

# ***Extensometer Indicator***

**51810199**

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INSTRUCTION MANUAL

EXTENSOMETER INDICATOR

Model 518101

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Photo: Model 518101 Extensometer Indicator  
Wiring Schematics

Rev: Jan 14, 1987 (ECL-B)  
WP/0538B

## INSTRUCTION MANUAL

### EXTENSOMETER INDICATOR

Model 518101

#### 1.0 INTRODUCTION

The Extensometer Indicator is a portable, battery operated instrument for reading resistance potentiometer-type extensometers and strain meters. This instrument provides a convenient digital (LCD) display of displacement in soil and rock masses.

#### 2.0 DESCRIPTION

##### 2.1 Indicator

The Indicator shown in Figure 1 is a self-contained portable instrument incorporating a rechargeable 6 volt battery, digital display, panel connectors and channel selector switch. The data display is a four digit, back lighted, Liquid Crystal Display (LCD).

Extensometers and strain meters are connected to the indicator through a connector on the panel. Up to 8 sensors to be connected from a junction box or MPBX installation.

##### 2.2 Electrical Jumper Cable

Jumper cables are used to make connection between the sensor, cable, and/or terminal box. See wiring schematics (enclosed) for sensor connections.

### 3.0 OPERATING INSTRUCTIONS

#### 3.1 Electrical Connections

Remove protective cap from INPUT connector, insert cable connector, and then make the necessary connections to the sensors using the appropriate jumper cable. When using the single sensor cable with alligator clips (P/N 51810150), match the color coding of the cable conductors to the same color of the sensor conductors.

When using any of the other jumper cables with either single sensor connectors or multi-sensor connectors, the connections are all predefined so that only the mating connectors are required. For single sensor input cables, switch the INPUT SELECT switch to position 1.

#### 3.2 Battery Test

- Move power switch to BATT TEST position.
- Display will read 10 times the actual battery voltage. Battery should be at least 6.0 volts for a fully charged battery.

#### CAUTION

DO NOT OPERATE INSTRUMENT WHEN BATTERY VOLTAGE IS BELOW 5.7 VOLTS, SINCE THE DATA MAY BE ERRONEOUS AND PERMANENT DAMAGE TO THE BATTERY MAY OCCUR.

### 3.3 Reading and Displacement Calculations

- Move power switch to ON position.
- Set INPUT SELECT to position 1. Observe digital display and record data.
- Switch to next position and record data.

#### a. Determining Changes (readout units)

After the sensor was installed, an initial reading was recorded. Subsequent changes from the initial reading are calculated by subtracting the initial reading from the current reading.

#### b. Determining Displacement (in inches)

To determine inches of displacement, divide the change in readout units by the sensitivity value supplied with the sensor:

$$\text{Displacement in inches} = \frac{\text{Change}}{\text{Sensitivity}}$$

#### Example:

Current Reading = 51.01 (readout units)

Initial Reading = -50.32 (readout units)

Change = 0.69 (readout units)

Sensitivity = 27.7/inch (example of sensitivity value supplied with sensor)

Displacement =  $\frac{0.69}{27.7}$  = 0.025 inches

## 4.0 MAINTENANCE

### 4.1 Recharging Battery (Sealed, Lead-Acid Type)

#### AC Charging:

Using the AC charger provided, plug charger into suitable 110 VAC\* 50/60 Hz and connect to power connector on the front panel. With the power switch OFF, the initial battery will recharge to 80% of rated capacity in 16 hours or less. Approximately 48 hours are required to fully recharge the battery. The charger should not be left connected for more than 48 hours. This will prevent the battery from being over-charged and will insure optimum battery performance and life. When the indicator is not in use, it should be recharged at least once every three months.

#### DC Charging:

An external 10-15 volts DC power source can also be used to recharge the internal battery. Connect the DC jumper cable to the power connector on the front panel and connect the battery clips to appropriate source. The internal battery will charge to 80% capacity in 16 hours or less and will be fully charged in 48 hours. To prevent over-charging, do not leave indicator connected to external DC for more than 48 hours.

\*230 and 100 VAC are available as options

#### 4.2 Electrical Connector

- To insure good electrical contact, periodically wipe contacts with clean dauber or cloth dipped in alcohol.
- Always keep protective cap over contacts when connector is not being used.
- DO NOT spray oil on connectors, since this may damage the insulator material.

#### 4.3 Humidity

The indicator enclosure is sealed to permit operation in wet or humid environments. Since the sealing is only semi-tight, the enclosure will breathe in a small amount of cool, damp night air, and expel drier air during the heat of the day. The atmospheric condition of the interior of the enclosure can eventually reach nearly 100 per cent RH and saturate the desiccant, even though the instrument has not been used.

If the humidity indicator in the upper left corner of the display loses its blue color and starts to turn pink, the desiccant should be replaced or reactivated. The desiccant can be reactivated by banking it in an oven at 250 degrees F (120°C) for 16 hours.

## 5.0 SPECIFICATIONS

### 5.1 Range

The range of the digital display is from 0 to 199.99 units which is equivalent to percent of full scale displacement. Calibration of the sensors is adjusted so that the full scale displacement reads close to 100.00 on the indicator.

### 5.2 Resolution

The smallest change in displacement that can be detected, corresponding to one digit, is equivalent to one part in 10,000, or sensor displacement range divided by 10,000.

### 5.3 Power Requirements

AC Charge: 115 volts,  $\pm 10\%$ , 50/60 Hz  
Internal Battery: 6 volt, 6 ampere hours,  
rechargeable, sealed, lead-acid  
External DC: 12 volts

### 5.4 Dimensions

Indicator: 5" x 7" x 7" (12.7 x 17.8 x 17.8 cm)  
Weight: 7.5 lbs (3.4 kg)

### 5.5 Temperature

Operating Temperature: -10 to +120°F  
(-23 to + 49°C)

Accuracy (1 year):  $\pm (.1\% \text{ Reading} + .02\% \text{ F.S.})$   
at 70°F (21°C)

Temperature Coefficient:

$\pm (0.008\% \text{ Reading} + 0.0006\% \text{ F.S.}) / ^\circ\text{F}$   
 $\pm (.015\% \text{ Reading} + .001\% \text{ F.S.}) / ^\circ\text{C}$



5.6 Watertight Case

The indicator case is splashproof and is capable of use in damp or wet environments. The case is not designed for submersion in water.

5.7 Operating Time on Internal Battery

With the batteries fully charged, the indicator will operate continuously for nine hours at 70 degrees F (21°C). Below 40 degrees F (4°C), operating time is reduced by up to 50 percent due to the necessity of heating the Liquid Crystal Display.

For a fully charged battery, the battery voltage should be greater than 6 volts.

CAUTION

DO NOT OPERATE INSTRUMENT WHEN BATTERY VOLTAGE IS BELOW 5.7 VOLTS, SINCE THE DATA MAY BE ERRONEOUS AND PERMANENT DAMAGE TO THE BATTERY MAY OCCUR.

5.8 Fuses

The system has three fuses located on the printed circuit card behind the indicator panel.

F-1	External Input	2 amp
F-2	Battery	2 amp
F-3	Heater	1 amp

## 5.9 Controls

ON/OFF: Turns system power on.

BATTERY TEST: Displays battery voltage on Digital Voltmeter. Reading displayed is 10 times the actual battery voltage.

INPUT SELECT: Selects sensor to display  
1 thru 6 circuit.

## 5.10 Electrical Connectors

POWER - For connecting external charger to indicator for battery charge.

- For operating instrument and recharging battery with external 12-volt DC.

INPUT - For connecting electrical cable from sensors, junction box, or MPBX installation, to indicator.

6.0 REPAIR AND/OR RECALIBRATION

Slope Indicator Company designs and manufactures all its products for optimum reliability and ruggedness in field conditions. Proper care and maintenance will repay the user with years of trouble-free performance. However, after extended usage or mishandling, it may become necessary to return the instrument for evaluation and recalibration, as well as possible repair. Yearly recalibration is recommended when the instrument is used for a critical application.

The following are instructions on where to ship, who to contact, and how to help expedite the necessary services, including the return of your instrument.

NOTE: When shipping instruments back for evaluation and/or repair, it is recommended to include all accessories pertinent to your operations; i.e. cable, jumpers, sensor, and indicator. The Service Department can not evaluate and/or repair what has not been returned.

Instrument carrying cases are NOT shipping containers. All instruments should be properly packaged to protect user's investment. The original shipping containers or similarly constructed boxes with 2-inch minimum foam cushion surrounding all sides of instruments should be used.

SHIP ALL ITEMS TO:

SLOPE INDICATOR COMPANY  
3665 Woodland Park Avenue North  
Seattle, Washington 98103  
(206) 633-3073

ATTN: SERVICE DEPARTMENT  
Reason Returned: REPAIR

EXPEDITING SERVICE

The following is a list of information necessary to expedite service. A copy of this list should accompany the instrument to help the Service Department evaluate the problem and possibly reduce the overall servicing time:

1. Instrument Owner.
2. Why returned.
3. Specific problem and extenuating circumstances if intermittent.
4. Name of person to contact for further information.
5. Telephone number of the person to contact.
6. Where to ship instrument on return.
7. How to ship instrument.
8. Who to invoice if not on warranty.
9. Purchase Order Number, if any.
10. Date needed returned.

For further information or assistance contact:

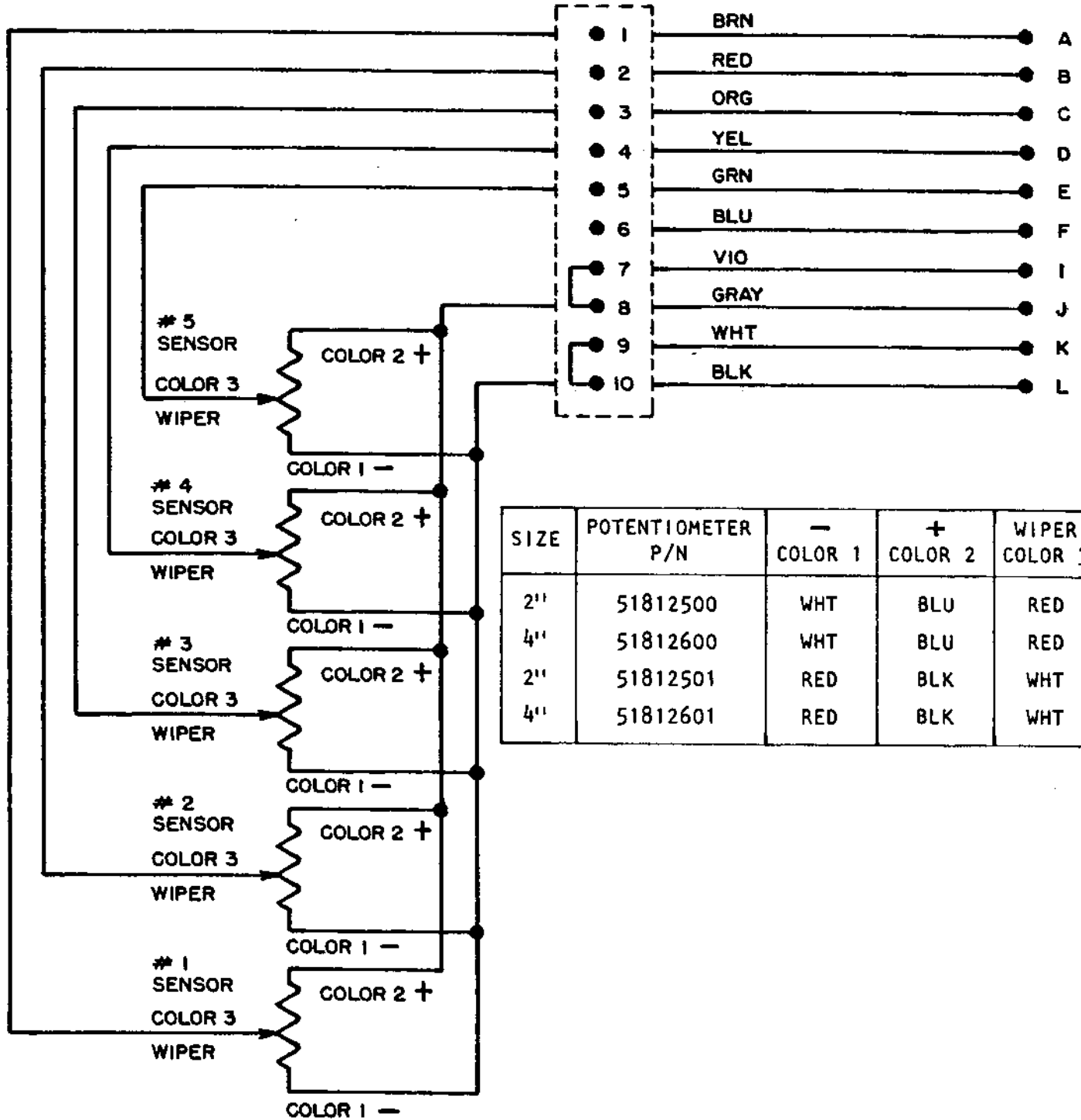
SLOPE INDICATOR COMPANY

SERVICE DEPARTMENT - - - (206) 633-3073

BARRIER  
TERMINAL

CABLE  
52604200

14 PIN  
MS



SIZE	POTENTIOMETER P/N	- COLOR 1	+ COLOR 2	WIPER COLOR 3
2"	51812500	WHT	BLU	RED
4"	51812600	WHT	BLU	RED
2"	51812501	RED	BLK	WHT
4"	51812601	RED	BLK	WHT

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES  
 TOLERANCES ON DECIMALS      FRACTIONS      ANGLES  
 (.00) ± .010      (.000) ± .005      ± .015      ± 1/4°  
 CHAMFER OR RAD ON ALL CORNERS OR EDGES .005 TO .010  
 REMOVE ALL BURRS

MATERIAL

FINISH

SCALE

DR'N

45

APP'D

MOA

ECL

A

DATE

3-19-86

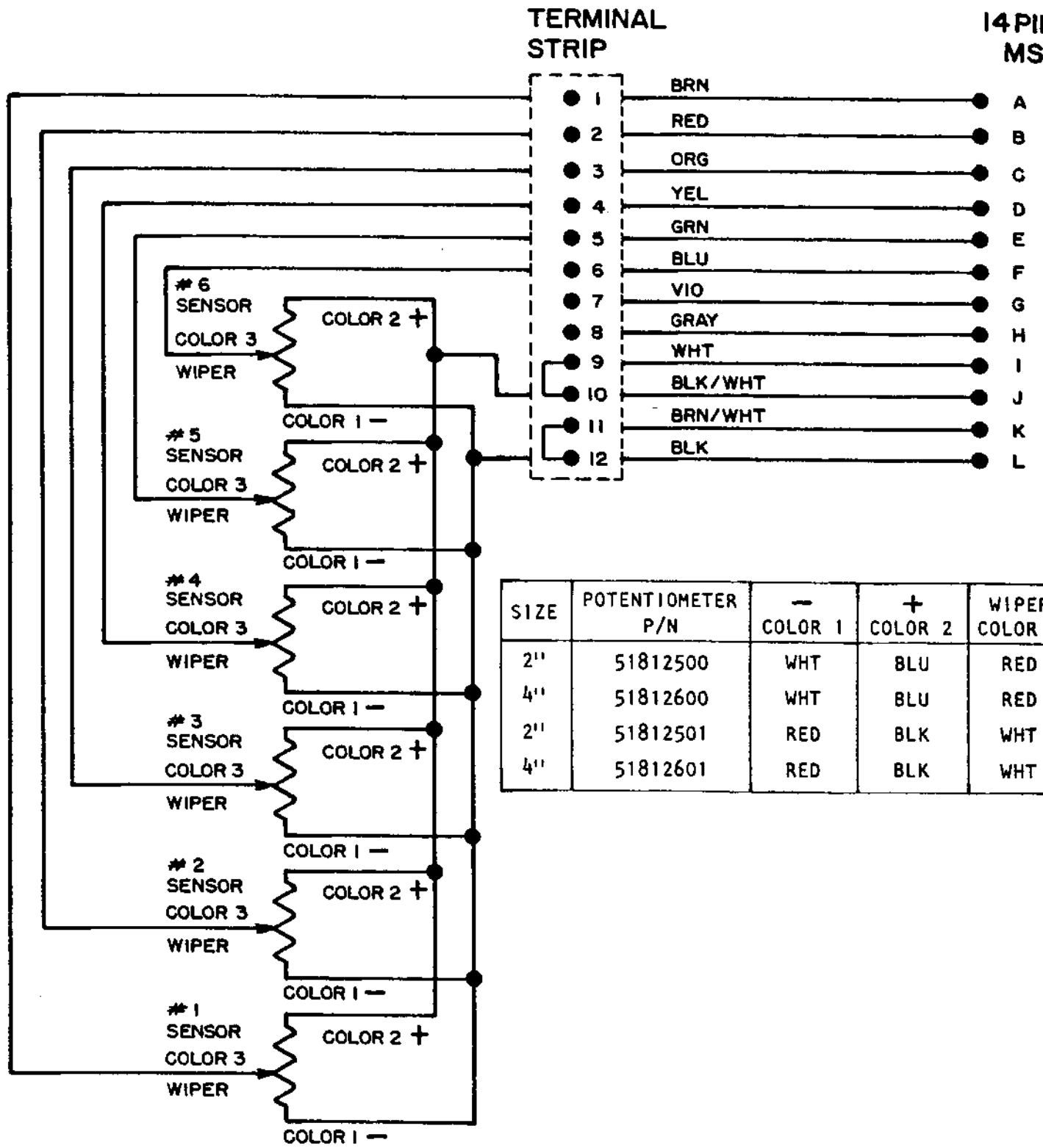
SHT

1 OF 1

WIRING DIAGRAM  
EXTENSOMETER, MPBX

51809200

**Sinco** Slope Indicator Company  
Seattle, Washington U.S.A.



SIZE	POTENTIOMETER P/N	- COLOR 1	+ COLOR 2	WIPER COLOR
2"	51812500	WHT	BLU	RED
4"	51812600	WHT	BLU	RED
2"	51812501	RED	BLK	WHT
4"	51812601	RED	BLK	WHT

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES  
 TOLERANCES ON DECIMALS      FRACTIONS      ANGLES  
 (.00) ± .010      (.000) ± .005      ± .015      ± 1/2°  
 CHAMFER OR RAD ON ALL CORNERS OR EDGES .005 TO .010  
 REMOVE ALL BURRS

MATERIAL

FINISH

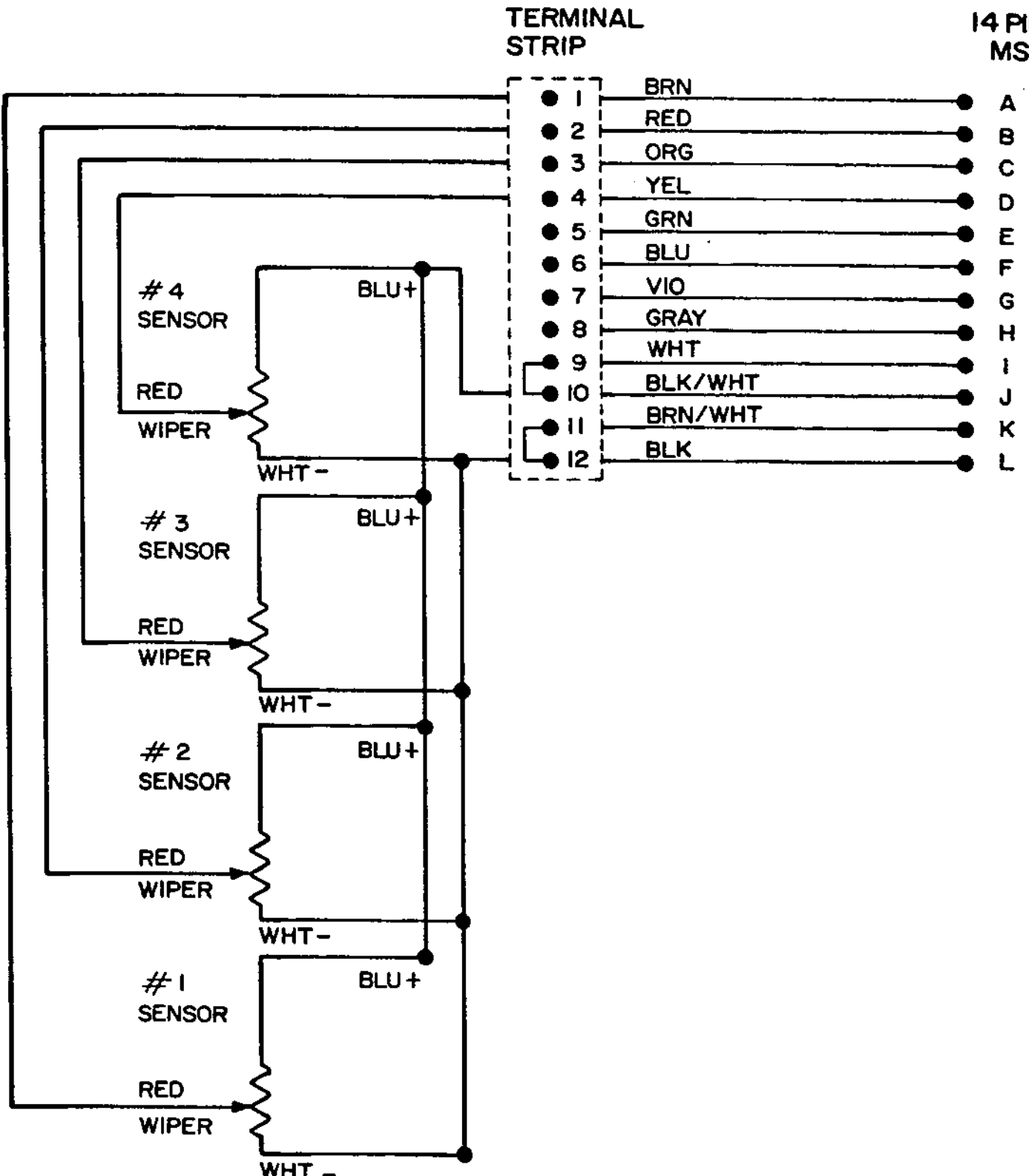
SCALE      OR'N *45*      APP'D *M&A*

WIRING DIAGRAM  
 6 CSLT  
 51850620

**Sinco** Slope Indicator Company  
 Seattle, Washington U.S.A.

ECL      DATE 3-17-86      SHT 1 OF 1

SINCO 70001297



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES  
 TOLERANCES ON DECIMALS      FRACTIONS      ANGLES  
 (.00) ± .010      (.000) ± .005      ± .015      ± 1/2°  
 CHAMFER OR RAD ON ALL CORNERS OR EDGES .005 TO .010  
 REMOVE ALL BURRS

WIRING DIAGRAM  
 8 CSLT

51850820

MATERIAL

FINISH

**Sinco** Slope Indicator Company  
 Seattle, Washington U.S.A.

SCALE

DR'N *45*

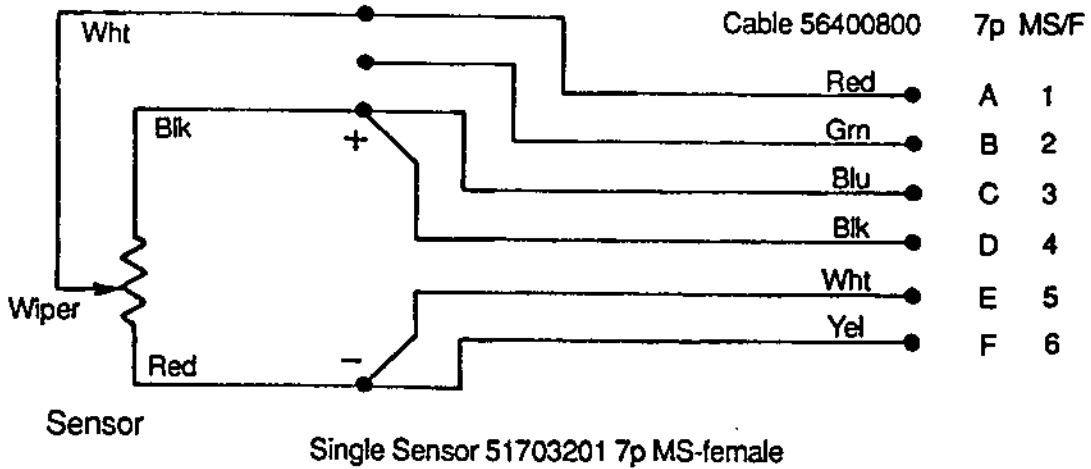
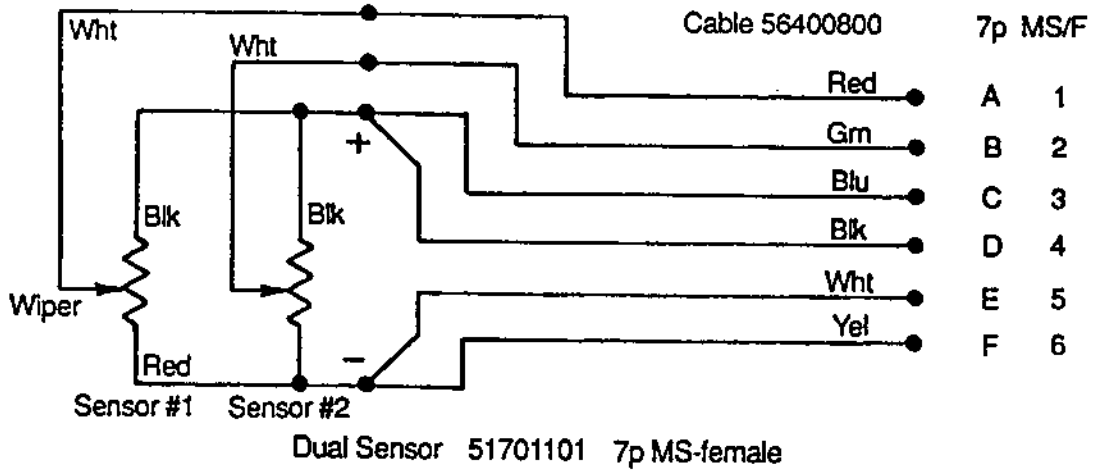
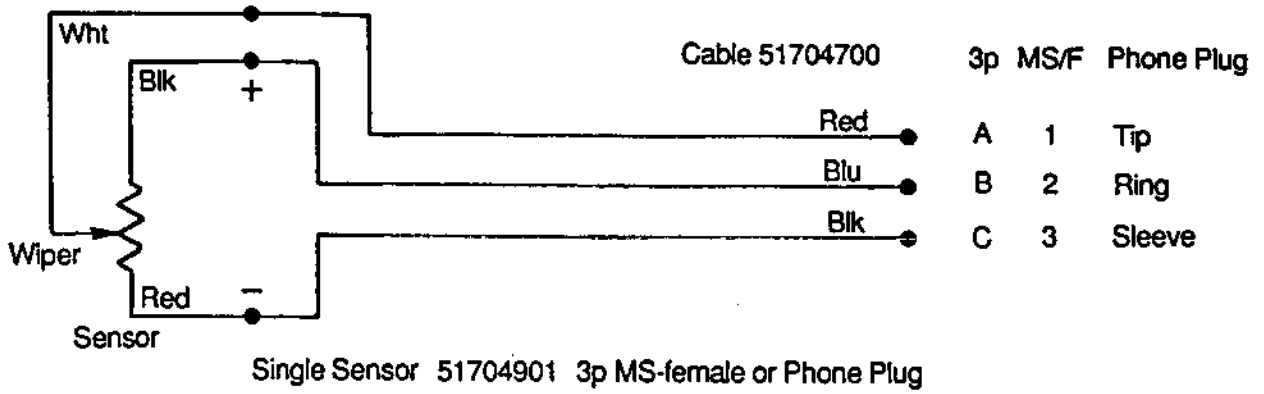
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SHT 1 OF 1

CASE 1000X CONWIF



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES  
 TOLERANCES ON DECIMALS      FRACTIONS      ANGLES  
 (.00) ± .010      (.000) ± .005      ± .015      ± 1/2°  
 CHAMFER OR RAD ON ALL CORNERS OR EDGES .005 TO .010  
 REMOVE ALL BURRS

MATERIAL

FINISH

SCALE

DR'N

APP'D

ECL

DATE

11-10-89

SHT / OF

# Wiring Diagram Extensometer

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Seattle, Washington U.S.A.



