INSTALLATION • OPERATION • MAINTENANCE

# INSTRUCTIONS

# RESERVE SIGNAL DETECTOR FOR TC AND KR CARRIER

## APPLICATION

The reserve signal detector is a device used to detect changes in received signal level on a power-line carrier channel. The relaying receiver output current is saturated at normal received signal levels. Thus, even a substantial reduction in the received signal may not give a corresponding drop in receiver output current. The reserve signal detector makes it possible to detect such changes in signal level before the signal drops to a low enough value to cause an incorrect relay operation.

## CONSTRUCTION

The reserve signal detector is available in two different mechanical designs; one for switchboard mounting, and one for rack mounting (19" panel). The unit for switchboard mounting is shown in Figure 1 which includes outline dimensions and schematic wiring. Figure 2 shows the outline of the rack-mounting unit, and Figure 3 is the internal schematic for this design. Electrically both units consist of a fixed resistor, a variable resistor, and a normally open pushbutton connected in series.

## OPERATION

The resistors and pushbutton of the reserve signal detector are connected into the transmitter carrier-start circuit, effectively functioning as a separate transmitter output control. This control is obtained by varying the d-c voltage to the amplifier stage following the crystal oscillator in either the KR or TC transmitter. With TC set, the output will not drop appreciably until sufficient resistance has been inserted to drop the voltage across zener diode CR101 below its 20-volt breakdown. The adjustable resistor is effective over a 40-db range of transmitter output. If a fault occurs while a reserve signal test is being made (with reduced transmitter output), operation of any carrier-start protective relay will instantly restore full output as long as required for the relaying function. The connections of the reserve signal detector into the carrier-start circuit are shown on the overall schematic which applies to a particular order.

## ADJUSTMENT

Because of differences in transmitter output, supply voltage, and service conditions, it is not practical to have a calibrated dial for this unit. However, calibration may be made at installation by recording output (either db or volts) at various knob settings of R1. Then, by depressing pushbutton S1 and adjusting the R1 dial so as to obtain one-half the normal saturated receiver output current (on a clear dry day), any increase in line attenuation at a later time may be noted as the difference between the original setting, and that required to obtain the one-half maximum receiver output current at the time of checking. The normal procedure for this test is to start with the knob full counterclockwise, and rotate slowly until the remote receiver output drops to half its maximum value.

NOTE: The nominal "one-half maximum" value for the TC set is 100 ma, and for the KR set, 10 ma. Since these values are half way up a steep curve, it may be rather difficult to adjust to exactly 10 or 100 ma. If the receiver output current is within ± 20 per cent of the nominal 10 or 100 ma figure, any attenuation figures will be correct within one db.

If communication between stations on a line section makes the foregoing periodic adjustment procedure inconvenient, there is a second method of using the reserve signal detector. First, set the receiver sensitivity to the desired margin for deterioration of signal. Depending on power company standards, this will usually be somewhere between 6 and 15 db. Now on a clear dry day, close S1 and increase R1 setting until the remote receiver output current drops 20 per cent. Leave the control at this point. At another time when a reserve signal test is to be made, it is necessary only to close the S1 pushbotton and have the remote operator note the receiver output current. If it does not drop more than 20 per cent or so, the desirable receiver margin still

exists. If the receiver output drops to a low value or to zero, it indicates that the original margin no longer exists. This could mean increased line loss, reduced transmitter output, reduced receiver sensitivity, or a combination of these factors.

PARTS LIST

| Symbol | Description | Style |
|---|---|---|
| R1 | 100-K Pot. | 1475074 |
| R2 | 2000-ohm resistor | 1267296 |
| S1 | Pushbutton Switch | 327C854H01 |

## RENEWAL PARTS

Repair work can be done most satisfactorily at the factory. However, replacement parts can be furnished, in most cases, to customers who are equiped for doing repair work. When ordering parts, always give the complete nameplate data as well as the part identification as given in the Parts List.

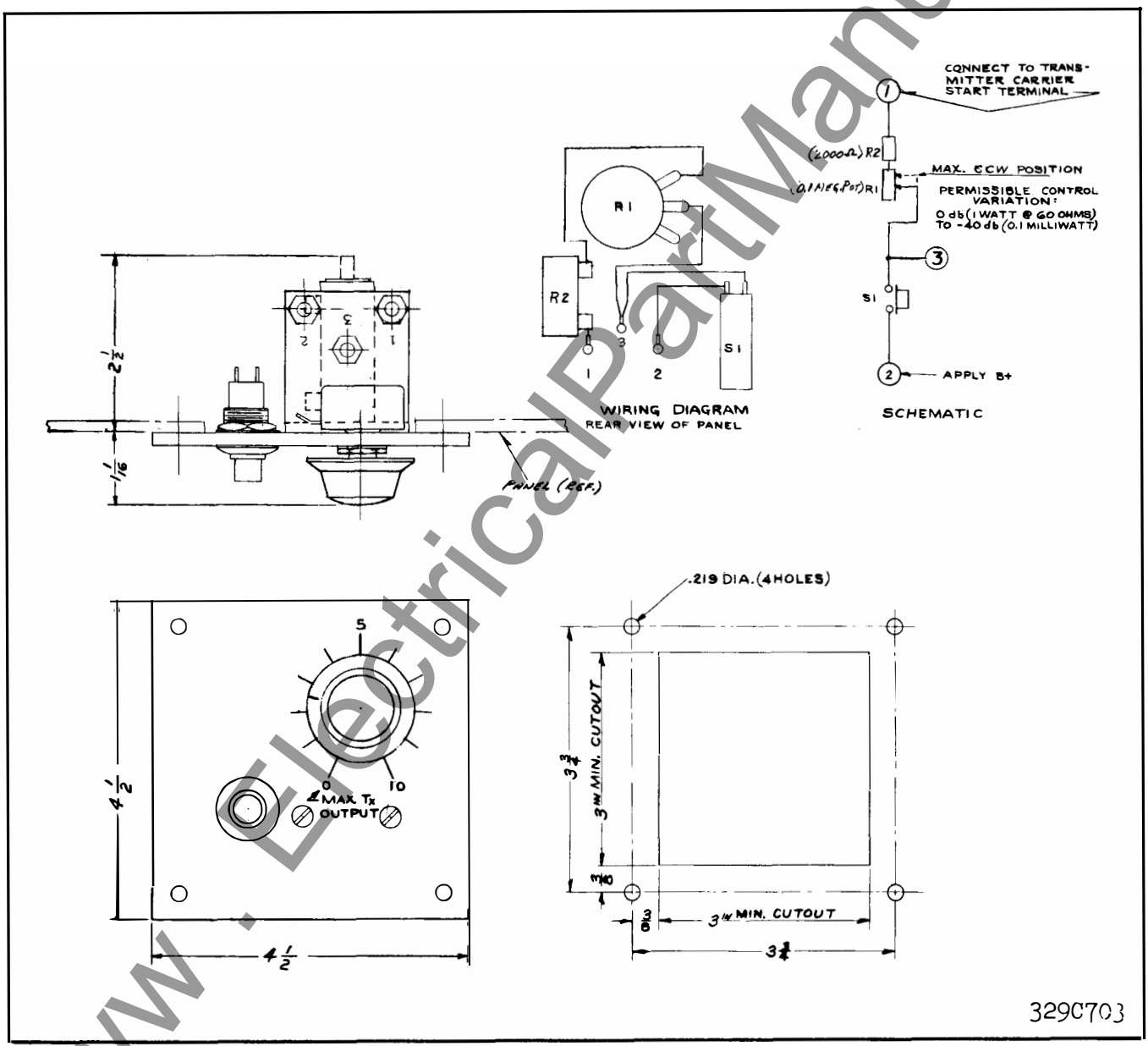



*Fig. 1. Reserve Signal Detector for Panel Mounting.*

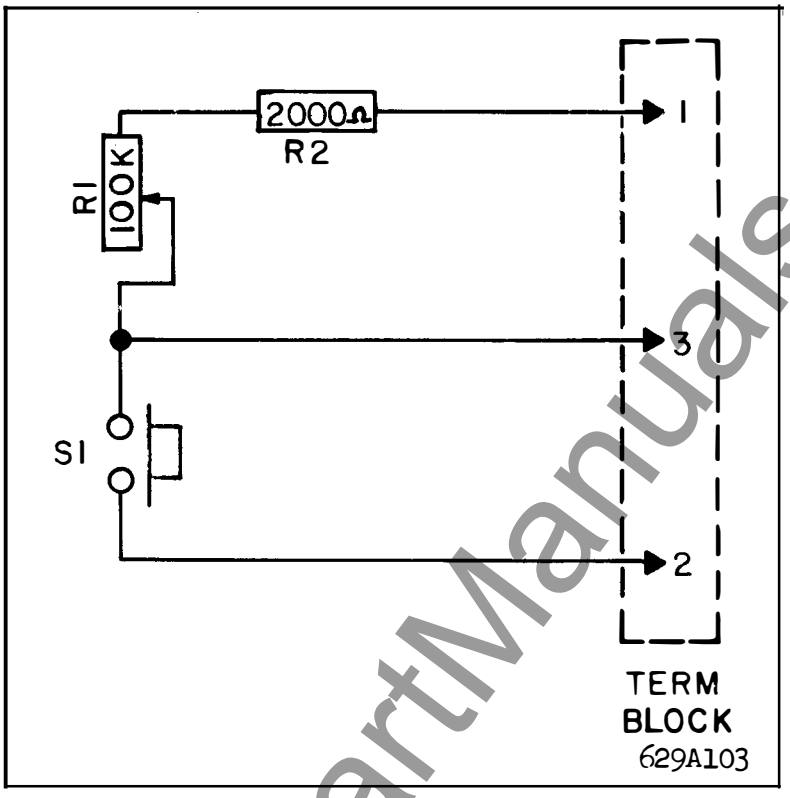
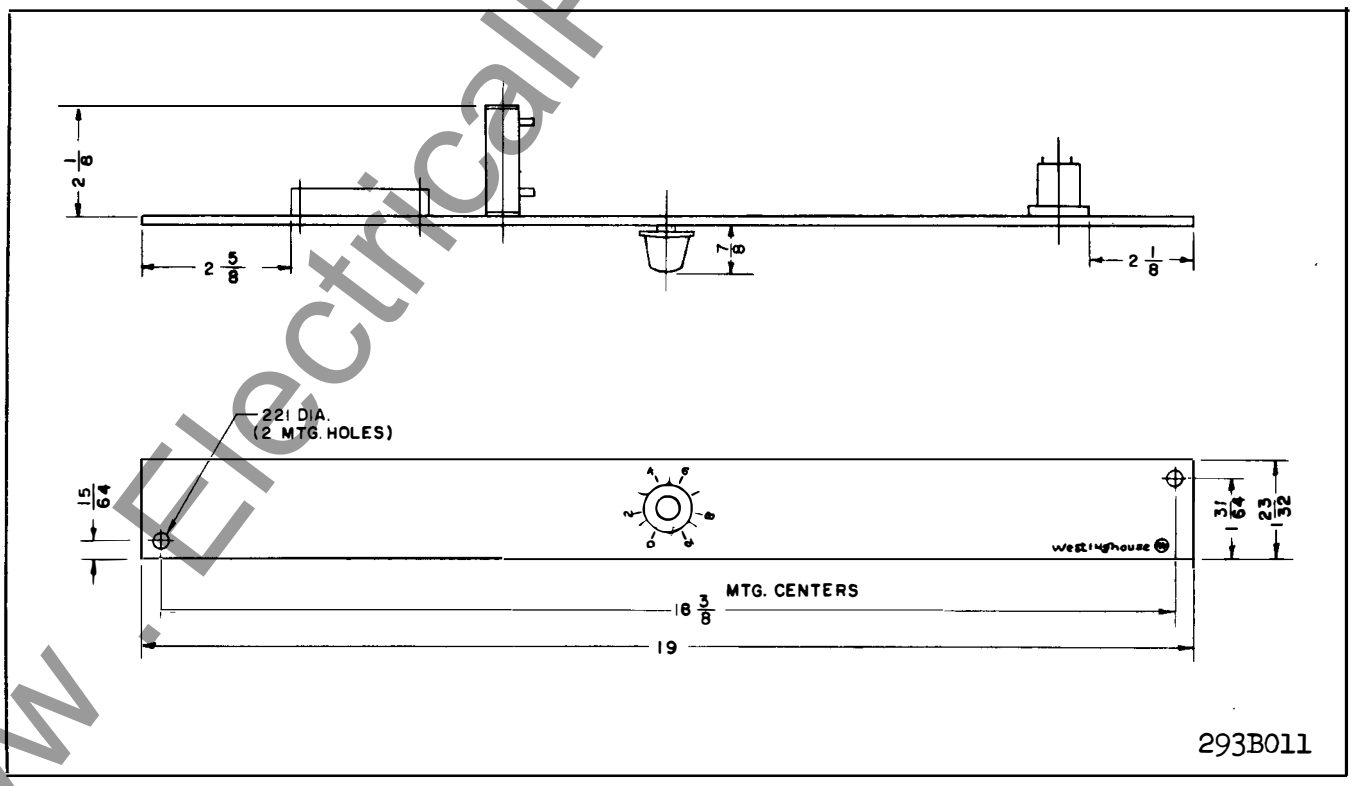



*Fig. 2. Reserve Signal Detector for 19-inch Rack Mounting.*

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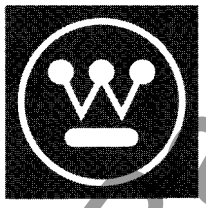

**WESTINGHOUSE ELECTRIC CORPORATION**

**RELAY-INSTRUMENT DIVISION** **NEWARK, N. J.**

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INSTALLATION • OPERATION • MAINTENANCE

# INSTRUCTIONS

# RESERVE SIGNAL DETECTOR FOR TC AND KR CARRIER

| Description | Style |
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| Panel mounted for 48 or 125 volt D.C. KR or TC Carrier | 470D167G02 |
| Panel mounted for 250 volt D.C. TC Carrier only | 470D167G03 |
| Rack mounted for 48 or 125 volt D.C. KR or TC Carrier | 408C484G01 |
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## OPERATION

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## ADJUSTMENT

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NOTE: The nominal "one-half maximum" value for the TC set is 100 ma, and for the KR set, 10 ma. Since these values are half way up a steep curve, it may be rather difficult to adjust to exactly 10 or 100 ma. If the receiver output current is within ± 20 per cent of the nominal 10 or 100 ma figure, any attenuation figures will be correct within one db.

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**SUPERSEDES I.L. 41-944.6F, dated May 1972**
**✪ Denotes change from superseded issue.**
**Also supersedes Addendum, dated August 1976**

**EFFECTIVE APRIL 1977**

ceiver output current. If it does not drop more than 20 per cent or so, the desirable receiver margin still exists. If the receiver output drops to a low value or to zero, it indicates that the original margin no longer exists. This could mean increased line loss, reduced transmitter output, reduced receiver sensitivity, or a combination of these factors.

## RENEWAL PARTS

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## PARTS LIST

| Symbol | Description | Style |
|---|---|---|
| R1 | 200-K Pot. | 185A086H27 |
| R1 | 200-K Pot. | 185A067H14 |
| R2 | 2000-ohm resistor | 1267296 |
| | 8000-ohm resistor | 1205219 |
| S1 | Pushbutton Switch | 879A860H01 |

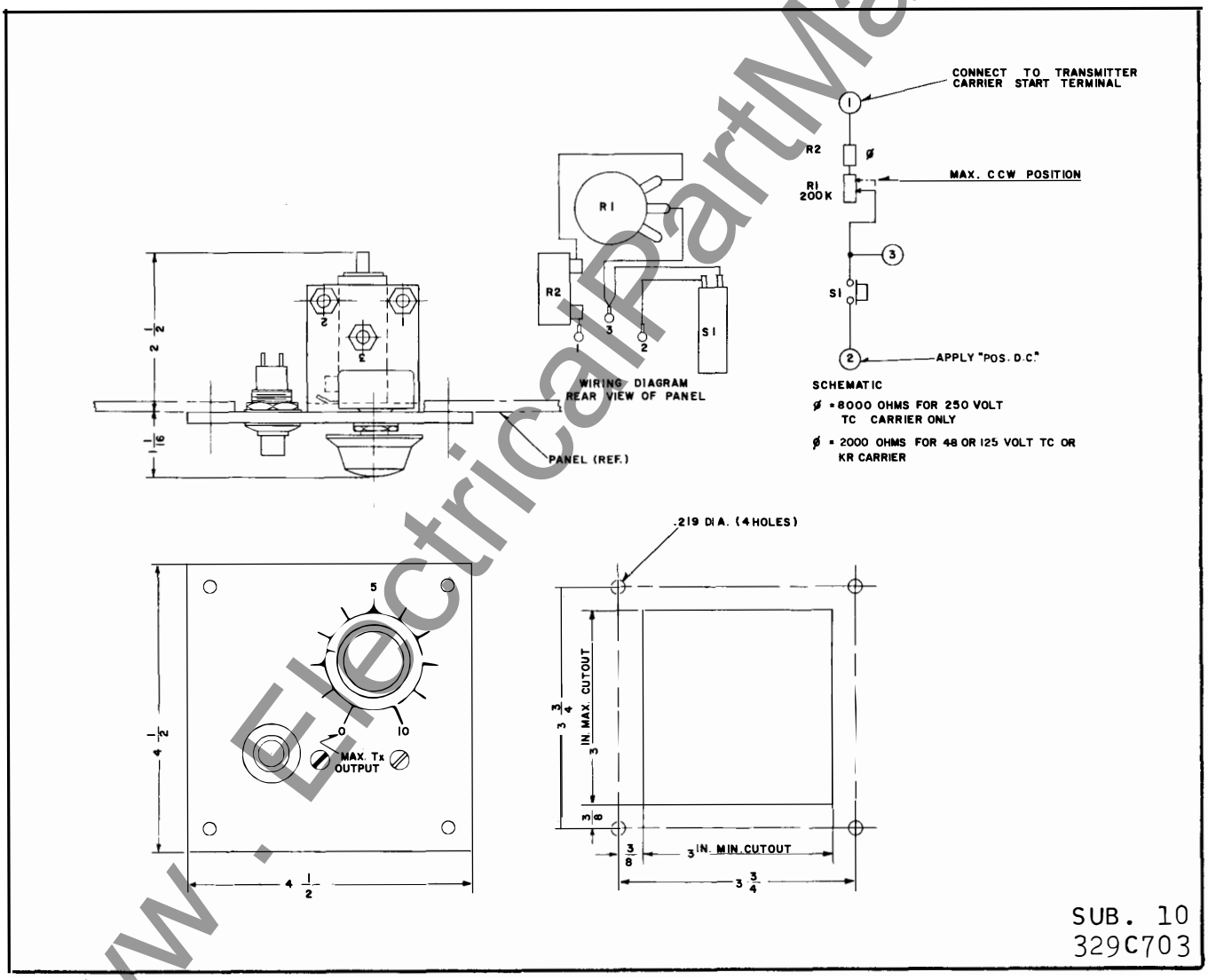



Fig. 1. Reserve Signal Detector for Panel Mounting.

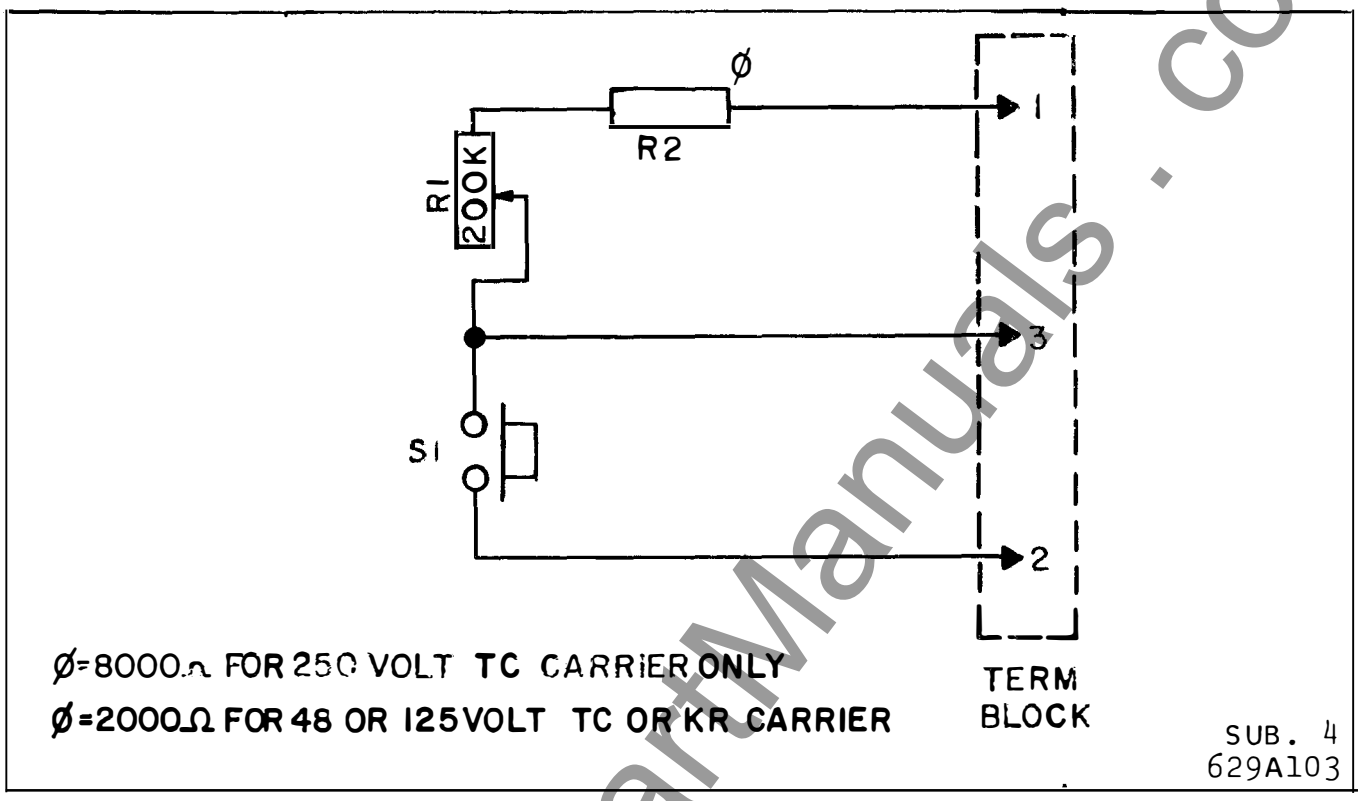



Fig. 2. Reserve Signal Detector for 19-inch Rack Mounting.

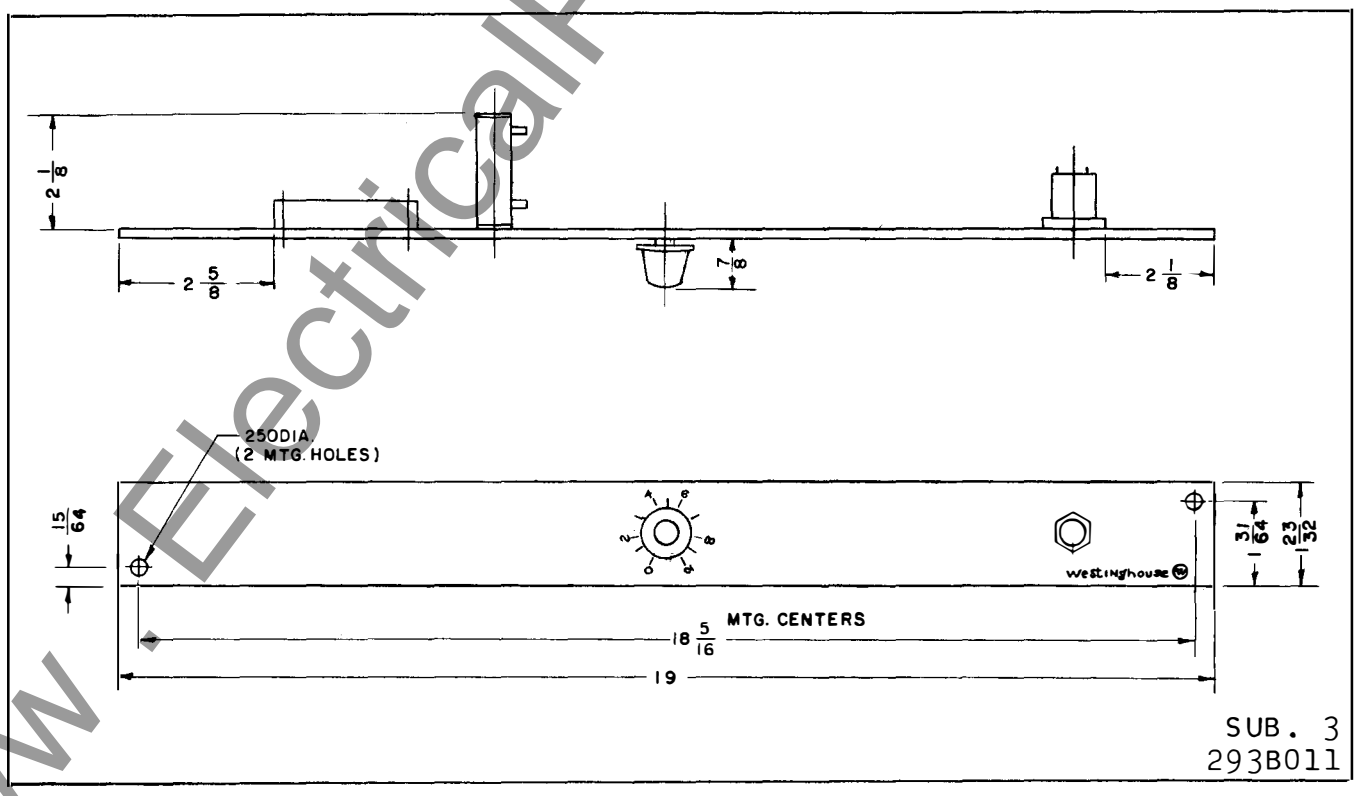
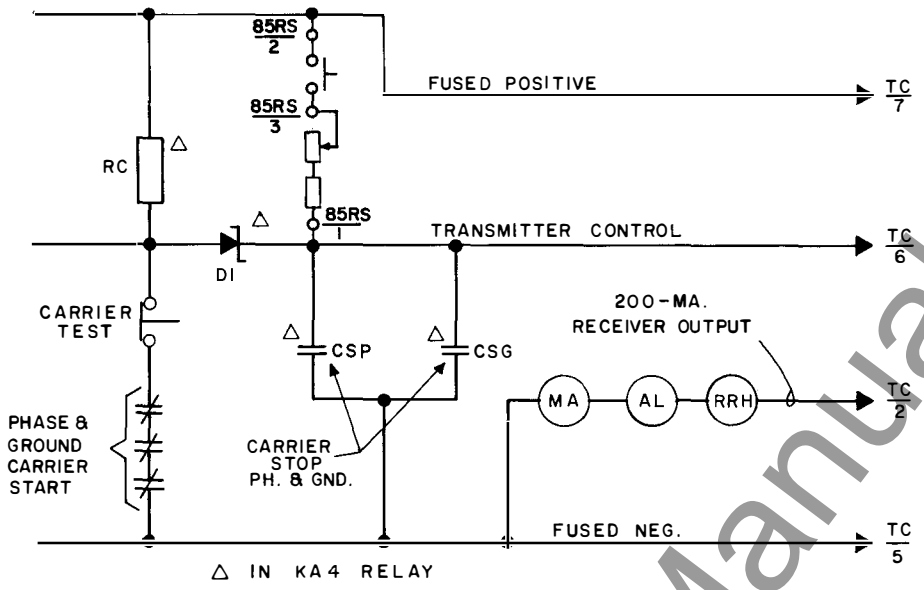


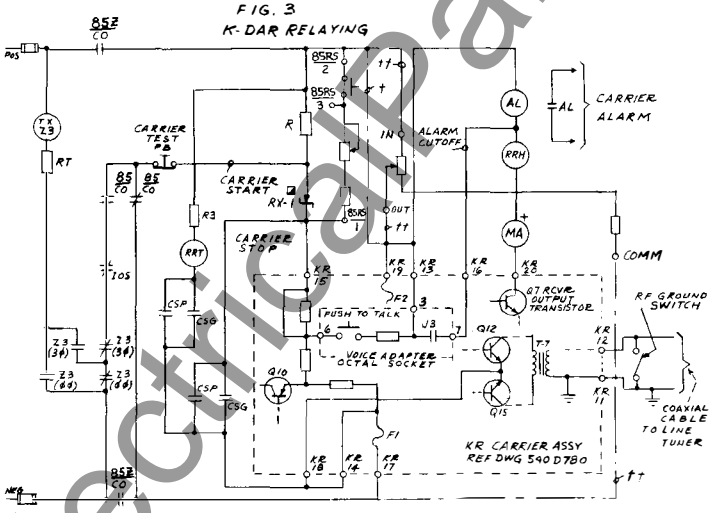

Fig. 3. Reserve Signal Detector for 19-inch Rack Mounting.




85RS-RESERVE SIGNAL DETECTOR (WHEN USED)

SUB. 2
862A937

*Fig. 4. Elementary K-Dar/TC Carrier Control Circuit.*




REQUIREMENTS FOR K-DAR RELAYING

| SUPPLY VOLTAGE | CARRIER START | CARRIER STOP | R |
|---|---|---|---|
| 51 VDC | + 37 V. 7MA | 0 VOLTS | 2K |
| 129 VDC | +100 V 8MA | 0 VOLTS | 3.75K |
| 258 VDC | +100 V 8MA | 0 VOLTS | 19K |

KR RELAYING TRANSMITTER / RECV. EXTERNAL CONNECTIONS

| TERMINAL | CONNECTION |
|---|---|
| 11 | GROUND |
| 12 | COAXIAL CABLE |
| 13 | SUPERVISORY PREFERENCE CONTACT |
| 14 | CARRIER STOP B- RETURN |
| 15 | CARRIER START (POSITIVE) |
| 16 | ALARM CUTOFF FOR COMMUNICATIONS |
| 17 | B MINUS |
| 18 | CARRIER STOP (HI/HEM) |
| 19 | B PLUS |
| 20 | RELAY COIL |

NOTES

~~* FOR "R" USE OHMITE VITREOUS ENAMELED DIVIDOHM ADJUSTABLE 4K OR 06K 25W RESISTOR. CONNECT & ADJUST FOR VALUES SHOWN~~

~~△ IN KA RELAY~~

■ TYPE IN3051 IN CARRIER AUX. RELAY

† FOR 51 & 129 VDC SUPPLY

†† FOR 258 VDC SUPPLY USE 330C191H01 RESISTOR UNIT REF DWG 223B497

85RS- RESERVE SIGNAL DETECTOR (WHEN USED)

SUB. 21
329C704

*Fig. 5. Elementary K-Dar/KR Carrier Control Circuit.*

INSTALLATION • OPERATION • MAINTENANCE

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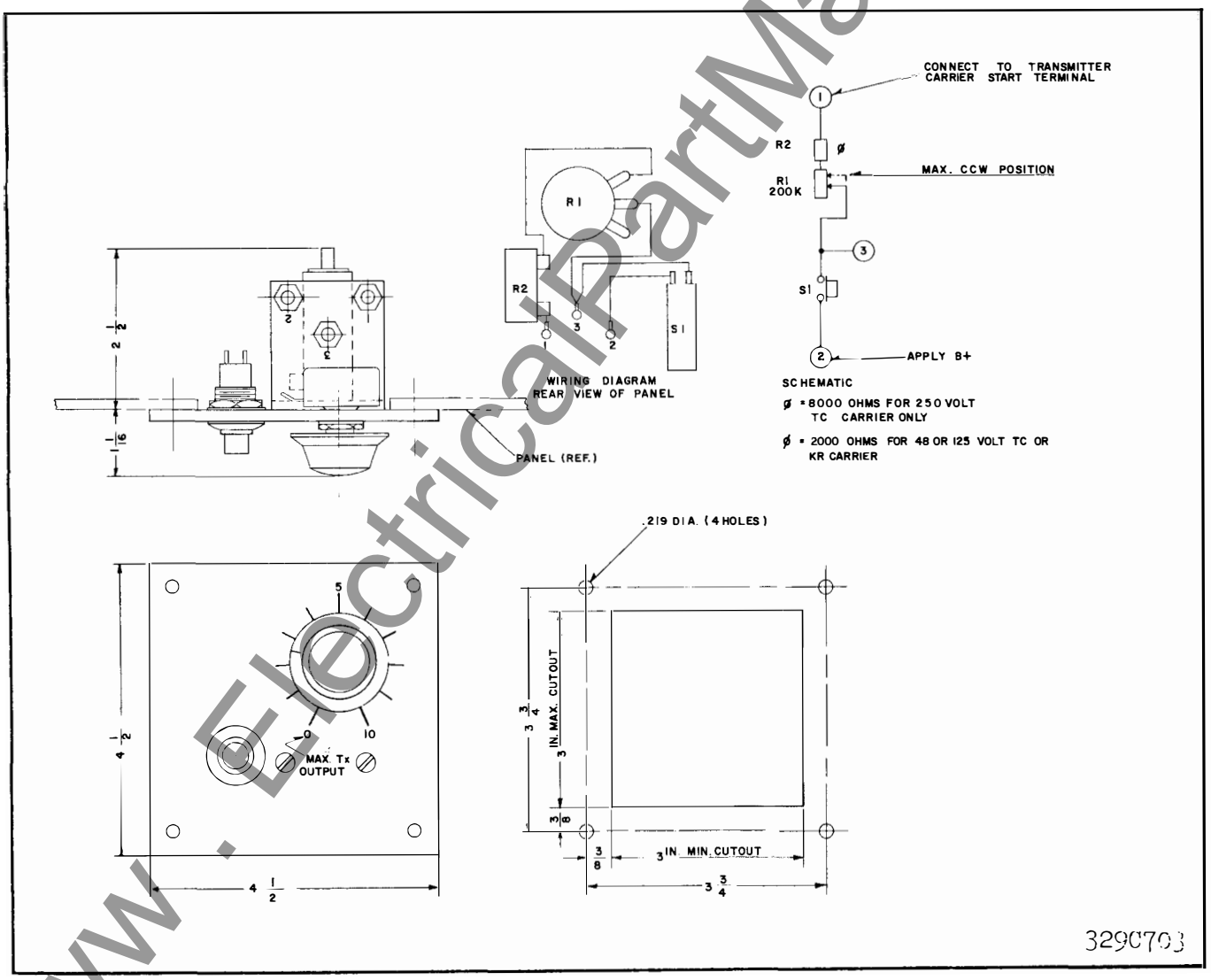



*Fig. 1. Reserve Signal Detector for Panel Mounting.*

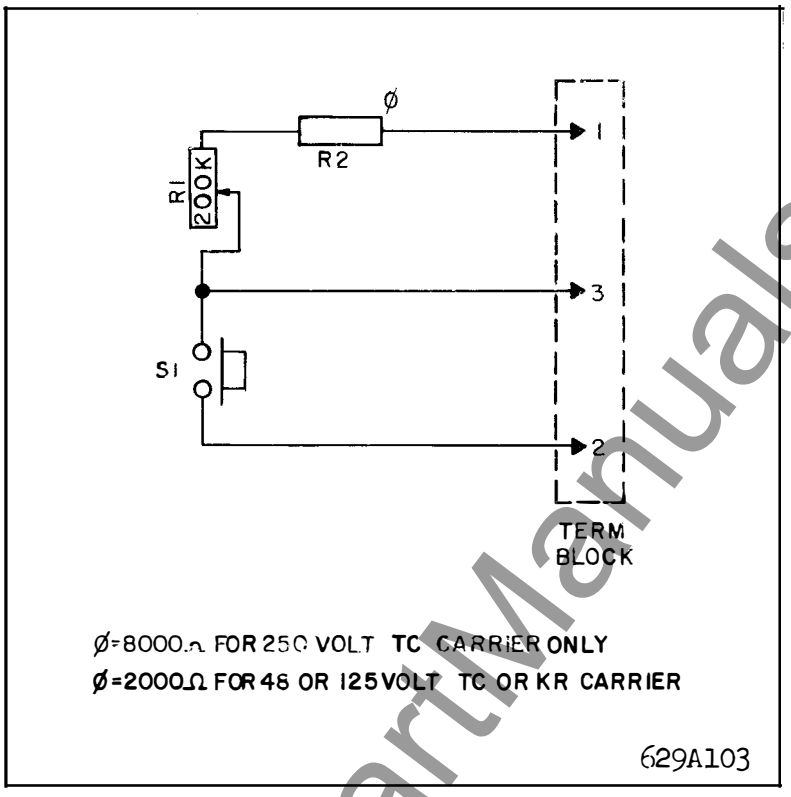
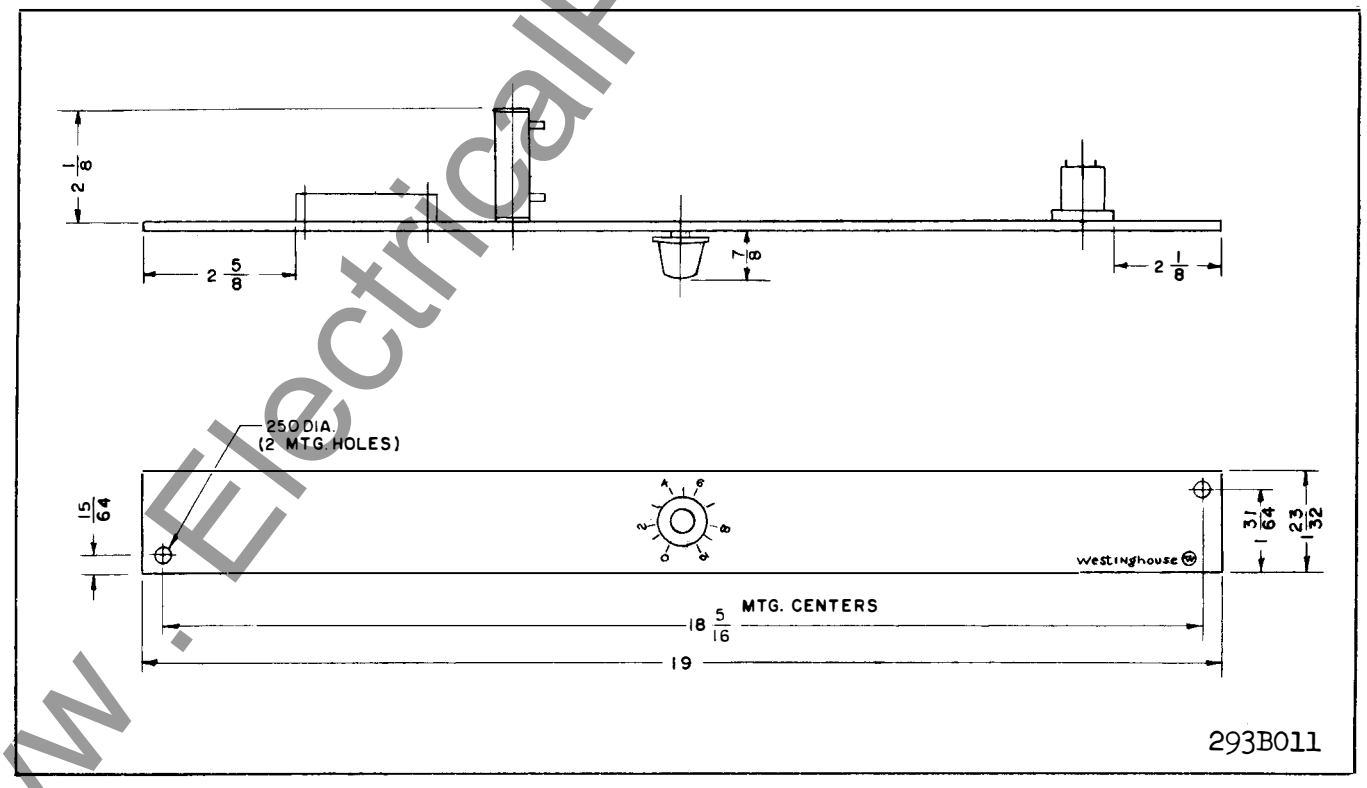



*Fig. 2. Reserve Signal Detector for 19-inch Rack Mounting.*

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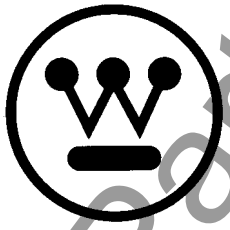

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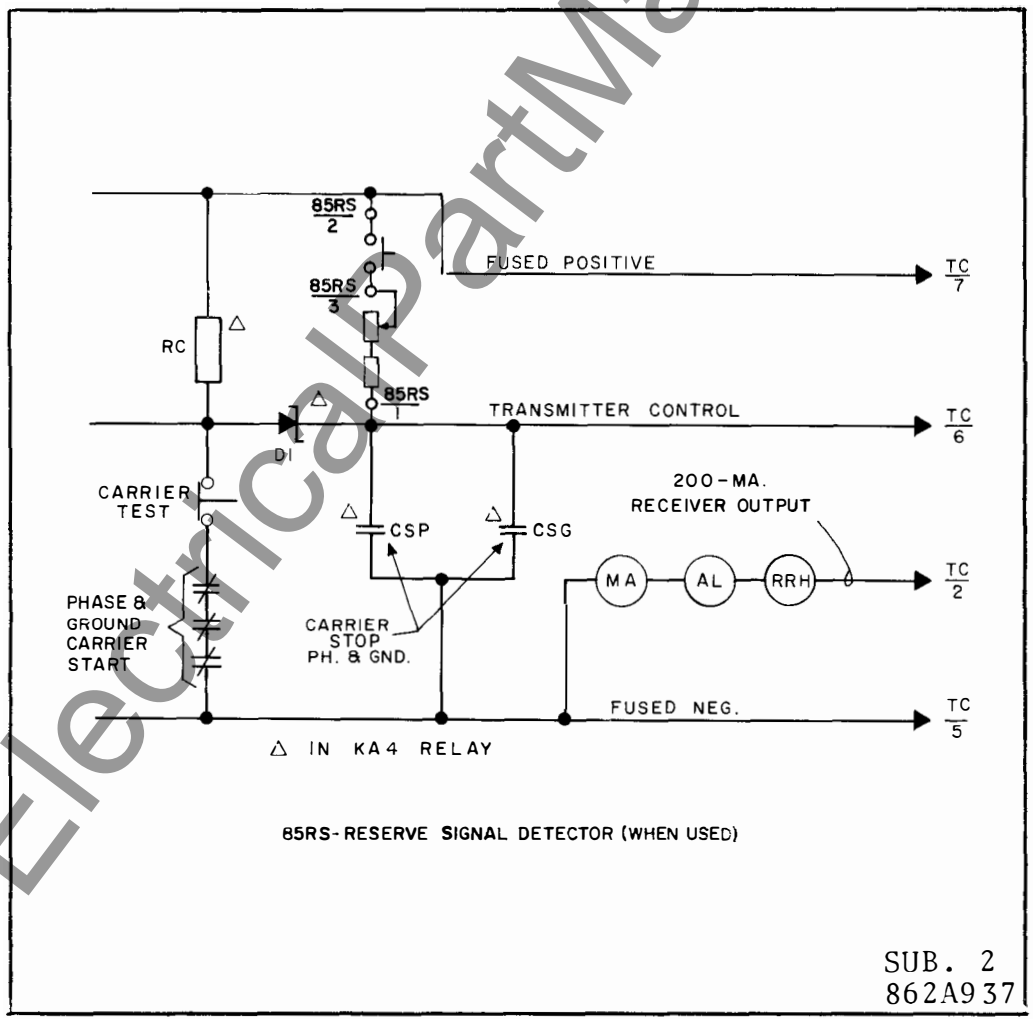
## RESERVE SIGNAL DETECTOR FOR TC AND KR CARRIER

This sheet notes changes which should be made in instruction leaflet I.L. 41-944.6F dated May 1972.

1. Add "Fig. 4. Elementary K-Dar/TC Carrier Control Circuits."

2. Add "Fig. 5. Elementary K-Dar/KR Carrier Control Circuits."

NOTE: Fig. 4 and 5 are shown on this sheet.

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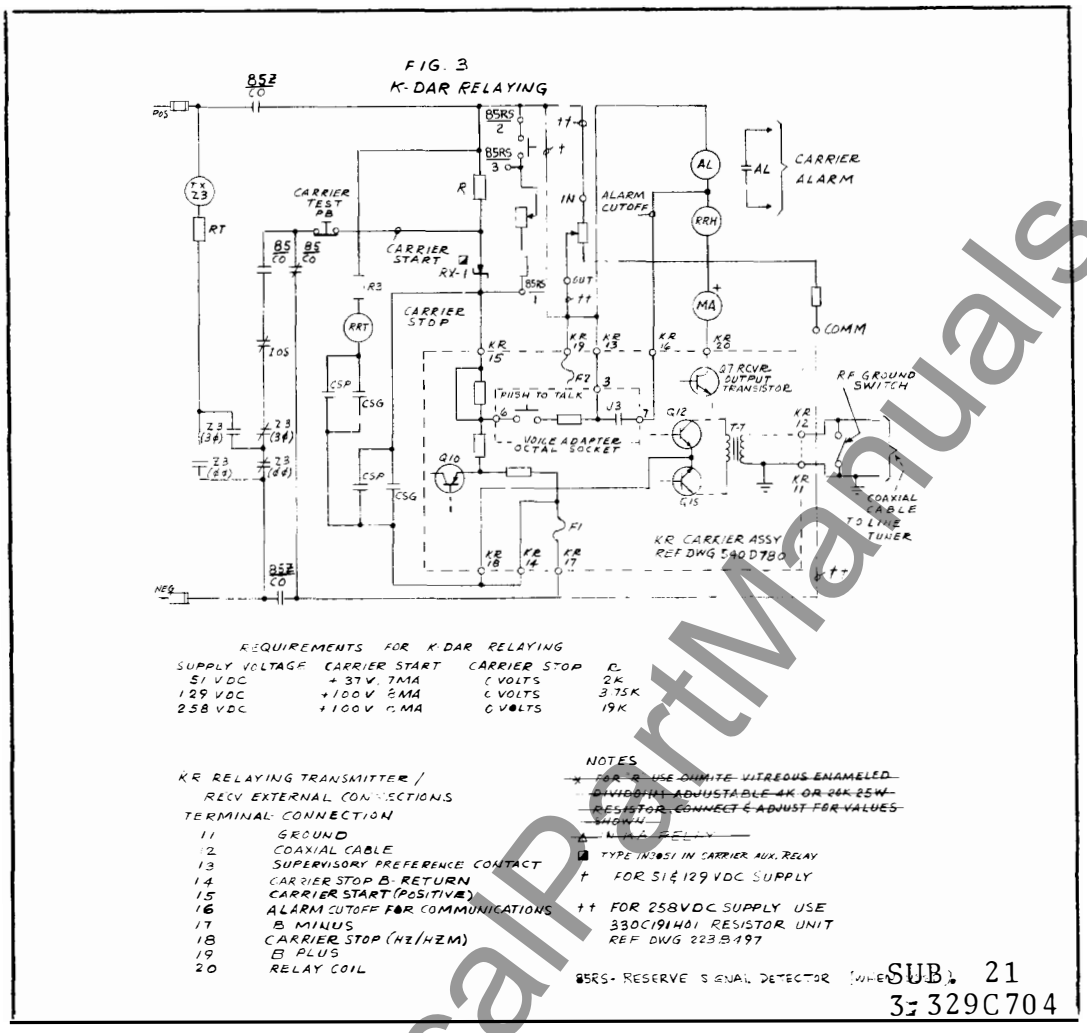


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INSTALLATION • OPERATION • MAINTENANCE

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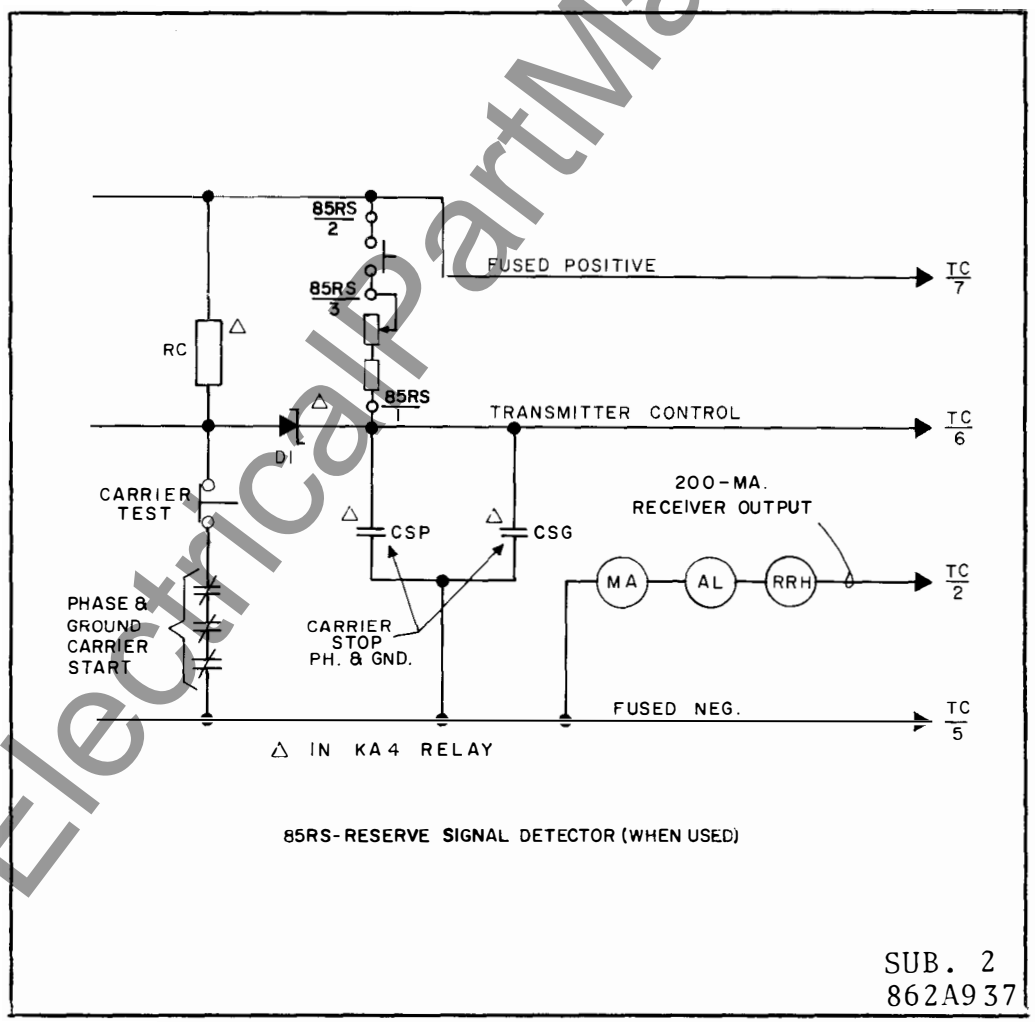


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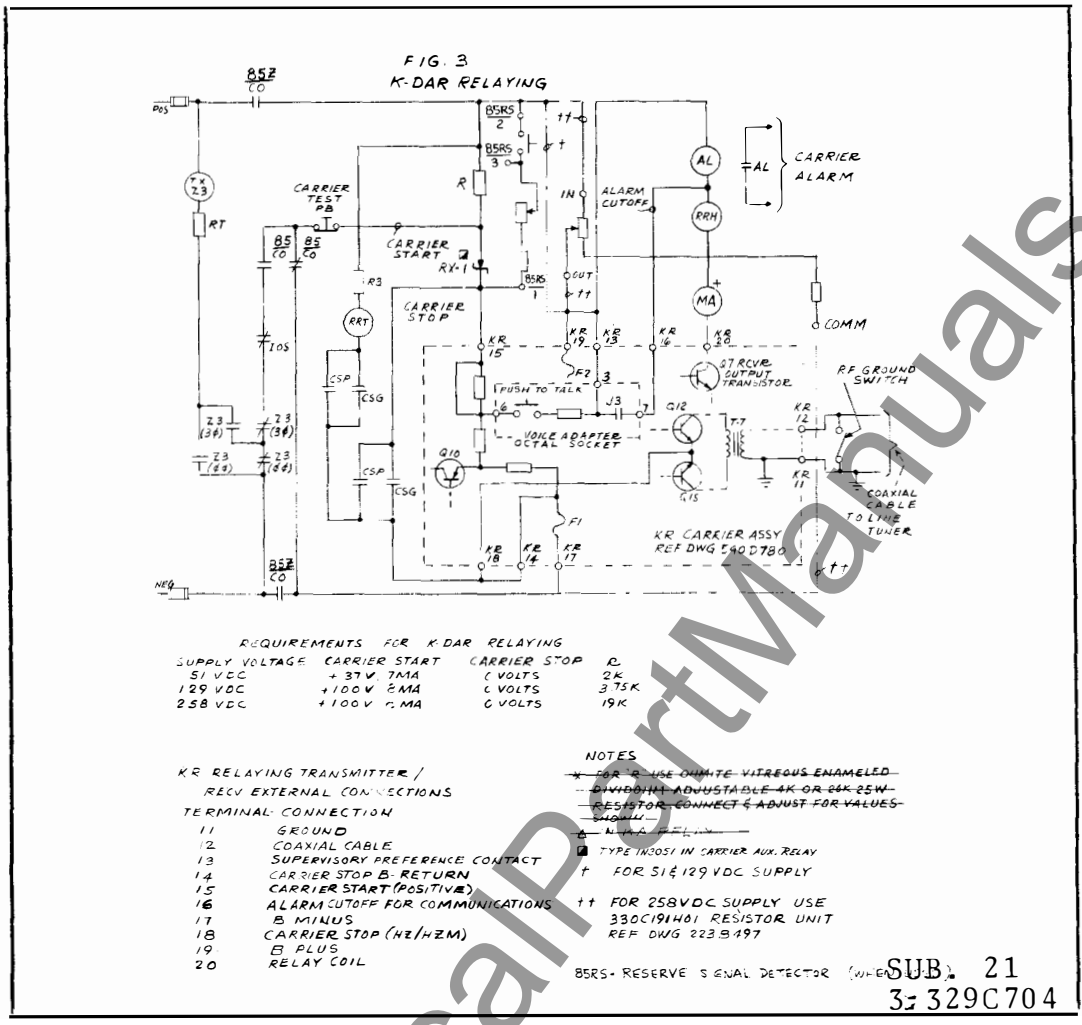


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SUPERSEDES I.L. 41-944.6E
*Denotes change from superseded issue.

EFFECTIVE MAY 1972

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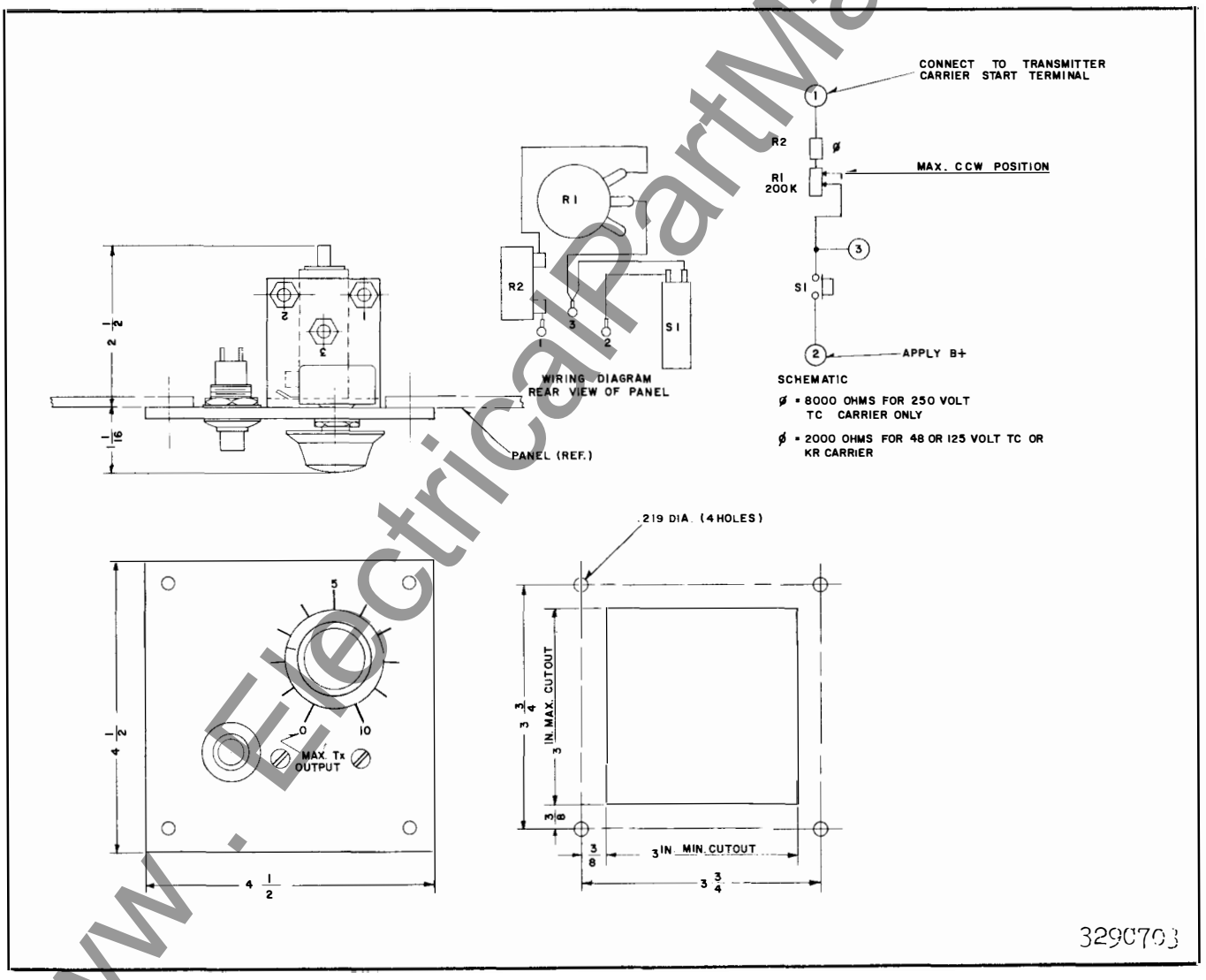



*Fig. 1. Reserve Signal Detector for Panel Mounting.*

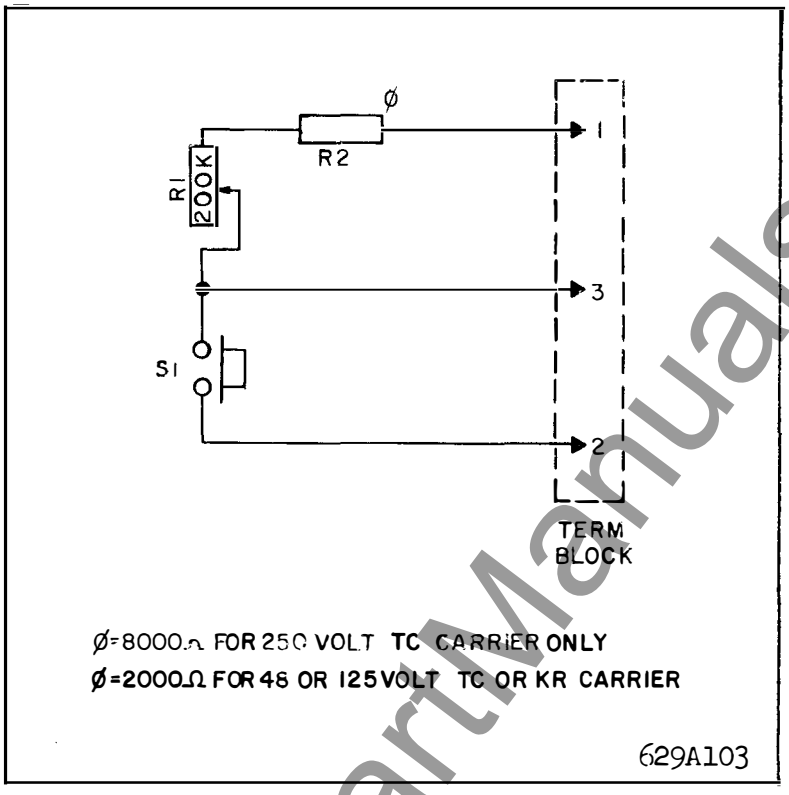
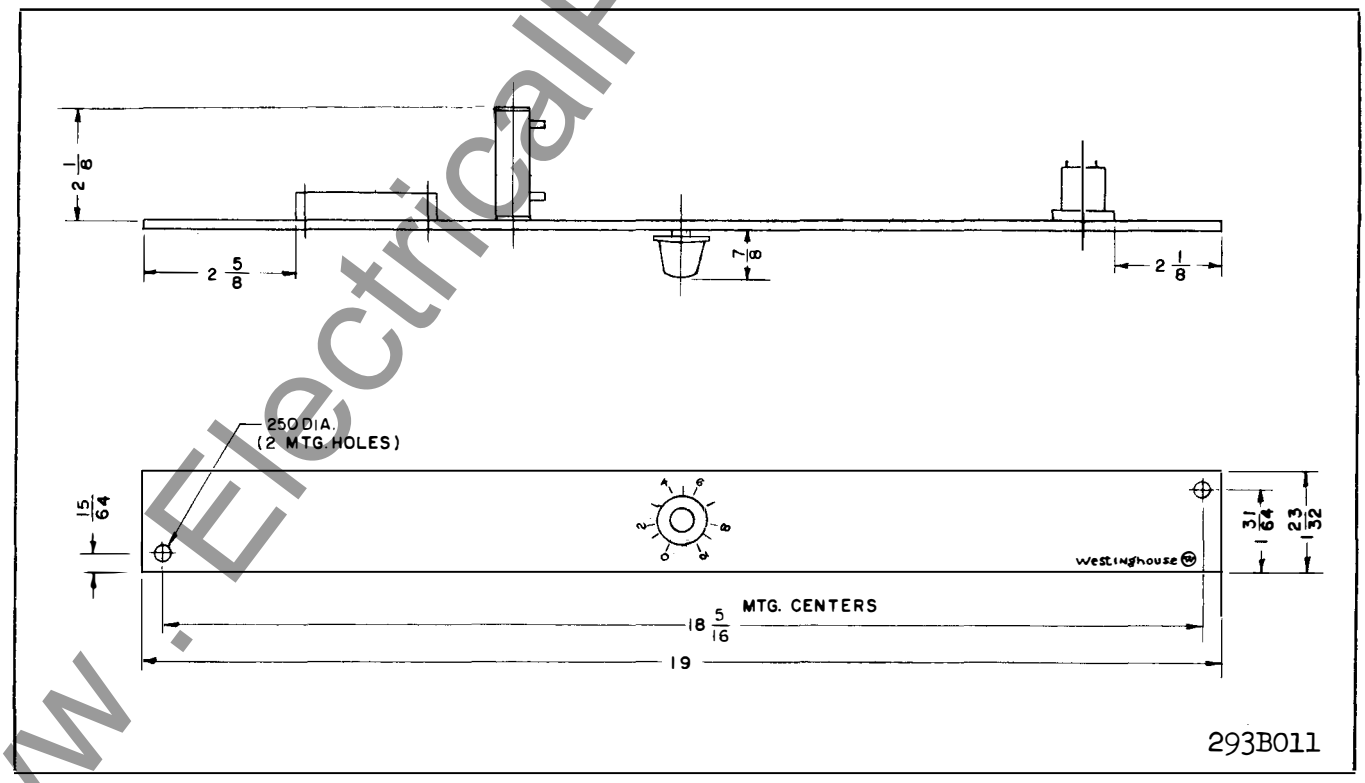
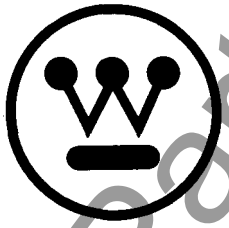



*Fig. 2. Reserve Signal Detector for 19-inch Rack Mounting.*




* *Fig. 3. Reserve Signal Detector for 19-inch Rack Mounting.*



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# INSTRUCTIONS

# RESERVE SIGNAL DETECTOR FOR TC AND KR CARRIER

| * Description | Style |
|---|---|
| Panel mounted for 48 or 125 volt D.C. KR or TC Carrier | 470D167G02 |
| Panel mounted for 250 volt D.C. TC Carrier only | 470D167G03 |
| Rack mounted for 48 or 125 volt D.C. KR or TC Carrier | 408C484G01 |
| Rack mounted for 250 volt D.C. TC Carrier only | 408C484G03 |

## APPLICATION

The reserve signal detector is a device used to detect changes in received signal level on a power-line carrier channel. The relaying receiver output current is saturated at normal received signal levels. Thus, even a substantial reduction in the received signal may not give a corresponding drop in receiver output current. The reserve signal detector makes it possible to detect such changes in signal level before the signal drops to a low enough value to cause an incorrect relay operation.

## CONSTRUCTION

The reserve signal detector is available in two different mechanical designs; one for switchboard mounting, and one for rack mounting (19" panel). The unit for switchboard mounting is shown in Figure 1 which includes outline dimensions and schematic wiring. Figure 2 shows the outline of the rack-mounting unit, and Figure 3 is the internal schematic for this design. Electrically both units consist of a fixed resistor, a variable resistor, and a normally open pushbutton connected in series.

## OPERATION

The resistors and pushbutton of the reserve signal detector are connected into the transmitter carrier-start circuit, effectively functioning as a separate transmitter output control. This control is obtained by varying the d-c voltage to the amplifier stage following the crystal oscillator in either the KR or TC transmitter. With TC set, the output will not drop appreciably until sufficient resistance has been inserted to drop the voltage across zener diode CR101 below its 20-volt breakdown. The adjustable resistor is effective over a 25-db range of transmitter output. If a fault occurs while a reserve signal test is being made (with reduced transmitter output), operation of any carrier-start protective relay will instantly restore full output as long as required for the relaying function. The connections of the reserve signal detector into the carrier-start circuit are shown on the overall schematic which applies to a particular order.

## ADJUSTMENT

Because of differences in transmitter output, supply voltage, and service conditions, it is not practical to have a calibrated dial for this unit. However, calibration may be made at installation by recording output (either db or volts) at various knob settings of R1. Then, by depressing pushbutton S1 and adjusting the R1 dial so as to obtain one-half the normal saturated receiver output current (on a clear dry day), any increase in line attenuation at a later time may be noted as the difference between the original setting, and that required to obtain the one-half maximum receiver output current at the time of checking. The normal procedure for this test is to start with the knob full counterclockwise, and rotate slowly until the remote receiver output drops to half its maximum value.

NOTE: The nominal "one-half maximum" value for the TC set is 100 ma, and for the KR set, 10 ma. Since these values are half way up a steep curve, it may be rather difficult to adjust to exactly 10 or 100 ma. If the receiver output current is within ± 20 per cent of the nominal 10 or 100 ma figure, any attenuation figures will be correct within one db.

If communication between stations on a line section makes the foregoing periodic adjustment procedure inconvenient, there is a second method of using the reserve signal detector. First, set the receiver sensitivity to the desired margin for deterioration of signal. Depending on power company standards, this will usually be somewhere between 6 and 15 db. Now on a clear dry day, close S1 and increase R1 setting until the remote receiver output current drops 20 per cent. Leave the control at this point. At another time when a reserve signal test is to be made, it is necessary only to close the S1 pushbutton and have the remote operator note the re-

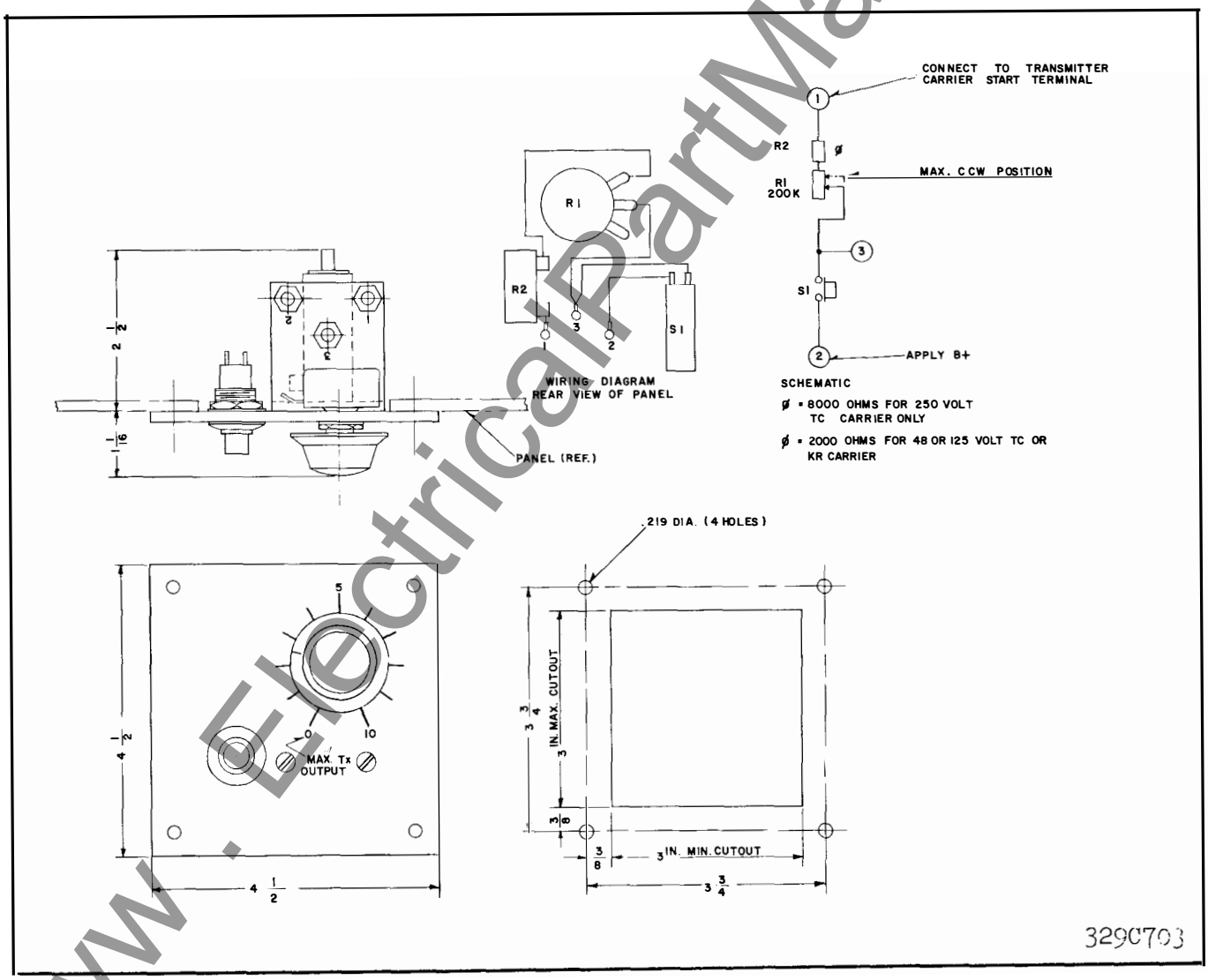
ceiver output current. If it does not drop more than 20 per cent or so, the desirable receiver margin still exists. If the receiver output drops to a low value or to zero, it indicates that the original margin no longer exists. This could mean increased line loss, reduced transmitter output, reduced receiver sensitivity, or a combination of these factors.

## RENEWAL PARTS

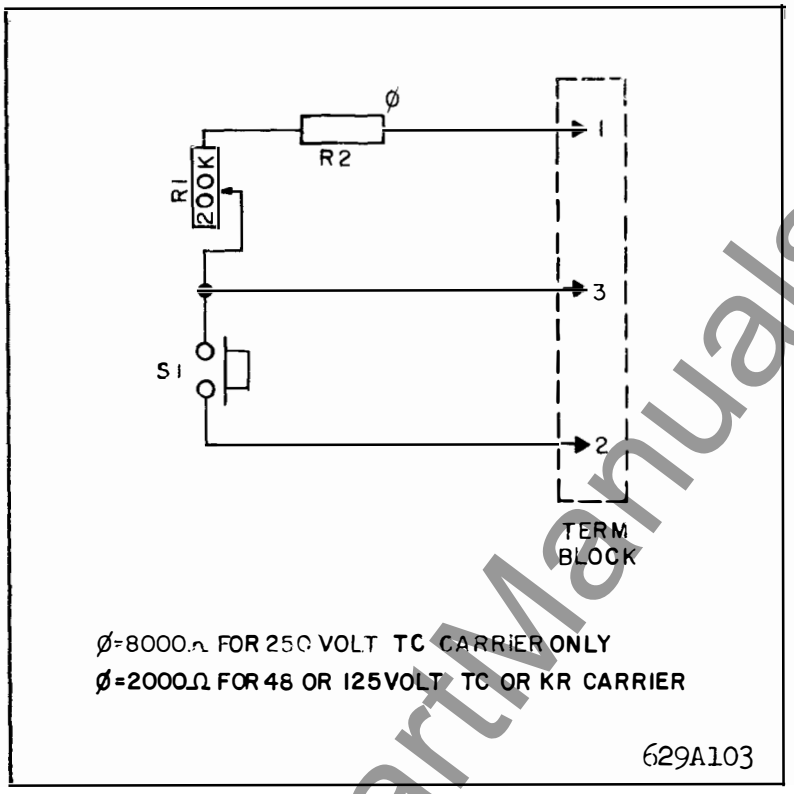
Repair work can be done most satisfactorily at the factory. However, replacement parts can be furnished, in most cases, to customers who are equiped for doing repair work. When ordering parts, always give the complete nameplate data as well as the part identification as given in the Parts List.

## * PARTS LIST

| Symbol | Description | Style |
|---|---|---|
| R1 | 200-K Pot. | 185A086H27 |
| R1 | 200-K Pot. | 185A067H14 |
| R2 | 2000-ohm resistor | 1267296 |
| | 8000-ohm resistor | 1205219 |
| S1 | Pushbutton Switch | 879A860H01 |




* *Fig. 1. Reserve Signal Detector for Panel Mounting.*




* *Fig. 2. Reserve Signal Detector for 19-inch Rack Mounting.*

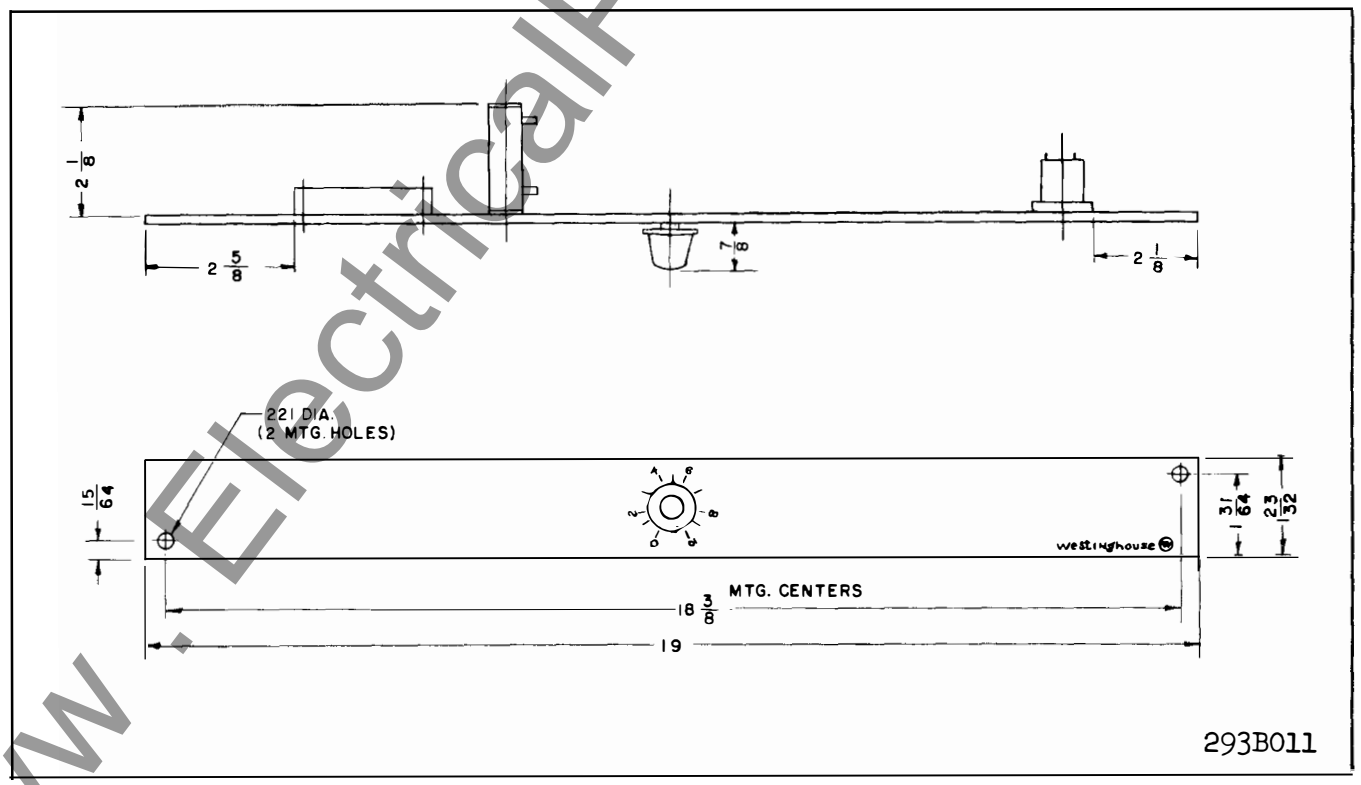
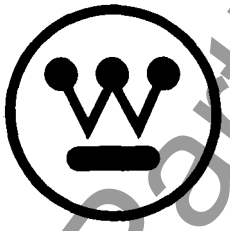



*Fig. 3. Reserve Signal Detector for 19-inch Rack Mounting.*



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# INSTRUCTIONS

# RESERVE SIGNAL DETECTOR FOR TC AND KR CARRIER

| * Description | Style |
|---|---|
| Panel mounted for 48 or 125 volt D.C. KR or TC Carrier | 470D167G02 |
| Panel mounted for 250 volt D.C. TC Carrier only | 470D167G03 |
| Rack mounted for 48 or 125 volt D.C. KR or TC Carrier | 408C484G01 |
| Rack mounted for 250 volt D.C. TC Carrier only | 408C484G03 |

## APPLICATION

The reserve signal detector is a device used to detect changes in received signal level on a power-line carrier channel. The relaying receiver output current is saturated at normal received signal levels. Thus, even a substantial reduction in the received signal may not give a corresponding drop in receiver output current. The reserve signal detector makes it possible to detect such changes in signal level before the signal drops to a low enough value to cause an incorrect relay operation.

## CONSTRUCTION

The reserve signal detector is available in two different mechanical designs; one for switchboard mounting, and one for rack mounting (19" panel). The unit for switchboard mounting is shown in Figure 1 which includes outline dimensions and schematic wiring. Figure 2 shows the outline of the rack-mounting unit, and Figure 3 is the internal schematic for this design. Electrically both units consist of a fixed resistor, a variable resistor, and a normally open pushbutton connected in series.

## OPERATION

The resistors and pushbutton of the reserve signal detector are connected into the transmitter carrier-start circuit, effectively functioning as a separate transmitter output control. This control is obtained by varying the d-c voltage to the amplifier stage following the crystal oscillator in either the KR or TC transmitter. With TC set, the output will not drop appreciably until sufficient resistance has been inserted to drop the voltage across zener diode CR101 below its 20-volt breakdown. The adjustable resistor is effective over a 25-db range of transmitter output. If a fault occurs while a reserve signal test is being made (with reduced transmitter output), operation of any carrier-start protective relay will instantly restore full output as long as required for the relaying function. The connections of the reserve signal detector into the carrier-start circuit are shown on the overall schematic which applies to a particular order.

## ADJUSTMENT

Because of differences in transmitter output, supply voltage, and service conditions, it is not practical to have a calibrated dial for this unit. However, calibration may be made at installation by recording output (either db or volts) at various knob settings of R1. Then, by depressing pushbutton S1 and adjusting the R1 dial so as to obtain one-half the normal saturated receiver output current (on a clear dry day), any increase in line attenuation at a later time may be noted as the difference between the original setting, and that required to obtain the one-half maximum receiver output current at the time of checking. The normal procedure for this test is to start with the knob full counterclockwise, and rotate slowly until the remote receiver output drops to half its maximum value.

NOTE: The nominal "one-half maximum" value for the TC set is 100 ma, and for the KR set, 10 ma. Since these values are half way up a steep curve, it may be rather difficult to adjust to exactly 10 or 100 ma. If the receiver output current is within ± 20 per cent of the nominal 10 or 100 ma figure, any attenuation figures will be correct within one db.

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## RENEWAL PARTS

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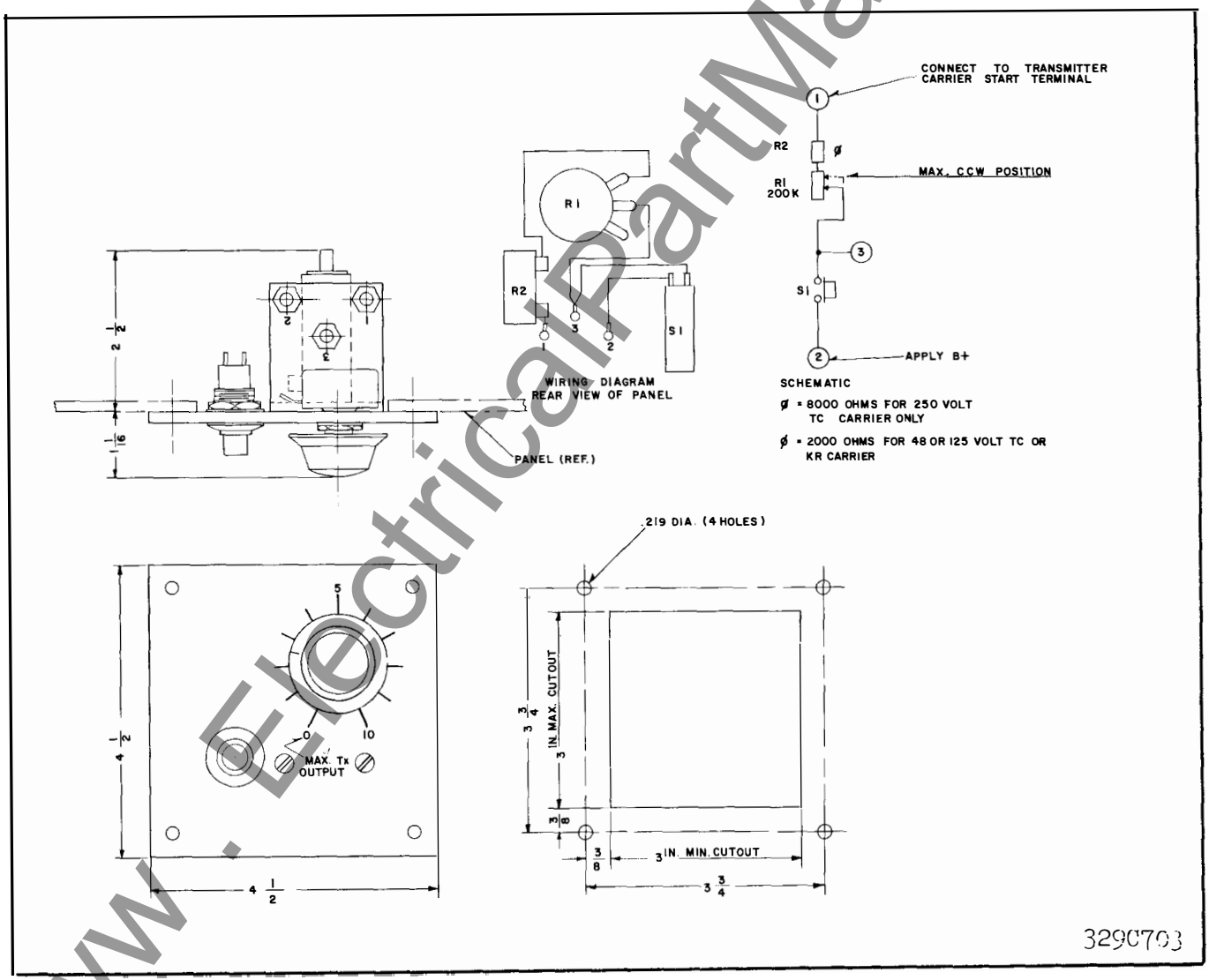
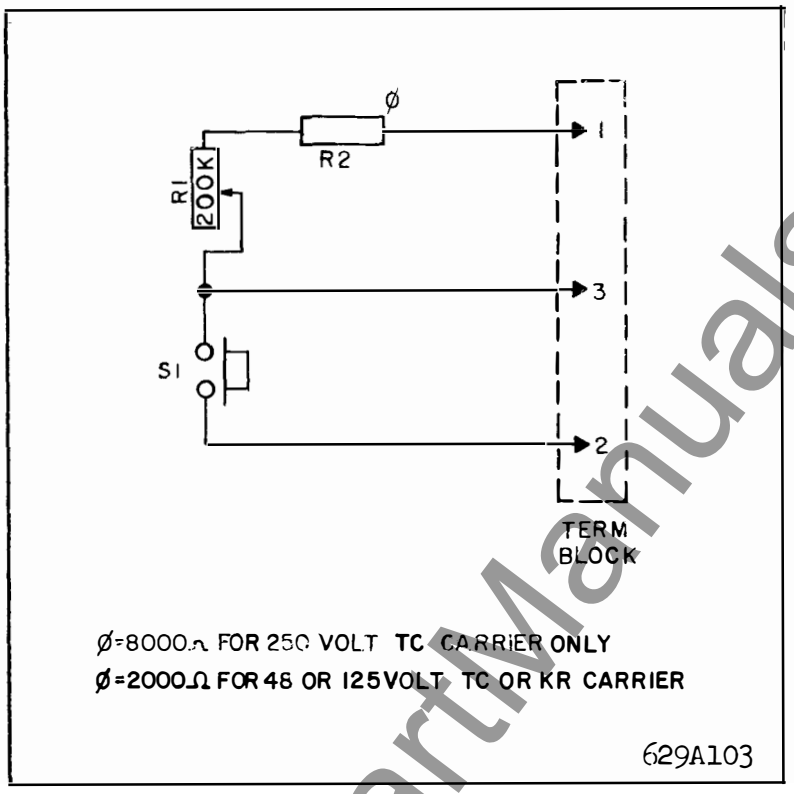
| R1 | 200-K Pot. | 185A067H14 |
| R2 | 2000-ohm resistor | 1267296 |
| | 8000-ohm resistor | 1205219 |
| S1 | Pushbutton Switch | 879A860H01 |




* *Fig. 1. Reserve Signal Detector for Panel Mounting.*




* *Fig. 2. Reserve Signal Detector for 19-inch Rack Mounting.*

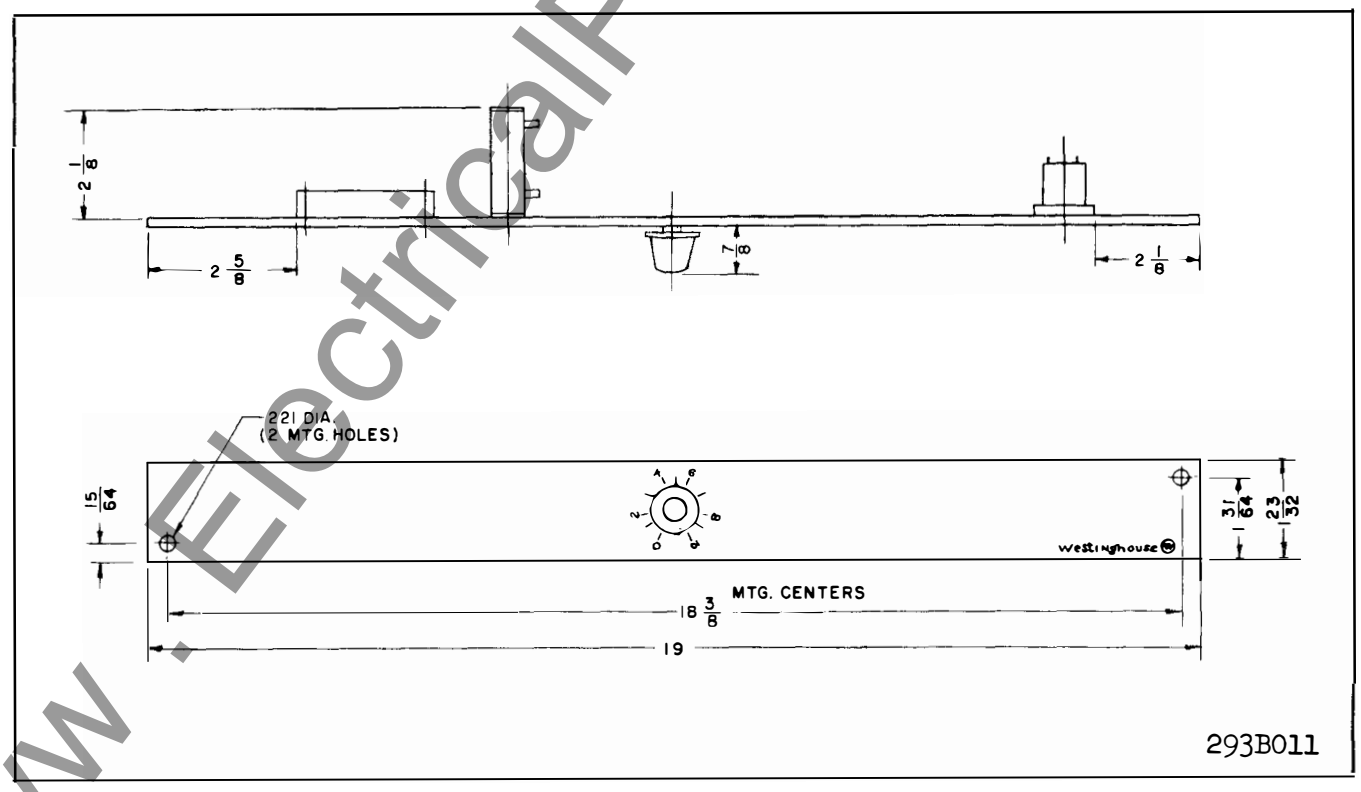
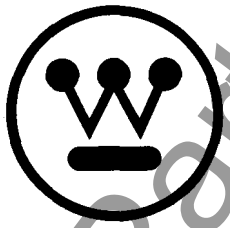



*Fig. 3. Reserve Signal Detector for 19-inch Rack Mounting.*



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# INSTRUCTIONS

# RESERVE SIGNAL DETECTOR FOR TC AND KR CARRIER

## APPLICATION

The reserve signal detector is a device used to detect changes in received signal level on a power-line carrier channel. The relaying receiver output current is saturated at normal received signal levels. Thus, even a substantial reduction in the received signal may not give a corresponding drop in receiver output current. The reserve signal detector makes it possible to detect such changes in signal level before the signal drops to a low enough value to cause an incorrect relay operation.

## CONSTRUCTION

The reserve signal detector is available in two different mechanical designs; one for switchboard mounting, and one for rack mounting (19" panel). The unit for switchboard mounting is shown in Figure 1 which includes outline dimensions and schematic wiring. Figure 2 shows the outline of the rack-mounting unit, and Figure 3 is the internal schematic for this design. Electrically both units consist of a fixed resistor, a variable resistor, and a normally open pushbutton connected in series.

## OPERATION

The resistors and pushbutton of the reserve signal detector are connected into the transmitter carrier-start circuit, effectively functioning as a separate transmitter output control. This control is obtained by varying the d-c voltage to the amplifier stage following the crystal oscillator in either the KR or TC transmitter. With TC set, the output will not drop appreciably until sufficient resistance has been inserted to drop the voltage across zener diode CR101 below its 20-volt breakdown. The adjustable resistor is effective over a 25-db range of transmitter output. If a fault occurs while a reserve signal test is being made (with reduced transmitter output), operation of any carrier-start protective relay will instantly restore full output as long as required for the relaying function. The connections of the reserve signal detector into the carrier-start circuit are shown on the overall schematic which applies to a particular order.

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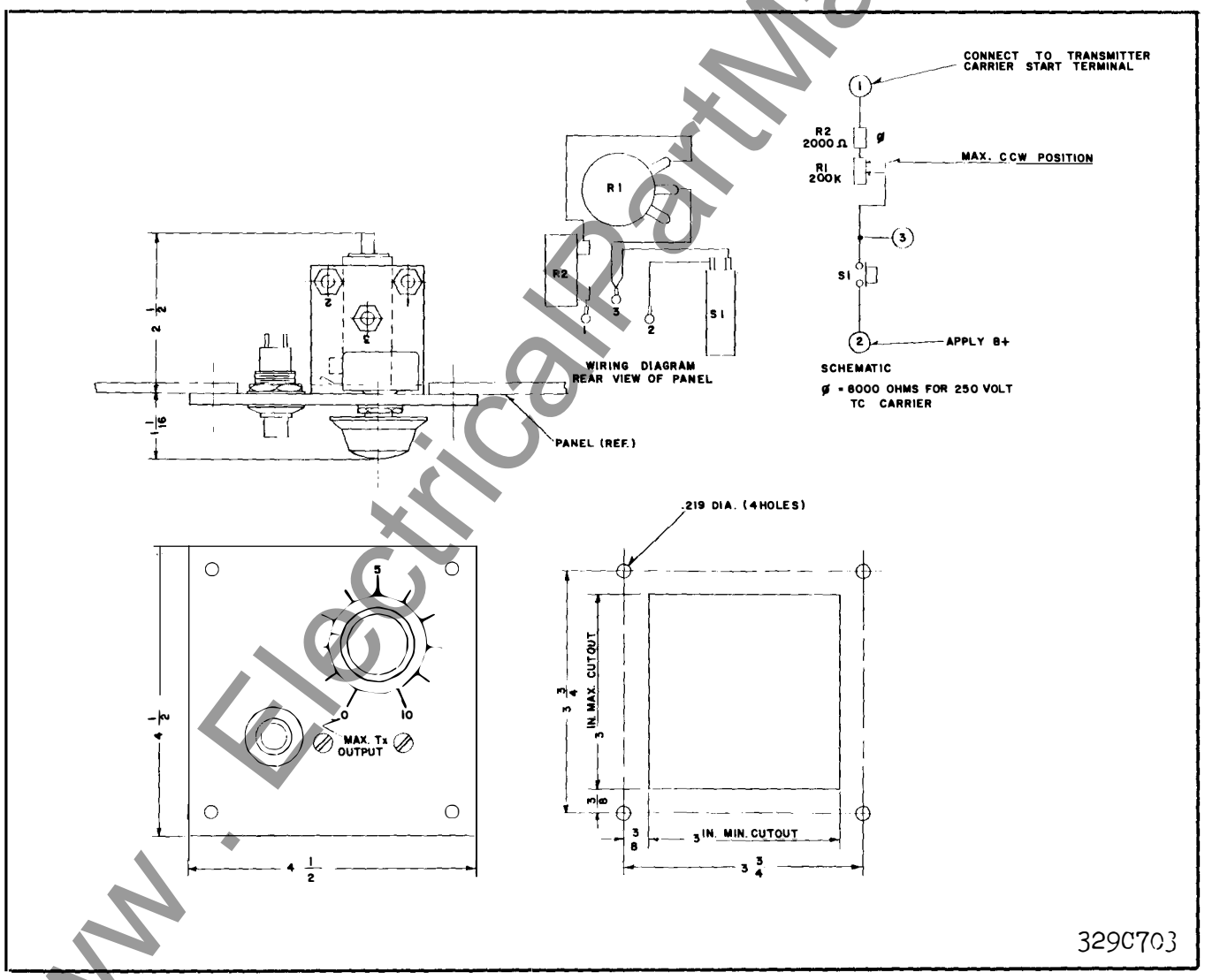
## RENEWAL PARTS

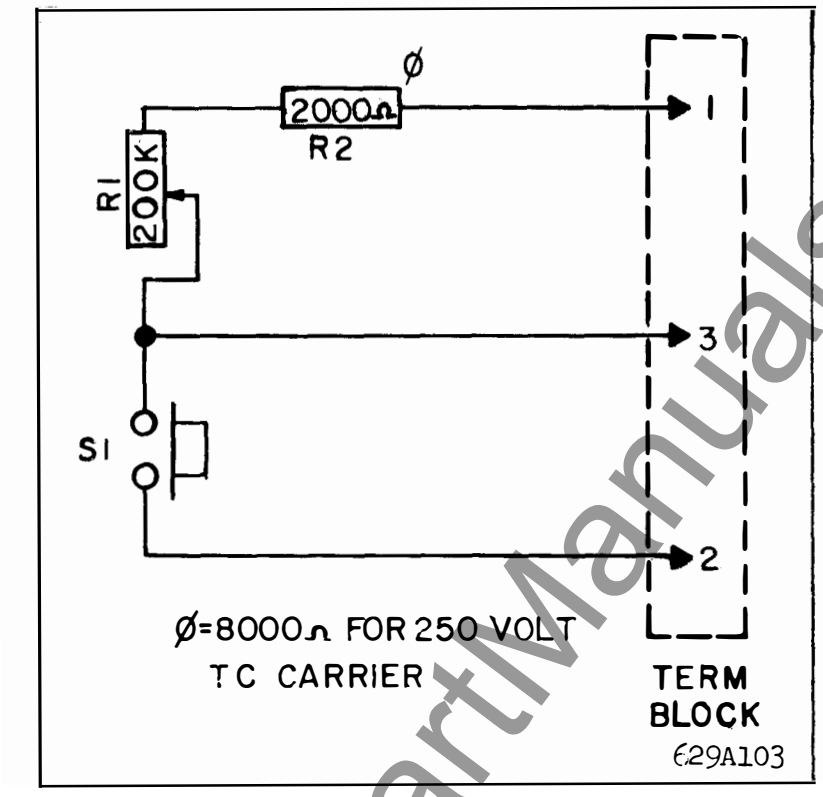
Repair work can be done most satisfactorily at the factory. However, replacement parts can be furnished, in most cases, to customers who are equiped for doing repair work. When ordering parts, always give the complete nameplate data as well as the part identification as given in the Parts List.

PARTS LIST

| | Symbol | Description | Style |
|---|---|---|---|
| * | R1 | 200-K Pot. | 185A086H27 – Used for 408C484G01 and G03 |
| * | R1 | 200-K Pot. | 185A067H14 – Used for 408C484G02 |
| | R2 | 2000-ohm resistor | 1267296 – 408C484G01 – G02 only |
| | | 8000-ohm resistor | 1205219 – 408C484G03 |
| | S1 | Pushbutton Switch | 327C854H01 |




* *Fig. 1. Reserve Signal Detector for Panel Mounting.*




* *Fig. 2. Reserve Signal Detector for 19-inch Rack Mounting.*

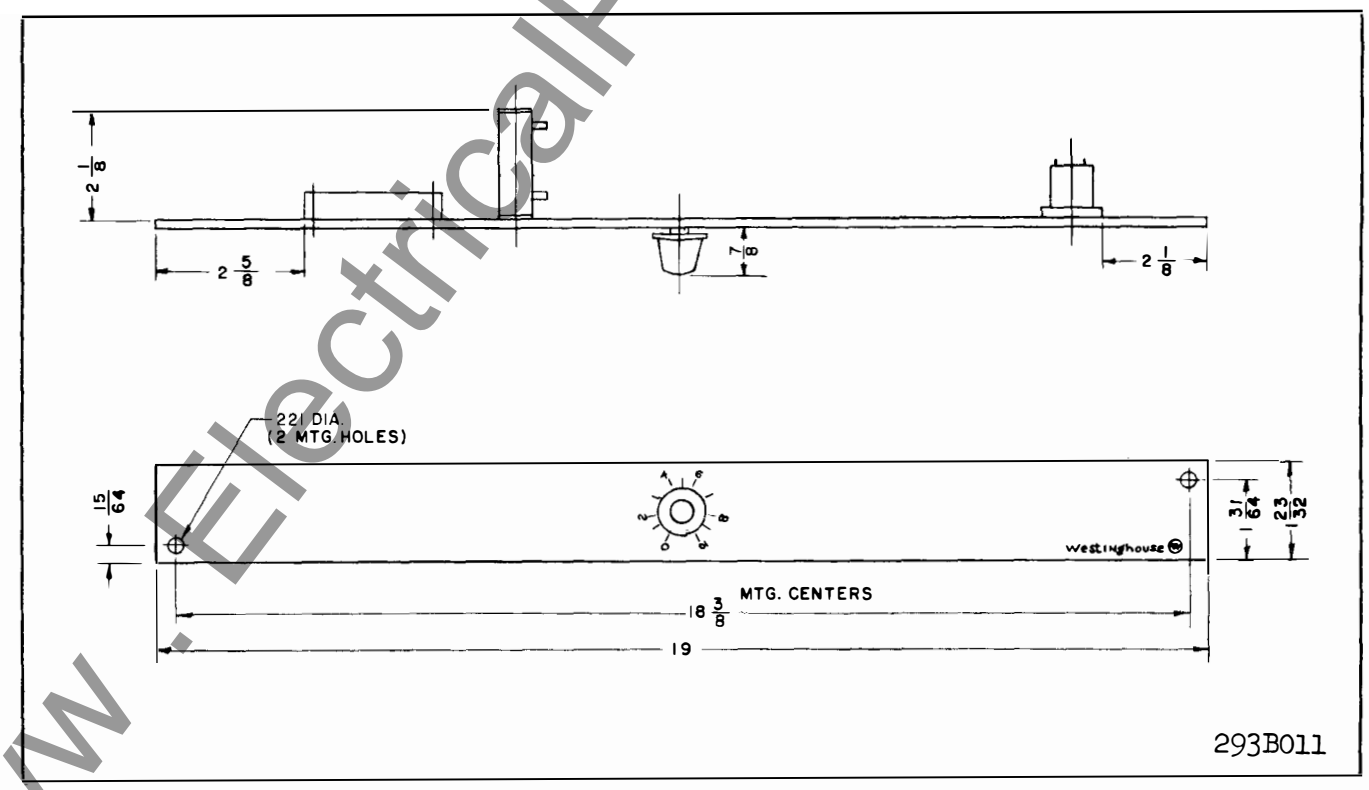
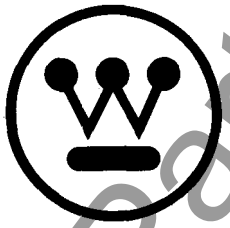



*Fig. 3. Reserve Signal Detector for 19-inch Rack Mounting.*



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# INSTRUCTIONS

# RESERVE SIGNAL DETECTOR FOR TC AND KR CARRIER

## APPLICATION

The reserve signal detector is a device used to detect changes in received signal level on a power-line carrier channel. The relaying receiver output current is saturated at normal received signal levels. Thus, even a substantial reduction in the received signal may not give a corresponding drop in receiver output current. The reserve signal detector makes it possible to detect such changes in signal level before the signal drops to a low enough value to cause an incorrect relay operation.

## CONSTRUCTION

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## OPERATION

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SUPERSEDES I.L. 41-944.6C
*Denotes change from superseded issue

EFFECTIVE JANUARY 1969.

exists. If the receiver output drops to a low value or to zero, it indicates that the original margin no longer exists. This could mean increased line loss, reduced transmitter output, reduced receiver sensitivity, or a combination of these factors.

## RENEWAL PARTS

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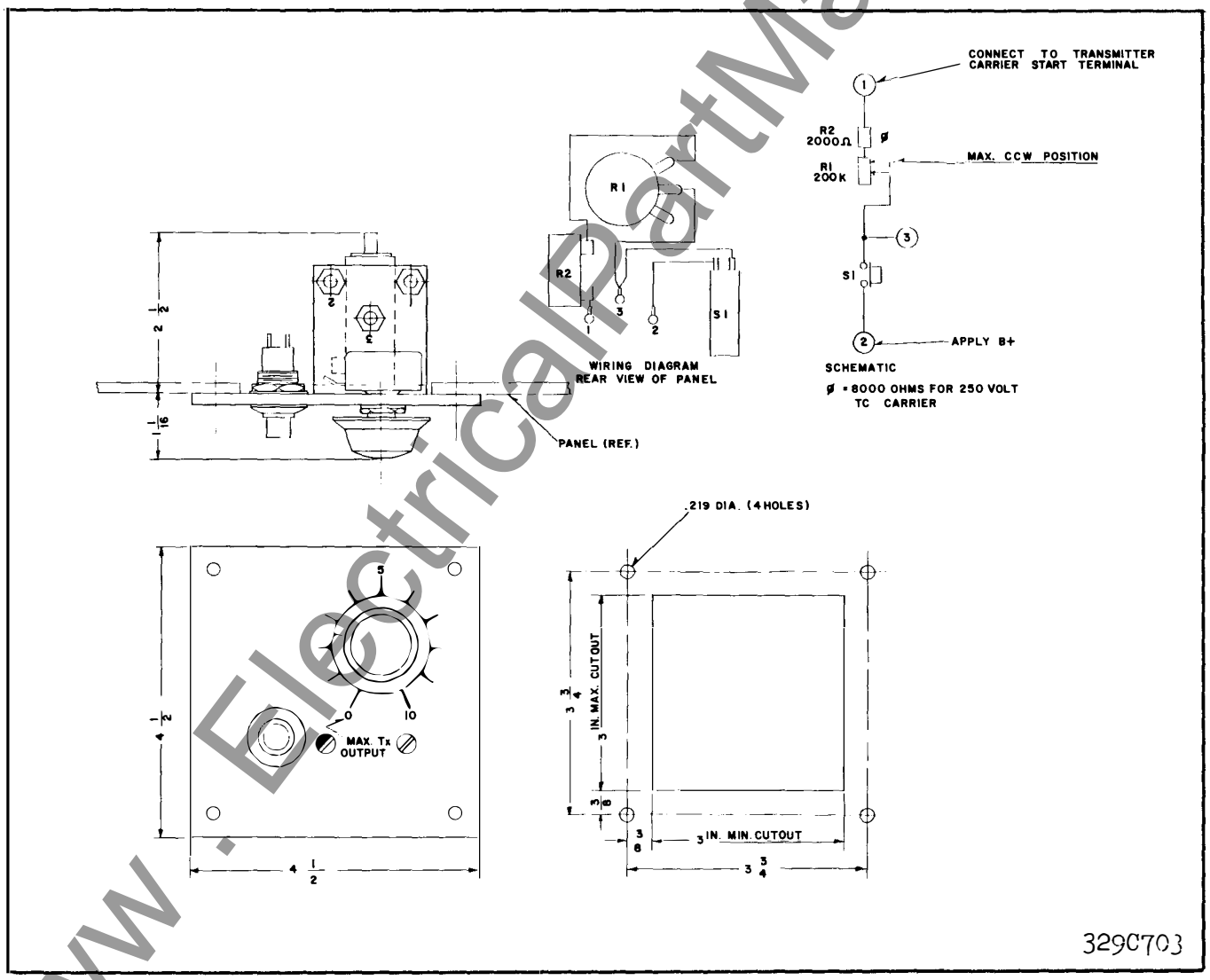
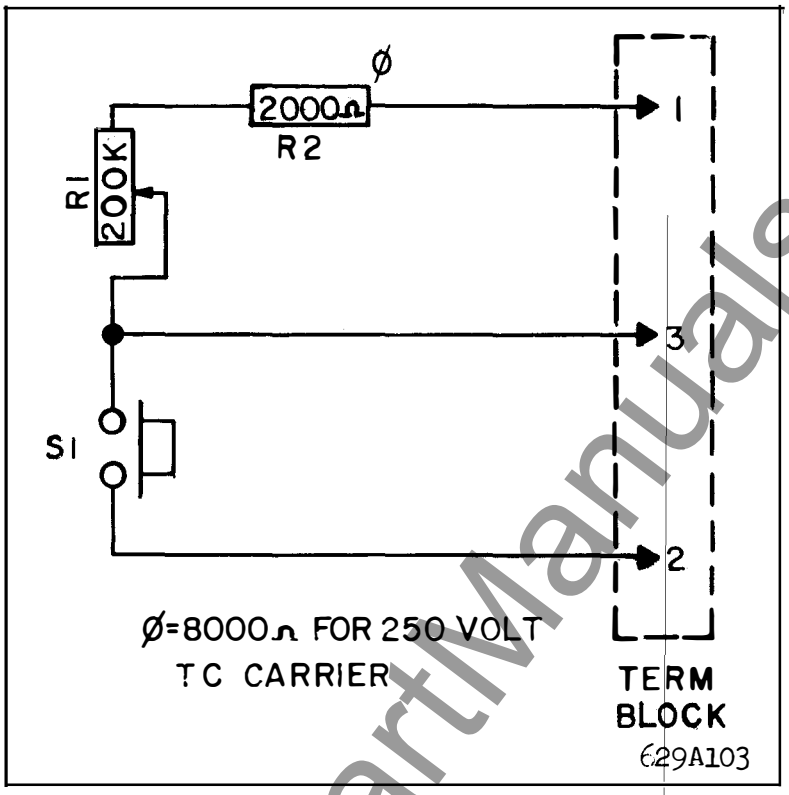
| * | R1 | 200-K Pot. | 185A067H14 – Used for 408C484G02 |
| | R2 | 2000-ohm resistor | 1267296 – 408C484G01 – G02 only |
| | | 8000-ohm resistor | 1205219 – 408C484G03 |
| | S1 | Pushbutton Switch | 327C854H01 |




* *Fig. 1. Reserve Signal Detector for Panel Mounting.*




* *Fig. 2. Reserve Signal Detector for 19-inch Rack Mounting.*

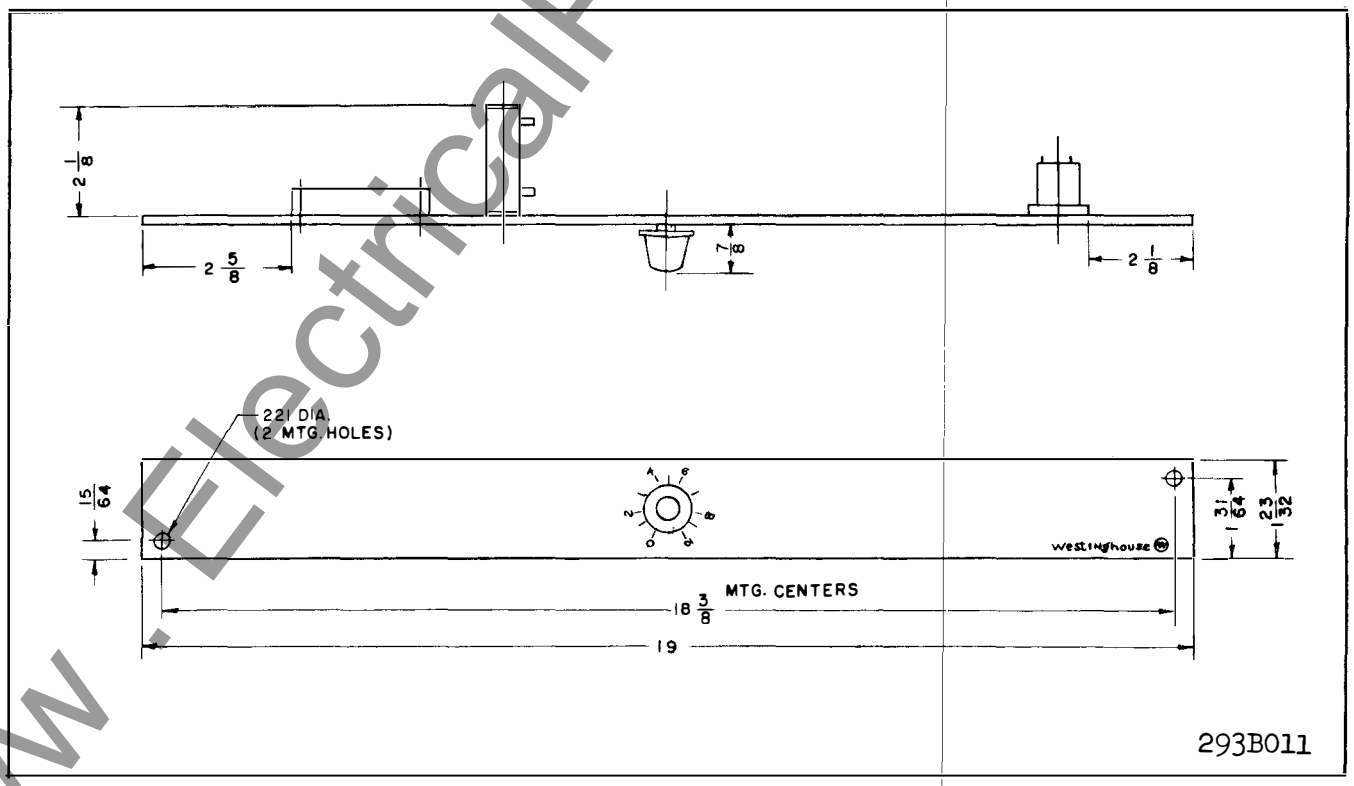



*Fig. 3. Reserve Signal Detector for 19-inch Rack Mounting.*

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# INSTRUCTIONS

# RESERVE SIGNAL DETECTOR FOR TC AND KR CARRIER

## APPLICATION

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## ADJUSTMENT

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## RENEWAL PARTS

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| R1 | 100-K Pot. | 762A790H02 | — Used for 408C484G02 |
| R2 | 2000-ohm resistor | 1267296 | — 408C484G01 — G02 only |
| | 8000-ohm resistor | 1205219 | — 408C484G03 |
| S1 | Pushbutton Switch | 327C854H01 | |

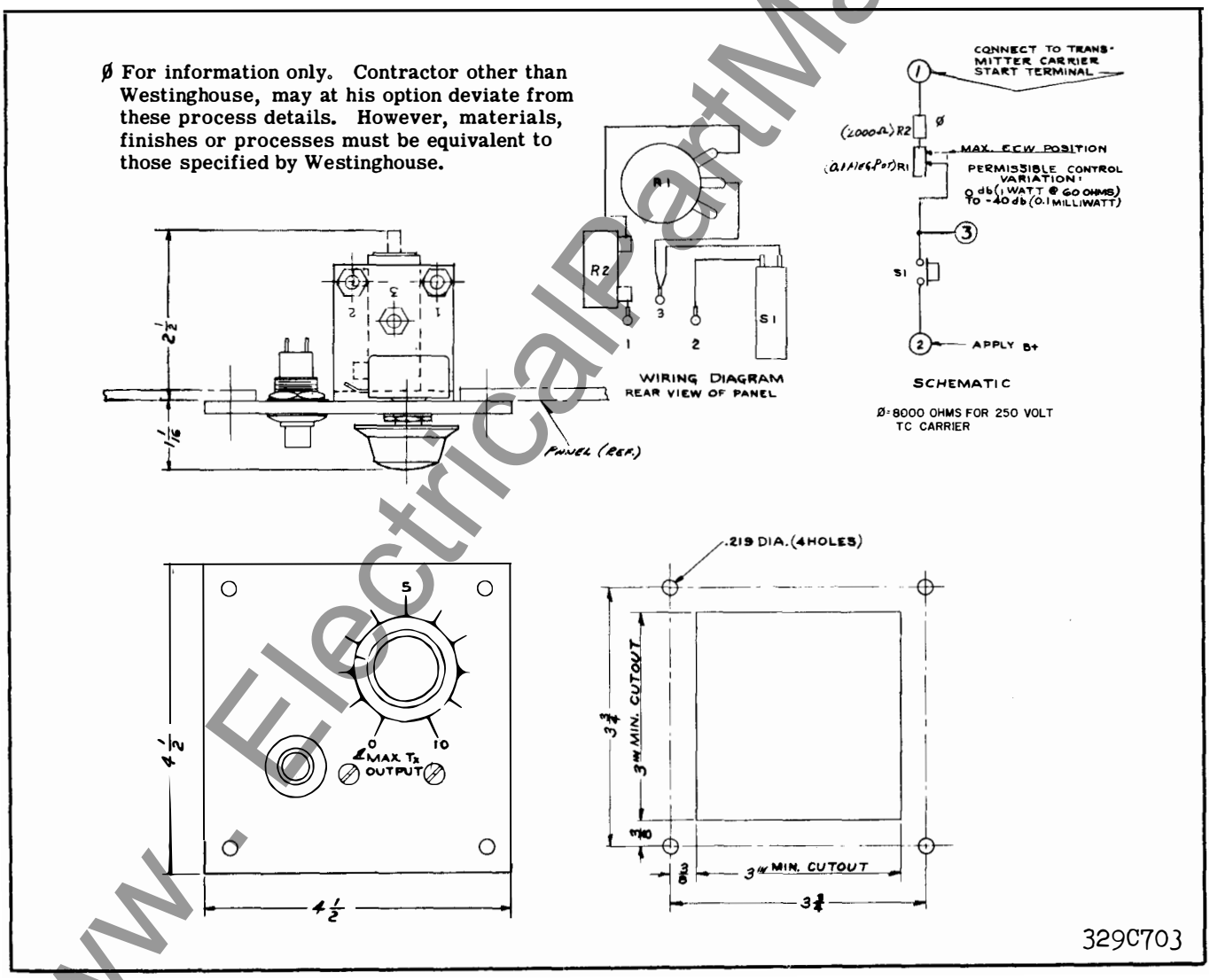


*Fig. 1. Reserve Signal Detector for Panel Mounting.*

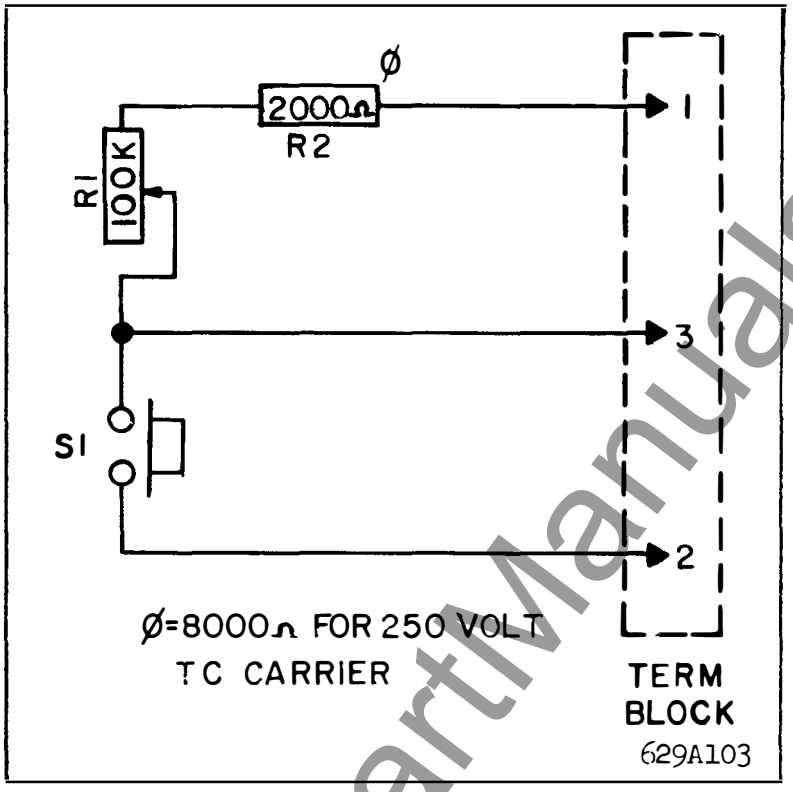


*Fig. 2. Reserve Signal Detector for 19-inch Rack Mounting.*

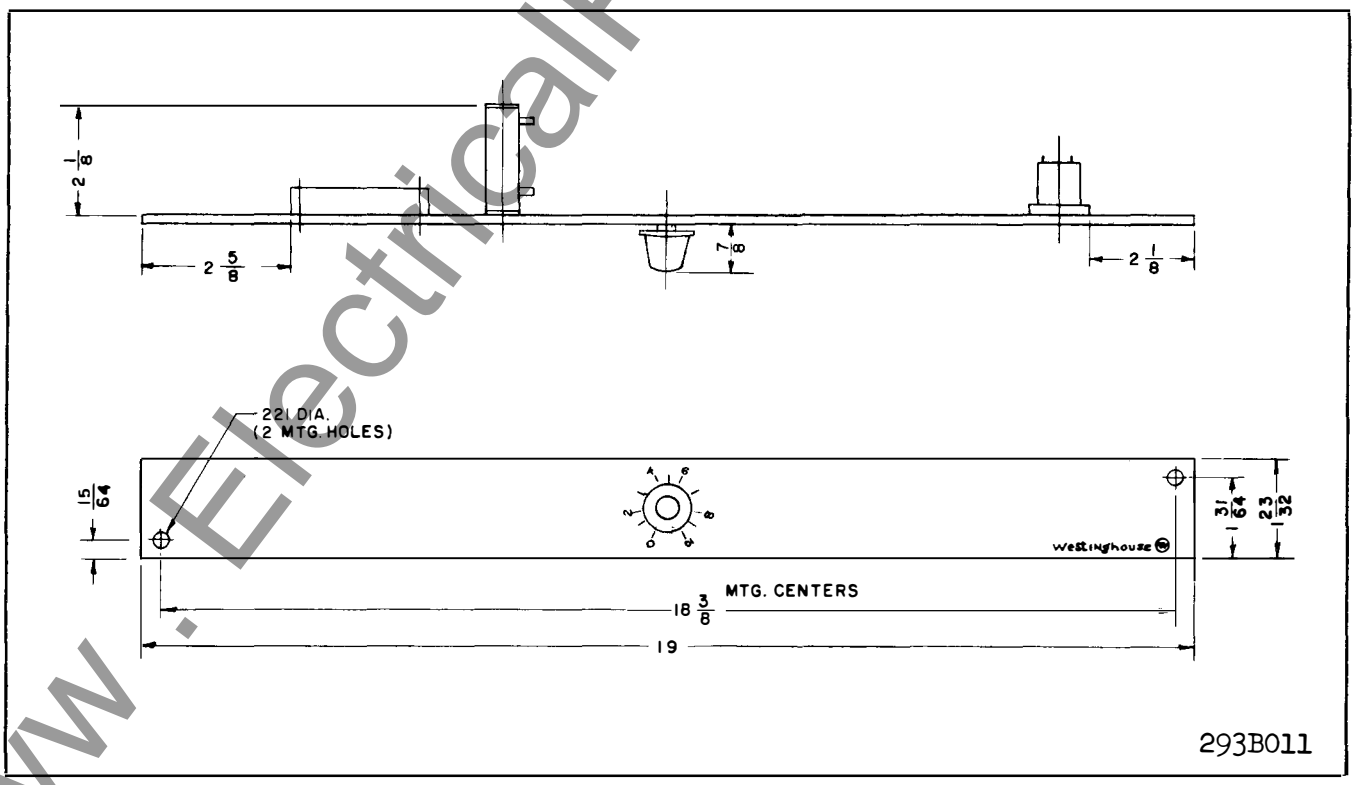


*Fig. 3. Reserve Signal Detector for 19-inch Rack Mounting.*

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# INSTRUCTIONS

# RESERVE SIGNAL DETECTOR FOR TC AND KR CARRIER

## APPLICATION

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The reserve signal detector is available in two different mechanical designs; one for switchboard mounting, and one for rack mounting (19" panel). The unit for switchboard mounting is shown in Figure 1 which includes outline dimensions and schematic wiring. Figure 2 shows the outline of the rack-mounting unit, and Figure 3 is the internal schematic for this design. Electrically both units consist of a fixed resistor, a variable resistor, and a normally open pushbutton connected in series.

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## ADJUSTMENT

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| R1 | 100-K Pot. | 762A790H02 | — Used for 408C484G02 |
| R2 | 2000-ohm resistor | 1267296 | — 408C484G01 — G02 only |
| | 8000-ohm resistor | 1205219 | — 408C484G03 |
| S1 | Pushbutton Switch | 327C854H01 | |

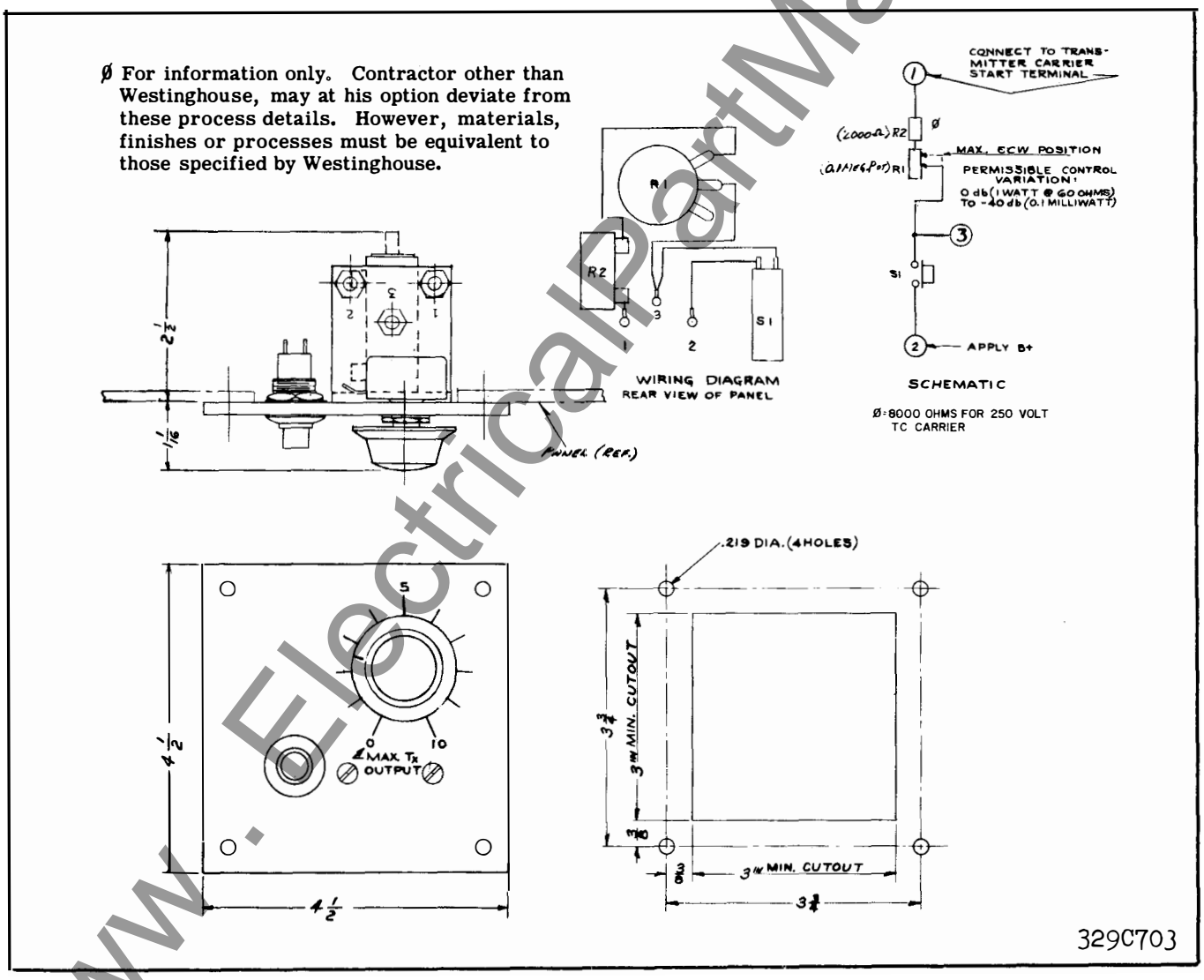



*Fig. 1. Reserve Signal Detector for Panel Mounting.*

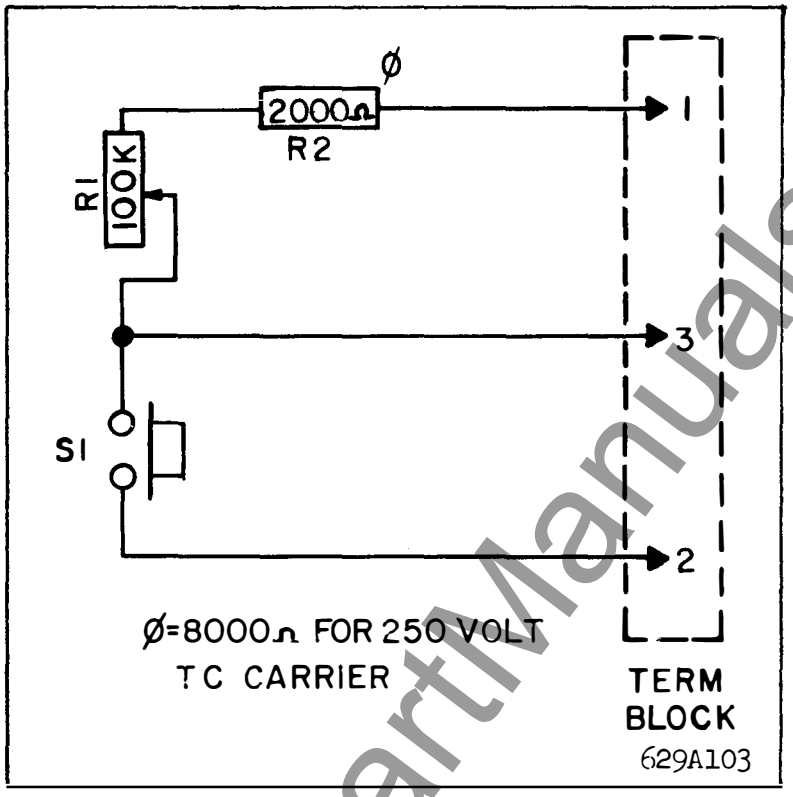



*Fig. 2. Reserve Signal Detector for 19-inch Rack Mounting.*

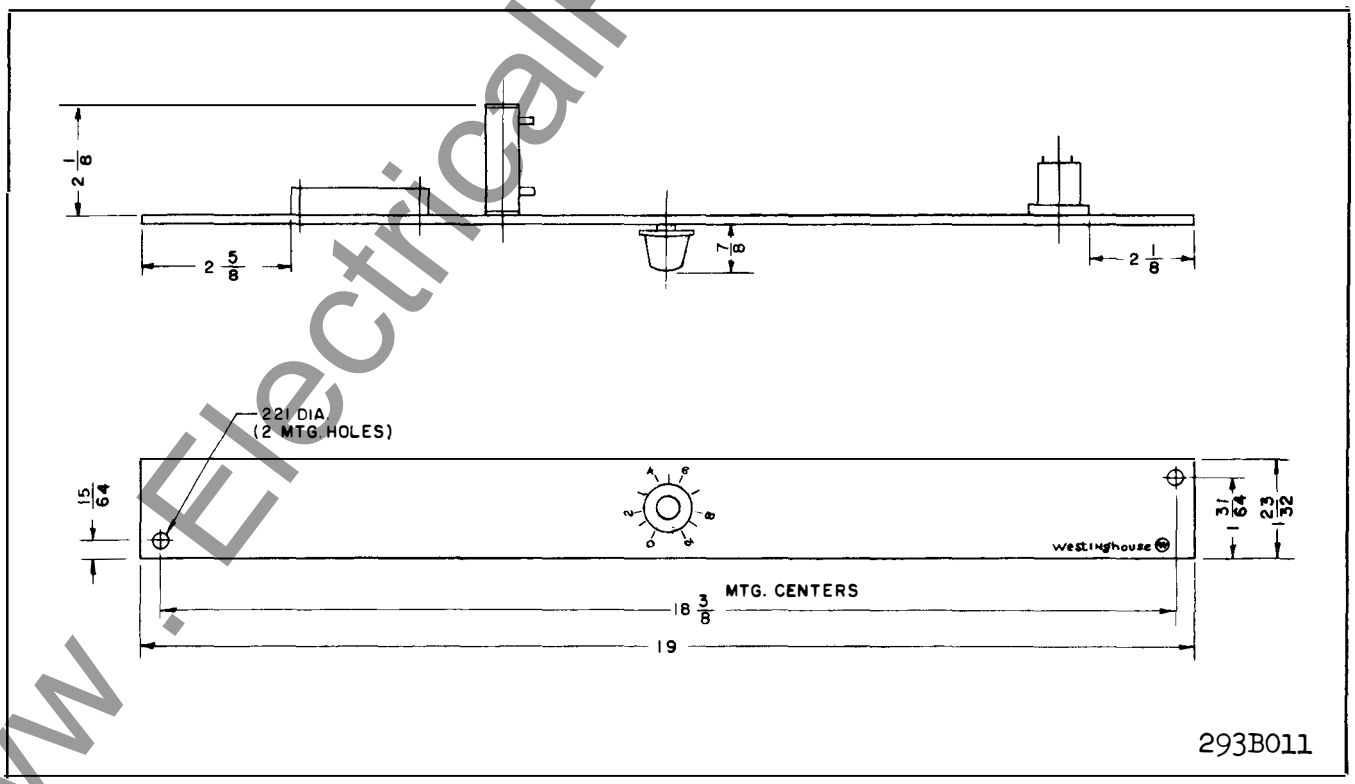
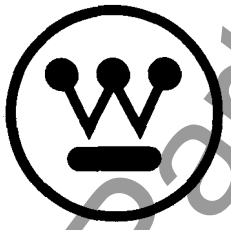



*Fig. 3. Reserve Signal Detector for 19-inch Rack Mounting.*



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# INSTRUCTIONS

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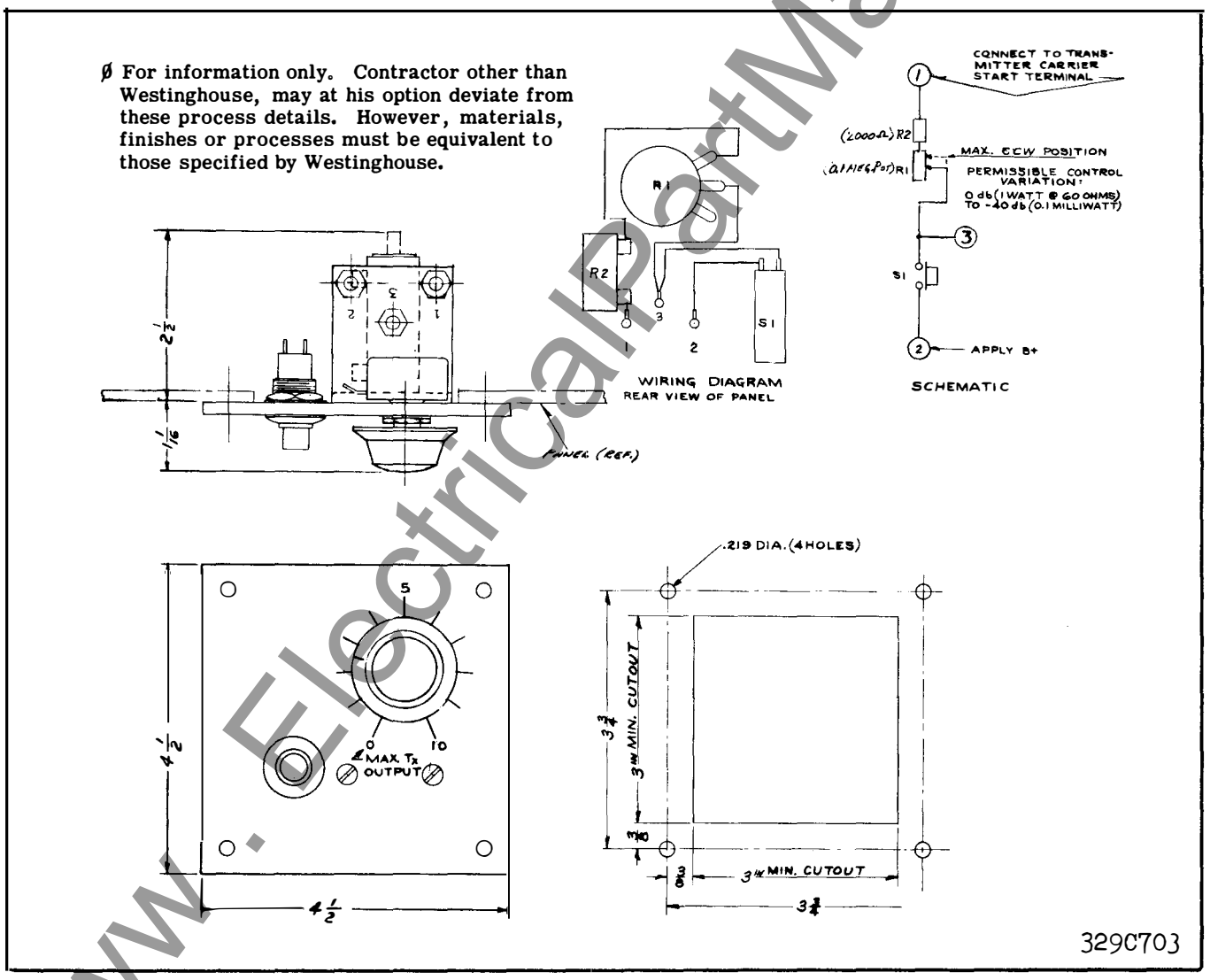


*Fig. 1. Reserve Signal Detector for Panel Mounting.*

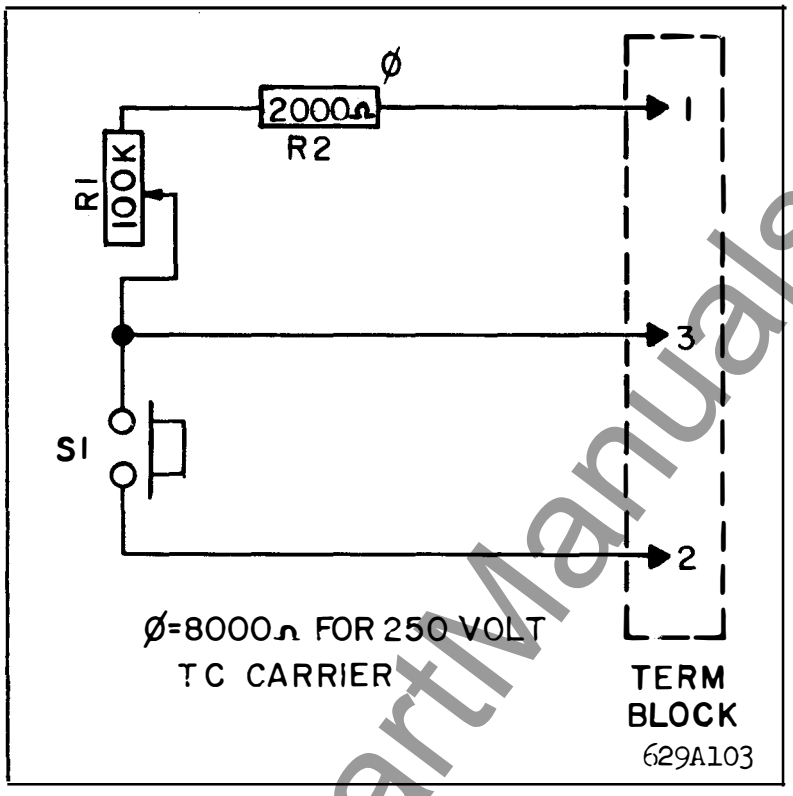


*Fig. 2. Reserve Signal Detector for 19-inch Rack Mounting.*

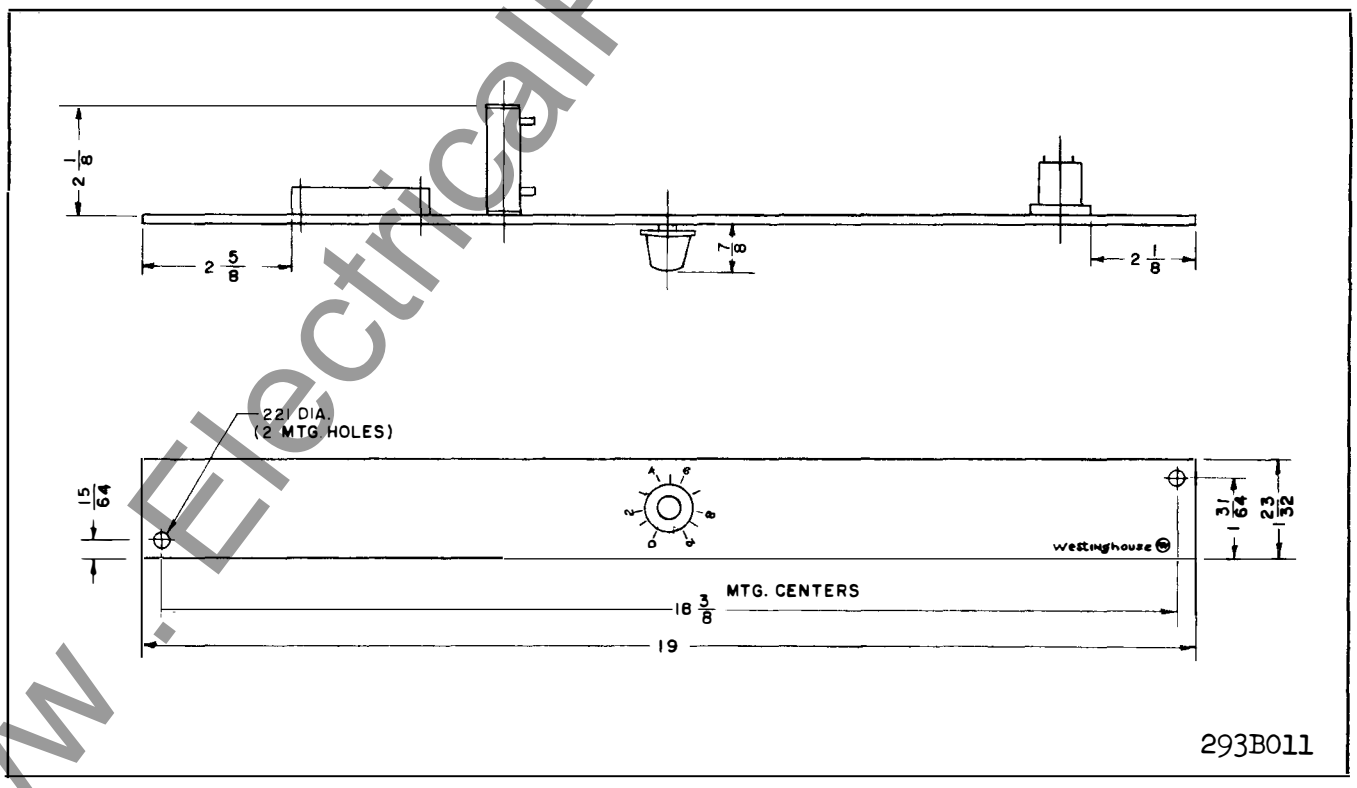


*Fig. 3. Reserve Signal Detector for 19-inch Rack Mounting.*

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# INSTRUCTIONS

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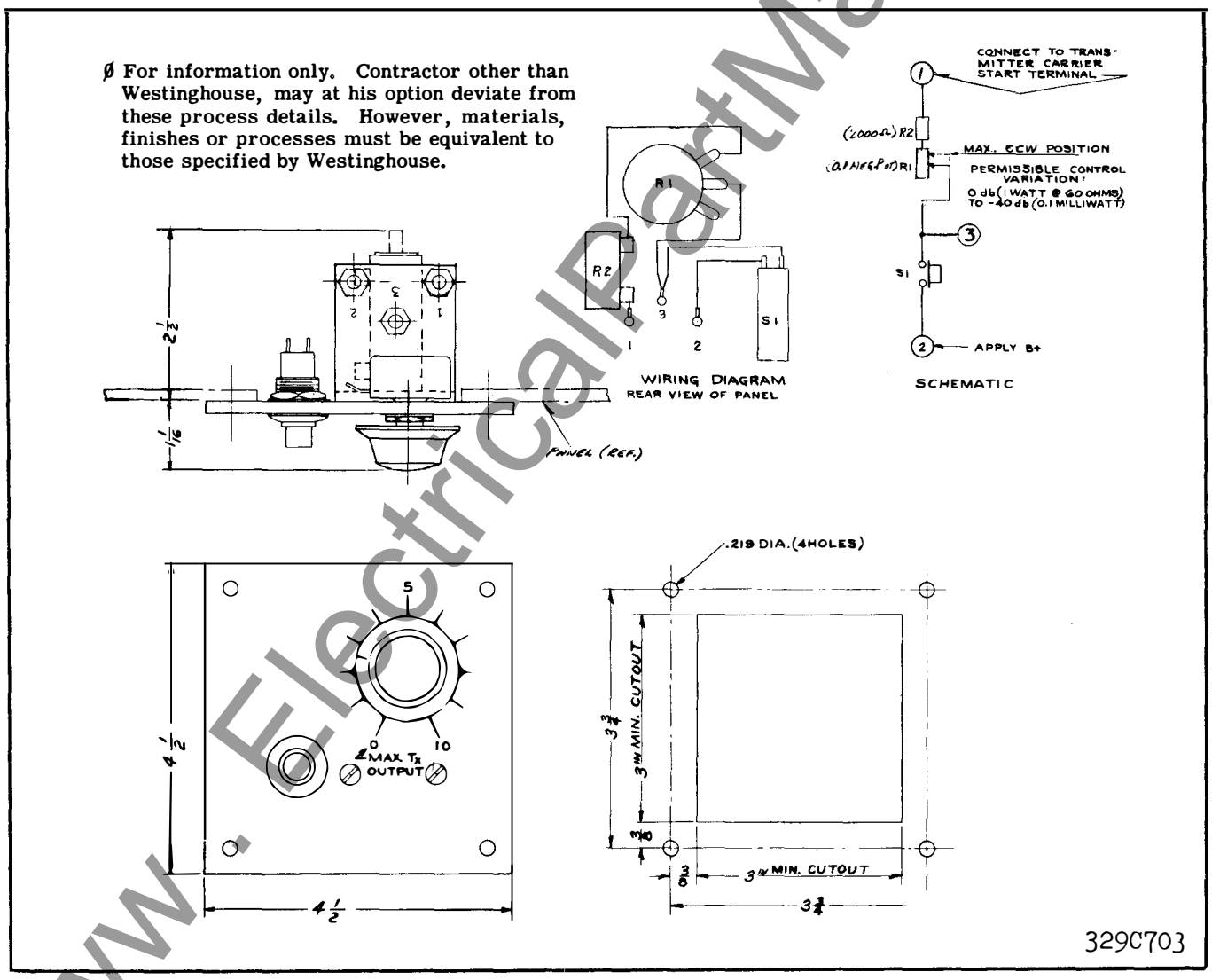



*Fig. 1. Reserve Signal Detector for Panel Mounting.*

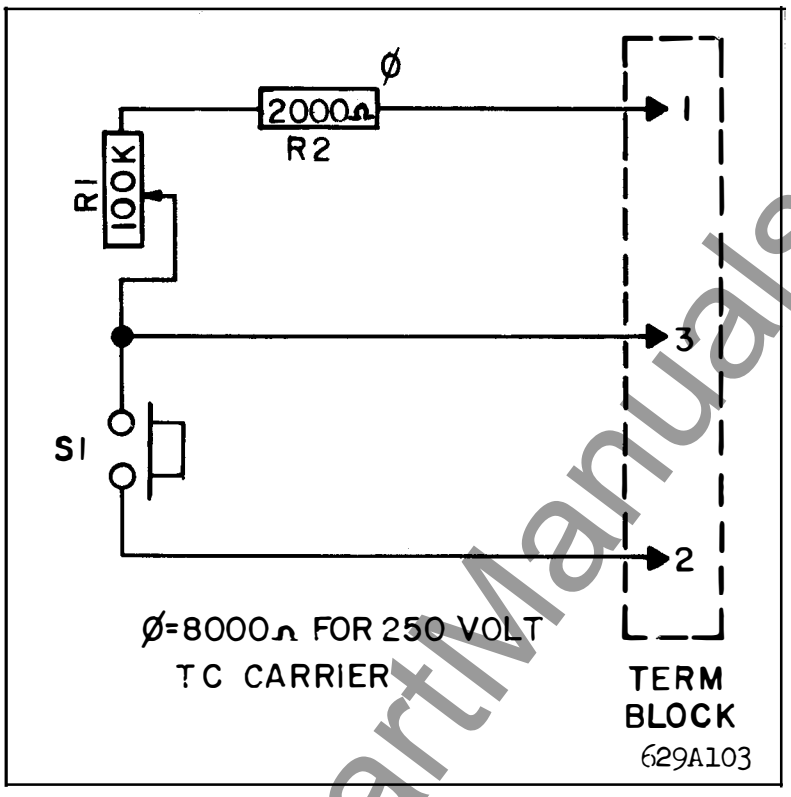



*Fig. 2. Reserve Signal Detector for 19-inch Rack Mounting.*

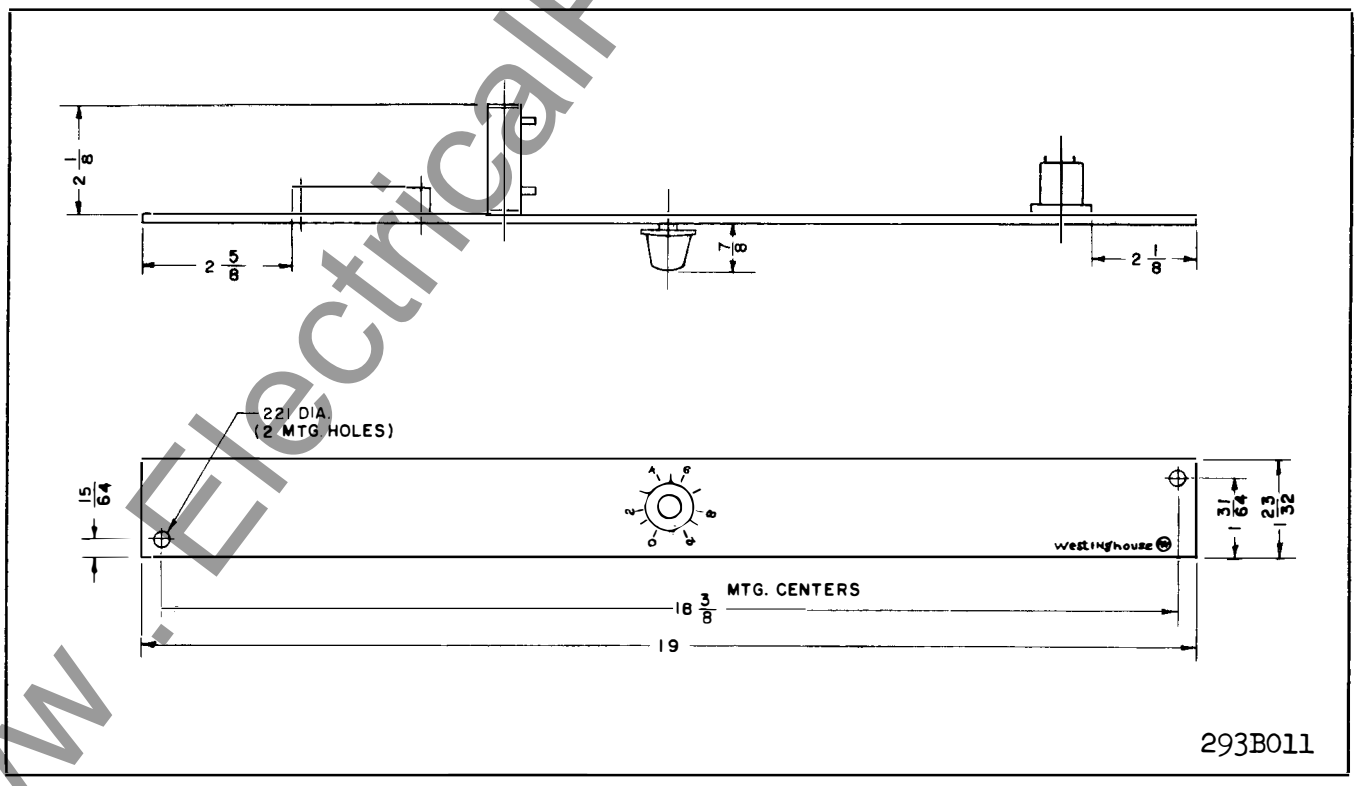
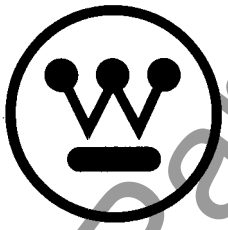



*Fig. 3. Reserve Signal Detector for 19-inch Rack Mounting.*



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| S 1 | Pushbutton Switch | 327C854H01 |

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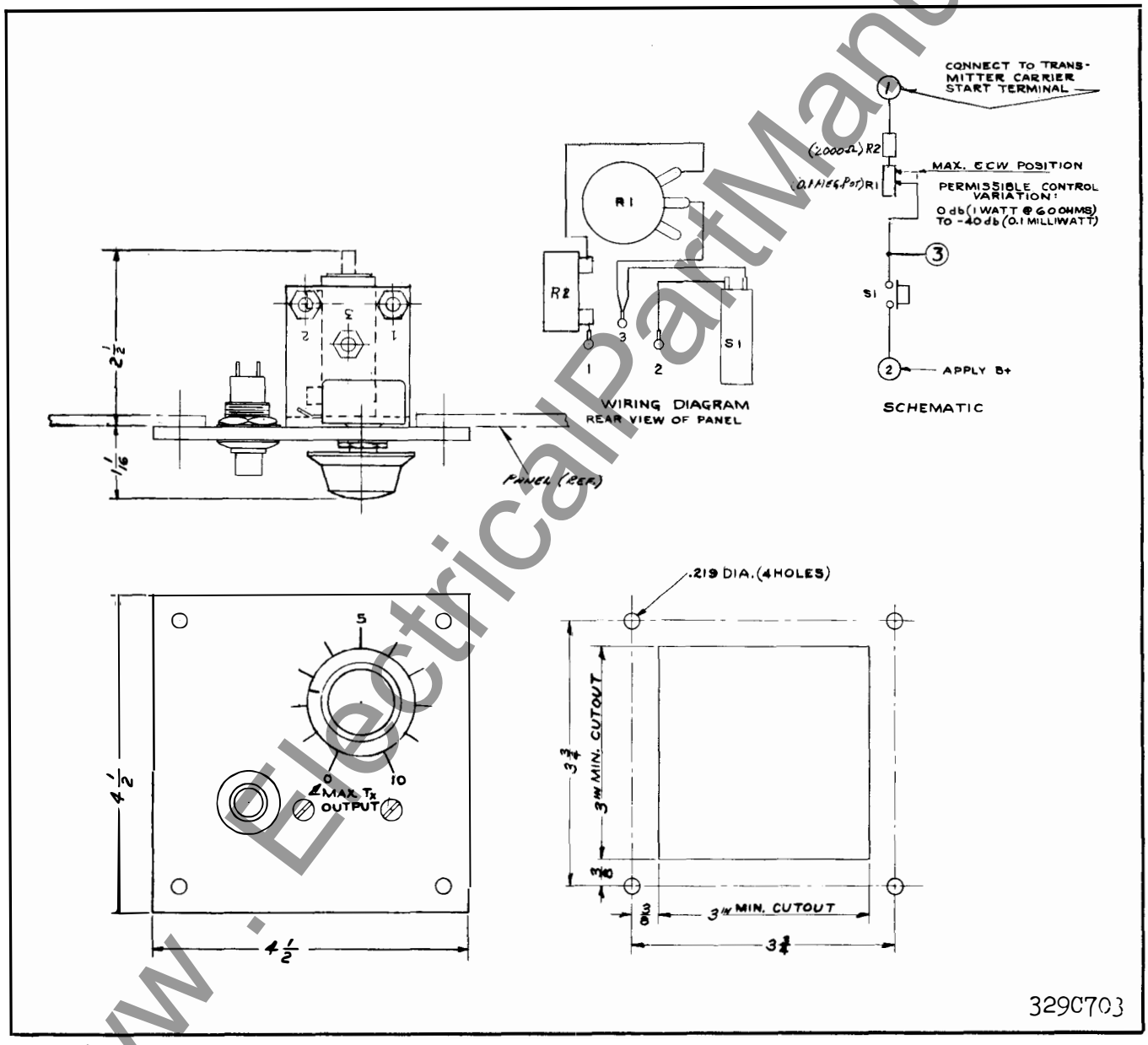


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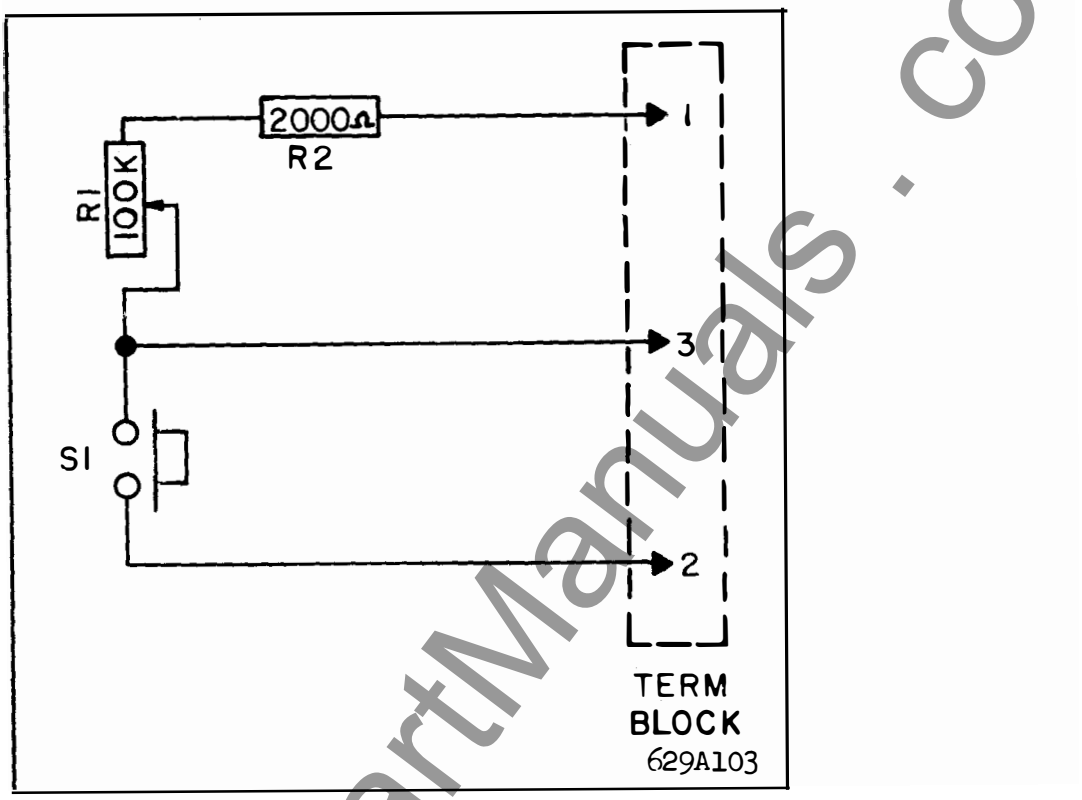


*Fig. 2. Reserve Signal Detector for 19-inch Rack Mounting.*

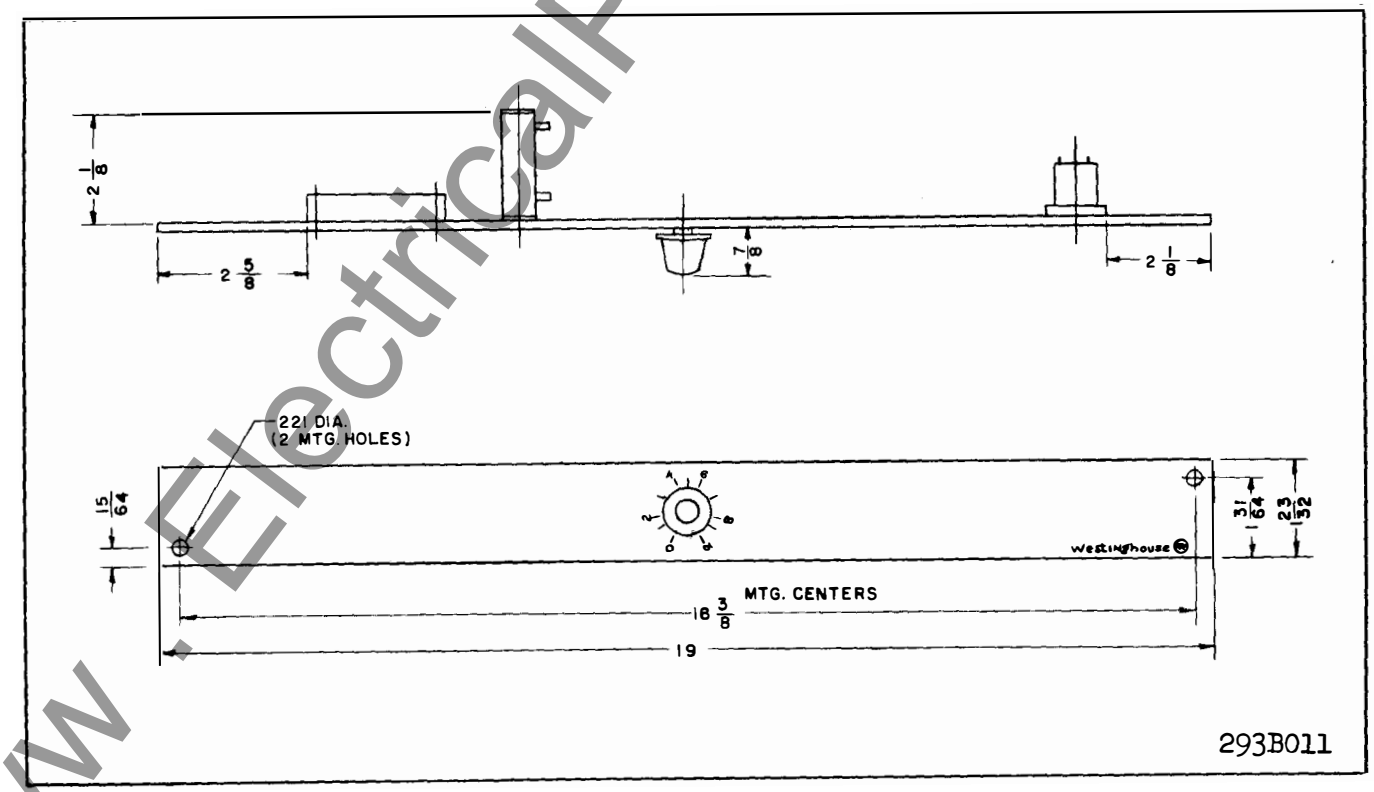


*Fig. 3. Reserve Signal Detector for 19-inch Rack Mounting.*

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