



**PLEASE CHECK FOR CHANGE INFORMATION  
AT THE REAR OF THIS MANUAL.**

This manual covers the  
following part numbers:

016-0280-02  
016-0284-02  
016-0278-03  
016-0279-02  
016-0300-02  
016-0290-02

# **WRITING SPEED ENHANCER (WSEN)**

## **INSTRUCTION MANUAL**

**Tektronix, Inc.  
P.O. Box 500  
Beaverton, Oregon 97077**


Serial Number \_\_\_\_\_

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Product Group 58

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### INSTRUMENT SERIAL NUMBERS

Each instrument has a serial number on a panel insert, tag, or stamped on the chassis. The first number or letter designates the country of manufacture. The last five digits of the serial number are assigned sequentially and are unique to each instrument. Those manufactured in the United States have six unique digits. The country of manufacture is identified as follows:

|         |   |
|---------|---|
| B000000 | Tektronix, Inc., Beaverton, Oregon, USA               |
| 100000  | Tektronix Guernsey, Ltd., Channel Islands             |
| 200000  | Tektronix United Kingdom, Ltd., London                |
| 300000  | Sony/Tektronix, Japan                                 |
| 700000  | Tektronix Holland, NV, Heerenveen,<br>The Netherlands |

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# SAFETY SUMMARY

*The general safety information in this summary is for both operating personnel and servicing personnel. Specific warnings and cautions will be found throughout the manual where they apply and do not appear in this summary.*

## TERMS

### In This Manual

WARNING statements identify conditions or practices that could result in personal injury or loss of life.

CAUTION statements identify conditions or practices that could result in damage to the equipment or other property.

### As Marked on Equipment

DANGER or WARNING—HIGH VOLTAGE indicates a personal injury hazard immediately accessible as you read the marking.

CAUTION indicates either a personal injury hazard not immediately accessible as you read the marking, or a hazard to property including the equipment itself.

## SYMBOLS

### As Marked on Equipment



DANGER-High voltage.



Protective ground (earth) terminal.

### Do Not Operate in Explosive Atmospheres

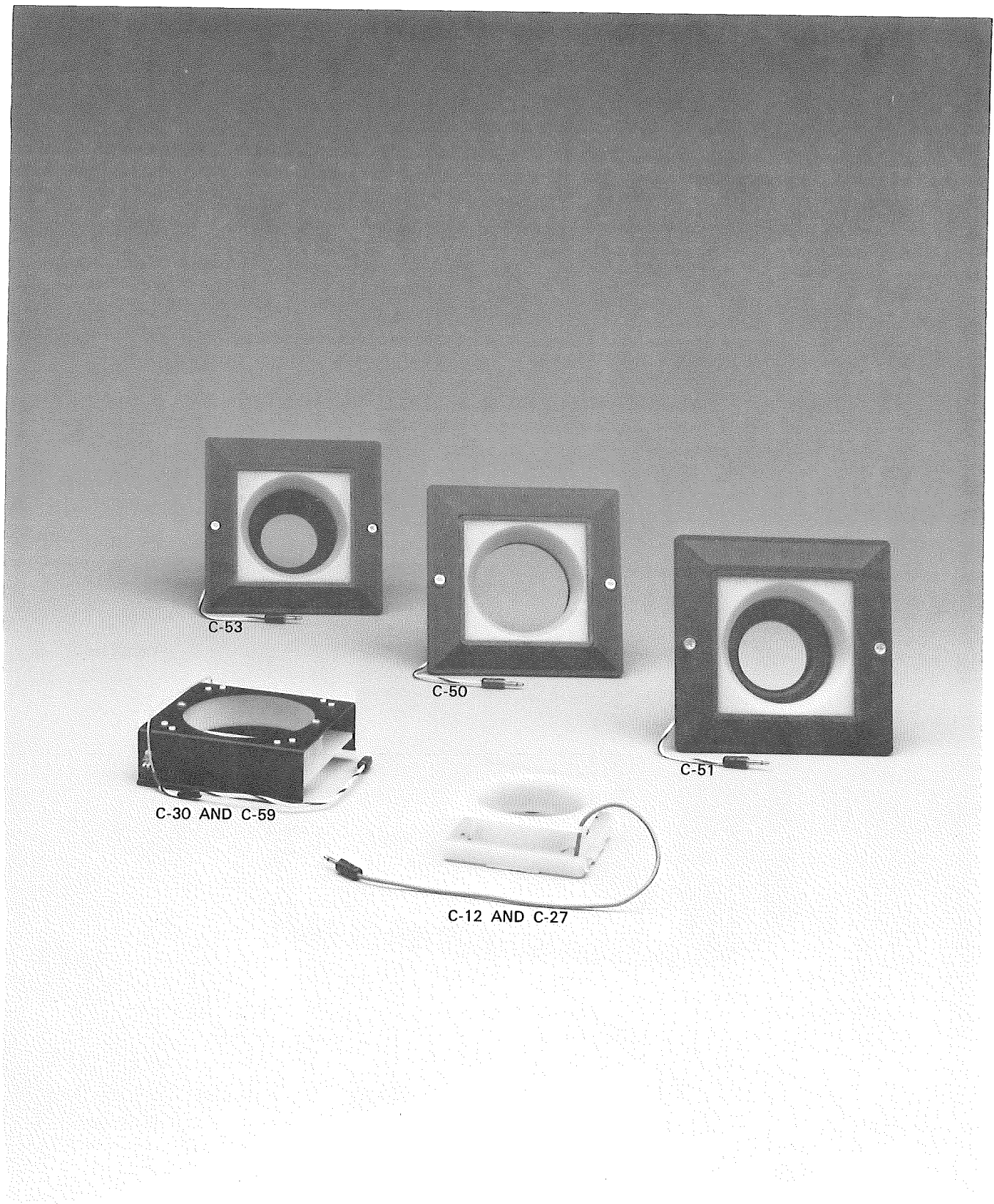
To avoid explosion, do not operate this product in an explosive atmosphere unless it has been specifically certified for such operation.





4396-01

The Writing Speed Enhancer Control Unit.



4396-02

The Writing Speed Enhancer Diffuser Units.



# SPECIFICATIONS

## INTRODUCTION

The TEKTRONIX Writing Speed Enhancer (WSEN) is a device used to increase the photographic writing speed of oscilloscope trace-recording films. A light diffuser mounted behind the lens in the camera provides accurate "film-fogging" illumination. The WSEN provides controlled variations of fogging-illumination time for films of various ASA ratings.

This instruction manual covers the installation of the WSEN on current and past models of Tektronix oscilloscope cameras as specified in Table 1-1. Special applications or additional information may be obtained from your Tektronix representative or local Tektronix Field Office.

Standard accessories supplied with the WSEN are listed and described in the Replaceable Mechanical Parts list of Section 6 of this manual.

The optical and electrical characteristics described in Tables 1-2 and 1-3 apply over the stated environmental range for instruments calibrated at an ambient temperature of between +20°C and +30°C unless otherwise stated.

Environmental and physical characteristics appear in Tables 1-4 and 1-5.

**Table 1-1**  
**INFORMATION ON THE FOLLOWING UNITS**  
**IS INCLUDED IN THIS MANUAL**

| Tektronix Camera Type | Complete Assembly Number | Control Unit | Subassembly Part Number<br>Diffuser Assembly | Mounting Bracket |
|-----------------------|--------------------------|--------------|--|------------------|
| C-12                  | 016-0280-02              | 016-0289-02  | 337-1606-01                                  | 407-1030-00      |
| C-27                  | 016-0280-02              | 016-0289-02  | 337-1606-01                                  | 407-1030-00      |
| C-30 Series           | 016-0284-02              | 016-0289-02  | 337-1603-01                                  | 407-1018-00      |
| C-31 Series           | 016-0284-02              | 016-0289-02  | 337-1603-01                                  | 407-1018-00      |
| C-50                  | 016-0278-03              | 016-0289-02  | 337-1604-01                                  | 386-2046-01      |
| C-51                  | 016-0279-02              | 016-0289-02  | 337-1605-01                                  | 386-2046-01      |
| C-53                  | 016-0300-02              | 016-0289-02  | 337-1724-01                                  | 386-2046-01      |
| C-59 Series           | 016-0290-02              | 016-0289-02  | 337-1603-01                                  | 386-2046-01      |

**Table 1-2**  
**ELECTRICAL CHARACTERISTICS**

| Characteristics        | Performance Requirements | Supplemental Information   |
|------------------------|--------------------------|--|
| <b>Triggering</b>      |                          |  |
| Triggering Method      | Manual or automatic.     | Provided by the appropriate external signals connected to the WSEN + GATE or X SYNC input connections, or by pressing the MAN TRIG button. |
| Exposure time          | Variable.                | Determined by EXPOSURE CONTROL setting. Covers a wide range of film speeds.  |
| Exposure Repeatability | Within $\pm 5\%$ .       | Exclusive of humidity  |

Table 1-2 (cont)

| Characteristics                | Performance Requirements  | Supplemental Information  |
|--------------------------------|---|---|
| Triggering Signal Requirements | + Gate of at least 2 V, 50 ns duration.                                       | TRIG'D indicator on the front panel remains on approximately 1 second upon receipt of proper trigger signal. Will not light if the battery supply is below 13.2 V, $\pm 10\%$ . |
| <b>Battery</b>                 |   |   |
| Batteries Required             | 2, 9 volts each.  | NEDA 1604 Carbon-Zinc, or NEDA 1604 M Mercury.  |
| Life Expectancy                | Approximately 1 year or 10,000 flashes; 700 hours in continuous standby mode. | Cutoff at 6 to 7 V/cell.  |

Table 1-3  
OPTICAL CHARACTERISTICS

| Characteristics                 | Performance Requirements | Supplemental Information   |
|---------------------------------|--------------------------|--|
| Writing Speed Gain              | Approximately 3x.        | Dependent on film type, temperature, development time, and control settings. |
| Fogging Illumination Wavelength | 565 nm.                  | Provided by four light-emitting diodes in a specially-designed diffuser.     |

Table 1-4  
ENVIRONMENTAL CHARACTERISTICS

| Characteristics                        | Performance and Requirements   | Supplemental Information    |
|--|--|-----------------------------|
| Temperature                            |  |                             |
| Operating                              | 0°C to +50°C.  |                             |
| Non Operating                          | -55°C to +75°C.  | Storage, without batteries. |
| Humidity                               | 0 to 75% relative humidity at +50°C (+122°F).  |                             |
| Vibration                              |  |                             |
| Operating, mounted on an oscilloscope  | 15 minutes along each axis at a total displacement of 0.025 inch p-p. 10 to 55 to 10 Hz in 1-minute sweeps. Held for 10 minutes at any resonant point or, if none, at 55 Hz. |                             |
| Shock                                  |  |                             |
| Operating, mounted on an oscilloscope. | 50 g's 1/2 sine, 10 ms duration, 3 shocks in each direction along each major axis, a total of 18 shocks.   |                             |

**Table 1-5  
PHYSICAL CHARACTERISTICS**

| <b>Characteristics</b>               | <b>Performance and Requirements</b>                | <b>Supplemental Information</b> |
|--------------------------------------|--|---------------------------------|
| Weight                               |  |                                 |
| With Accessories                     | Approx. 0.5 kg, (1 lb).                            | Max., Varies with options.      |
| With Accessories and shipping carton | Approx. 0.9 kg, (2 lbs).                           | Max., Varies with options.      |
| Dimensions                           |  |                                 |
| WSEN Control Unit                    | 7.9 x 6.6 x 4.8 cm, (3.1 x 2.6 x 1.9 inches).      | Max., Varies with options.      |
| Diffuser                             | 12.7 x 12.7 x 5.1 cm, (5.0 x 5.0 x 2.0 inches).    | Max., Varies with options.      |
| Shipping                             | 30.5 x 26.7 x 11.4 cm, (12.0 x 10.5 x 4.5 inches). | Max.                            |



# OPERATING INSTRUCTIONS

## PURPOSE

This section describes the operation of the front panel controls and some general operating principles. A detailed circuit description appears in Section 3, Calibration, of this manual, and Theory and Application is discussed in Section 4.

## CONTROLS CONNECTORS, AND INDICATORS

### EXPOSURE

**CONTROL** .....A calibrated control that varies the length of time of light output from the diffuser.

**TRIG'D** .....Indicates that the diffuser light source is on. The indicator light will not light if the battery supply is too low.

**OFF-ON**.....Power switch for the WSEN control unit.

**MAN TRIG** .....Pushing the button manually triggers the diffuser light source.

### REMOTE

**X SYNC** .....A micro-phonjack that provides connections for external triggering synchronous with the camera shutter opening. Any closure to ground of this circuit will trigger the unit.

**+ GATE** .....Input MB connector for oscilloscope gate-output signals. Triggering occurs at the beginning of the sweep when the gate-input signal goes positive.

## GENERAL OPERATION

### INTRODUCTION

The WSEN improves the ability of films to record fast oscilloscope single-sweep displays by using a technique called "film-fogging." Film-fogging is achieved by controlled exposure of the film in the camera to low levels of light from the diffuser. This light supplements the light from the crt trace, to produce a usable image.

Film-fogging can be used prior to, during, or after the taking of the picture. There are three basic methods for triggering the WSEN. The method by which the trigger is actuated will determine the time that the film-fogging takes place. Simultaneous fogging is recommended for maximum writing-speed gain. Simultaneous fogging means "simultaneous to the majority of the light-energy that the film receives from the oscilloscope trace."

### TRIGGERING

#### NOTE

To prevent accidental triggering, set the WSEN ON-OFF switch to OFF when making connections to the enhancer.

#### + GATE Triggered

This is the recommended method for achieving maximum writing speed enhancement. The + GATE input connector uses the + Gate output signal of an oscilloscope as a trigger source; however, any positive-going signal of at least 2 V with a duration of 50 ns will trigger the WSEN. Use the special cable provided as a standard accessory to connect the + Gate output of the oscilloscope to the + GATE input of the WSEN. This method should be used for a single-shot event if the time at which the event will occur is unknown. The oscilloscope should be put in single-sweep mode. The oscilloscope will now trigger the WSEN at the start of the sweep.

#### NOTE

Because of signal deterioration due to cable capacitance, the maximum length of cable used to connect a + Gate signal to the WSEN should be limited to 20 inches of 50  $\Omega$ , RG-58/U coaxial cable.

### Camera Triggered

This is the recommended alternative method if a + Gate triggering signal is not available. To achieve camera-triggered fogging, connect the special cable that is provided (see the standard accessories at the back of the manual) to the X SYNC output connector of the camera and the X SYNC input connector of the WSEN. This allows the camera to trigger the WSEN when the camera shutter opens. The source of triggering signal applied to the X SYNC connector is not limited to the camera. Any closure to ground at the X SYNC input for approximately one microsecond duration will trigger the WSEN.

### Manually Triggered

The MAN TRIG pushbutton provides the ability to obtain all three methods of fogging. Prefogging is obtained by pushing the MAN TRIG button prior to taking the picture, while post-fogging is achieved by pushing the button after taking the picture. Simultaneous fogging is accomplished by pushing the button as the picture is being taken.

## OPERATION

When determining the initial setting of the WSEN EXPOSURE CONTROL, two considerations arise; the type of camera, and the ASA of the film being used. Typical initial settings for all Tektronix cameras for ASA 3,000 films and ASA 20,000 films are 7.5 and 5.0, respectively. Since these are only suggested starting points, optimizing writing speed enhancement will require taking several sample photos and varying the control settings for optimum performance.

As an example, assume that you are using a C-30 camera with a film pack of Poloroid 107, 3,000 ASA film. You should take the initial photograph with the WSEN EXPOSURE CONTROL set at 7.5. Take two other photographs, one at 7.0, and one at 8.0. These three photographs should allow you to determine the correct setting needed for your particular application.

# CIRCUIT DESCRIPTION AND ADJUSTMENT

## CIRCUIT DESCRIPTION

### PURPOSE

This section contains a description of the electronic circuitry used in the WSEN. Also provided is a procedure for adjustment. Refer to the schematic diagram (Figure 6-1) and parts list in the Replaceable Parts (Section 6) of this manual.

### POWER SUPPLY IC

The power-supply-IC, U1040, may be viewed as an operational amplifier with the positive input internally connected to a 0.2 V reference with respect to the negative supply, pin 4. R1030 and R1031 provide a gain of 25 for U1040B, and an output of 5 V.

#### NOTE

*If CR240 is shorted or leaking, the voltage on U2020, pins 3 and 13, will be greater than the +5 V supply. Internal protection diodes in U2010 will then cause the +5 V supply to be high, and erratic circuit performance may result.*

*The current supply capability of U1040B is approximately 4 mA, and U1040A can supply approximately 20 mA.*

U1040A compares the battery voltage (18 V) to the +5 V normally at U2020B, pin 9. When the supply voltage falls below approximately +13 V, U1040A, pin 6, goes to a low state, disabling U2020.

### TRIGGERING IC

IC U2020 is a CMOS, dual, monostable multivibrator capable of being triggered by a positive-going input on pin 4 (or 12), or by a negative-going signal on pin 5. In order for a negative trigger input to be recognized by pin 5, the following conditions must be realized: pin 3 (reset) must be high, and pin 4 (positive input trigger) must be low.

The output pulse-width, positive going on the output (Q, pin 6 and pin 10), negative going on output ( $\bar{Q}$ , pin 9), is controlled by the RC time constant of C2010, R1011, the EXPOSURE CONTROL potentiometer (R1), and by C1020 and R1020 for U2020B. If current-set jumper J1020 (violet, 2-pin harmonica connector) is open, the RC time constant approaches infinity, as +5 V is no longer supplied.

IC U2020A pulse-width is between approximately 0.006 seconds (EXPOSURE CONTROL at minimum, counter-clockwise), and 0.8 seconds (EXPOSURE CONTROL set at maximum, clockwise). U2020B pulse-width is approximately 1.25 seconds. U2020B, pin 10, connects to U2020A, pin 4, preventing another trigger pulse from occurring until U2020B completes its cycle.

Triggering may be accomplished by closure of the MAN TRIG button, by X SYNC being shorted, or by a positive-going pulse input on + GATE switching on Q2040.

#### NOTE

*In electrically-noisy environments, adding capacitor C3030 (refer to schematic, Figure 6-1) will increase noise immunity and prevent false triggers. Typical value; 100 pf to 0.01  $\mu$ f. A 0.01  $\mu$ f C3030 will increase the + Gate pulse width requirement from 50 ns to approximately 500 ns.*

### DIFFUSER DRIVER

The pulse output from U2020 is connected to constant-current-source transistor Q3011, via R3011 CURRENT SET control. Q3010 collector couples the output current to the diffuser light-emitting-diodes. Q2030 drives the TRIG'D LED from U2020B.

# ADJUSTMENT

## INTRODUCTION

The WSEN control box and diffuser assemblies are shipped from the factory as a matched pair. There is no adjustment necessary if these units are received as a matched pair. If either unit is repaired or replaced, or if two units are to be used together that are not a matched pair, adjustment of the units will be necessary.

## TEKTRONIX FIELD SERVICE

Tektronix, Inc. provides complete instrument repair and adjustment at local Field Service Centers and the Factory Service Center. Contact your local Tektronix Field Office or representative for further information.

## TEST EQUIPMENT REQUIRED

If the diffuser assembly or the control unit need adjustment, then a dc milliammeter such as a TEKTRONIX DM 501 and TM 501 or equivalent, with a range of 0 to 25 mA and accuracy within  $\pm 2\%$ , will be needed to match the current characteristics of the two units. If monitoring of the pulse output is desired, a Tektronix oscilloscope with a bandwidth of dc to 1 MHz and a deflection factor of 5 mV/div is recommended.

## ADJUSTMENT

Adjustment of the WSEN consists of matching the current capability of the control box to the current requirement of the diffuser light-emitting-diodes. A small tag placed on the diffuser at the factory states the current requirement for that particular diffuser. To match the diffuser unit to the control box, proceed as follows:

1. Disconnect the diffuser from the control box.
2. Remove jumper J1010 (violet, 2-pin harmonica connector).
3. Insert a micro-phonejack into the output connector and connect a milliammeter across the terminals of the jack.
4. Turn the ON-OFF switch to ON, and press MAN TRIG.
5. Adjust R3011 for a current-reading between the values as shown on the rear of the diffuser unit.
6. Turn the ON-OFF switch to OFF, remove the jack and milliammeter, and reinstall jumper J1010.

This concludes the adjustment requirements for the WSEN unit.



# THEORY OF OPERATION

## INTRODUCTION

This section contains a basic interpretation of background information and application theory of the principles involved in the use of the Writing Speed Enhancer.

## DEFINITION OF TERMS

- Density** .....A mathematical quantity used to express the ratio of increase or decrease in pigmentation following exposure and processing.
- Enhancement** .....Purposefully adding minute amounts of latent energy to film emulsion in order to increase sensitivity to low-energy exposure, (also called "fogging").
- Gross Fog** .....The resultant density of unexposed film ("background noise").
- Reciprocity** .....The ability of film to maintain constant density through varying light-intensity versus exposure-time.
- Sensitivity** .....The inverse of the energy-per-unit area required to achieve a specified density under specified exposure and processing conditions. Sensitivity is usually expressed as a film speed.

**Sensitometry** .....The technique of determining film sensitivity.

## BACKGROUND

Writing speed enhancement deals directly with film density and exposure (energy), energy relationships. These relationships are usually represented by a characteristic curve. An idealized version of such a curve is shown in Figure 4-1.

The slope of the curve over the linear portion indicates the contrast to be expected. The base, or toe line of the curve, when extended, falls into the gross fog level. This is the area where sensitometry measurements begin, and where the majority of non-enhanced, high-speed, oscilloscope-trace photography usually occurs.

## Oscilloscope Photography

ASA film speed ratings are determined to standards by the use of multiple graduated test strips under specified conditions. This system was designed for pictorial photography and is not really suitable for fast cathode-ray-tube photography where exposures fall at the toe of the characteristic curve.

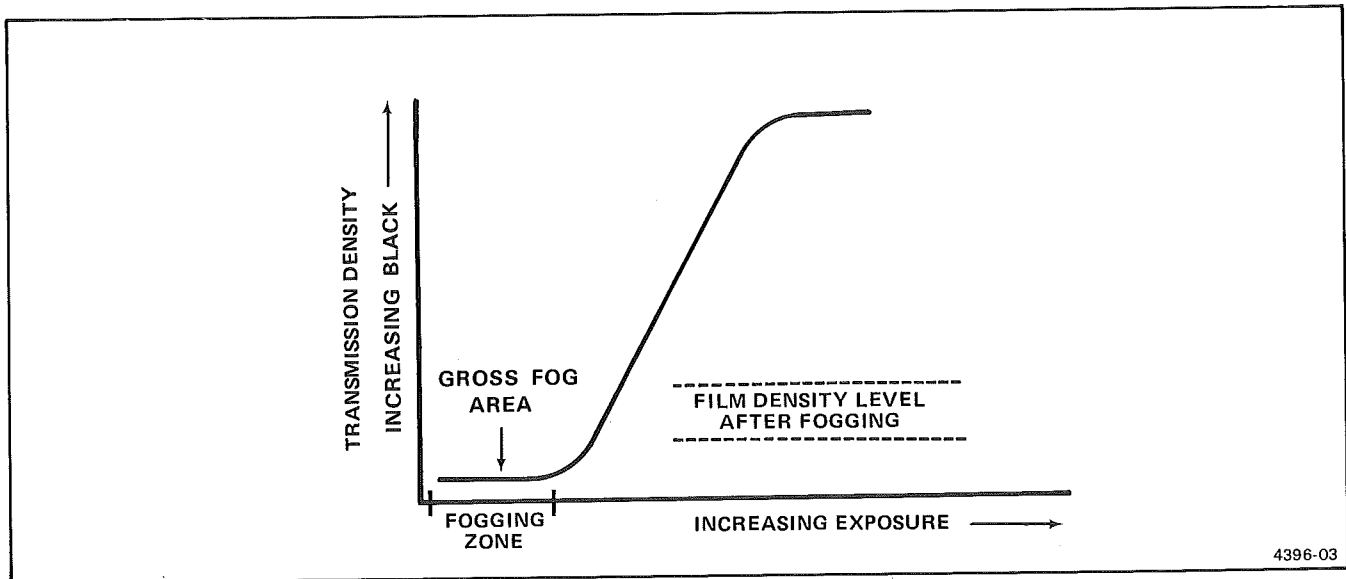


Figure 4-1. Idealized film density versus exposure. (Negative).

## Theory and Application - WSEN

Film reciprocity characteristics are only consistent within a certain exposure time frame, and lose validity for exposure times that are very short or very lengthy. This characteristic is known as reciprocity failure. Since most single-sweep oscilloscope photography consists of capturing very fast events, the majority of event-recording takes place in the reciprocity-failure area of the film being used.

### Film Fogging

When film emulsion is exposed, ions and electrons form molecular-development centers and, in combination, latent images (or seeds). When the exposure does not provide enough energy to establish development centers, the ion-

electron combinations disappear. Deliberate and consistent low light exposure (or fogging) of the film causes the beginning of many development centers throughout the film. When the intended exposure is then made, many more development centers mature, resulting in the processed film density occurring somewhere above the gross fog level and reciprocity-failure level of the film.

With the Writing Speed Enhancer, this process is accomplished by surrounding the camera lens, in front of the film, with a fogging light-source consisting of a diffusing lens and four light-emitting-diodes (driven by precise current pulses from a battery-powered control unit). The WSEN provides accurate and repeatable film fogging, and is capable of enhancing the writing speed of all commonly-used oscilloscope trace-recording film.

# MAINTENANCE AND INSTALLATION

## MAINTENANCE

### INTRODUCTION

This section contains information on general and preventive maintenance and installation procedures.

### CLEANING

The WSEN should be cleaned as often as necessary to maintain proper operating conditions. Accumulation of dirt can cause component breakdown by providing improper electrical conduction paths, especially under high-humidity conditions.

#### CAUTION

*Avoid the use of chemical cleaning agents that might damage the plastics used in this instrument. Use a nonresidue type cleaner, preferably isopropyl alcohol or a solution of 5% Kelite detergent with 95% water. Before using any other type cleaner, consult your Tektronix Service Center or representative.*

#### Exterior

Loose dirt on the outside of the instrument should be removed with a small, soft brush, especially around the controls. Remaining dirt can be removed with a soft cloth dampened in a solution of 5% Kelite and 95% water. Abrasive cleaners should never be used.

#### Interior

To clean the interior, blow off dust with dry, low-pressure air. Remove any remaining dirt with a soft brush or a soft cloth dampened in a solution of 5% Kelite and 95% water.

### BATTERIES

Batteries should be checked occasionally to insure that no leakage is occurring to cause damage to circuits or components.

### COMPONENTS

Some components (integrated circuits and transistors) used in this instrument may be subject to damage when exposed to static discharge. When replacing or repairing components, use precautions to insure that static-free surfaces and containers are used during transport or installation.

### REPACKAGING FOR SHIPMENT

If the Tektronix instrument is to be shipped to a Tektronix Service Center for service or repair, attach a tag showing: owner, address, and the name of an individual at your location who can be contacted, along with the instrument number and a description of the service required.

Obtain a corrugated cardboard carton with a test strength of at least 200 pounds and having no less than six inches more than the instrument length to allow for cushioning. Surround the instrument with polyethylene sheeting and cushion the instrument by tightly packing dunnage or urethane foam between the carton and the instrument, a minimum of three inches on all sides. Seal the carton with shipping tape or an industrial stapler.

## INSTALLATION

### INTRODUCTION

These are the instructions for installing the WSEN on a variety of Tektronix camera types. There are three basic procedures provided; one for the C-12 and C-27 cameras, one for the C-30 series and C-31 series cameras, and one for the C-50, C-51, C-53 and C-59 series cameras.

#### NOTE

*If the WSEN control unit and diffuser to be used were not received from Tektronix as a matched pair, or if either has been repaired or replaced, the adjustment procedure in Section 3 should be performed before installing the units in a camera.*

## INSTALLATION C-12 and C-27 Cameras

1. Install the dark-slide in the camera film-back and remove the film-back from the camera.

2. Remove the Adjustable Rotating Slide Adapter from the back of the camera. (Older units may have a one-piece Rotating Slide Adapter. See the camera manual for the correct part identification.)

3. Remove the lower nut-bar and mounting screws from the Rotating Slide Adapter. (This is not part of the one-piece units.) Refer to Figure 5-1.

4. Centermark a point 25 mm (1 inch) from the left side and in the center of the trough as shown in the inset of Figure 5-1.

5. Drill a 5/32 (0.156 inch) diameter hole in the Rotating Slide Adapter. Remove all burrs and smooth all sharp edges.

6. Remove the power cable from the diffuser assembly. Note the correct location of the cable connections for reassembly (step 8).

7. Feed the power cable through the drilled hole.

8. Reconnect the power cable assembly to the diffuser unit and install the diffuser into the Rotating Slide Adapter, locking it in place.

### NOTE

*Some versions of the Rotating Slide Adapter require modification to be compatible with the WSEN diffuser assembly. A new latch-tab is provided with each diffuser assembly. If you are unable to install the diffuser unit in your Rotating Slide Adapter, replace the existing latch-tab.*

9. Reinstall the lower nut-bar and mounting screws.

10. Remove any slack from the power cable and push the light-sealing grommet up the cable and firmly into the drilled hole.

11. Remove and discard the two screws from the lower chromed strip on the front of the Rotating Slide Adapter where the WSEN mounting bracket is to be installed. Attach the WSEN mounting bracket to the Rotating Slide Adapter with the two small black screws provided. (See Figure 5-1.)

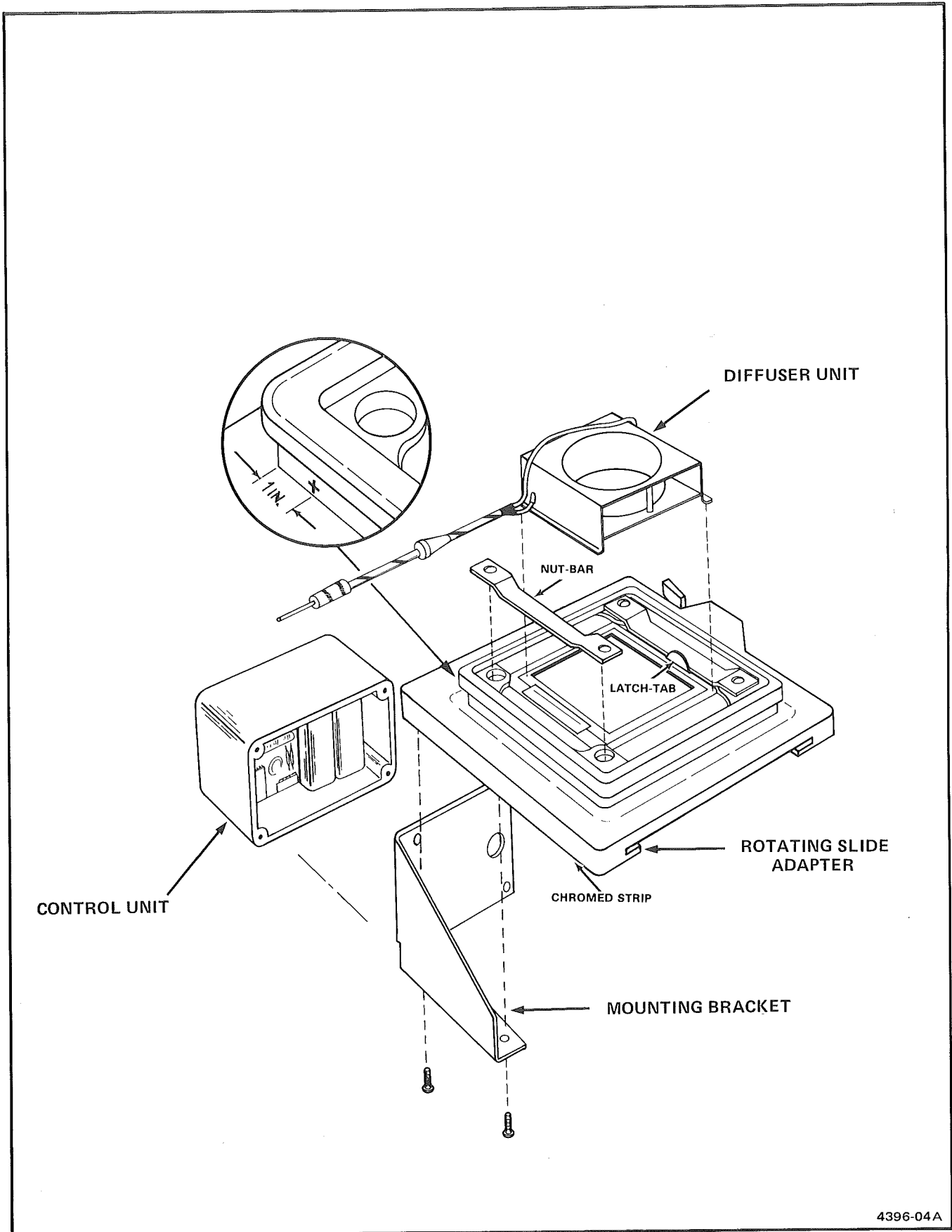
12. Install the batteries in the WSEN Control Unit and mount it to the mounting bracket with the four round-head screws provided.

13. Connect the power cable to the WSEN Control Unit.

14. Test the diffuser assembly under low ambient light for visible illumination. (Set Exposure Control fully clockwise.)

15. Install the Rotating Slide Adapter/Diffuser assembly and film-back onto the camera and test the unit for proper operation.

This completes the installation of the WSEN on the C-12 and C-27 cameras.



4396-04A

Figure 5-1. WSEN installation on the C-12 and C-27 Cameras.

## INSTALLATION

### C-30 Series and C-31 Series Cameras

1. Install the dark-slide in the film-back of the camera. Remove the film-back from the camera.

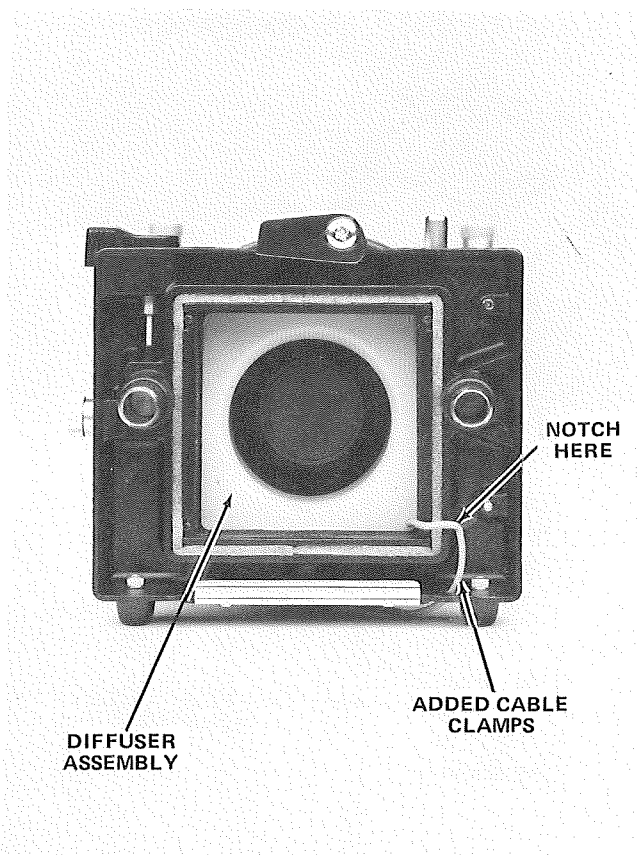
2. On type C-30 series cameras, set the object-to-image ratio to 1.5:1.

3. Use a small round or half-round file to produce a small notch in the rear casting as shown in Figure 5-2A. The depth of the notch should be approximately one-half the

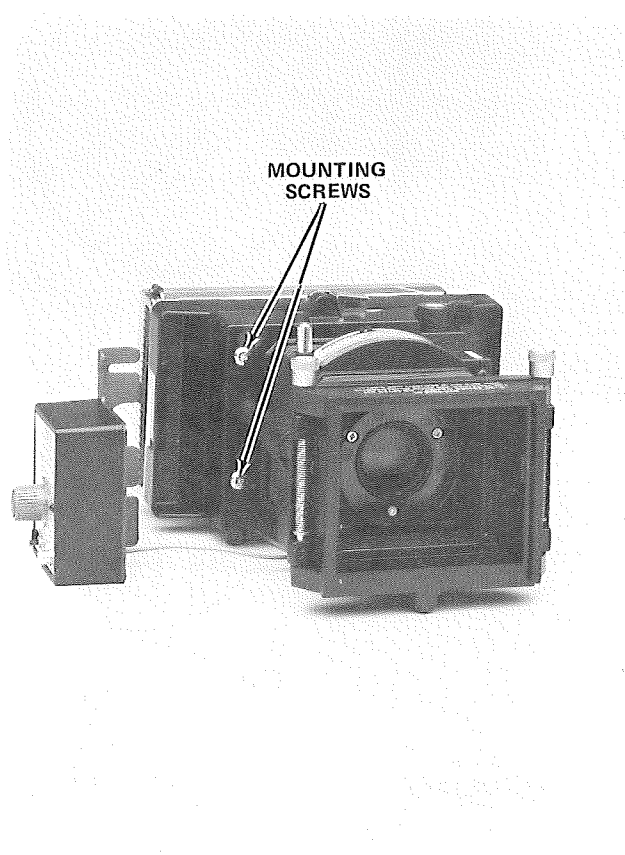
thickness of the diffuser power cable. (Some units may already have a notch.)

4. Remove all metal filings and sharp edges from the camera and the groove.

5. Remove the protective covering from the tape on the back of the diffuser assembly. Press the diffuser assembly into the rear of the camera as shown in Figure 5-2A.



A. Rear of camera with notch, clamps, and diffuser placement.  
4396-05



B. Front of camera with WSEN, mounting bracket, and screws.  
4396-05

Figure 5-2. C-30 Series and C-31 installation.

6. Route the cable through the notch in the rear casting. Secure the cable with the cable clamps provided as shown in Figure 5-2A. Make certain that there is sufficient cable length to allow the C-30 series camera to be set to an object-to-image ratio of 1.5:1, and that the cable does not interfere when the object-to-image ratio is changed.

7. Install the batteries in the WSEN Control Unit and attach it to the mounting bracket with the four round-head screws provided.

8. Loosen the two screws on the right, front side of the rear camera casting, as shown in Figure 5-2B, enough to allow slipping the WSEN mounting bracket under them. Retighten the mounting screws.

9. Connect the WSEN power cable to the rear of the WSEN Control Unit.

10. Test the diffuser assembly for visible light under low ambient light conditions. (Set Exposure Control fully clockwise.)

11. Reinstall the film-back on the camera and test the assembly for proper operation.

This completes the installation of the WSEN on the C-30 series and C-31 series camera units.

## INSTALLATION C-50, C-51, C-53, and C-59 Series Cameras

1. Install the dark-slide in the film-back of the camera and remove the film-back from the camera.

2. With the exception of the C-59 series, remove the light shield from the rear of the lens. (This is shown in the Mechanical Parts List Illustration in the appropriate camera manual, and will not be reused unless the WSEN is removed from the camera.)

### NOTE

*On the C-51 camera, install the provided O-ring in the rear lens element in the manner shown in Figure 5-3. The O-ring serves as a light seal for the diffuser assembly and must be positioned just past the groove in the lens element toward the shutter.*

3. Remove and discard the top two screws from the left camera side. (See Figure 5-3.)

4. Temporarily install the WSEN mounting plate using two of the 4-40 round-head screws provided.

### NOTE

*Observe that in Figure 5-3, two positions are available for the mounting bracket; one for the camera without battery pack, and one for the camera with battery pack. Note that the position selected determines the location of the power supply cable opening to be drilled.*

5. Mark the center of the mounting-plate opening on the side panel.

6. Remove the mounting plate and the side panel from the camera. (Due to the components mounted on the side panel, the C-59 series side panel will not be completely removable.)



*Care should be taken to insure that all components and wiring are free from the area to be drilled on the C-59 series side panel.*

7. Drill the opening in the side panel with a 9/32 (0.2812 inch) diameter drill bit.



*Care should be taken to insure that all sharp edges and burrs are removed upon completion of the drilling operation, and that all metal fillings are removed from the camera.*

8. Install the diffuser unit in the camera. Route the power cable through the left side around any sharp edges and components to the best position for being placed through the opening drilled in the camera side panel.

9. Route the cable through the drilled side, and install the side panel loosely at the bottom with two of the 4-40 round-head screws provided.

10. Install the batteries in the WSEN Control Unit and attach it to the mounting plate with the four flat-head screws provided.

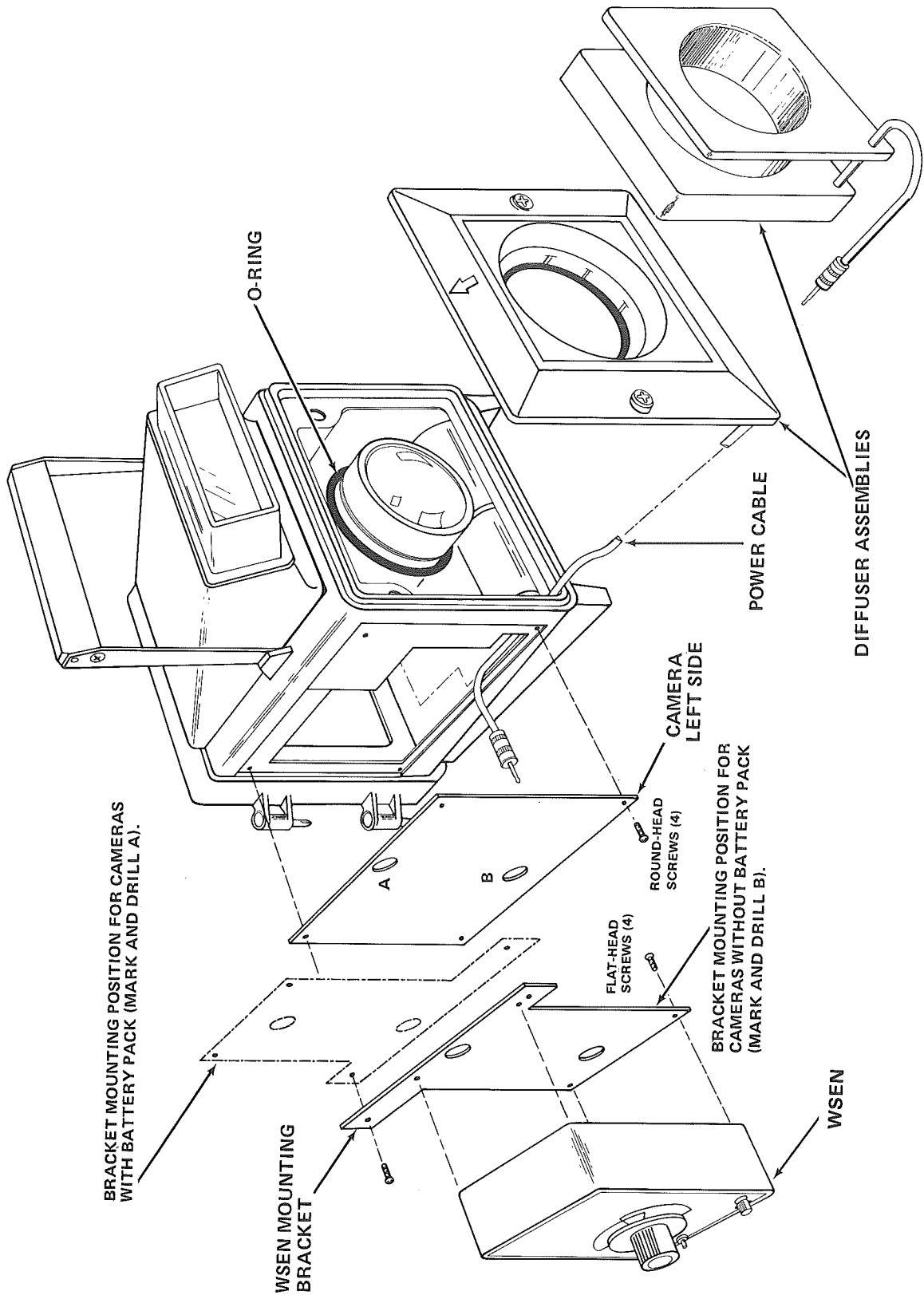


Figure 5-3. Typical installation C-50, C-51, C-53 and C-59 Cameras.

4396-06A



11. Connect the power cable to the Control Unit.

12. Feed the power cable back into the camera until the WSEN Control Unit and mounting bracket are next to the camera side.

13. Install the other two 4-40 screws provided, and, while holding the side and the WSEN unit in place, tighten all four side screws.

14. Test the diffuser assembly for visible light under low ambient light conditions. (Set the Exposure Control fullyclockwise.)

15. Reinstall the film-back on the camera and test the assembly for correct operation.

This completes the installation of the WSEN unit on C-50, C-51, C-53, and C-59 series cameras.







# REPLACEABLE PARTS

## PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

## SPECIAL NOTES AND SYMBOLS

- X000 Part first added at this serial number
- 00X Part removed after this serial number

## FIGURE AND INDEX NUMBERS

Items in this section are referenced by figure and index numbers to the illustrations.

## INDENTATION SYSTEM

This mechanical parts list is indented to indicate item relationships. Following is an example of the indentation system used in the description column.

```

1 2 3 4 5           Name & Description
Assembly and/or Component
Attaching parts for Assembly and/or Component
    ---*---
Detail Part of Assembly and/or Component
Attaching parts for Detail Part
    ---*---
Parts of Detail Part
Attaching parts for Parts of Detail Part
    ---*---
    
```

Attaching Parts always appear in the same indentation as the item it mounts, while the detail parts are indented to the right. Indented items are part of, and included with, the next higher indentation. The separation symbol ---\*--- indicates the end of attaching parts.

**Attaching parts must be purchased separately, unless otherwise specified.**

## ITEM NAME

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

## ABBREVIATIONS

|       |                    |         |                       |          |                      |          |                 |
|-------|--------------------|---------|-----------------------|----------|----------------------|----------|-----------------|
| "     | INCH               | ELECTRN | ELECTRON              | IN       | INCH                 | SE       | SINGLE END      |
| #     | NUMBER SIZE        | ELEC    | ELECTRICAL            | INCAND   | INCANDESCENT         | SECT     | SECTION         |
| ACTR  | ACTUATOR           | ELECTLT | ELECTROLYTIC          | INSUL    | INSULATOR            | SEMICOND | SEMICONDUCTOR   |
| ADPTR | ADAPTER            | ELEM    | ELEMENT               | INTL     | INTERNAL             | SHLD     | SHIELD          |
| ALIGN | ALIGNMENT          | EPL     | ELECTRICAL PARTS LIST | LPHLDR   | LAMPHOLDER           | SHLDR    | SHOULDERED      |
| AL    | ALUMINUM           | EQPT    | EQUIPMENT             | MACH     | MACHINE              | SKT      | SOCKET          |
| ASSEM | ASSEMBLED          | EXT     | EXTERNAL              | MECH     | MECHANICAL           | SL       | SLIDE           |
| ASSY  | ASSEMBLY           | FIL     | FILLISTER HEAD        | MTG      | MOUNTING             | SLFLKG   | SELF-LOCKING    |
| ATTEN | ATTENUATOR         | FLEX    | FLEXIBLE              | NIP      | NIPPLE               | SLVG     | SLEEVING        |
| AWG   | AMERICAN WIRE GAGE | FLH     | FLAT HEAD             | NON WIRE | NOT WIRE WOUND       | SPR      | SPRING          |
| BD    | BOARD              | FLTR    | FILTER                | OBD      | ORDER BY DESCRIPTION | SQ       | SQUARE          |
| BRKT  | BRACKET            | FR      | FRAME or FRONT        | OD       | OUTSIDE DIAMETER     | SST      | STAINLESS STEEL |
| BRS   | BRASS              | FSTNR   | FASTENER              | OVH      | OVAL HEAD            | STL      | STEEL           |
| BRZ   | BRONZE             | FT      | FOOT                  | PH BRZ   | PHOSPHOR BRONZE      | SW       | SWITCH          |
| BSHG  | BUSHING            | FXD     | FIXED                 | PL       | PLAIN or PLATE       | T        | TUBE            |
| CAB   | CABINET            | GSKT    | GASKET                | PLSTC    | PLASTIC              | TERM     | TERMINAL        |
| CAP   | CAPACITOR          | HDL     | HANDLE                | PN       | PART NUMBER          | THD      | THREAD          |
| CER   | CERAMIC            | HEX     | HEXAGON               | PNH      | PAN HEAD             | THK      | THICK           |
| CHAS  | CHASSIS            | HEX HD  | HEXAGONAL HEAD        | PWR      | POWER                | TNSN     | TENSION         |
| CKT   | CIRCUIT            | HEX SOC | HEXAGONAL SOCKET      | RCPT     | RECEPTACLE           | TPG      | TAPPING         |
| COMP  | COMPOSITION        | HLCPS   | HELICAL COMPRESSION   | RES      | RESISTOR             | TRH      | TRUSS HEAD      |
| CONN  | CONNECTOR          | HLEXT   | HELICAL EXTENSION     | RGD      | RIGID                | V        | VOLTAGE         |
| COV   | COVER              | HV      | HIGH VOLTAGE          | RLF      | RELIEF               | VAR      | VARIABLE        |
| CPLG  | COUPLING           | IC      | INTEGRATED CIRCUIT    | RTNR     | RETAINER             | W/       | WITH            |
| CRT   | CATHODE RAY TUBE   | ID      | INSIDE DIAMETER       | SCH      | SOCKET HEAD          | WSHR     | WASHER          |
| DEG   | DEGREE             | IDNT    | IDENTIFICATION        | SCOPE    | OSCILLOSCOPE         | XFMR     | TRANSFORMER     |
| DWR   | DRAWER             | IMPLR   | IMPELLER              | SCR      | SCREW                | XSTR     | TRANSISTOR      |

Replaceable Parts—WSEN

CROSS INDEX—MFR. CODE NUMBER TO MANUFACTURER

| Mfr. Code | Manufacturer   | Address                                  | City, State, Zip         |
|-----------|--|--|--------------------------|
| 000CY     | NORTHWEST FASTENER SALES, INC.   | 7923 SW CIRRHUS DRIVE                    | BEAVERTON, OR 97005      |
| 00779     | AMP, INC.  | P O BOX 3608                             | HARRISBURG, PA 17105     |
| 01121     | ALLEN-BRADLEY COMPANY  | 1201 2ND STREET SOUTH                    | MILWAUKEE, WI 53204      |
| 01295     | TEXAS INSTRUMENTS, INC., SEMICONDUCTOR GROUP                             | P O BOX 5012, 13500 N CENTRAL EXPRESSWAY | DALLAS, TX 75222         |
| 07263     | FAIRCHILD SEMICONDUCTOR, A DIV. OF FAIRCHILD CAMERA AND INSTRUMENT CORP. | 464 ELLIS STREET                         | MOUNTAIN VIEW, CA 94042  |
| 08261     | SPECTRA-STRIP CORP.  | 7100 LAMPSON AVE.                        | GARDEN GROVE, CA 92642   |
| 10389     | CHICAGO SWITCH, INC.   | 2035 WABANSIA AVE.                       | CHICAGO, IL 60647        |
| 22526     | BERG ELECTRONICS, INC.   | YOUK EXPRESSWAY                          | NEW CUMBERLAND, PA 17070 |
| 27014     | NATIONAL SEMICONDUCTOR CORP.   | 2900 SEMICONDUCTOR DR.                   | SANTA CLARA, CA 95051    |
| 50522     | MONSANTO CO., ELECTRONIC SPECIAL PRODUCTS                                | 3400 HILLVIEW AVENUE                     | PALO ALTO, CA 94304      |
| 50558     | ELECTRONIC CONCEPTS, INC.  | 526 INDUSTRIAL WAY WEST                  | EATONTOWN, NJ 07724      |
| 72982     | ERIE TECHNOLOGICAL PRODUCTS, INC.  | 644 W. 12TH ST.                          | ERIE, PA 16512           |
| 73138     | BECKMAN INSTRUMENTS, INC., HELIPOT DIV.                                  | 2500 HARBOR BLVD.                        | FULLERTON, CA 92634      |
| 73743     | FISCHER SPECIAL MFG. CO.   | 446 MORGAN ST.                           | CINCINNATI, OH 45206     |
| 74868     | BUNKER-RAMO CORP., THE AMPHENOL RF DIV.                                  | 33 E. FRANKLIN ST.                       | DANBURY, CT 06810        |
| 78189     | ILLINOIS TOOL WORKS, INC. SHAKEPROOF DIVISION                            | ST. CHARLES ROAD                         | ELGIN, IL 60120          |
| 79807     | WROUGHT WASHER MFG. CO.  | 2100 S. O BAY ST.                        | MILWAUKEE, WI 53207      |
| 80009     | TEKTRONIX, INC.  | P O BOX 500                              | BEAVERTON, OR 97077      |
| 81073     | GRAYHILL, INC.   | 561 HILLGROVE AVE., PO BOX 373           | LA GRANGE, IL 60525      |
| 82389     | SWITCHCRAFT, INC.  | 5555 N. ELSTON AVE.                      | CHICAGO, IL 60630        |
| 83385     | CENTRAL SCREW CO.  | 2530 CRESCENT DR.                        | BROADVIEW, IL 60153      |
| 86928     | SEASTROM MFG. COMPANY, INC.  | 701 SONORA AVENUE                        | GLENDALE, CA 91201       |
| 91637     | DALE ELECTRONICS, INC.   | P. O. BOX 609                            | COLUMBUS, NE 68601       |
| 95987     | WECKESSER CO., INC.  | 4444 WEST IRVING PARK RD.                | CHICAGO, IL 60641        |

Replaceable Electrical Parts—WSEN

| Ckt No.       | Tektronix Part No. | Serial/Model No. Eff | Dscont | Name & Description                        | Mfr Code | Mfr Part Number  |
|---------------|--------------------|----------------------|--------|---|----------|------------------|
|               | 670-7791-00        |                      |        | CKT BOARD ASSY:WRITING SPEED ENHANCER     | 80009    | 670-7791-00      |
| C1020         | 283-0203-00        |                      |        | CAP., FXD, CER DI:0.47UF, 20%, 50V        | 72982    | 8131N075E474M    |
| C2010         | 285-1133-00        |                      |        | CAP., FXD, PLSTC:0.33UF, 1%, 100V         | 50558    | MH12D334F        |
| C3010         | 283-0198-00        |                      |        | CAP., FXD, CER DI:0.22UF, 20%, 50V        | 72982    | 8121N083Z5U0224M |
| C3030         | -----              |                      |        | (CUSTOMER OPTIONAL)                       |          |                  |
| C3040         | 283-0204-00        |                      |        | CAP., FXD, CER DI:0.01UF, 20%, 50V        | 72982    | 8121N061Z5U0103M |
| CR2040        | 152-0141-02        |                      |        | SEMICONV DEVICE:SILICON, 30V, 150MA       | 01295    | 1N4152R          |
| CR2041        | 152-0141-02        |                      |        | SEMICONV DEVICE:SILICON, 30V, 150MA       | 01295    | 1N4152R          |
| J1020         | 131-0608-00        |                      |        | TERMINAL, PIN:0.365 L X 0.025 PH BRZ GOLD | 22526    | 47357            |
| Q2030         | 151-0190-00        |                      |        | TRANSISTOR:SILICON, NPN                   | 07263    | S032677          |
| Q2040         | 151-0190-00        |                      |        | TRANSISTOR:SILICON, NPN                   | 07263    | S032677          |
| Q3010         | 151-0190-00        |                      |        | TRANSISTOR:SILICON, NPN                   | 07263    | S032677          |
| R1010         | 321-0277-00        |                      |        | RES., FXD, FILM:7.5K OHM, 1%, 0.125W      | 91637    | MFF1816G75000F   |
| R1011         | 315-0183-00        |                      |        | RES., FXD, CMPSN:18K OHM, 5%, 0.25W       | 01121    | CB1835           |
| R1020         | 315-0275-00        |                      |        | RES., FXD, CMPSN:2.7M OHM, 5%, 0.25W      | 01121    | CB2755           |
| R1021         | 315-0473-00        |                      |        | RES., FXD, CMPSN:47K OHM, 5%, 0.25W       | 01121    | CB4735           |
| R1030         | 321-0385-00        |                      |        | RES., FXD, FILM:100K OHM, 1%, 0.125W      | 91637    | MFF1816G10002F   |
| R1031         | 321-0252-00        |                      |        | RES., FXD, FILM:4.12K OHM, 1%, 0.125W     | 91637    | MFF1816G41200F   |
| R1032         | 321-0357-00        |                      |        | RES., FXD, FILM:51.1K OHM, 1%, 0.125W     | 91637    | MFF1816G51101F   |
| R2020         | 315-0911-00        |                      |        | RES., FXD, CMPSN:910 OHM, 5%, 0.25W       | 01121    | CB9115           |
| R2020         | -----              |                      |        | (NOMINAL VALUE, SELECTED)                 |          |                  |
| R2021         | 315-0821-00        |                      |        | RES., FXD, CMPSN:820 OHM, 5%, 0.25W       | 01121    | CB8215           |
| R2030         | 321-0377-00        |                      |        | RES., FXD, FILM:82.5K OHM, 1%, 0.125W     | 91637    | MFF1816G82501F   |
| R3010         | 315-0473-00        |                      |        | RES., FXD, CMPSN:47K OHM, 5%, 0.25W       | 01121    | CB4735           |
| R3011         | 311-1035-00        |                      |        | RES., VAR, NONWIR:50K OHM, 10%, 0.50W     | 73138    | 82-40-0          |
| R3020         | 315-0105-00        |                      |        | RES., FXD, CMPSN:1M OHM, 5%, 0.25W        | 01121    | CB1055           |
| R3030         | 321-0260-00        |                      |        | RES., FXD, FILM:4.99K OHM, 1%, 0.125W     | 91637    | MFF1816G49900F   |
| R3031         | 315-0104-00        |                      |        | RES., FXD, CMPSN:100K OHM, 5%, 0.25W      | 01121    | CB1045           |
| R3032         | 315-0822-00        |                      |        | RES., FXD, CMPSN:8.2K OHM, 5%, 0.25W      | 01121    | CB8225           |
| R3040         | 315-0473-00        |                      |        | RES., FXD, CMPSN:47K OHM, 5%, 0.25W       | 01121    | CB4735           |
| R3041         | 315-0102-00        |                      |        | RES., FXD, CMPSN:1K OHM, 5%, 0.25W        | 01121    | CB1025           |
| U1040         | 156-1719-00        |                      |        | MICROCIRCUIT, LI:OPNL AMP/V REF           | 27014    | LM10CN           |
|               | -----              |                      |        | (EARLY PRODUCTION UNITS MAY USE LM10CLN   |          |                  |
|               | -----              |                      |        | OR LM10CH)                                |          |                  |
| U2020         | 156-1152-00        |                      |        | MICROCIRCUIT, DI:DUAL PRGN RETR RESET MM  | 80009    | 156-1152-00      |
| CHASSIS PARTS |                    |                      |        |   |          |                  |
| C1            | 283-0204-00        |                      |        | CAP., FXD, CER DI:0.01UF, 20%, 50V        | 72982    | 8121N061Z5U0103M |
| B1            | 146-0017-00        |                      |        | BATTERY SET:9V, 400 MAH                   | 80009    | 146-0017-00      |
| CR5           | 150-1001-00        |                      |        | LT EMITTING DIO:RED, 660NM, 100MA MAX     | 50522    | MV5024           |
| R1            | 311-2206-00        |                      |        | RES, VAR, NOWW:PNL, 2.5M OHM, 20%         |          |                  |
| S1            | 260-0960-00        |                      |        | SWITCH, SLIDE:2A, 120VAC, 0.5A, 120VDC    | 10389    | 23-021-006       |
| S2            | 260-0735-00        |                      |        | SWITCH, PUSH:T, NO CONTACT, RED BUTTON    | 81073    | 39-1             |



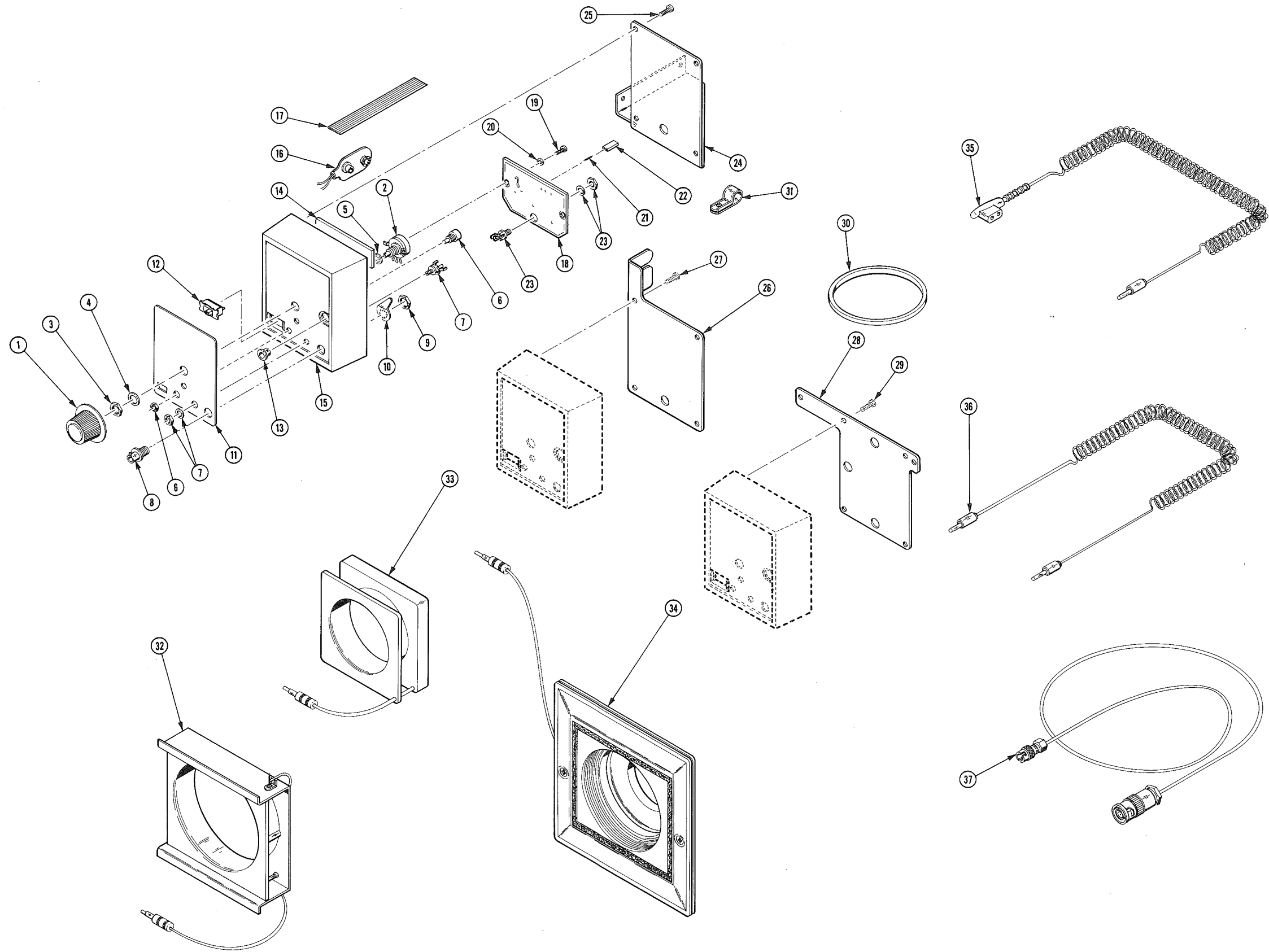


Replaceable Mechanical Parts—WSEN

| Fig. & Index No. | Tektronix Part No. | Serial/Model No. Eff Dscont | Qty | 1 | 2 | 3 | 4 | 5 | Name & Description   | Mfr Code | Mfr Part Number  |
|------------------|--------------------|-----------------------------|-----|---|---|---|---|---|--|----------|------------------|
| 1-1              | 366-1362-00        |                             | 1   |   |   |   |   |   | KNOB:GY,0.127 ID X1.0 OD X 0.52 H                          | 80009    | 366-1362-00      |
|                  | 213-0153-00        |                             | 1   |   |   |   |   |   | . SETSCREW:5-40 X 0.125,STL BK OXD,HEX SKT                 | 000CY    | OBD              |
| -2               | -----              |                             | 1   |   |   |   |   |   | RESISTOR,VAR:(SEE R1 REPL)<br>(ATTACHING PARTS)            |          |                  |
| -3               | 210-0583-00        |                             | 1   |   |   |   |   |   | NUT,PLAIN,HEX:0.25-32 X 0.312 INCH,BRS                     | 73743    | 2X20317-402      |
| -4               | 210-0940-00        |                             | 1   |   |   |   |   |   | WASHER,FLAT:0.25 ID X 0.375 INCH OD,STL                    | 79807    | OBD              |
| -5               | 210-0046-00        |                             | 1   |   |   |   |   |   | WASHER,LOCK:0.261 ID,INTL,0.018 THK,BRS                    | 78189    | 1214-05-00-0541C |
|                  |                    |                             |     |   |   |   |   |   | -----*-----  |          |                  |
| -6               | -----              |                             | 1   |   |   |   |   |   | SWITCH,PUSH:(SEE S2 REPL)                                  |          |                  |
| -7               | 131-0407-00        |                             | 1   |   |   |   |   |   | JACK,TELEPHONE:W/HARDWARE                                  | 82389    | TR-2A            |
| -8               | 131-0282-00        |                             | 1   |   |   |   |   |   | CONNECTOR,RCPT,:FEEDTHRU<br>(ATTACHING PARTS)              | 74868    | 74300MB          |
| -9               | 210-0583-00        |                             | 1   |   |   |   |   |   | NUT,PLAIN,HEX:0.25-32 X 0.312 INCH,BRS                     | 73743    | 2X20317-402      |
| -10              | 210-0223-00        |                             | 1   |   |   |   |   |   | TERMINAL,LUG:0.25 INCH DIA,SE                              | 86928    | A313-136         |
|                  |                    |                             |     |   |   |   |   |   | -----*-----  |          |                  |
| -11              | 333-1462-01        |                             | 1   |   |   |   |   |   | PANEL,FRONT:   | 80009    | 333-1462-01      |
| -12              | -----              |                             | 1   |   |   |   |   |   | SWITCH,SLIDE:(SEE S1 REPL)                                 |          |                  |
| -13              | -----              |                             | 1   |   |   |   |   |   | PART OF 150-1001-00(SEE CR5 REPL)                          |          |                  |
| -14              | 348-0102-00        |                             | 1   |   |   |   |   |   | PAD,CUSHIONING:13.76 INCH LONG(CUT TO FIT)                 | 80009    | 348-0102-00      |
| -15              | 380-0247-02        |                             | 1   |   |   |   |   |   | HSG,WRITING SP:  | 80009    | 380-0247-02      |
| -16              | 131-1160-00        |                             | 2   |   |   |   |   |   | CLIP,ELECTRICAL:BATTERY                                    | 80009    | 131-1160-00      |
| -17              | 175-0858-00        |                             | 1   |   |   |   |   |   | WIRE,ELECTRICAL:7 WIRE RIBBON                              | 08261    | SS-0722-7(1061)  |
| -18              | -----              |                             | 1   |   |   |   |   |   | CKT BOARD ASSY:(SEE REPL)<br>(ATTACHING PARTS)             |          |                  |
| -19              | 213-0034-00        |                             | 2   |   |   |   |   |   | SCR,TPG,THD CTG:4-40 X 0.188 INCH,PNH STL                  | 83385    | OBD              |
| -20              | 210-0906-00        |                             | 2   |   |   |   |   |   | WASHER,NONMETAL:FIBER,0.125 ID X 0.203"OD                  | 86928    | OBD              |
|                  |                    |                             |     |   |   |   |   |   | -----*-----  |          |                  |
| -21              | -----              |                             | 2   |   |   |   |   |   | . TERMINAL PIN:(SEE J1020 REPL)                            |          |                  |
| -22              | 131-0993-07        |                             | 1   |   |   |   |   |   | . LINK,TERM.CONNE:2 WIRE VIOLET                            | 00779    | 530153-7         |
| -23              | 131-0407-00        |                             | 1   |   |   |   |   |   | . JACK,TELEPHONE:W/HARDWARE                                | 82389    | TR-2A            |
| -24              | 407-1030-00        |                             | 1   |   |   |   |   |   | BRACKET,CAMERA:ALUMINUM<br>(016-0280-02 ONLY)              | 80009    | 407-1030-00      |
|                  |                    |                             |     |   |   |   |   |   | (ATTACHING PARTS)  |          |                  |
| -25              | 213-0034-00        |                             | 4   |   |   |   |   |   | SCR,TPG,THD CTG:4-40 X 0.188 INCH,PNH STL                  | 83385    | OBD              |
|                  |                    |                             |     |   |   |   |   |   | -----*-----  |          |                  |
| -26              | 407-1018-00        |                             | 1   |   |   |   |   |   | BRACKET,SENSOR:ALUMINUM<br>(016-0284-02 ONLY)              | 80009    | 407-1018-00      |
|                  |                    |                             |     |   |   |   |   |   | (ATTACHING PARTS)  |          |                  |
| -27              | 213-0034-00        |                             | 4   |   |   |   |   |   | SCR,TPG,THD CTG:4-40 X 0.188 INCH,PNH STL                  | 83385    | OBD              |
|                  |                    |                             |     |   |   |   |   |   | -----*-----  |          |                  |
| -28              | 386-2046-01        |                             | 1   |   |   |   |   |   | PL,WRITING RT:   | 80009    | 386-2046-01      |
|                  | -----              |                             | -   |   |   |   |   |   | (016-0278-03,016-0279-02,016-0290-02,<br>016-0300-02 ONLY) |          |                  |
|                  | -----              |                             |     |   |   |   |   |   | (ATTACHING PARTS)  |          |                  |
| -29              | 213-0012-00        |                             | 4   |   |   |   |   |   | SCREW,MACHINE:4-40 X 0.375 INCH,FLH STL                    | 83385    | OBD              |
|                  |                    |                             |     |   |   |   |   |   | -----*-----  |          |                  |
| -30              | 354-0310-00        |                             | 1   |   |   |   |   |   | RING,RUBBER:   | 80009    | 354-0310-00      |
| -31              | 343-0119-00        |                             | 2   |   |   |   |   |   | CLAMP,LOOP:0.094 INCH DIA                                  | 95987    | 3/32-2           |
| -32              | 337-1606-01        |                             | 1   |   |   |   |   |   | DIFFUSER ASSY:<br>(016-0280-02 ONLY)                       | 80009    | 337-1606-01      |
|                  | -----              |                             |     |   |   |   |   |   | (ATTACHING PARTS)  |          |                  |
| -33              | 337-1603-01        |                             | 1   |   |   |   |   |   | DIFFUSER ASSY:<br>(016-0290-02,016-0284-02 ONLY)           | 80009    | 337-1603-01      |
|                  | -----              |                             |     |   |   |   |   |   | (ATTACHING PARTS)  |          |                  |
| -34              | 337-1604-01        |                             | 1   |   |   |   |   |   | DIFFUSER ASSY:<br>(016-0278-03 ONLY)                       | 80009    | 337-1604-01      |
|                  | -----              |                             |     |   |   |   |   |   | (ATTACHING PARTS)  |          |                  |
|                  | 337-1605-01        |                             | 1   |   |   |   |   |   | DIFFUSER ASSY:<br>(016-0279-02 ONLY)                       | 80009    | 337-1605-01      |
|                  | -----              |                             |     |   |   |   |   |   | (ATTACHING PARTS)  |          |                  |
|                  | 337-1724-01        |                             | 1   |   |   |   |   |   | DIFFUSER ASSY:<br>(016-0300-02 ONLY)                       | 80009    | 337-1724-01      |
|                  | -----              |                             |     |   |   |   |   |   | (ATTACHING PARTS)  |          |                  |

**Replaceable Mechanical Parts—WSEN**

| Fig. & Index No.     | Tektronix Part No. | Serial/Model No. Eff Dscont | Qty | 1 | 2 | 3 | 4 | 5 | Name & Description                         | Mfr Code | Mfr Part Number |
|----------------------|--------------------|-----------------------------|-----|---|---|---|---|---|--|----------|-----------------|
| STANDARD ACCESSORIES |                    |                             |     |   |   |   |   |   |  |          |                 |
| -35                  | 012-0364-01        |                             | 1   |   |   |   |   |   | CABLE, INTCON: 12.75 L                     | 80009    | 012-0364-01     |
|                      | -----              |                             | -   |   |   |   |   |   | (016-0280-02, 016-0284-02 ONLY)            |          |                 |
| -36                  | 012-0339-01        |                             | 1   |   |   |   |   |   | CABLE ASSY, SP E: INTERCONNECTING          | 82389    | 4C4394          |
|                      | -----              |                             | -   |   |   |   |   |   | (016-0278-03, 016-0279-02, 016-0290-02,    |          |                 |
|                      | -----              |                             | -   |   |   |   |   |   | 016-0300-02)                               |          |                 |
| -37                  | 012-0340-00        |                             | 1   |   |   |   |   |   | CABLE ASSY, RF: AND GATE                   | 80009    | 012-0340-00     |
|                      | -----              |                             | -   |   |   |   |   |   | (016-0278-03, 016-0279-02, 016-0280-02,    |          |                 |
|                      | -----              |                             | -   |   |   |   |   |   | 016-0284-02, 016-0290-02, 016-0300-02)     |          |                 |
|                      | 070-4396-00        |                             | 1   |   |   |   |   |   | MANUAL, TECH: INSTR                        | 80009    | 070-4396-00     |
|                      | 211-0097-00        |                             | 4   |   |   |   |   |   | SCREW, MACHINE: 4-40 X 0.312 INCH, PNH STL | 83385    | OBD             |
|                      | -----              |                             | -   |   |   |   |   |   | (016-0278-03, 016-0279-02, 016-0290-02,    |          |                 |
|                      | -----              |                             | -   |   |   |   |   |   | 016-0300-02 ONLY)                          |          |                 |
|                      | 211-0176-00        |                             | 2   |   |   |   |   |   | SCREW, MACHINE: 2-56 X 0.500, PNH, STL     | 83385    | OBD             |
|                      | -----              |                             | -   |   |   |   |   |   | (016-0280-02 ONLY)                         |          |                 |



## **MANUAL CHANGE INFORMATION**

At Tektronix, we continually strive to keep up with latest electronic developments by adding circuit and component improvements to our instruments as soon as they are developed and tested.

Sometimes, due to printing and shipping requirements, we can't get these changes immediately into printed manuals. Hence, your manual may contain new change information on following pages.

A single change may affect several sections. Since the change information sheets are carried in the manual until all changes are permanently entered, some duplication may occur. If no such change pages appear following this page, your manual is correct as printed.