

215



DIGITAL PANEL VOLTMETER

Operator's Manual



 **NEWPORT Electronics, Inc.**



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It is the policy of NEWPORT to comply with all worldwide safety and EMC/EMI regulations that apply. NEWPORT is constantly pursuing certification of its products to the European New Approach Directives. NEWPORT will add the CE mark to every appropriate device upon certification.

The information contained in this document is believed to be correct but NEWPORT Electronics, Inc. accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

WARNING: These products are not designed for use in, and should not be used for, patient connected applications.



This device is marked with the international caution symbol. It is important to read the Setup Guide before installing or commissioning this device as it contains important information relating to safety and EMC.

SAFETY CONSIDERATIONS



This device is marked with the international Caution symbol. It is important to read this manual before installing or commissioning this device as it contains important information relating to Safety and EMC (Electromagnetic Compatibility).

Unpacking & Inspection

Unpack the instrument and inspect for obvious shipping damage. Do not attempt to operate the unit if damage is found.



Note

This instrument is a panel mount device protected in accordance with Class I of EN 61010 (115/230 AC power connections). Installation of this instrument should be done by Qualified personnel. In order to ensure safe operation, the following instructions should be followed.

This instrument has no power-on switch. An external switch or circuit-breaker shall be included in the building installation as a disconnecting device. It shall be marked to indicate this function, and it shall be in close proximity to the equipment within easy reach of the operator. The switch or circuit-breaker shall not interrupt the Protective Conductor (Earth wire), and it shall meet the relevant requirements of IEC 947-1 and IEC 947-3 (International Electrotechnical Commission). The switch shall not be incorporated in the mains supply cord.

Furthermore, to provide protection against excessive energy being drawn from the mains supply in case of a fault in the equipment, an overcurrent protection device shall be installed.



- The **Protective Conductor** must be connected for safety reasons. Check that the power cable has the proper Earth wire, and it is properly connected. It is not safe to operate this unit without the Protective Conductor Terminal connected.



Note

-
- Do not exceed voltage rating on the label located on the top of the instrument housing.
 - Always disconnect power before changing signal and power connections.
 - Do not use this instrument on a work bench without its case for safety reasons.
 - Do not operate this instrument in flammable or explosive atmospheres.
 - Do not expose this instrument to rain or moisture.

EMC Considerations

- Whenever EMC is an issue, always use shielded cables.
- Never run signal and power wires in the same conduit.
- Use signal wire connections with twisted-pair cables.
- Install Ferrite Bead(s) on signal wires close to the instrument if EMC problems persist.

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1.0 GENERAL INFORMATION

1.1 UNPACKING AND INSPECTION

Your Model 215 was systematically inspected and tested, then carefully packed before shipment. Unpack the instrument and inspect for obvious shipping damage. Notify the freight carrier immediately upon discovery of any damage.

1.2 SPECIFICATIONS

External Reference 0.05 to 0.11V on 0.2V range
 For Ratio (optional) 0.5 to 1.1V on other ranges

	215-2	215-3	215-4	215-5	
Full Scale Voltage	0.2	2.0	20.0	200.0	V
Resolution	0.1	1.0	10.0	100.0	mV
Maximum Input	130	130	150	330	V _p
Impedance	10,000	10,000	1.0	1.0	M
Bias Current	50	50	5.0	0.5	pA
NMR @ 50/60 Hz	56	56	42	36	dB
CMR (DC to 60 Hz)	80	80	80	80	dB

$$\text{CMR (DC to 60 Hz)}$$

$$\text{CMV} = \frac{V_{HI} + V_{LO}}{2}$$

-1V to +2V

1.3 ACCURACY

Maximum Error @ 25°C ±.05%R ±1 Count
 Reading Tempco ±0.008% R°C
 Zero Drift ±2μV/°C
 Warmup to Rated Accuracy 5 sec. to within 1 count

1.4 CONVERSION CHARACTERISTICS

Technique Dual Slope, Average Value
 Signal Integration Period 100 ms
 Reading Rate 2.5 sec.
 Full Scale Step Response 1.2 sec.

1.5 ENVIRONMENTAL

Operating Temperature	0°C to +55°C
Storage Temperature	-40°C to +85°C
Humidity	0 to 95% RH @ 0 to 40°C

1.6 DISPLAY

Type	14.2mm 7-segment LED
Symbols	±1.8.8.8
Decimal Points	Connector wired or solder switched to any of above three positions.
Overload	3 LSDs blank
Test	Lights -1888 when +5V is applied.
HOLD	Holds the last reading when grounded. (TTL/CMOS compatible)

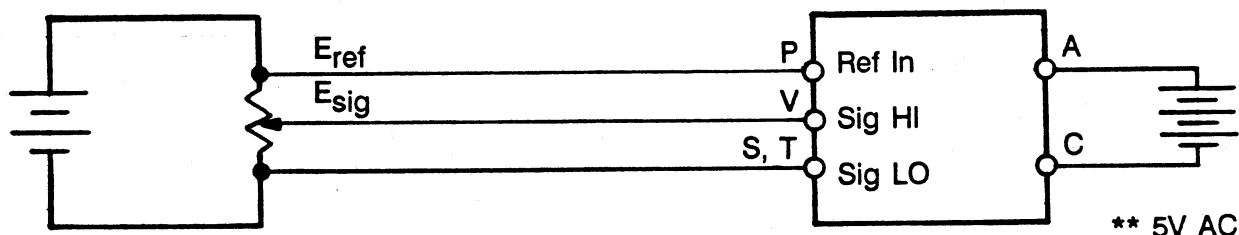
POWER

Input Voltage	5VDC ±5%
Consumption	1.2W Maximum

2.0 OPERATING INSTRUCTIONS

Ratio Operation

The Model 215 may be used to measure the ratio of an input signal to an external reference voltage.



In the diagram, the position of the slider is to be determined. The long-term accuracy of the external reference voltage is not important, but it must remain stable during the measurement period.

For a ratio measurement, the Model 215 will provide the following reading:

$$\text{RATIO} = 1000 \times \frac{E_{sig}^*}{E_{ref}}$$

* E_{sig} for the 20V and 200V ranges must be scaled by 1/10 and 1/100 respectively.

** Change R21 1K resistor to 0 ohms if signal LO must be common to 5 volt power return.

EXTERNAL REFERENCE VOLTAGES ARE:

$$\frac{E_{sig} \text{ (FS Volt)}}{2V, 20V, 200V}$$

200mV

$$\frac{E_{ref} \text{ (Limits)}}{+500mV < E_{ref} < +1.1V}$$

$$+50mV^* < E_{ref} < +100mV$$

* Below 90mV, accuracy is degrade, depending on the VLSI noise.

2.1 INITIAL CHECKOUT PROCEDURE

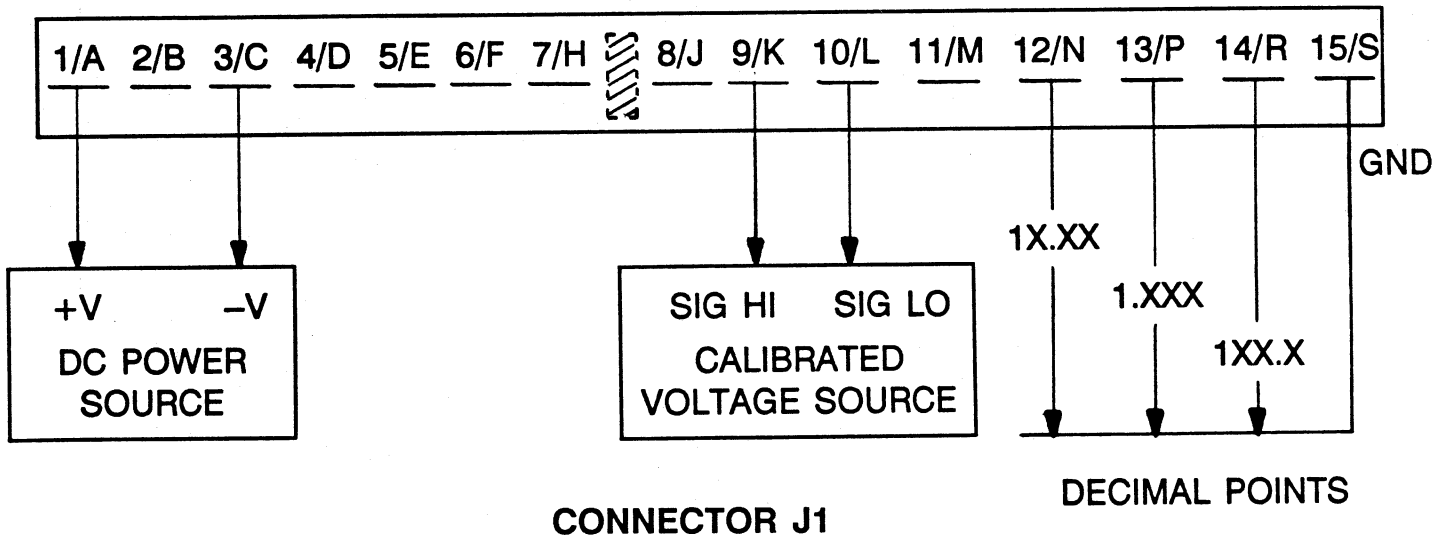
See Section 1.1 for unpacking and inspection procedure.

CAUTION

CHECK THAT THE DC POWER SOURCE IS SET TO +5.0V, ±5% BEFORE CONNECTING TO THE METER.

REQUIRED EQUIPMENT:

1. +5v, ±5, DC power source (2 Watts)
2. Calibrated voltage source.



2.2 CALIBRATION INSTRUCTIONS

The Model 215 was calibrated at the factory or field-service center with a precision source. Frequent calibration is not necessary due to the stability and internal accuracy of the meter. The gain adjustment is accessible with the lens removed for customer calibration.

1. Check label on meter for proper DC power and input.
2. Connect DC power as indicated in the operating instructions.
3. Apply a positive signal input close to the full scale input of the model under test.
4. Adjust R14 so that the displayed reading agrees with the signal input.

3.0 DRAWINGS

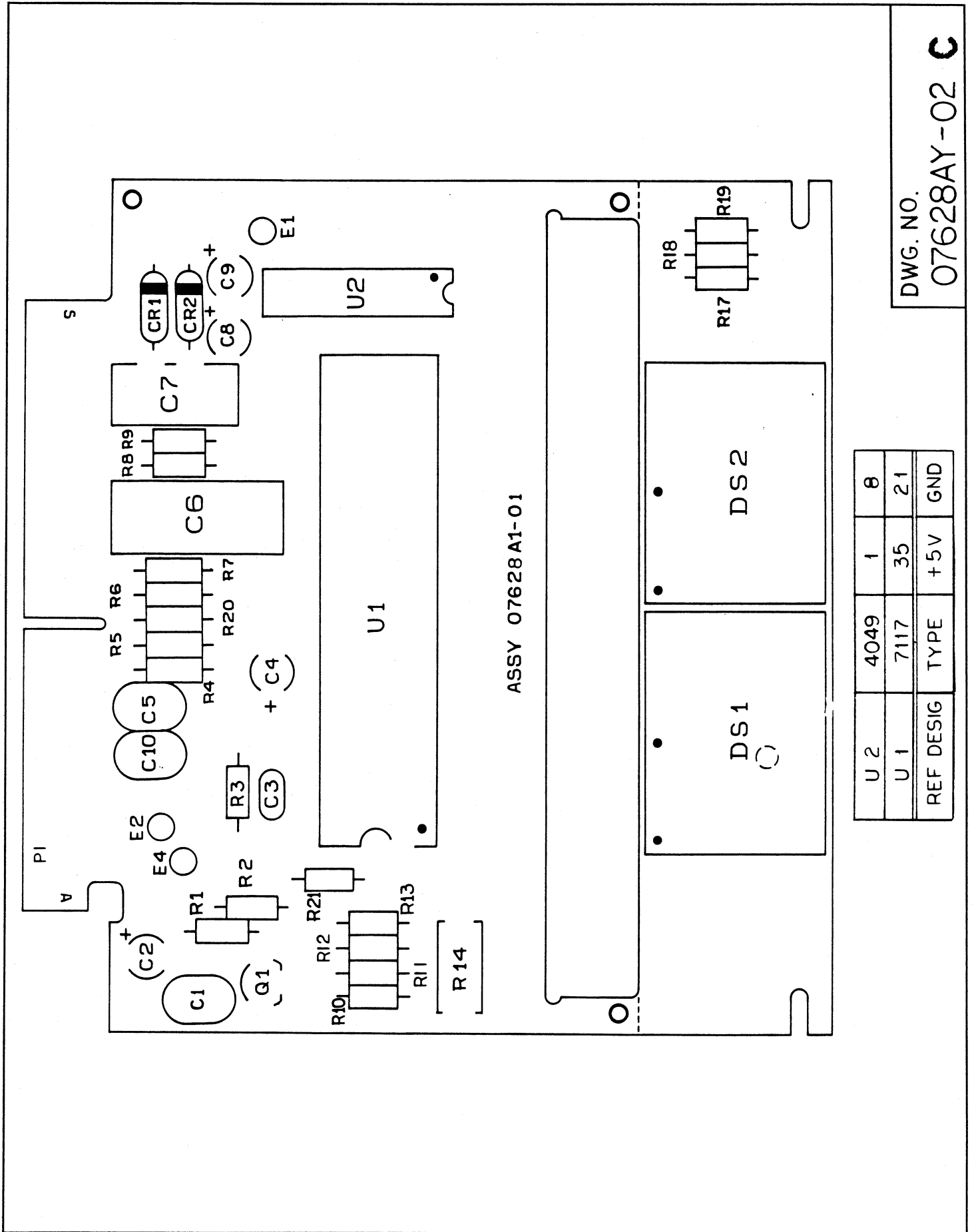


Figure 3-1 Assembly Diagram

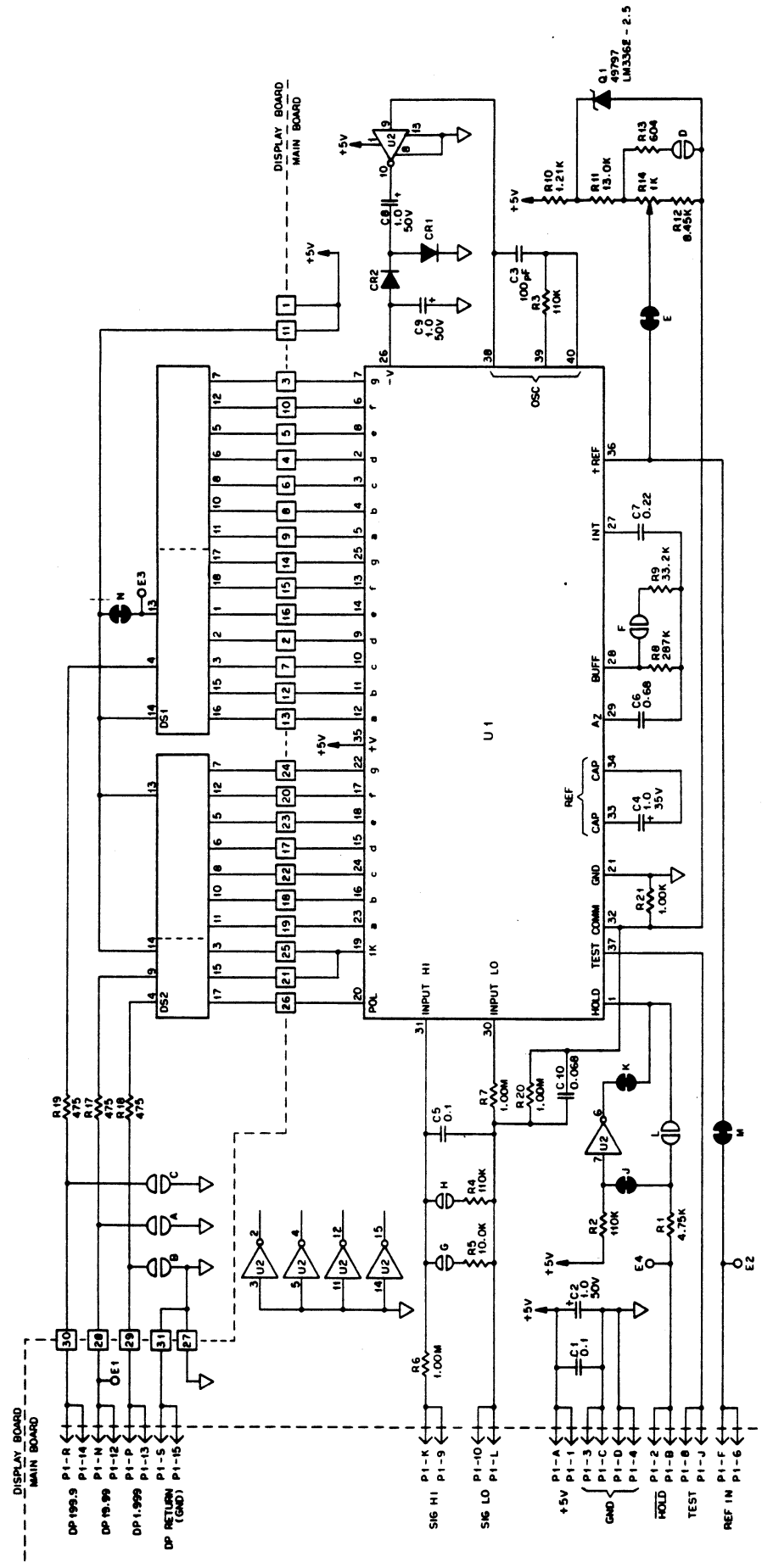


TABLE I

DECIMAL PT.	A	B	C	D	E	F	G	H
DP 1	1.999	⊖	⊖	⊖	⊖	⊖	⊖	⊖
DP 2	19.99	⊖	⊖	⊖	⊖	⊖	⊖	⊖
DP 3	199.9	⊖	⊖	⊖	⊖	⊖	⊖	⊖

TABLE II

MODEL	RANGE	D	E	F	G	H
215-2	200mV	⊖	⊖	⊖	⊖	⊖
215-3	2V	⊖	⊖	⊖	⊖	⊖
215-4	20V	⊖	⊖	⊖	⊖	⊖
215-5	200V	⊖	⊖	⊖	⊖	⊖

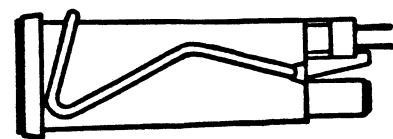
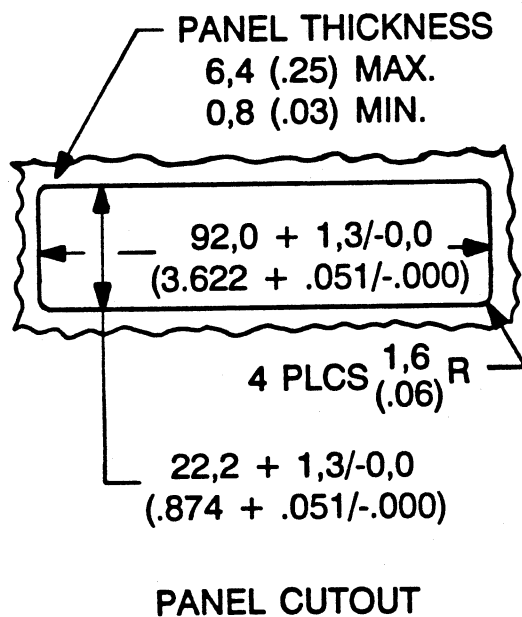
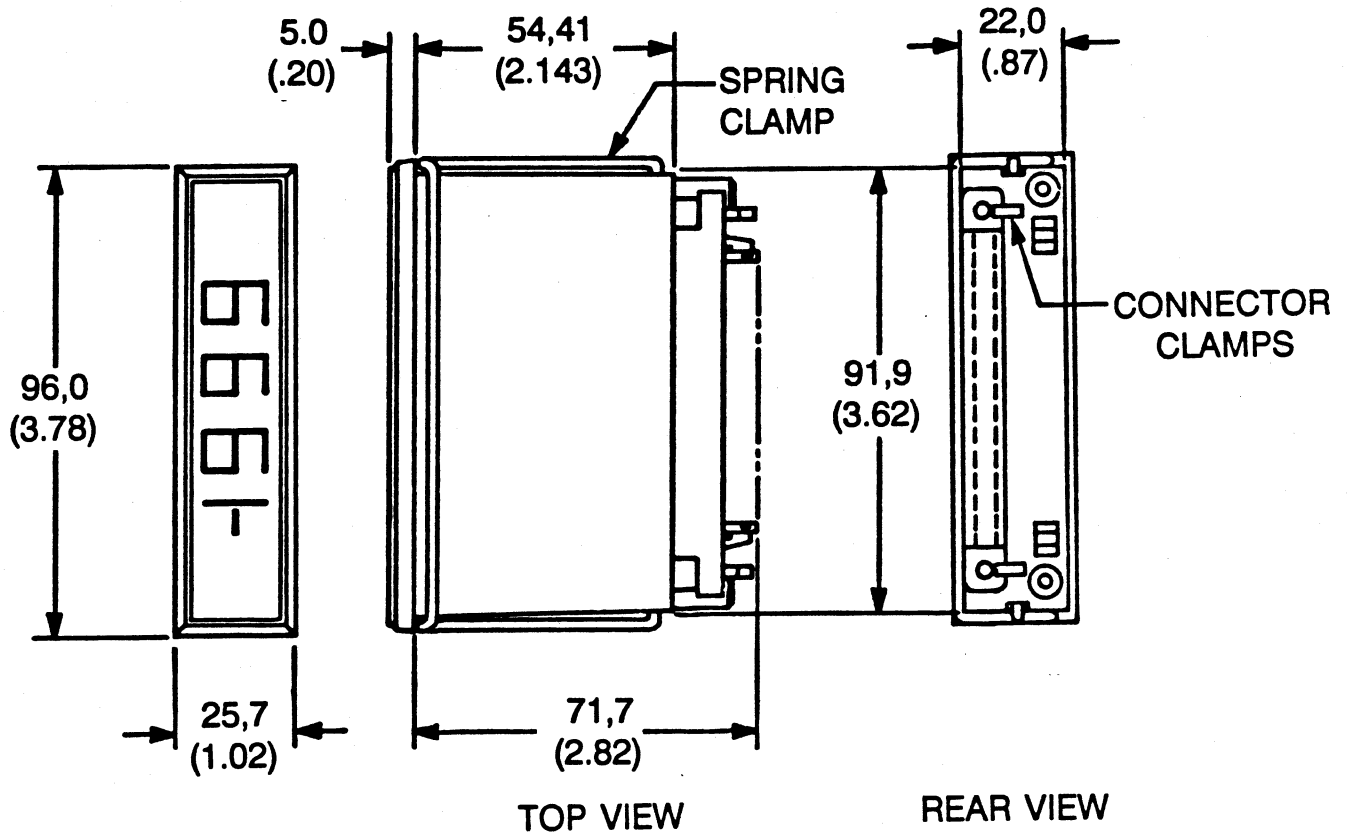
⊖ OPEN
⊖ CLOSE

Figure 3-2 Schematic Diagram

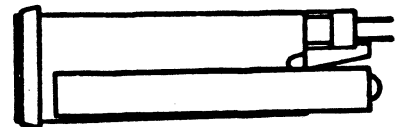
4.0 MECHANICAL

4.1 CASE AND PANEL CUTOUT DIMENSIONS

NOTE: Dimensions are in millimeters $\pm 0,25\text{mm}$ and inches are in () $\pm .01$ in.



SIDE VIEW
SPRING CLAMP



SIDE VIEW
U-CLAMP

4.2 CONNECTOR TYPES

SAE
ELCO

SCA 15S/1-2
00-6007-015-940-012

4.3 CONNECTOR PIN ASSIGNMENTS

1/A	+5VDC	9/K	SIG HI IN
2/B	HOLD	10/L	SIG LO IN
3/C	GND	11/M	SPARE
4/D	GND	12/N	DP 1X.XX
5/E	SPARE	13/P	DP 1.XXX
6/F	REF IN	14/R	DP 1XX.X
7/H	SPARE	15/S	DP RETURN (GND)
8/J	TEST		

4.4 PHYSICAL

Weight	145g (5 oz)
Case Material	94V-O UL-rated polycarbonate
Bezel (W x H x T)	96 x 25.7 x 5mm
Depth behind bezel, with connector	72mm
Panel Cutout (W x H)	92 x 22.2mm

Warranty/Disclaimer

NEWPORT ELECTRONICS, INC. warrants this unit to be free of defects in materials and workmanship for a period of one (1) year from date of purchase. In addition to NEWPORT's standard warranty period, NEWPORT ELECTRONICS will extend the warranty period for one (1) additional year if the warranty card enclosed with each instrument is returned to NEWPORT.

If the unit should malfunction, it must be returned to the factory for evaluation. NEWPORT's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by NEWPORT, if the unit is found to be defective it will be repaired or replaced at no charge. NEWPORT's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of being damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of NEWPORT's control. Components which wear are not warranted, including but not limited to contact points, fuses, and triacs.

NEWPORT is pleased to offer suggestions on the use of its various products. However, NEWPORT neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by NEWPORT, either verbal or written. NEWPORT warrants only that the parts manufactured by it will be as specified and free of defects. NEWPORT MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive and the total liability of NEWPORT with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall NEWPORT be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by NEWPORT is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, NEWPORT assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and additionally, purchaser will indemnify NEWPORT and hold NEWPORT harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

Return Requests/Inquiries

Direct all warranty and repair requests/inquiries to the NEWPORT Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO NEWPORT, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM NEWPORT'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting NEWPORT:

1. P.O. number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult NEWPORT for current repair charges. Have the following information available BEFORE contacting NEWPORT:

1. P.O. number to cover the COST of the repair,
2. Model and serial number of product, and
3. Repair instructions and/or specific problems relative to the product.

NEWPORT's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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For immediate technical or application assistance please call:

1-800-6397678®
1-800-NEWPORT

Newport Electronics, Inc.
2229 South Yale Street • Santa Ana, CA • 92704 • U.S.A.
TEL: (714) 540-4914 • FAX: (203) 968-7311
Toll Free: 1-800-639-7678 • www.newportUS.com • e-mail: info@newportUS.com
ISO 9001 Certified

Newport Technologies, Inc.
976 Bergar • Laval (Quebec) • H7L 5A1 • Canada
TEL: (514) 335-3183 • FAX: (514) 856-6886
Toll Free: 1-800-639-7678 • www.newport.ca • e-mail: info@newport.ca

Newport Electronics, Ltd.
One Omega Drive • River Bend Technology Centre
Northbank, Irlam • Manchester M44 5BD • United Kingdom
Tel: +44 161 777 6611 • FAX: +44 161 777 6622
Toll Free: 0800 488 488 • www.newportuk.co.uk • e-mail: sales@newportuk.co.uk

Newport Electronics B.V.
Postbus 8034 • 1180 LA Amstelveen • The Netherlands
TEL: +31 20 3472121 • FAX: +31 20 6434643
Toll Free: 0800 0993344 • www.newport.nl • e-mail: info@newport.nl

Newport Electronics spol s.r.o.
Frystatska 184, 733 01 Karviná • Czech Republic
TEL: +420 59 6311899 • FAX: +420 59 6311114
Toll Free: 0800-1-66342 • www.newport.cz • e-mail: info@newport.cz

Newport Electronics GmbH
Daimlerstrasse 26 • D-75392 Deckenpfronn • Germany
TEL: 49 7056 9398-0 • FAX: 49 7056 9398-29
Toll Free: 0800 / 6397678 • www.newport.de • e-mail: sales@newport.de

Newport Electronique S.A.R.L.
11, rue Jacques Cartier • 78280 Guyancourt • France
TEL: +33 1 61 37 29 00 • FAX: +33 1 30 57 54 27
Toll Free: 0800 466 342 • www.newport.fr • e-mail: sales@newport.fr

Mexico and Latin America
FAX: 001 (203) 359-7807
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