage reading within the operating line voltage limits should be obtained between terminal #1 on TB1 and the ground stud (at the top of the cabinet).



Be careful. Electrical shock can be deadly. Do not come in contact with the electrically hot terminal board.

To check the transformer secondary:

1. Turn on the power to the Time Interval Control.
2. Check the voltage across pins #3 and #5 in the six-pin circuit board plug (these are the two red wire leads). A reading between 20 and 30 VAC should be obtained. If not, replace the transformer.



Electrical shock can kill. Do not come in contact with the input power leads on TB1 (terminals #1, #2 and #3).

To check the solenoid circuit voltage:

1. Turn on the Time Interval Control. Plug in the circuit board at J1.
2. Check the voltage across terminal #9 on TB1 and the ground stud (at the top of the cabinet). A reading between 24 and 30 VDC should be obtained. If not, replace the circuit board.

5/82 - Procedure changed.

## TROUBLESHOOTING, (Continued)

To check the gun solenoid for proper resistance:

1. Shut off power to the Time Interval Control.
2. Remove the solenoid lead wires from terminals #9, #10, #11 and #12 on TB1.
3. Check for proper resistance across each solenoid coil. If the reading does not meet this specification, replace the solenoid.

NOTE: If the circuit board fuse blows, check the solenoids for proper resistance.

To check the photosensor/light source:

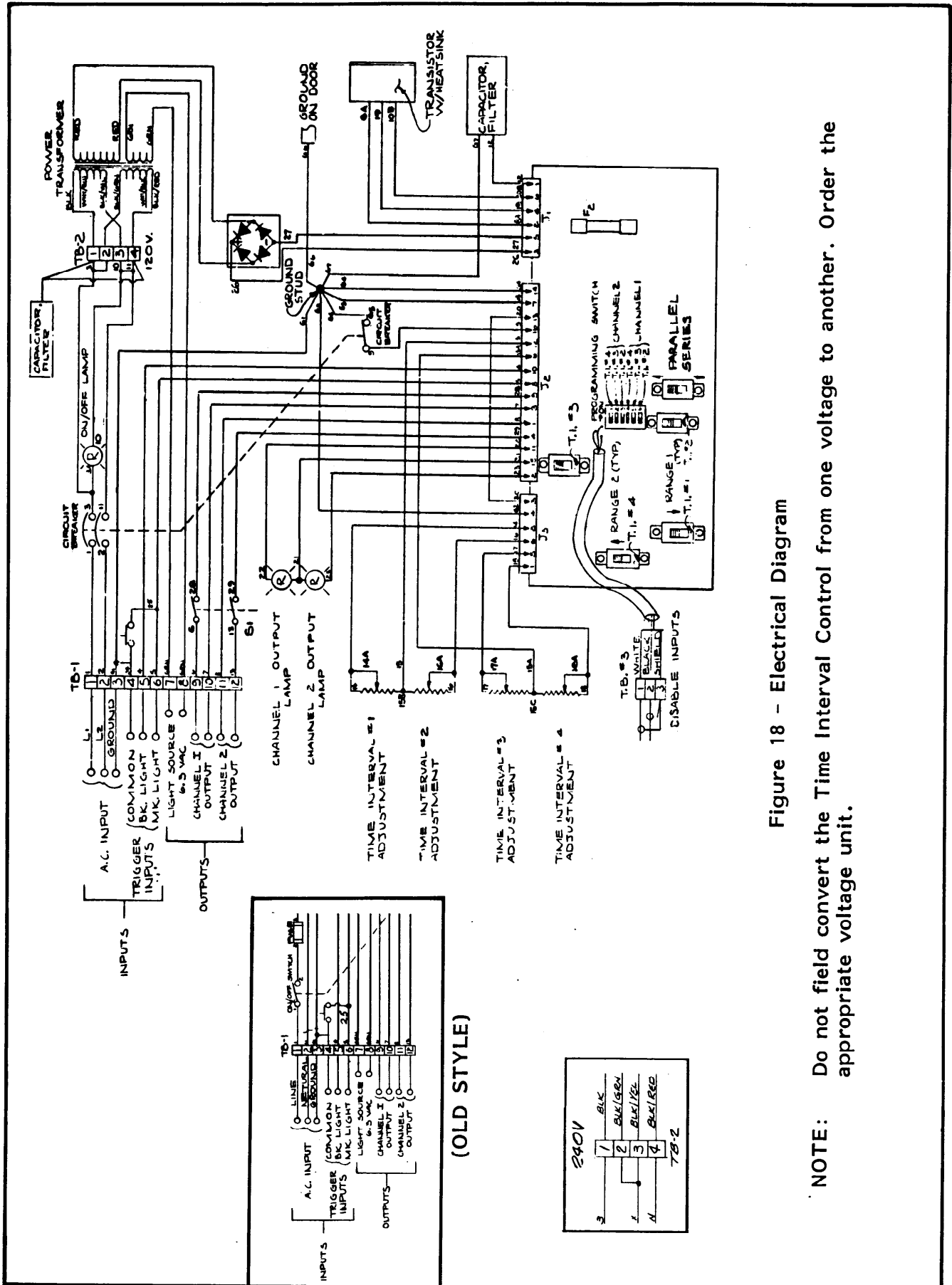
1. Turn on power to the Time Interval Control.
2. Check the voltage across terminals #7 and #8 on TB1. A reading of 6.3 VAC should be obtained. If not, replace the transformer.

NOTE: In the case of a photocell trigger device, care should be taken to insure the photocell and light source are in line. If they are not properly in line the system will not function. Check to see that the light beam is focused and is being projected in the direction of the light source.

3. Check the photosensor electrical connections. The black lead and the ground shield must be connected to terminal #4. The red lead is connected to terminal #5 or #6 (depending upon the mode used).
4. Confirm the phototransistor receiver alignment. With the timer power ON, test for minimum voltage (less than .5 volt) across the red and black leads.

To check the 24 VDC output capacitor:

1. Turn off power to the FET-2.
2. Discharge capacitor by touching both terminals with a screwdriver tip.
3. Disconnect both leads from the capacitor.
4. Set a test meter on the 1 ohm range. Connect one test lead to each terminal of the capacitor and observe meter.
5. Meter deflection towards the zero ohms end of the scale followed by an immediate return of the needle to infinity, indicates capacitor is good.



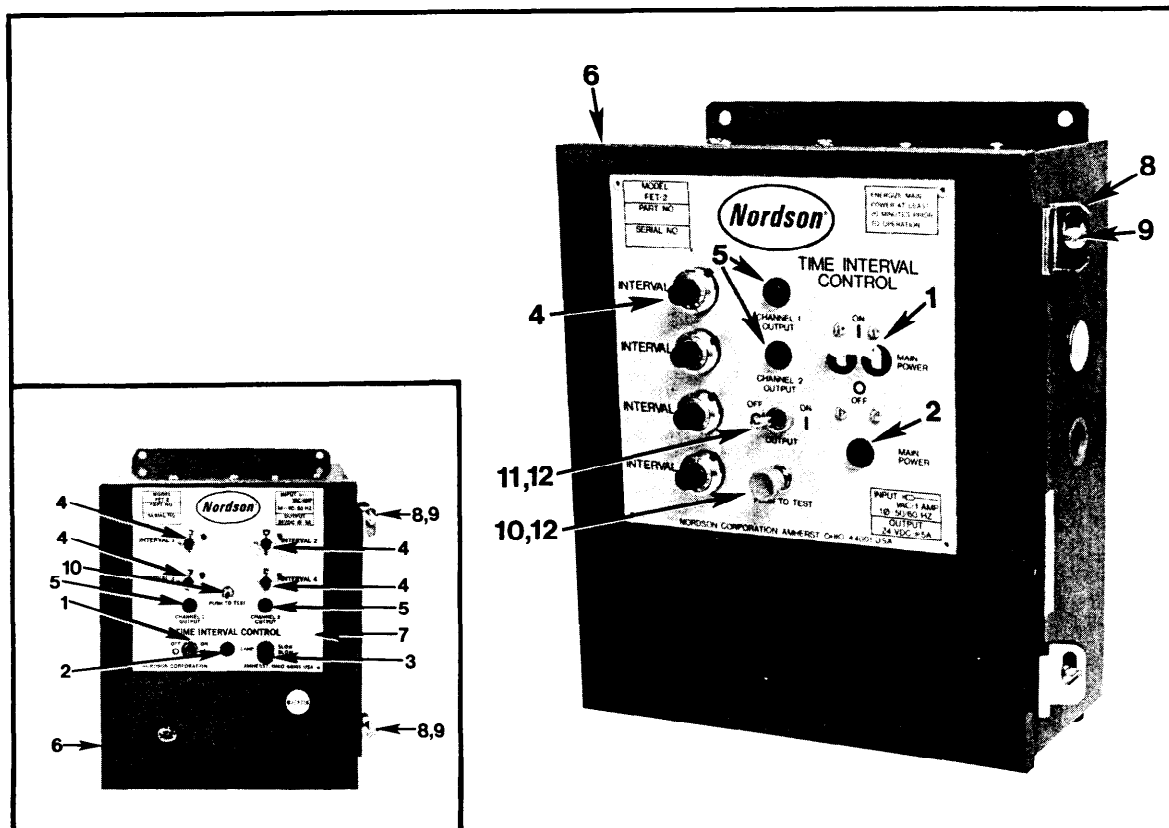


Figure 19 - FET-2 Control Cabinet (Front)  
(Inset Old Style)

Key	Part No. Old Style	Part No. New Style	Description	Req'd.
-	246 081	246 081	Time Interval Control, FET-2, 120 VAC	-
-	246 083	246 083	Time Interval Control, FET-2, 240 VAC	-
1	973 211	-	. Switch, Toggle, Dust Tight, DPDT	1
1	-	937 263	. Breaker, Circuit	1
2	939 265	939 265	. Lamp, Indicator (Unit On), Red, 115 VAC	1
3	939 016	-	. Fuse, 1 Amp, Slow Blow	1
4	937 218	937 218	. Dial, Counting, Ten Turn	4
5	939 266	939 266	. Lamp, Indicator (Output), Red, 28 VAC	2
6	-	-	. Cabinet, FET-2	1
8	242 687	242 687	. Latch, Cabinet	2
9	981 232	981 232	. Screw, Fil. Hd., 1/4-28 x 3/4, SL,ZN	2
-	242 654	242 654	. Gasket, Cabinet	3.5 Ft.
10	937 114	-	. Switch, Pushbutton, N/O, 1/4 Dia.	1
10	-	937 262	. Switch, Pushbutton	1
11	-	937 150	. Switch, Dust Tight, DPST	1
12	-	939 028	. Nut, Dress	2

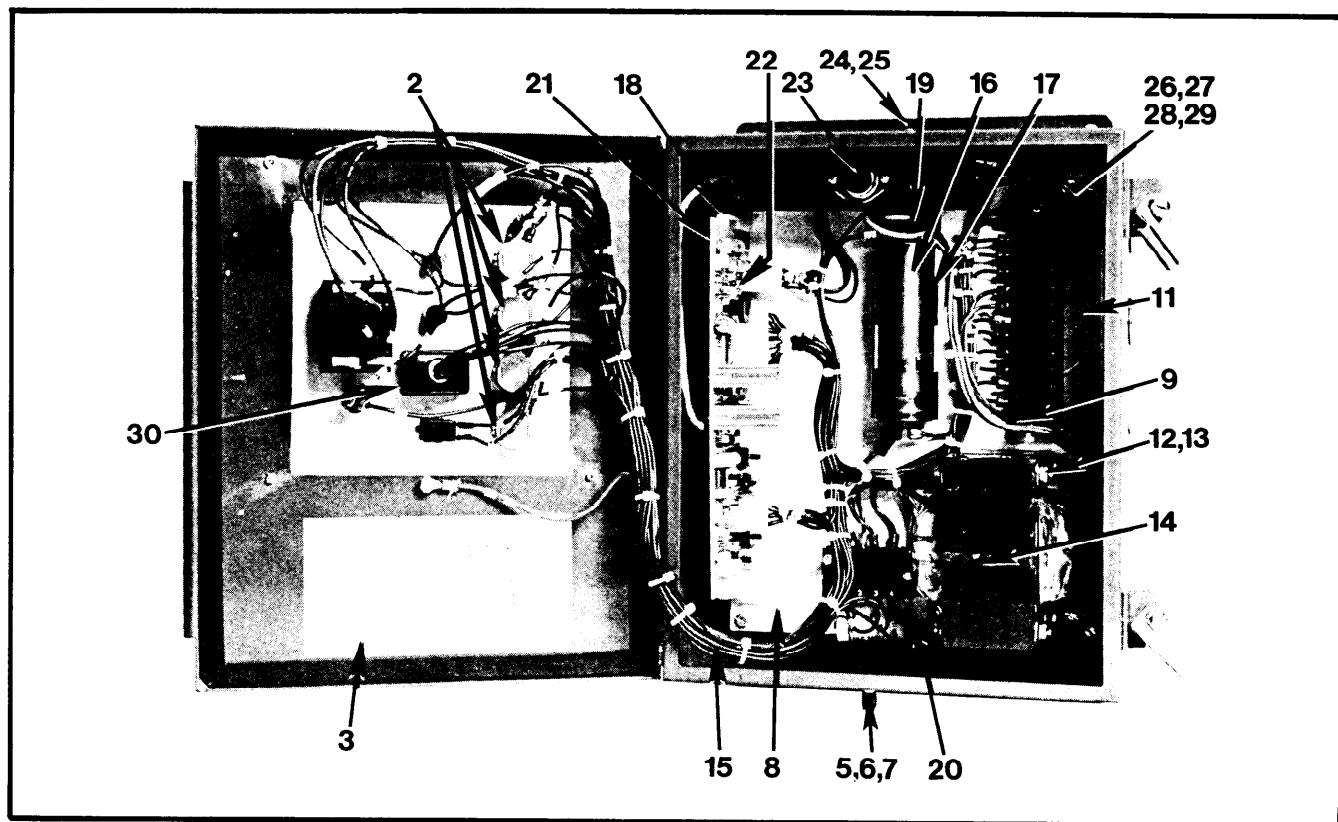
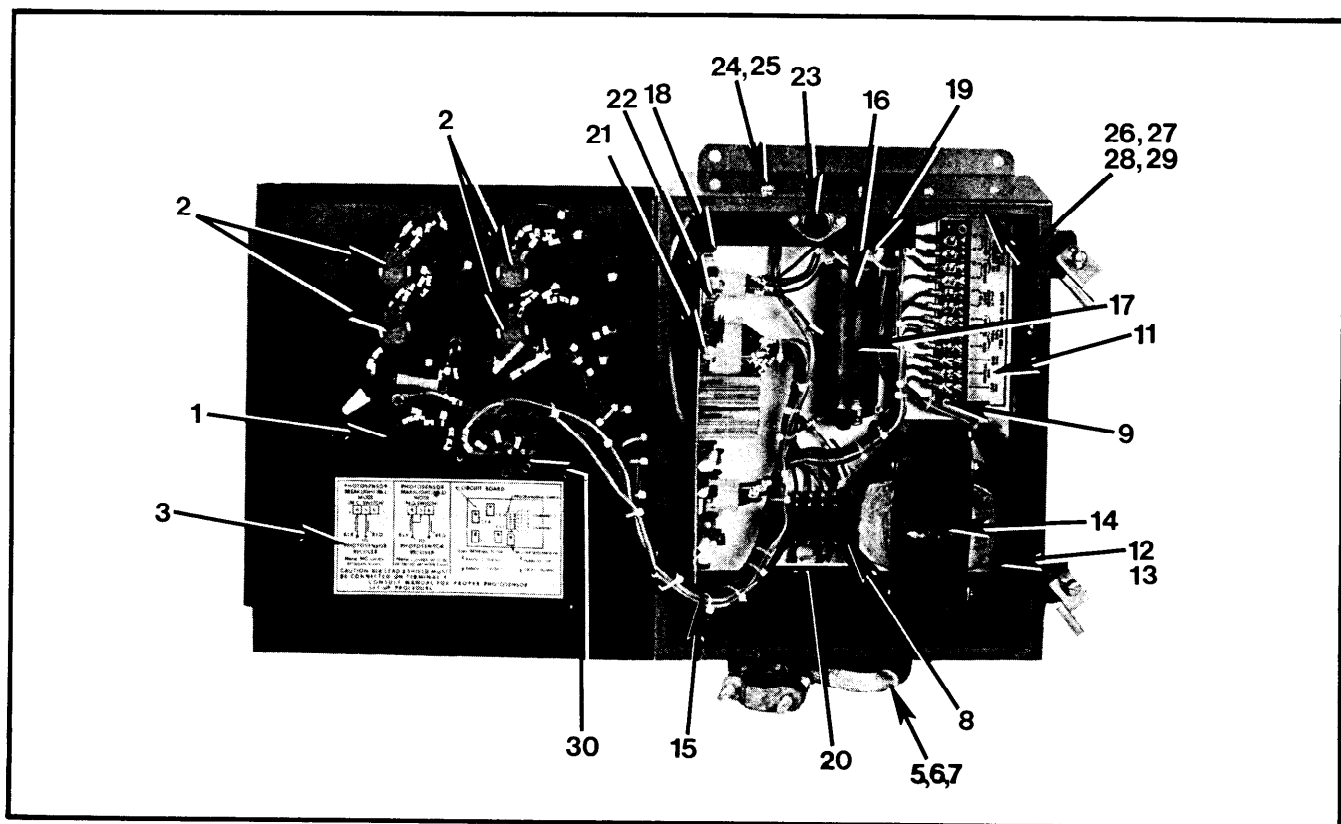


Figure 20 - FET-2 Control Cabinet (Inside)



Old Style

OBSOLETE

Key	Part No. Old Style	Part No. New Style	Description	Req'd.
1	933 161	-	. Post, Fuse	1
2	937 116	937 116	. Potentiometer, Ten Turn	4
3	295 039	295 039	. Tag, Wiring Instruction	1
5	983 021	983 021	. Washer, Flat, Brass, #10	2
6	984 129	984 129	. Nut, Hex, Brass, 10-32	2
7	983 120	983 120	. Lockwasher, #10	4
-	246 079	246 958	. Panel w/Hardware	1
8	-	246 070	. . Panel	1
-	981 039	981 039	. . Screw, Pan Hd., 6-32 x 5/16	4
9	981 024	981 024	. . Screw, Pan Hd., 6-32 x 3/16	4
-	983 102	983 102	. . Lockwasher, #6	4
10	933 100	933 100	. . Strip, Marker, 12 Station	1
11	295 038	295 038	. . Tag, Wiring	1
-	244 493	244 493	. . Spacer, Stand-Off	4
12	981 105	981 105	. . Screw, Pan Hd., 10-24 x 3/8	3
13	983 120	983 120	. . Lockwasher, #10	3
14	-	246 078	. . Transformer, w/Harness	1
15	-	246 957	. . Harness Wire	1
16	939 259	939 259	. . Capacitor, Filter	1
17	295 022	295 022	. . Clip, Component	2
18	271 586	271 586	. . Retainer, Circuit Board	2
19	939 256	939 256	. . Bridge Rectifier	1
20	295 265	295 265	. . Capacitor, Line Filter	1
	-	981 016	. . Screw, Round Hd., #4-24 x 1/4	4
	-	939 110	. . Strap, Cable	3
	-	933 208	. . Strip, Marker, 4 Station	1
	-	984 550	. . Nut, Captive, #10-24	4
	-	981 028	. . Screw, Fil. Hd., #6-32 x 3/4	1
	-	984 551	. . Nut, Captive, #6-32	9
21	247 410	247 410	. Circuit Board, FET-2	1
22	939 119	939 119	. . Fuse, 2-1/2 Amp, 250 VAC	1
-	-	-	. Transistor, w/Heat Sink	1
23	939 230	939 230	. . Transistor	1
24	981 055	981 055	. Screw, Pan Hd., 8-32 x 1/4	2
25	983 110	983 110	. Lockwasher, #8	2
26	933 127	933 127	. Block, Terminal, 3 Station	1
27	981 035	981 035	. Screw, Pan Hd., 6-32 x 5/8	2
28	983 102	983 102	. Lockwasher, Split, #6	2
29	984 101	984 101	. Nut, Hex, 6-32	2
-	933 203	933 203	. Jumper, Terminal (See Note)	3
30	243 326	243 326	. Protector, Switch, Terminal	1

NOTE: One jumper is used to install the photocell in the makelight mode (or normally open switch). Two jumpers are installed on terminal board #3, when the no can, no spray feature is not used.





**Nordson Corporation**  
Finishing Equipment Division, Amherst, Ohio 44001

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SUPERSEDES 9/84

ISSUED 2/86

### RECOMMENDED SPARE PARTS

Fig. / Key	Part No. Old Style	Part No. New Style	Description	Req'd.
19/2	939 265	939 265	Lamp, Indicator (Unit On)	1
19/5	939 266	939 266	Lamp, Indicator (Output)	1
19/3	939 016	-	Fuse, 1 Amp, Slow Blow	2
19/1	-	937 263	Circuit, Breaker	1
20/2	937 116	937 116	Potentiometer, Ten Turn	1
20/21	247 410	247 410	Circuit Board, FET-2	1
20/22	939 119	939 119	Fuse, 2-1/2 Amp, 250V	2
20/23	939 230	939 230	Transistor	1

### SUPPLEMENTAL PARTS LIST (All Styles)

	Part No.	Description
	242 659	Amplifier, Proximity, 120 VAC (Peco #C-3007)
	242 660	Amplifier, Proximity, 240 VAC (Peco #C-3561)
	242 661	Sensor, Proximity w/Bracket (Peco #C-3054)
	242 658	Enclosure, Amplifier (Peco #C-3035)
	937 119	Light Source, Photocell
	937 121	. Lamp, GE #12
	937 191	Receiver, Photosensor
	937 190	. Phototransistor

OBSOLETE