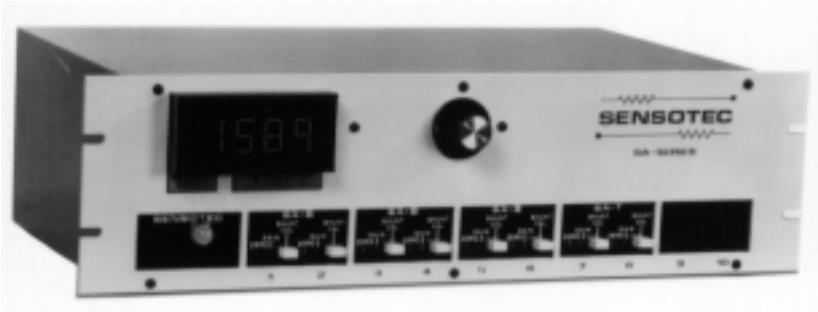


SA SERIES



SENSOTEC

2080 Arlingate Lane, Columbus, Ohio 43228 (614) 850-5000

Sensotec, Inc.

SA Series Instruction Manual
Sensotec Part Number: 008 - 0131 - 00
Rev. A: January 1996

Copyright Notice:

2080 Arlingate Lane

Columbus, Ohio 43228

Copyright 1995 by Sensotec, Inc. all rights Reserved
U.S.A.

Printed in U.S.A.

TEL (614) 850-5000

FAX (614) 850-1111

1-800-848-6564

IMPORTANT! IT IS RECOMMENDED THAT YOU READ THIS DOCUMENT THOROUGHLY BEFORE APPLYING POWER TO THIS UNIT. THIS DOCUMENT CONTAINS INFORMATION ON WIRING, CALIBRATION, AND USE OF FEATURES.

Table of Contents

Chapter 1: Introduction

1.1	Introduction	1
1.2	SA Transducer Amplifier Cards	2
1.3	SA Function Cards.....	3
1.4	SA Interface Cards.....	4

Chapter 2: Installation

2.1	Unpacking	5
2.2	Mounting	5
2.3	Wiring.....	6
2.4	General Information	7

Chapter 3: Scaling SA-10D Instruments

3.1	Introduction	8
3.2	Changing the Scaling.....	8
3.3	Changing the Decimal Point	8
3.3.1	SENSOTEC Panel Meter.....	9
3.3.2	Newport Panel Meters	9

Chapter 4: Replacement of an SA Card

Chapter 5: Drawings

1.1 INTRODUCTION

The SA-Series Multi-Channel Instrumentation concept is a packaging system in which the customer can specify a particular combination of transducer signal conditioning, function, and interface cards to suit his requirements. Each card is Dual-Channel. Within one case, all SA cards may be the same or any mix. The SA-4 holds one or two SA cards and thus has a capacity of four channels. The SA-10 holds up to five cards and thus has a ten-channel capacity. The SA-10D holds up to five cards plus a digital readout and a channel selector switch.

Three types of SA cards are available: TRANSDUCER AMPLIFIER cards, FUNCTION cards, and INTERFACE cards. TRANSDUCER AMPLIFIER cards provide excitation (3V, 5V or 10V) for the transducer, and produce a voltage output to 5 volts. 4-20 milliamp outputs are available as an option. FUNCTION cards operate on the output signals from the amplifier cards to perform a programmed function. The function cards are set up to provide dual channels so that one function card will work with one amplifier card and provide two channels of output. INTERFACE CARDS form a connection between the signal conditioner or function cards and the user or his/her data system. Interconnections between SA cards are accomplished by external wiring on the rear connectors of the SA system.

The SA cards are listed and explained below:

1.2 SA TRANSDUCER AMPLIFIER CARDS

- SA-B II - The SA-B II amplifier is used to amplify the millivolt signals from standard four-arm strain gage bridge transducers to 5 VDC. The transducer excitation (3, 5, or 10 VDC) passes through the SA-B II card to the transducers. The SA-BII amplifier has switchable gain and an optional active filter for each channel. Bridge completion resistors may also be added.
- SA-S - The SA-S is a strain gage amplifier that provides output in proportion to strain. A programmable bridge completion network allows it to be used with a variety of quarter-bridge and half-bridge configurations as well as with standard four-arm strain gage bridges.
- SA-TC - The SA-TC amplifier accepts low-level signals from types J, K, T, and E thermocouple devices and provides a 0 to 5 volt output. Optionally, 8-point linearization is available.
- SA-T - The SA-T amplifier conditions and amplifies the output of platinum resistance temperature probes.
- SA-AC - The SA-AC provides 5 KHz carrier excitation to drive LVDT's and variable reluctance devices and synchronously demodulates the output signal.
- SA-F - The SA-F is a frequency-to-voltage converter. The unit accepts low-level frequency signals from turbine flowmeters, magnetic pickups, optical pickups, and other similar devices and provides a 0 to a 5 volt signal proportional to frequency.

1.3 SA FUNCTION CARDS

- SA-L - The SA-L is a dual-channel card with a high and low limit detector for each channel. When the input becomes higher than the high limit setting or lower than the low limit setting, the SA-L provides a high (TTL) logic level transistor output to indicate that the limits have been exceeded.
- SA-AF - The SA-AF is a selectable two-pole, critically-damped low pass active filter. The frequency selector switch on the front panel selects the filter cutoff frequency: 1, 10, 100 Hz, or no filter.
- SA-SD - Each channel of the SA-SD accepts two independent 0-5 volt inputs (A and B) and then provides either a sum $(A + B)/2$ or difference $(A - B)/2$ at the output terminal.
- SA-PH - The SA-PH is a two-channel peak detector. The unit accepts a single ended voltage signal in the range of -5 to +5 volts and retains the peak value. An adjustable threshold level is provided, below which peaks will not be detected.
- SA-TH - The SA-TH provides a track and hold function. When the circuit is in the "track" mode, the output will track the input like a unity gain amplifier. The input signal is tracked until an external "hold" signal is received that causes the SA-TH to retain the output value at that point.
- SA-K - The SA-K is a special "kluge" card. The SA-K card is used for special user-requested functions that are not available in standard SA instrumentation.

1.4 SA INTERFACE CARDS

SA-SC - The SA-SC is a scanner card that accepts up to 8 inputs and provides sequential sampling of each of the inputs at a selected sampling rate. An external command will lock on a given channel, or stop scanning if desired.

SA-AD - The SA-AD is a dual 3 1/2 -digit display card to be used with any SA amplifier card, thus providing a simultaneous readout of both channels. Each display may be scaled in engineering units.

The foregoing explanation applies in general to all SA systems. The specific configuration information, as well as general setup information for each card supplied, follows.

Chapter 2

INSTALLATION

Sensotec SA series signal conditioners are custom assembled systems designed for each customer's individual requirements. Standard modules are interconnected to provide output signals as specified by the customer. Typically a system installation drawing specifies the factory-installed interconnections, as well as the connections to be made during installation by the customer. The following general instructions are provided for the SA system.

2.1 UNPACKING

1. Carefully remove the SA unit from its packing case, and inspect for shipping damage. Inform the factory (614/486-7723) of any such damage. If damage is noted, keep all packing materials in case the unit must be returned to factory for repair or replacement.
2. Gently shake the instrument to ascertain that no loose parts exist inside.

2.2 MOUNTING

1. Place the unit in its desired location and secured. Be certain that transducer cabling, and input/output wiring will reach the unit easily.

2.3 WIRING

POWER CABLE: SA series instrumentation utilizes two different power cables; one consists of a 3-pin integrally-molded cable and connector assembly, the second is a power cord using a 6-pin Buchanan type connector.

Integrally-Molded Cable - Plug the integrally-molded 3-pin connector into the mating socket, located at the right as you view the rear of the unit. The other end is connected to the power source.

Six-Pin Buchanan Type Connector - Using a small screw-driver, and with the power cord disconnected from the power source, connect as follows:

Green Wire (ground) Pin 5 or 6

White Wire (low-side) Pin 1 or 2

Black Wire (Hot-side) Pin 3 or 4

Be certain that the connector numbers read right side up. Serious damage may result if this connector is installed upside-down.

Connect the other end to the proper power source. See drawing 001-0074-00 (located near the end of this manual) for an illustration of the power connector.

Transducer Wiring - Your customer installation drawing shows the proper connections between the transducer(s) and the SA unit. Carefully make the connections specified.

Input/Output Wiring - Connect input signals from any non-transducer sources as shown on the installation drawing, and connect the output signals to the desired external readouts (if used). Normal channel outputs are 0-5 VDC or 4-20 mA DC (optional).

2.4 GENERAL INFORMATION

The SA-series case, except for the front panel, may be used for rack or bench mounting. In the rack-mount version, a rack front panel is used and the case is mounted so that the flush end is against the panel. The bench-mounted version utilizes a smaller front panel with the case reversed to create a shadowbox effect.

Your “Customer Information Sheet” describes the system that you received. It furnishes the shunt calibration resistance values and, if Sensotec transducers were purchased with the system, the output voltage when the “shunt cal” is used. Excitation voltages, output voltages, and other information are also supplied.

A two-page paper “Instructions for Calibrating Instrument Using the Transducer Shunt Cal Data” is also included to assist in set-up of your system. (Document number 087-0134-00).

Included with these general instructions are special instructions and drawings which apply to the individual module ordered, and to the system itself.

Chapter 3

SCALING SA-10D INSTRUMENTS

3.1 INTRODUCTION

A separate scaling unit subassembly (064-0192-00) is located behind the front panel of the SA-10D, and is attached to the Channel Selector switch, located close to the Panel Meter. On this subassembly there are adjustment potentiometers for each readout channel. These Scaling potentiometers adjust the voltage going to the Panel Meter to permit reading each channel in the proper engineering units. For example, a 200 psi pressure transducer could read 200.0 psi for a full scale input, or could read 1380 kilopascals. The decimal point adjustment is also made on the same subassembly.

3.2 To Change Scaling:

1. Remove the top cover from the SA-10D unit (10 screws).
2. Change the Channel Selector switch to the proper channel.
3. Adjust the potentiometer for the channel selected to give the proper reading.

3.3 To Change the Decimal Point:

SA-10D units use several types of panel meters. Most common are the Newport 2003B meter, and the Sensotec Panel Meter, P/N 060-3173. The meter choice will influence the manner in which the decimal point selection is made.

3.3.1 Sensotec Panel Meter P/N 060-3173

On the rear of this meter terminals exist which, when connected to the DP Common terminal, will light the desired decimal point. Jumper all of the channels which have the same decimal point location, and connect a jumper from these terminals to the proper decimal point terminal on the Panel Meter. There could be as many as four such wires. Then jumper the DP Common terminal of the Scaling Board to the DP COM terminal of the Panel Meter. Similarly interconnect remaining channels which use the same decimal point locations.

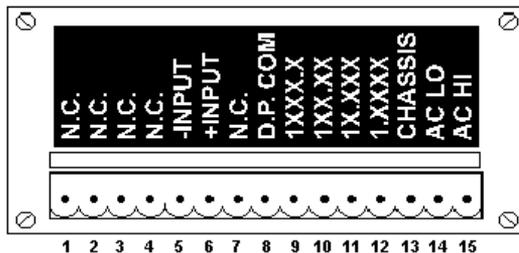


Figure 3-1: Sensotec Panel Meter Rear Panel

3.3.1 Newport Panel Meters

SA-10D's are sometimes supplied with Newport meters, in either a 3 - 1/2 digit (Newport 203A) or 4 - 1/2 digit (2003B) configuration.

Newport 203A, 3 - 1/2 digit Meter

All possible decimal point locations come to the rear of this meter, each to its own pin. When connected to the DP Common terminal, these terminals will cause each of the decimal point locations to illuminate.

<u>Pin</u>	<u>Decimal</u>
4	1.xxx
5	1x.xx
6	1xx.x

Jumper all of the channels which have the same decimal point location, and connect a jumper from these terminals to the proper decimal point terminal on the Panel Meter. There could be as many as three such wires. Then, jumper the DP Common terminal of the Scaling Board to Pin T of the Panel Meter.

Newport 2003B, 4 - 1/2 Digit Meter

The 2003B meter has only two decimal point terminals coming out to the rear panel. If the two choices are not what are needed, it is possible to go into the meter and make a jumper change which will produce the desired results. Sensotec normally does not provide the instruction manual for the Newport meter with the SA-10D instructions, but these manuals are available upon request. First determine if it is necessary to make a change that will require use of the manual. This is done as follows:

-
1. With the cover removed from the SA-10D, use a clip lead to momentarily jumper Pins S and T on the rear of the meter together. Notice the decimal point location. Then, momentarily jumper pins 14 and T together, again noting the decimal point location. If these two locations do not satisfy your decimal point needs, it will be necessary to request a copy of the meter manual from Sensotec.
 2. If the two potential decimal point locations will satisfy the needs, jumper together all of the decimal point locations on the Scaling board that use the same decimal point location. Then connect these terminals with a wire to either pin 14 or pin S on the meter. A second wire (to the other terminal), may be added if needed. Finally, interconnect the DP COM terminal on the scaling board and terminal T on the rear of the meter.

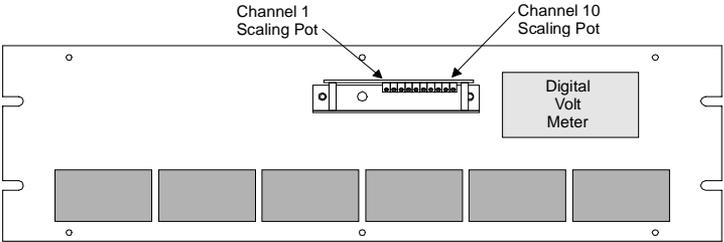
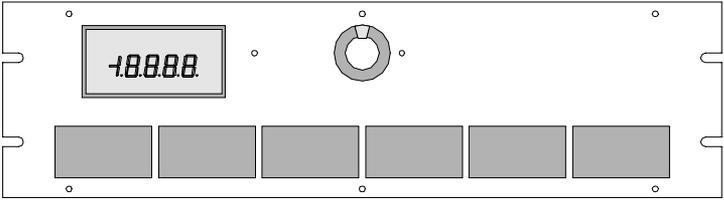


Figure 3-2: SA-10D Scaling Pots

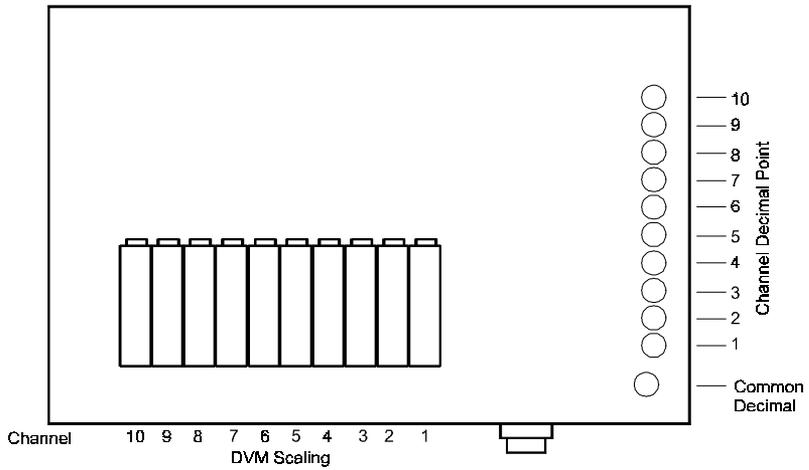


Figure 3-3: SA-10D Switch Board Adjustments

Chapter 4

REPLACEMENT OF AN SA CARD

TOOLS Needed:

#1 Phillips-head Screwdriver

1/4" Common Screwdriver

5/64" Phillips-head Screwdriver

Procedures:

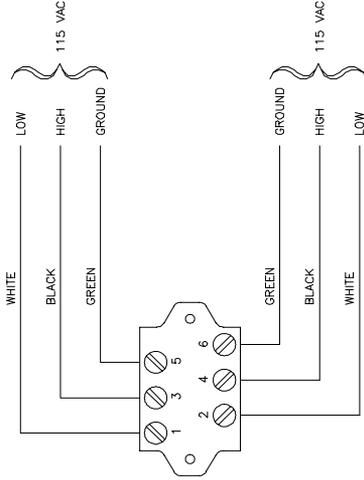
1. To remove the top cover, take out the following screws:
3 each - upper rear, 4 each - bottom mounting screws, 3 each - front panel phillips-head screws.
2. Slide the top cover from the unit.
3. Remove the rear panel lead wire terminal strip only from SA card being changed which connects to the module from the enclosure (2 screws).
4. Remove front panel.
5. Remove the 6 hold down screws from the center of the SA card being replaced. The power supply has only 3 hold down screws.
6. Remove wires from the SA module.
7. Remove the 2 small screws at bottom front which hold the SA card in place.
8. Unplug module from mother board and remove. The SA card connects to the mother board by the noval plug. Pry or pull with rocking motion.
9. Reverse the procedure to install a new module.

Chapter 5

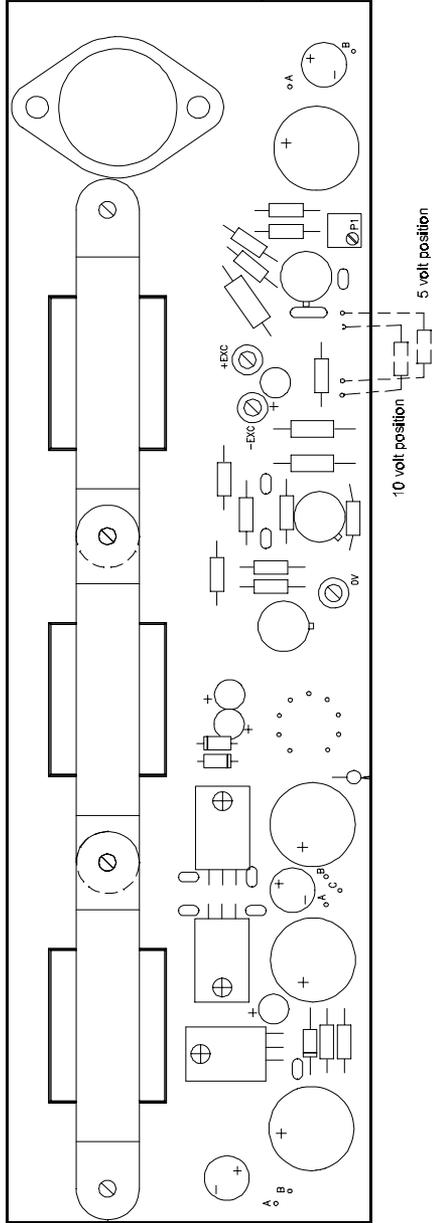
DRAWINGS

Included in this instruction Manual is drawing 001-0074-00, which shows the wiring code for the AC power cord. Also included is a figure of the power supply circuit board which shows how to change the DC excitation supply voltage. Finally, a schematic of the power supply board is included.

001-0074-00



DEBURR & BREAK SHARP UNLESS OTHERWISE SPECIFIED UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES		REV. 1 NONE	DESCRIPTION 9-1-78	CHECKED 07/17/96	REVISED APPROVED APPROVED: MKR
ECU USED NONE	X X X X	SCALE NONE	DRAWN 9-1-78	FILE 07/17/96	DATE 07/17/96
MANUFACTURE SPECIFICATION SA SERIES 117 VAC 1200 CHESTER AVE. COLUMBUS, OH 43213					
POWER WIRING CODE SA SERIES 117 VAC					
DOCUMENT NUMBER 001-0074-00					
SHEET 1 OF 1					



APPENDIX

A.1.1 LIMITED WARRANTY ON PRODUCTS

Any of our products which, under normal operating conditions, proves defective in material in workmanship within one year from the date of shipment by SENSOTEC, will be repaired or replaced free of charge provided that you obtain a return material authorization from SENSOTEC and send the defective product, transportation charges prepaid with notice of the defect, and establish that the product has been properly installed, maintained, and operated within the limits of rated and normal usage. Replacement product will be shipped F.O.B. our plant. The terms of this warranty do not extend to any product or part thereof which, under normal usage, has an inherently shorter useful life than one year. The replacement warranty detailed here is the buyer's exclusive remedy, and will satisfy all obligations of SENSOTEC whether based on contract, negligence, or otherwise. SENSOTEC is not responsible for any incidental or consequential loss or damage which might result from a failure of any SENSOTEC product. This express warranty is made in lieu of any and all other warranties, express or implied, including implied warranty of merchantability or fitness for particular purpose. Any unauthorized disassembly or attempt to repair voids this warranty.

A.1.2 SERVICE UNDER WARRANTY

Advanced authorization is required prior to the return to SENSOTEC. Before returning the items, either write to the Customer Service Department c/o SENSOTEC, Inc., 2080 Arlingate Lane, Columbus, Ohio 43228, or call (800) 848-6564 with: 1) a part number; 2) a serial number for the defective product; 3) a technical description* of the defect; 4) a no-charge purchase order number (so products can be returned to you correctly); and 5) ship and bill addresses. Shipment to SENSOTEC shall be at Buyer's expense and repaired or replacement items will be shipped F.O.B. our plant in Columbus, Ohio. Non-verified problems or defects may be subject to an evaluation charge. Please return the original calibration data with the unit.

A.1.3 NON-WARRANTY SERVICE

Advance authorization is required prior to the return to SENSOTEC. Before returning the item, either write to the Customer Service Department c/o SENSOTEC, Inc., 2080 Arlingate Lane, Columbus, Ohio 43228, or call (800) 848-6564 with: 1) a model number; 2) a serial number for the defective product; 3) a technical description* of the malfunction; 4) a purchase order number to cover SENSOTEC's repair cost; and 5) ship and bill addresses. At this time you will be issued a Return Material Authorization number (RMA#) on which to ship the unit(s) back to SENSOTEC. Shipment to SENSOTEC shall be at Buyer's expense and repaired items will be shipped to you F.O.B., our plant in Columbus, Ohio. Please return the original calibration data with the unit.

A.1.4 REPAIR WARRANTY

All repairs of SENSOTEC products are warranted for a period of 90 days from date of shipment. This warranty applies only to those items which were found defective and repaired, it does not apply to products in which no defect was found and returned as is or merely recalibrated. Out of warranty products may not be capable of being returned to the exact original specifications or dimensions.

* Technical description of the defect: In order to properly repair a product, it is necessary for SENSOTEC to receive information specifying the reason the product is being returned. Specific test data, written observations on the failure and the specific corrective action you require, is needed.