ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *Newport Q9040-00R3* at our website: *Click HERE*

QUANTA®

QXXXXR RTD HIGH RESOLUTION
QXXXXO 2- OR 4-WIRE RESISTANCE
DIGITAL PANEL METER

10294ML-02

© Copyright 1996, NEWPORT ELECTRONICS, INC. All rights reserved.

This documentation may not be copied, photocopied, reproduced, translated, or reduced to any electronic medium or machine-readable form, in whole or in part, without prior written consent of NEWPORT ELECTRONICS, INC.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

QUANTA CROSS REFERENCE

CONFIGURED MODEL

Q □ □ □ □ □

							MODULE NO.
						DISPLAY RESOLUTION	
	2					±1999 counts (3 1/2 digits)	BQ2X
	9					±9999 counts (4 digits)	BQ9X
						DISPLAY TYPE & METER POWER	
						(LCD is only available on Q2000 models)	
		0				LED, 120 V ac (50/60 Hz)	BQ20 or BQ90
		1				LCD, 120 V ac (50/60 Hz)	BQ21
		2				LED, 240 V ac (50/60 Hz)	BQ22 or BQ92
		3				LCD, 240 V ac (50/60 Hz)	BQ23
		4				LED, 9-32 V dc (isolated)	BQ24 or BQ94
		5				LCD, 9-32 V dc (isolated)	BQ25
		6				LED, 5 V dc	BQ26 or BQ96
		7				LCD, 5 V dc	BQ27
		8				LED, 24 V ac	BQ28 or BQ98
		9				LCD, 24 V ac	BQ29
		A				LED, 26-56 V dc (isolated)	BQ2A or BQ9A
		B				LCD, 26-56 V dc (isolated)	BQ2B
						ANALOG OUTPUTS	
			0			±1 or ±2 V (standard, all models)	None
			1			0-5 V dc	BA01
			2			0-10 V dc	BA01
			3			0-1 mA, source or sink	BA01
			4			4-20 mA, source or sink	BA01
			5			4-20 mA, sink (high-compliance)	BA02
						CONTROL OUTPUTS	
				0		None	None
				1		Dual-setpoint 10 A relays	BDT1
				2		Proportional 4-20 mA control, source or sink, plus drive for time-proportional solid-state relay	BDP1
				3		Proportional 4-20 mA control, source or sink, plus time-proportional solid-state 2 A relay	BDP2
				4		Parallel BCD (isolated)	BDD2
				5		Single-setpoint 10 A relay	BDS1
						SIGNAL-CONDITIONER INPUTS	
					A	DC voltage	BSCA
					B	DC current	BSCA
					C	AC voltage	BSCC
					D	AC current	BSCC
					F	True RMS voltage	BSCF
					G	True RMS current	BSCF
					H	Frequency/rate	BSCH1
					J	Type J thermocouple (°C or °F)	BSCJ
					K	Type K thermocouple (°C or °F)	BSCK
					T	Type T thermocouple (°C or °F)	BSCT
					M	RTD, normal resolution (°C or °F)	BSCM
					R	RTD, high resolution (°C or °F)	BSCR
					N	3-wire ratio (potentiometer)	BSCA
					O	2- or 4-wire resistance	BSCR
					P	Process signal (e.g., 4-20 mA, 1-5 V)	BSCP
					E	Process signal plus excitation	BSCE
					S	Strain gauge/low-level input	BSCS
					Z	Prototyping	BSCZ

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

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.

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.

- 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.
- Unit mounting should allow for adequate ventilation to ensure instrument does not exceed operating temperature rating.
- Use electrical wires with adequate size to handle mechanical strain and power requirements. Install without exposing bare wire outside the connector to minimize electrical shock hazards.

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.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

CHG	ECO NO	DATE	BY	CHK
K	7328	14 MAY 92	MG	

TABLE OF CONTENTS

MAIN ASSEMBLY Q2000

1.0 Specifications 3
2.0 Mechanical Assembly and Installation 6
3.0 Power and Signal Input Connections 7
4.0 Configuration Procedure 8
5.0 Configuration Charts 9
6.0 Tests and Diagnostics 11
7.0 Main Board Connector Pin Assignments (J1) 12
8.0 Drawings 13

MAIN ASSEMBLY Q9000

9.0 Specifications 19
10.0 Mechanical Assembly and Installation 22
11.0 Power and Signal Input Connections 23
12.0 Configuration Procedure 24
13.0 Configuration Charts 25
14.0 Tests and Diagnostics 28
15.0 Main Board Connector Pin Assignments 29
16.0 Drawings 30

SIGNAL CONDITIONERS BSCR & BSCR/O

17.0 Specifications 33
18.0 Signal Input Connections 37
19.0 Tests and Diagnostics 38
20.0 Configuration Procedure 39
21.0 Configuration Charts 41
22.0 Calibration 43
23.0 Drawings 45

INSTALLATION

24.0 Digital Panel Meter Installation Instructions 47
25.0 Power Requirements and Connections 50

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

This page intentionally left blank.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

1.0 MAIN ASSEMBLY Q2000 SPECIFICATIONS

1.1 GENERAL

The Q2000 main assemblies are identified by an initial designator (BQ2) plus a power/display option numeral, zero thru nine (0-9).

The following table identifies the main assembly types:

Display Type	120 V ac	240 V ac	9-32 V dc	5 V ac	24 V ac
LED	BQ20	BQ22	BQ24	BQ26	BQ28
LCD	BQ21	BQ23	BQ25	BQ27	BQ29

The QUANTA Digital Panel Meter/Controller consists of a main assembly, signal conditioner and interface options (if ordered) all housed in a 1/8 DIN case.

The main assembly consists of a main board and a display board which is permanently attached to it at a 90 degree angle.

The main board provides mounting for the power supply, circuit components, and connectors for plugging in the signal conditioner, optional analog card, and optional controller/communications interface card (requires removal of a bypass push-on jumper).

The display board includes the analog-to-digital converter, the LED or LCD display and the push-on jumper for programming the decimal points. Decimal point programming may also be done from the main board connector (J1).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

1.2 POWER

AC Models:	24/120/240 V +10/-15% 47-63 Hz
Common Mode Voltage:	1500 Vp test (354 Vp per IEC spacing)
DC Models:	5 V ±5% (5 V return common to signal LO)
	9-32 V (300 V isolation from 9-32 V return to signal LO)
Source Impedance:	3 ohms
Ripple:	250 mV maximum
Power Consumption:	5 watts maximum

1.3 DISPLAY

LED:	14.2 mm (0.56 in), 7-segment ligh emitting diode
Lens color:	Red
LCD:	12.7 mm (0.50 in), 7-segment liquid crystal
Lens color:	Clear
Range:	0 to ±1999
Overload Indication:	Three least significant digits blanked, "1" or "-1" displayed

1.4 CONVERSION

Technique:	auto-zero, dual slope, average value
Signal Integration Period:	100 ms, nominal
Reading Rate:	2.5/s, nominal

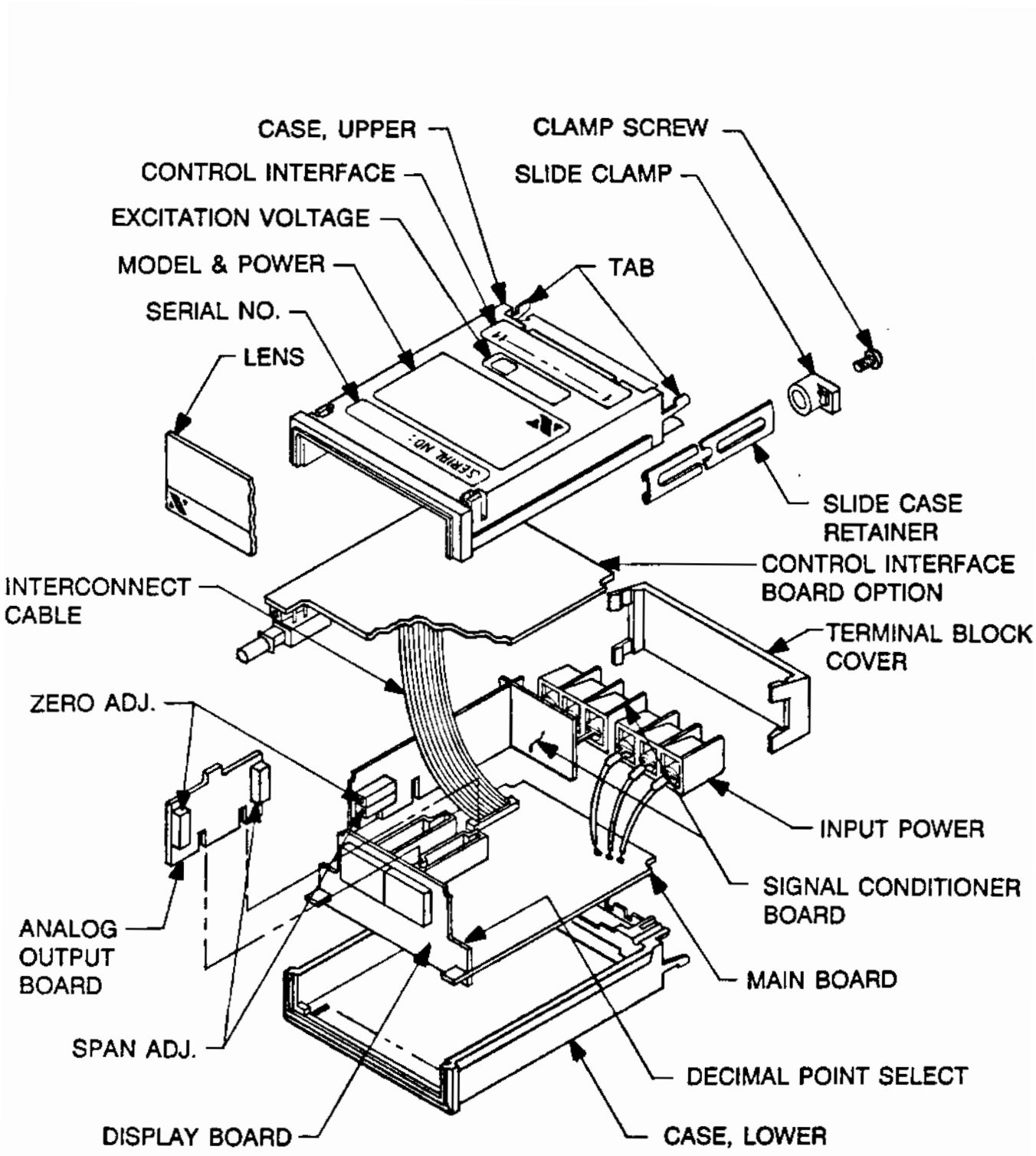
1.5 ENVIRONMENTAL

Operating Temperature (Ambient):	0-60°C
Storage Temperature:	-40 to 85°C
Humidity:	To 95% RH, non-condensing, 0-40°C

1.6 MECHANICAL

Case Material:	UL-rated 94V-0, polycarbonate
Weight:	0.57 kg (with interface board)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



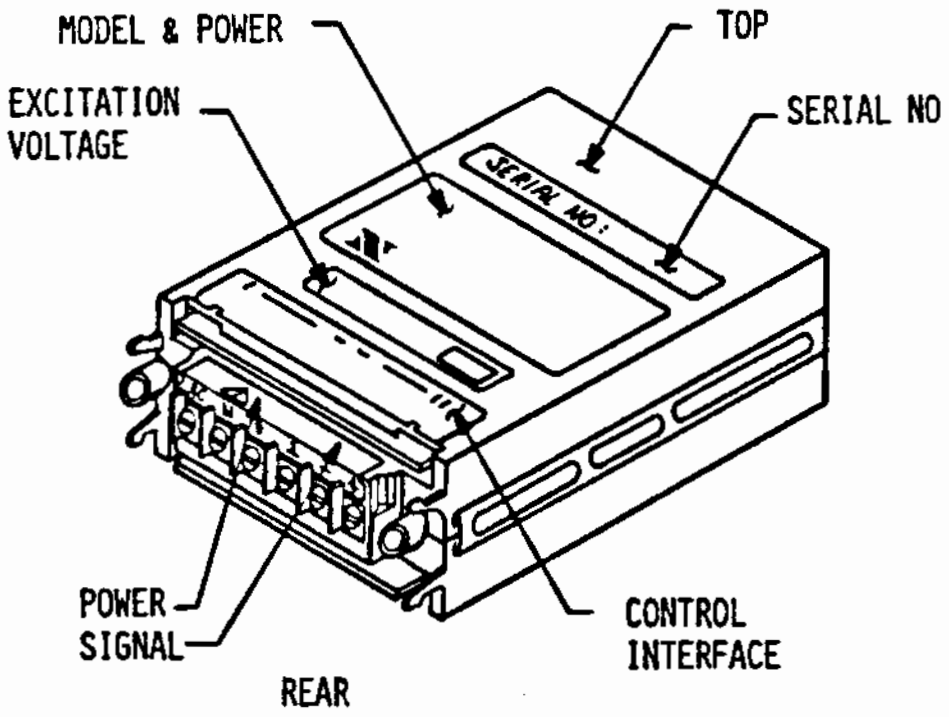
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.0 MECHANICAL ASSEMBLY & INSTALLATION

2.1 PANEL MOUNTING PROCEDURE (SEE FIGURE 1)

1. Remove the main board edge connector (J1), if installed.
2. Remove the interface board connector (J2), if installed.
3. Loosen two clamp screws on the rear of the case enough to rotate the two slide clamps.
4. Slide the two slide retainers toward the rear of the case and remove them.
5. From the front of the panel, insert the meter into the panel cutout.
6. Slide the slide retainers back onto the case and push up tightly against the rear of the panel.
7. Rotate the slide clamps back into their original position and tighten enough to hold the case in place. Overtightening can break the clamps.
8. Install any connectors removed.

2.2 LABELS (SEE FIGURE 2)



NOTE: READ LABELS FROM THE REAR

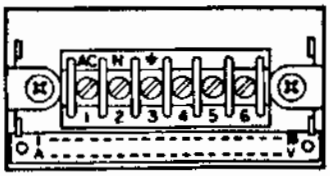
FIGURE 2. LABEL PLACEMENT

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

3.0 POWER & SIGNAL INPUT CONNECTIONS

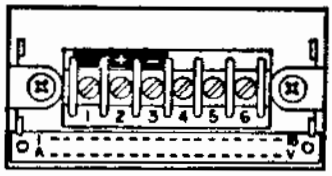
> **WARNING: Incorrect power input can damage your QUANTA PANEL METER**

3.1 POWER CONNECTIONS



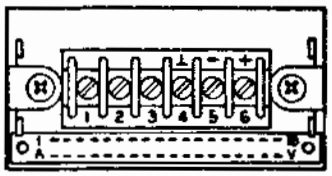
REAR TERMINAL VIEW

Terminal Connection	AC Versions	Wire Color
1	AC power HI	Black
2	AC power LO (neutral)	White
3	AC power GND	Green



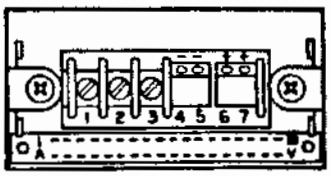
Terminal Connection	DC Versions
1	No connection
2	DC power +
3	DC power - (return)

3.2 SIGNAL INPUT CONNECTIONS



REAR TERMINAL VIEW

Terminal Connection	6 Terminal Versions Signal
4	Analog GND
5	Signal LO
6	Signal HI



Terminal Connection	7 Terminal Versions Signal
4	-E (Excitation return)
5	-S (Signal LO input)
6	+S (Signal HI input)
7	+E (Excitation output)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4.0 CONFIGURATION PROCEDURE

This procedure is used to set the decimal point of the display and interface board signal bypass selections for the configuration of the QUANTA Q2XXXX display and power options (BQ20 through BQ29).

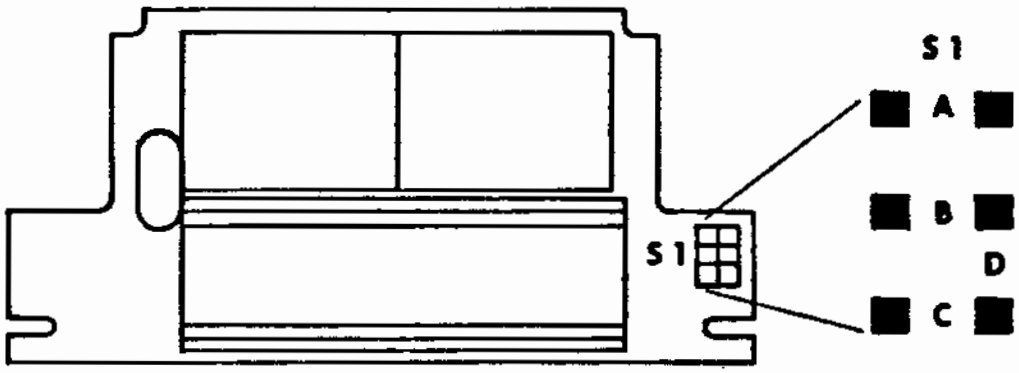
The main assembly can be configured using the push-on jumpers provided or already positioned on the pin-forests. Pin forest designations are shown at the top of each page of the configuration charts.

The main board must be configured for decimal point selection (including no DP) and for the interface bus if no option card is used.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

5.0 CONFIGURATION CHARTS

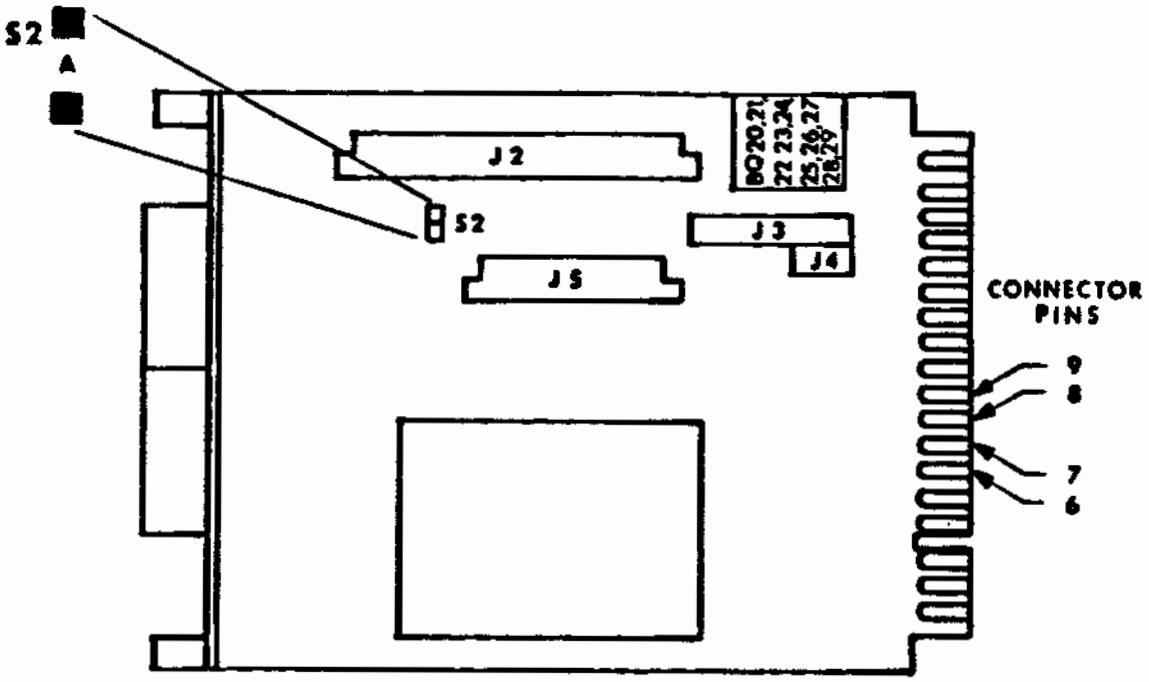
5.1 DECIMAL POINT SELECTION



1. Read the configuration procedures on the preceding page.		
2. Select the desired configuration from the chart below. Remove all jumpers not used and install the appropriate push-on jumpers as indicated.		
Decimal Point Selection	S1	Alternate DP Selection Using Main Assembly Bd Connector (J1)
Decimal Point (1.999)	A	Connect J1-K/9 to J1-6
Decimal Point (19.99)	B	Connect J1-J/8 to J1-6
Decimal Point (199.9)	C	Connect J1-H/7 to J1-6
No Decimal Point (1999)	D	No Connection

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

5.2 INTERFACE BOARD SIGNAL BYPASS SELECTION



Step 1: Check your QUANTA part number for a zero (0) in the following position; Q2XX0X. If there is a zero (0) in that position, interface board signal bypass is required.	
Step 2: Remove all push-on jumpers not used in the desired configuration(s).	
Step 3: Select the desired configuration from the chart below, then install the push-on jumpers indicated.	
Interface Board Signal Configuration	S2
Interface Board Signal Bypass	A

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

6.0 TESTS & DIAGNOSTICS

6.1 TEST CONFIGURATION REQUIREMENTS

The QUANTA main assembly is designed to function with a signal conditioner board as a minimum configuration. There is no provision for testing a main assembly alone.

6.2 SIGNAL INPUT REQUIREMENTS

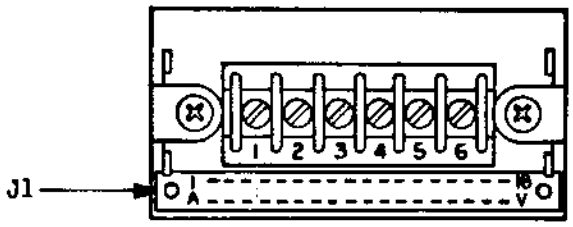
Signal input requirements for your configuration are identified in the signal conditioner section of this manual.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

7.0 MAIN BOARD CONNECTOR PINOUTS (J1)

(Left to right, looking at rear of case)

Connection	Function	
A - 1	Spare	
B	Oscillator	40 kHz
2	-8.2 V dc	Analog power
C - 3	Spare	
D	+ Pol (sign)	+ Polarity sign
4	$\overline{\text{HOLD}}$	LED version only
E - 5	Spare	
F	Buffer	Integrator output
6	Digital Ground	
H - 7	199.9 (Decimal point)	Use with pin 6
J - 8	19.99 (Decimal point)	Use with pin 6
K - 9	1.999 (Decimal point)	Use with pin 6
L - 10	TEST (LED version only)	Use with pin M/11
M - 11	+5 V dc	Analog & digital power
N - 12	Analog output	Standard 1 mV/count
P - 13	Spare	
R - 14	Spare	Used with H & S options - Excitation sense
S - 15	Analog Ground	
T - 16	Analog Option - Return	Used with analog option
U	Analog Option - Out	Used with analog option
17	+30 V dc	Unregulated power
V - 18	Spare	Used with S option + Excitation sense
-	Indicates common pin. 50 mA maximum power available from all internal sources.	

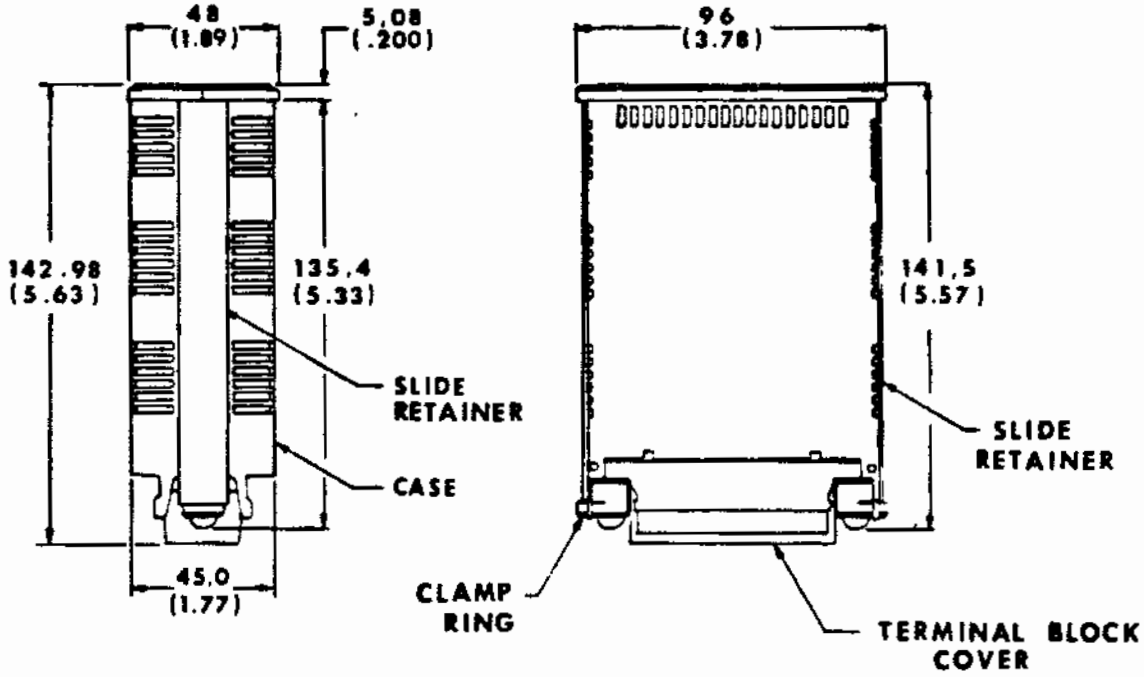


REAR TERMINAL VIEW

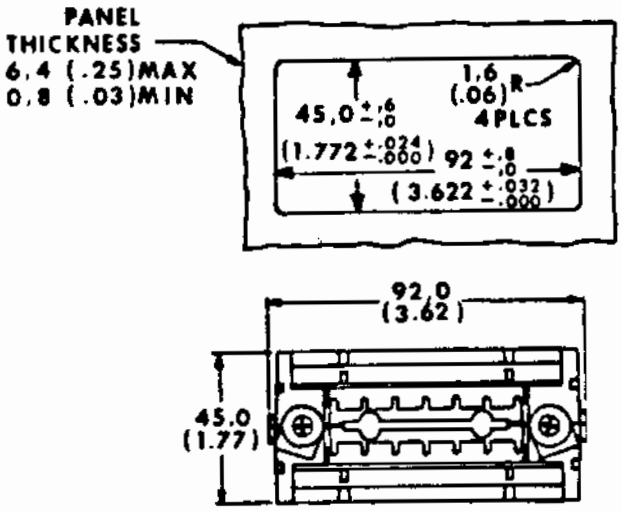
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

8.0 DRAWINGS

8.1 DIMENSIONS



NOTE : DIMENSIONS IN MILLIMETERS ±,25 MM
AND INCHES IN ( ) ±.01 IN

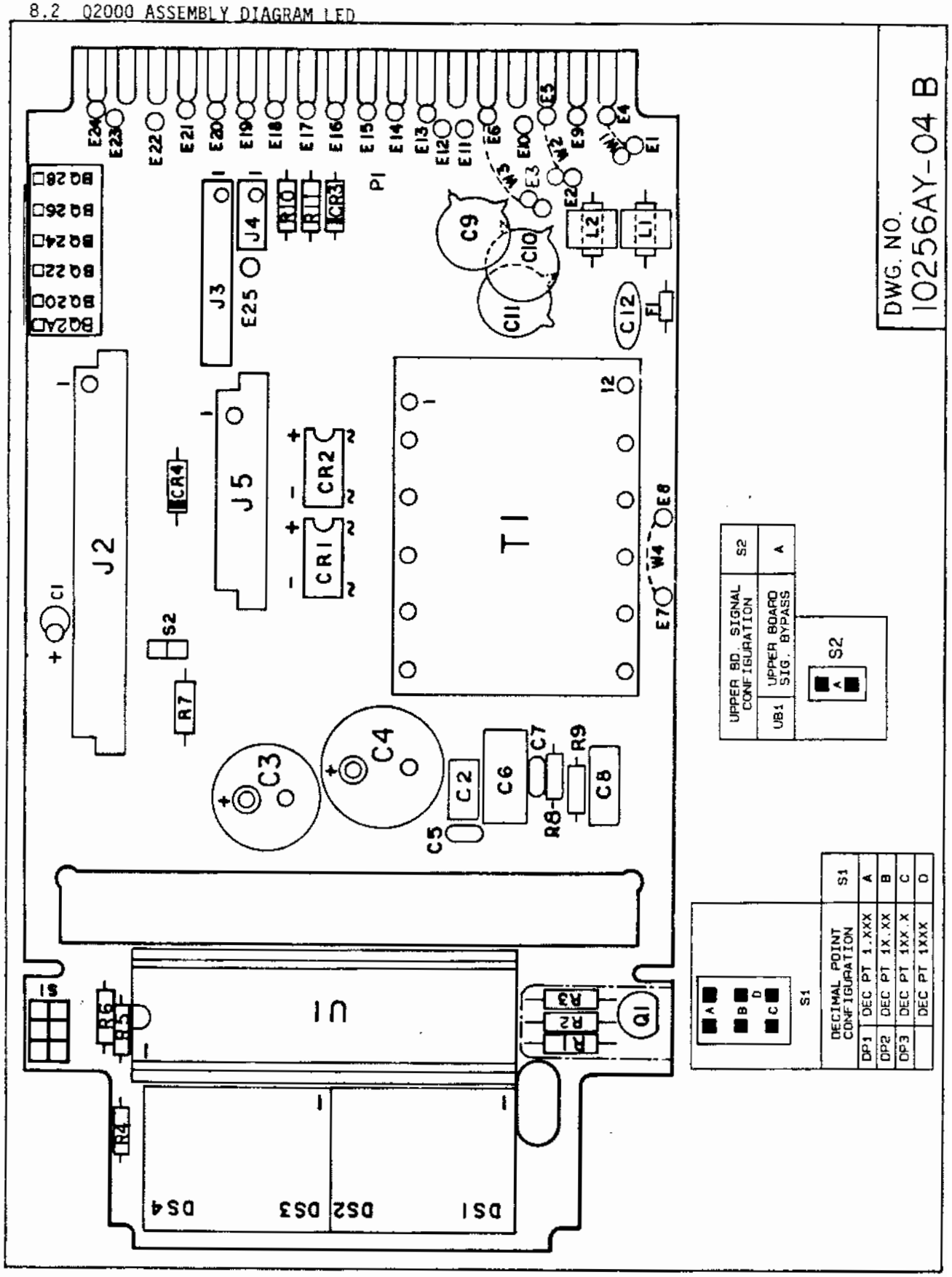


REAR VIEW

(TERMINAL BLOCK COVER AND BEZEL
NOT SHOWN FOR CLARITY)
SLIDE CLAMPS ROTATED AND SLIDE RETAINERS
REMOVED AS SHOWN FOR INSTALLATION .

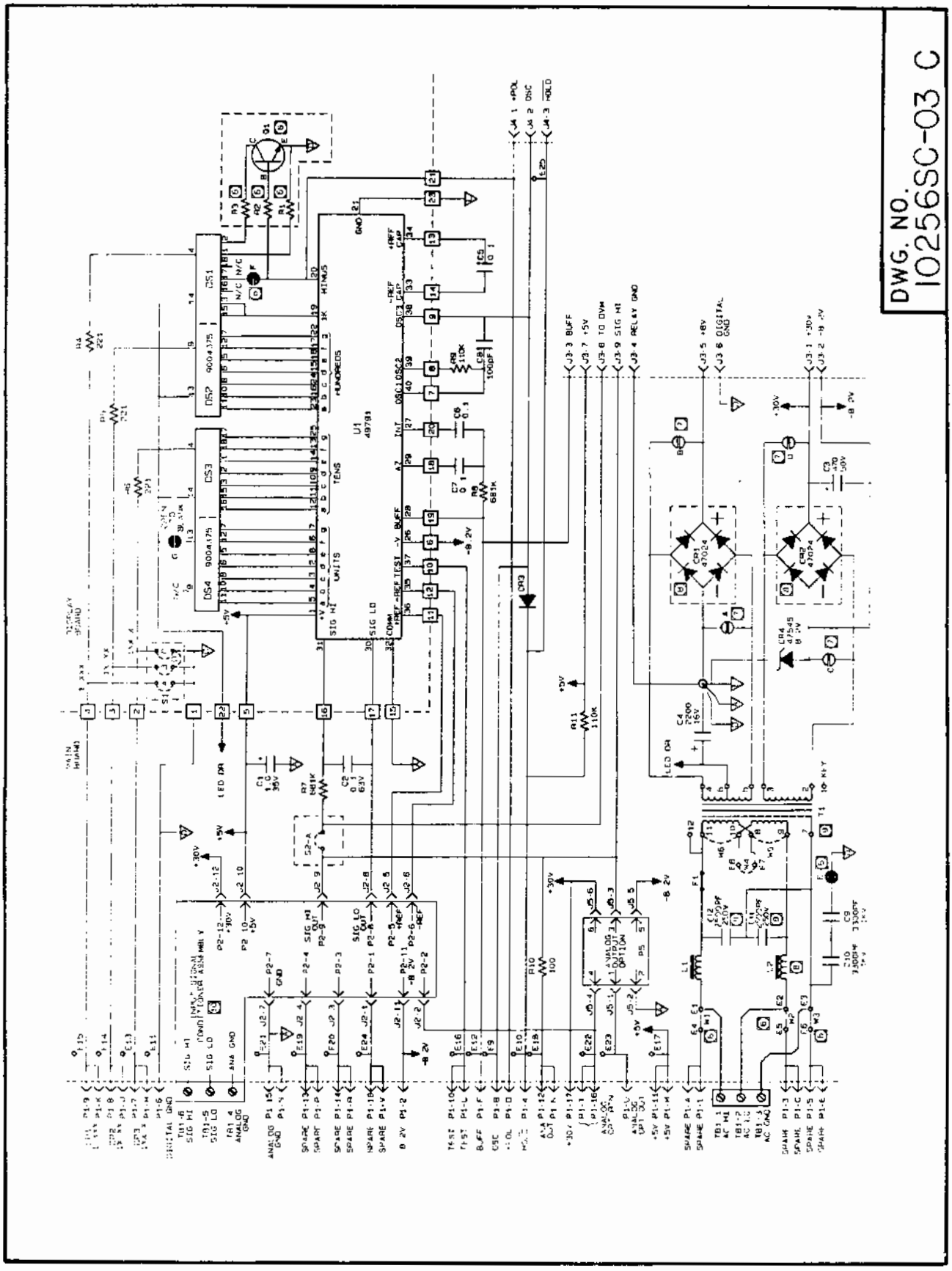
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

8.2 Q2000 ASSEMBLY DIAGRAM LED



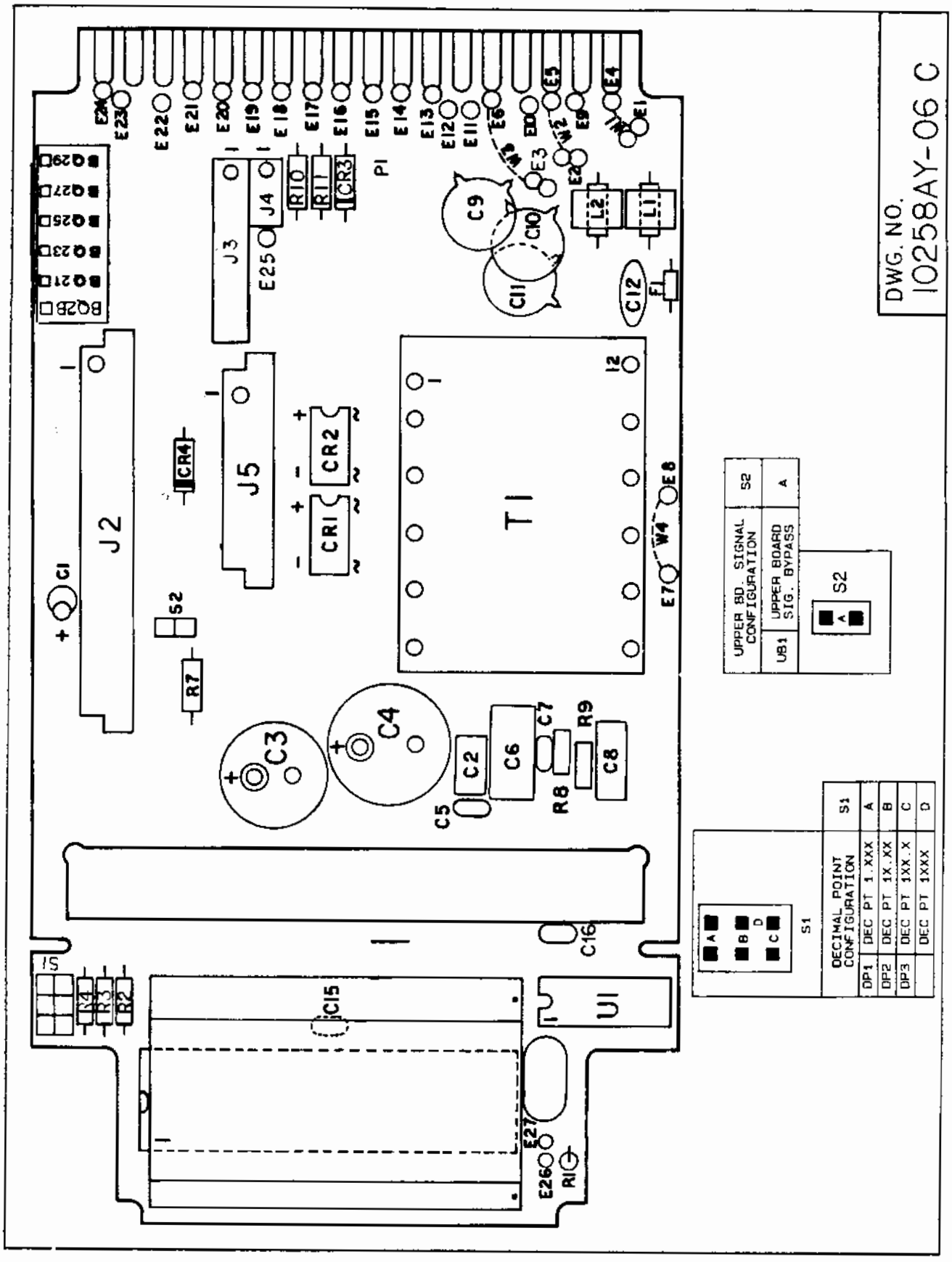
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

8.3 Q2000 SCHEMATIC DIAGRAM LED



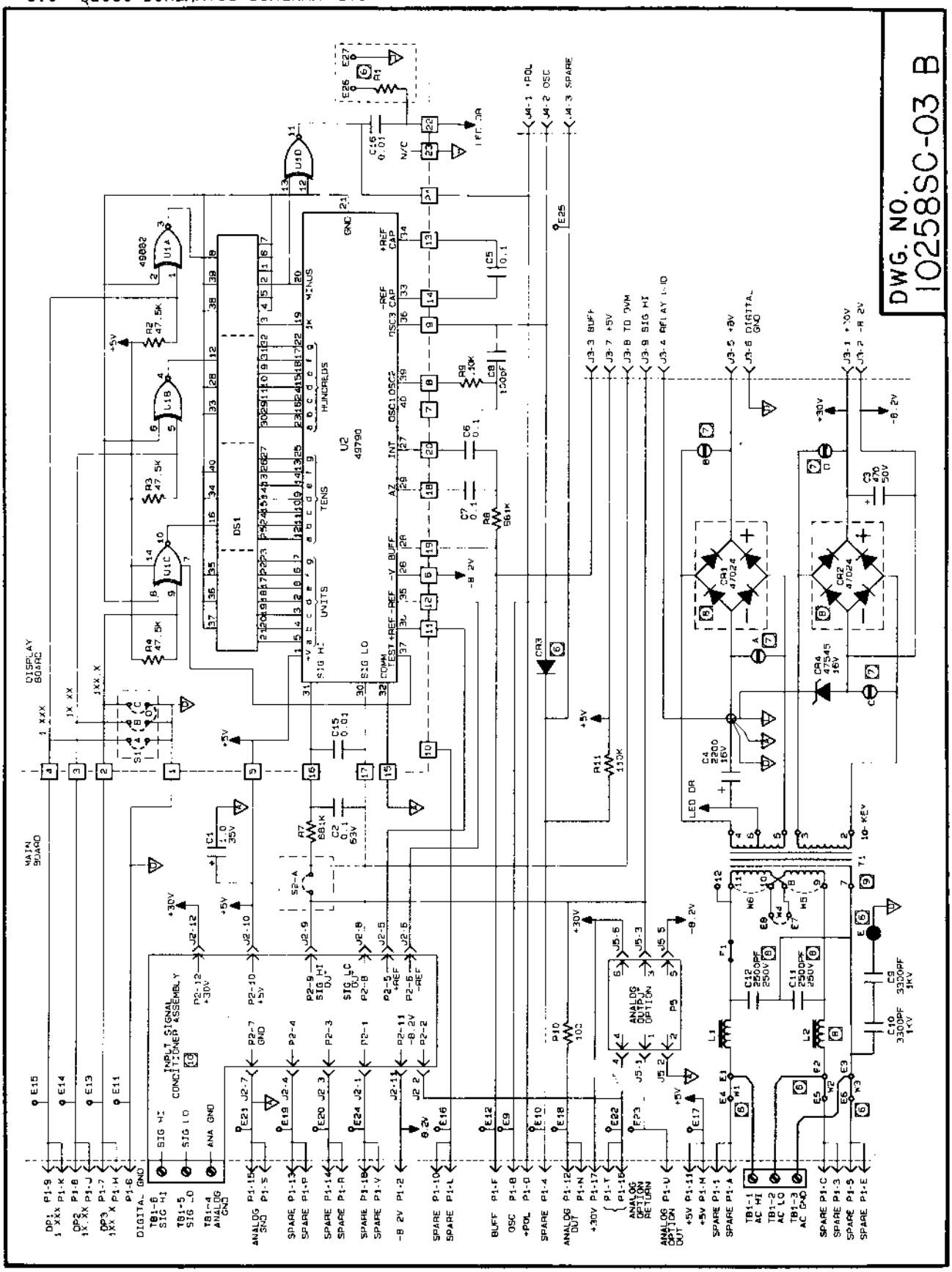
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

8.4 Q2000 ASSEMBLY DIAGRAM LCD



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

8.5 Q2000 SCHEMATIC DIAGRAM LCD



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

NOTES:

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

9.0 MAIN ASSEMBLY Q9000 SPECIFICATIONS

9.1 GENERAL

QUANTA Q9000 main assemblies are identified by an initial designator (BQ9) plus a power/display option numeral: 0, 2, 4, 6 or 8.

The following table identifies the main assembly types:

Display Type	120 V ac	240 V ac	9-32 V dc	5 V ac	24 V ac
LED	BQ90	BQ92	BQ94	BQ96	BQ98

The QUANTA Digital Panel Meter/Controller consists of a main assembly, signal conditioner and interface options (if ordered) all housed in a 1/8 DIN case.

The main assembly consists of a main board and a display board which is permanently attached to it at a 90 degree angle.

The main board provides mounting for the power supply, circuit components, and connectors for plugging in the signal conditioner, optional analog card, and optional controller/communications interface card (requires removal of a bypass push-on jumper).

The display board includes the analog-to-digital converter, the LED display and the push-on jumper for programming the decimal points. Decimal point programming may also be done from the main board connector (J1).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

9.2 POWER

AC Models:	24/120/240 V +10/-15% 47-63 Hz
Common Mode Voltage:	1500 Vp test (354 Vp per IEC spacing)
DC Models:	5 V ±5% (5 V return common to signal LO)
	9-32 V (300 V isolation from 9-32 V return to signal LO)
Source Impedance:	3 ohms
Ripple:	250 mV maximum
Power Consumption:	5 watts maximum

9.3 DISPLAY

LED:	14.2 mm (0.56 in), 7-segment light emitting diode
Lens color:	Red
Range:	0 to ±9999, digits flash form 10K-20K counts
Overload Indication:	Four digits flash zeros at 20K and above

9.4 CONVERSION

Technique:	Auto-zero, dual slope, average value
Signal Integration Period:	100 ms, nominal
Reading Rate:	2.5/s, nominal

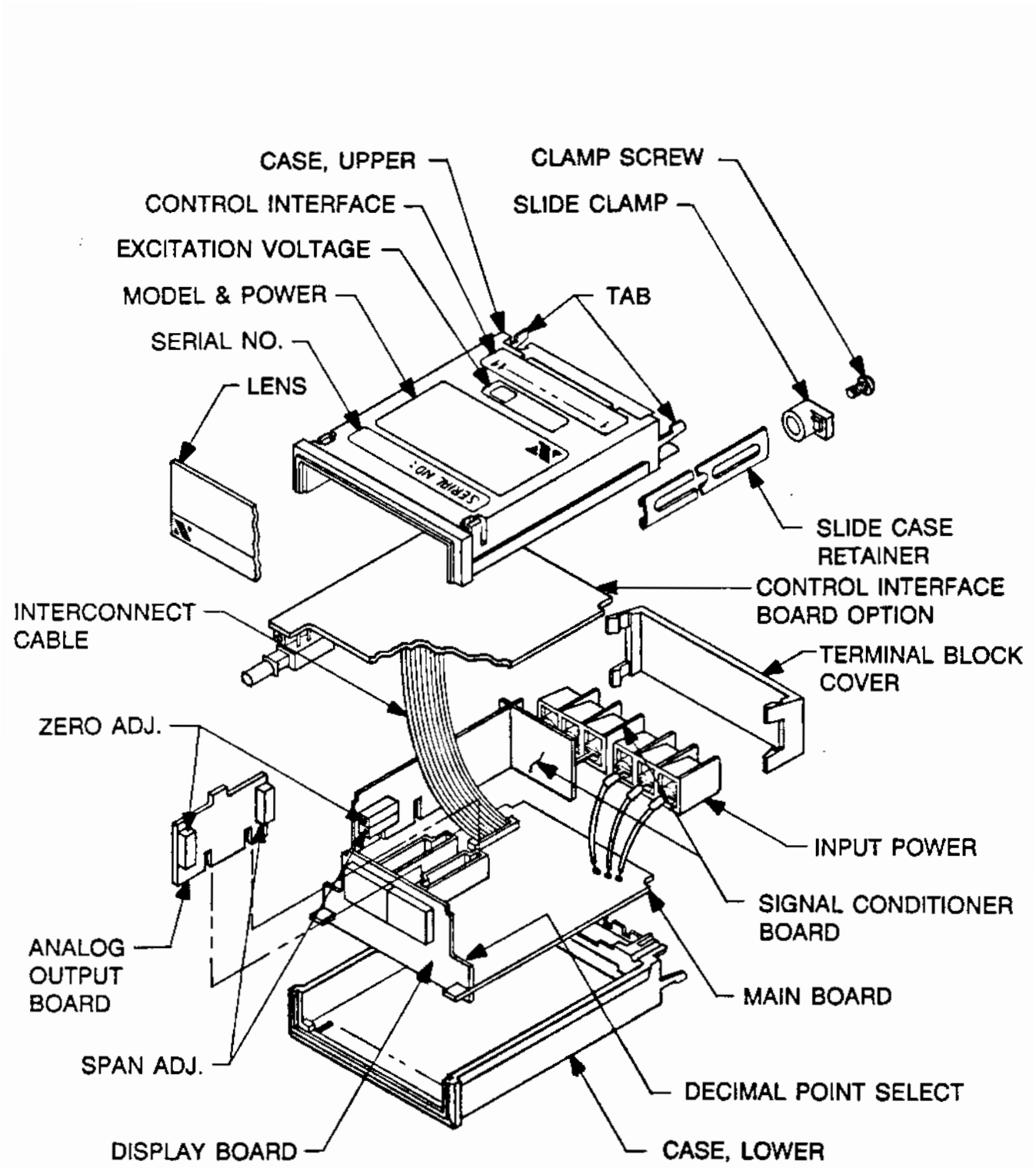
9.5 ENVIRONMENTAL

Operating Temp. (Ambient):	0 to 60°C
Storage Temp.:	-40 to 85°C
Humidity:	To 95% RH, non-condensing, 0-40°C

9.6 MECHANICAL

Case Material:	UL-rated 94V-0, polycarbonate
Weight:	0.57 kg (with interface board)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



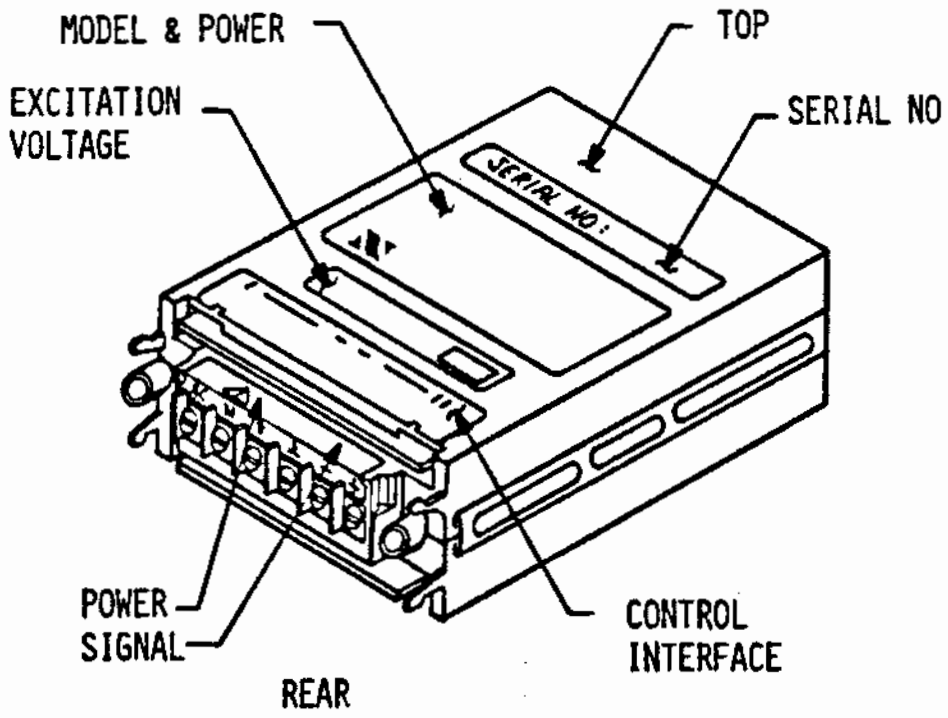
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

10.0 MECHANICAL ASSEMBLY & INSTALLATION

10.1 PANEL MOUNTING PROCEDURE (SEE FIGURE 3)

1. Remove the main board edge connector (J1), if installed.
2. Remove the interface board connector (J2), if installed.
3. Loosen two clamp screws on the rear of the case enough to rotate the two slide clamps.
4. Slide the two slide retainers toward the rear of the case and remove them.
5. From the front of the panel, insert the meter into the panel cutout.
6. Slide the slide retainers back onto the case and push up tightly against the rear of the panel.
7. Rotate the slide clamps back into their original position and tighten enough to hold the case in place. Overtightening can break the clamps.
8. Install any connectors removed.

10.2 LABELS (SEE FIGURE 4)



NOTE: READ LABELS FROM THE REAR

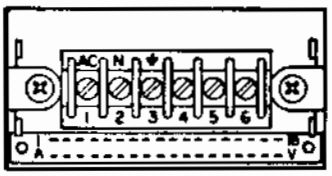
FIGURE 4. LABEL PLACEMENT

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

11.0 POWER & SIGNAL INPUT CONNECTIONS

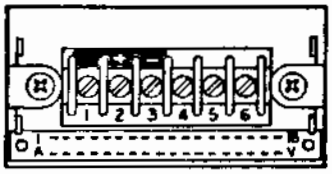
> **WARNING: Incorrect power input can damage your QUANTA PANEL METER.**

11.1 POWER CONNECTIONS



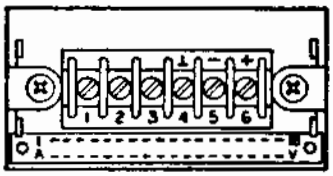
REAR TERMINAL VIEW

Terminal Connection	AC Versions	Wire Color
1	AC power HI	Black
2	AC power LO (neutral)	White
3	AC power GND	Green



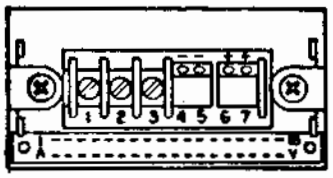
Terminal Connection	DC Versions
1	No connection
2	DC power +
3	DC power - (return)

11.2 SIGNAL INPUT CONNECTIONS



REAR TERMINAL VIEW

Terminal Connection	6 Terminal Versions Signal
4	Analog GND
5	Signal LO
6	Signal HI



Terminal Connection	7 Terminal Versions Signal
4	-E (Excitation return)
5	-S (Signal LO input)
6	+S (Signal HI input)
7	+E (Excitation output)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

12.0 CONFIGURATION PROCEDURE

This procedure is used to set the decimal point of the display and interface board signal bypass selections for the configuration of the QUANTA Q9XXXX display and power options (BQ90 through BQ98).

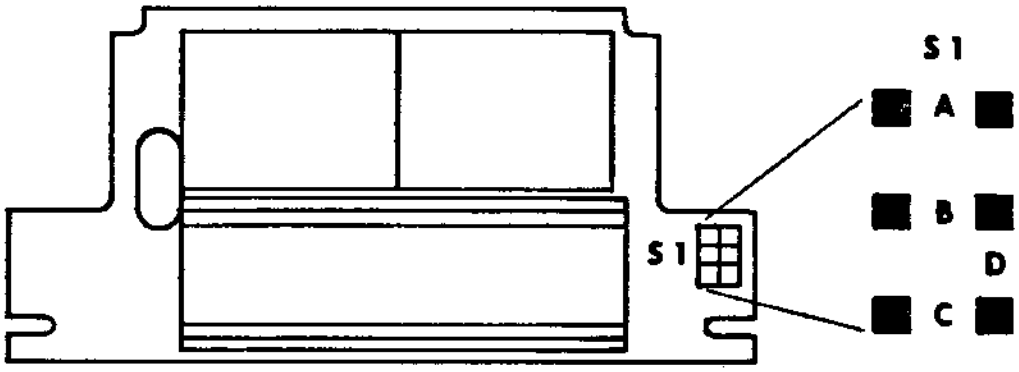
The main assembly can be configured using the push-on jumpers provided or already positioned on the pin forests. Pin-forest designations are shown at the top of each configuration chart.

The main board must be configured for decimal point selection (including no DP), reference voltage, and for the interface bus if no option card is used.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

13.0 CONFIGURATION CHARTS

13.1 DECIMAL POINT SELECTION



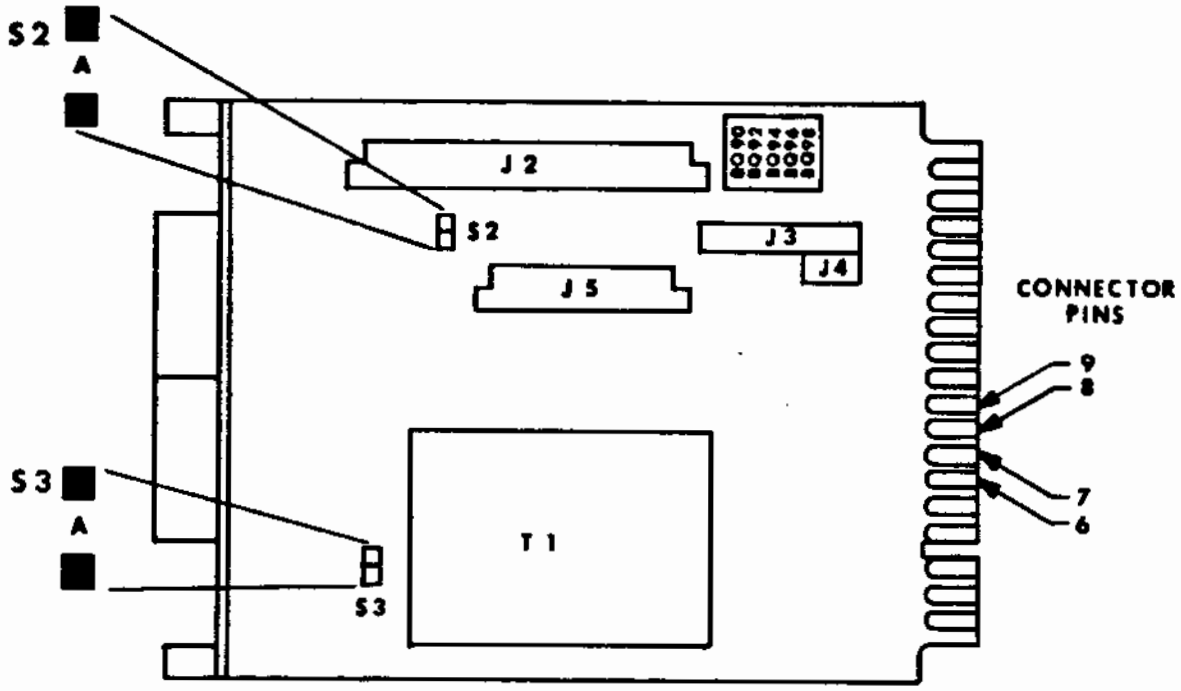
1. Read the configuration procedures on the preceding page.

2. Select the desired configuration from the chart below. Remove all jumpers not used and install the appropriate push-on jumpers as indicated.

Decimal Point Selection	S1	Alternate DP Selection Using Main Assembly Bd Connector (J1)
Decimal Point (9.999)	A	Connect J1-K/9 to J1-6
Decimal Point (99.99)	B	Connect J1-J/8 to J1-6
Decimal Point (999.9)	C	Connect J1-H/7 to J1-6
No Decimal Point (9999)	D	No Connection

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

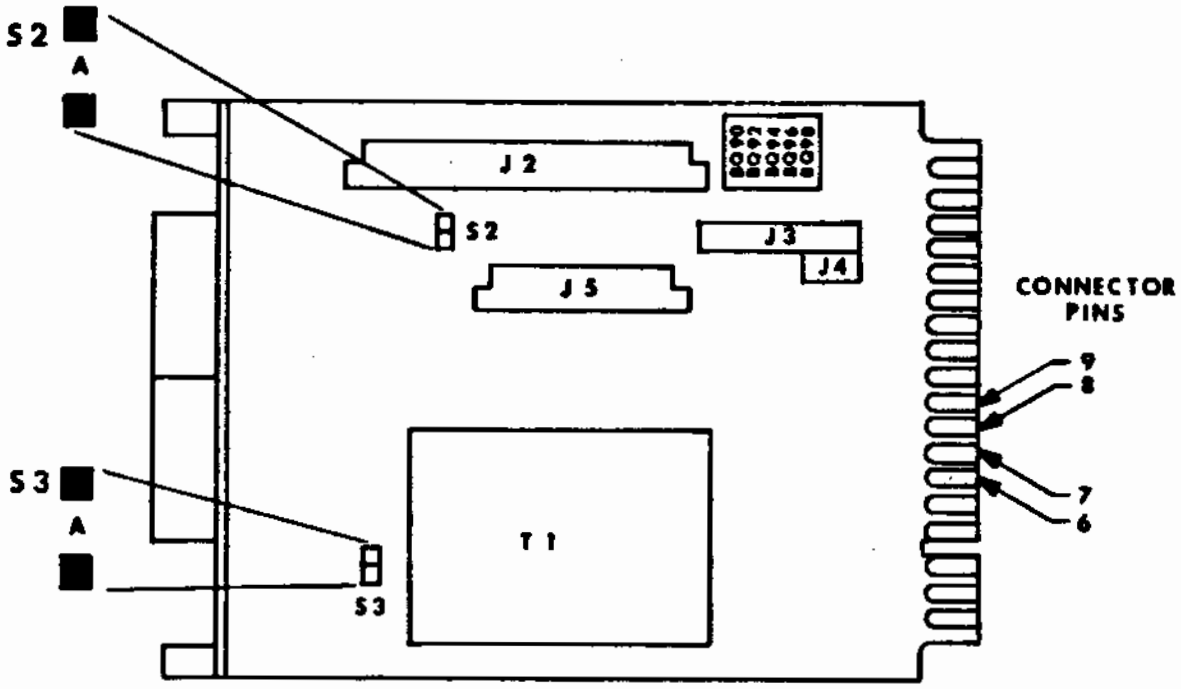
13.2 INTERFACE BOARD SIGNAL BYPASS SELECTION



Step 1:	Check your QUANTA part number for a zero (0) in the following position; Q9XX0X. If there is a zero (0) in that position, interface board signal bypass is required.	
Step 2:	Remove all push-on jumpers not used in the desired configuration(s).	
Step 3:	Select the desired configuration from the chart below, then install the push-on jumpers indicated.	
	Interface Board Signal Configuration	S2
	Interface Board Signal Bypass	A

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

13.3 REFERENCE VOLTAGE (RV1, RV2)



Step 1: Remove all push-on jumpers not used in the desired configuration(s).		
Step 2: Select the desired configuration from the chart below, then install the push-on jumpers indicated.		
Reference Voltage Configuration		S3
RV1	1 Volt	A
RV2	2 Volts	-

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

14.0 TESTS & DIAGNOSTICS

14.1 TEST CONFIGURATION REQUIREMENTS

The QUANTA main assembly is designed to function with a signal conditioner board as a minimum configuration. There is no provision for testing a main assembly alone.

14.2 SIGNAL INPUT REQUIREMENTS

Signal input requirements for your configuration are identified in the signal conditioner section of this manual.

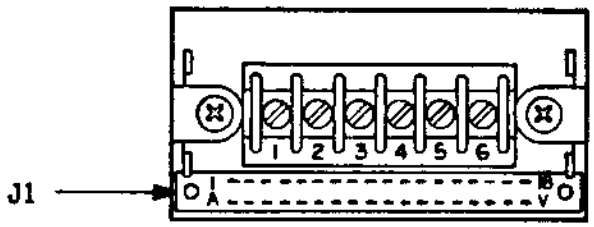
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

15.0 MAIN BOARD CONNECTOR PINOUTS (J1)

(Left to right, looking at rear of case)

Connection	Function	
A - 1	Spare	
B	Oscillator	100 kHz
2	-8.2 V dc	Analog power
C - 3	Spare	
D	+ Pol (sign)	+ Polarity sign
4	$\overline{\text{HOLD}}$	LED version only
E 5	Spare	
F	Buffer	Integrator output
6	Digital Ground	
H - 7	XXX.X (Decimal point)	Use with pin 6
J - 8	XX.XX (Decimal point)	Use with pin 6
K - 9	X.XXX (Decimal point)	Use with pin 6
L - 10	TEST	Use with pin M/11
M - 11	+5 V dc	Analog & digital power
N - 12	Analog output	Standard 1 mV/count
P 13	Spare	
R	Spare	
14	Used with H & S options - Excitation sense	
S - 15	Analog Ground	
T - 16	Analog Option - Return	Used with analog option
U	Analog Option - Out	Used with analog option
17	+30 V dc	Unregulated power
V - 18	Spare	Used with S option
	+ Excitation sense	
-	Indicates common pin	

50 mA maximum power available from all internal sources.

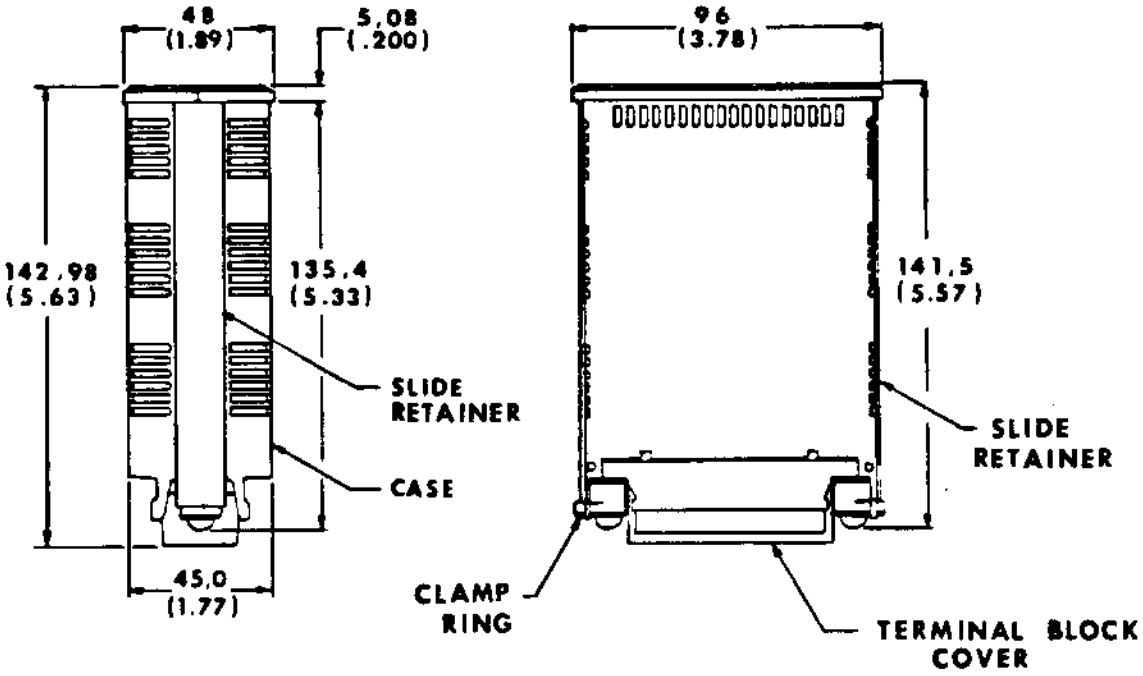


REAR TERMINAL VIEW

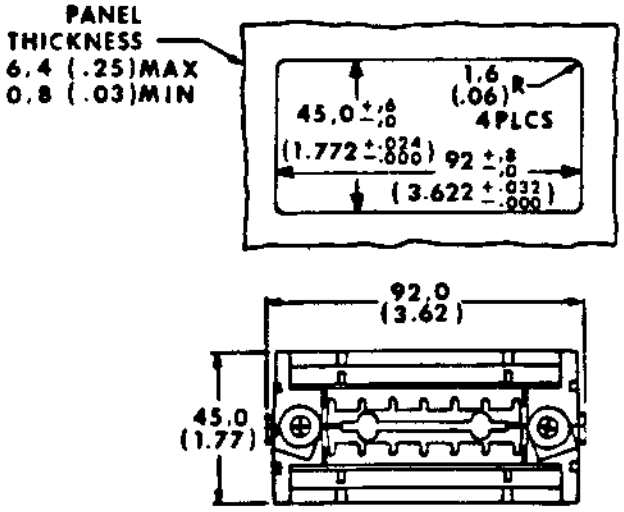
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

16.0 DRAWINGS

16.1 DIMENSIONS



NOTE : DIMENSIONS IN MILLIMETERS ± ,25 MM
AND INCHES IN ( ) ± .01 IN

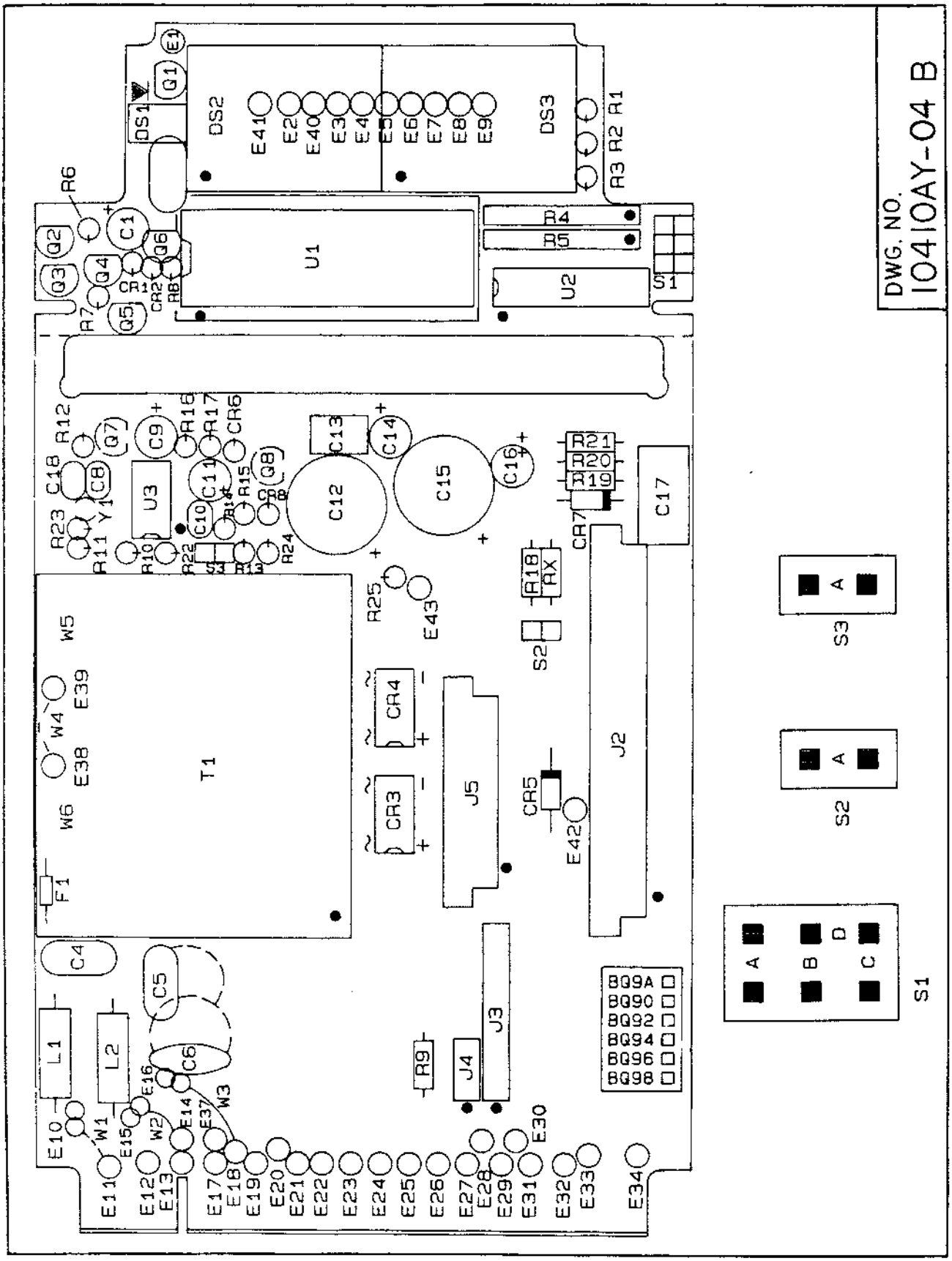


REAR VIEW

(TERMINAL BLOCK COVER AND BEZEL
NOT SHOWN FOR CLARITY)
SLIDE CLAMPS ROTATED AND SLIDE RETAINERS
REMOVED AS SHOWN FOR INSTALLATION.

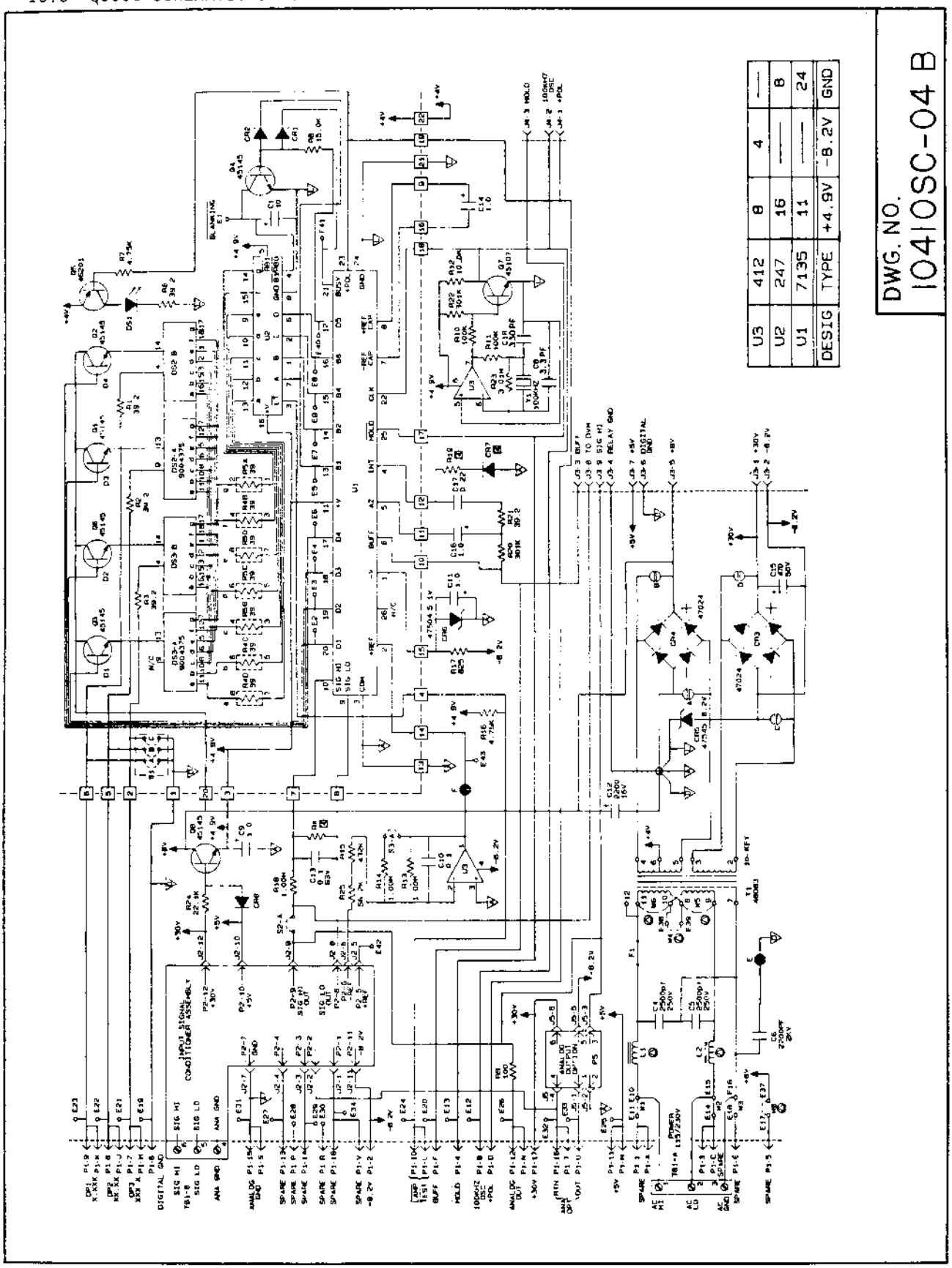
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

16.2 Q9000 MAIN ASSEMBLY LED



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

16.3 Q9000 SCHEMATIC DIAGRAM LED



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

17.0 SPECIFICATIONS: BSCR RESISTANCE TEMPERATURE DETECTOR; BSCR/O 2- OR 4-WIRE RESISTANCE

17.1 GENERAL

The basic signal conditioner board is identified as a BSCR (Q2000R or Q9000R) for resistance temperature detection. The Q2000 or Q9000 prefix is determined by the main assembly board used with the BSCR option board. When the BSCR board is configured differently, it is identified as a BSCR/O (Q20000 or Q90000), used for resistance.

17.2 BSCR: RESISTANCE TEMPERATURE DETECTOR (RTD) SIGNAL CONDITIONER

The BSCR QUANTA measures the output of 2-, 3-, or 4-wire 100 ohm platinum RTD sensors with open-sensor detection.

The Q2000R is available with 0.1^{o} resolution (^{o}C or ^{o}F). Temperature ranges available are from $-199.9^{o}C$ to $+199.9^{o}C$./$-199.9^{o}F$ to $+199.9^{o}F$ (0.1^{o}/count).

The Q9000R is available with 0.01^{o} resolution (^{o}C or ^{o}F). Temperature ranges available are from $-99.99^{o}C$ to $+99.99^{o}C$/$-99.99^{o}F$ to $+99.99^{o}F$ (0.01^{o}/count).

17.3 BSCR/O: RESISTANCE SIGNAL CONDITIONER

The BSCR/O QUANTA measures the output of 2- or 4-wire resistance sensors with open-sensor detection.

The Q20000 is available in four ranges: 19.99 ohms, 199.9 ohms, 1999 ohms and 19.99 kOhms.

The Q90000 is available in four ranges: 9.999 ohms, 99.99 ohms, 999.9 ohms and 9.999 kOhms.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

17.4 Q2000R & Q9000R: RESISTANCE TEMPERATURE DETECTOR INPUT SPECIFICATIONS

Temperature Sensor (customer-supplied)

Type	Resistance temperature
Material	Platinum
Resistance	100 ohms at 0°C
Calibration	DIN 43760 Oct. 1980 Table
Temperature Coefficient (Alpha)	0.00385 ohm/ohm/°C
Tolerance	
For Class 1	±0.15°C ±0.002 T with T = -200 to +650°C
For Class 2	±0.30°C ±0.005 T with T = -200 to +850°C
Connection Standard	2-, 3- or 4-wire configuration
Lead Resistance	20 ohm max for 3- or 4-wire input, within specified error. For 2-wire input, add 2.6°C or 4.7°F per ohm change to specified error.

Input Signal Conditioner

Configuration	Differential
Polarity	Bipolar
Zero	Adjustable ±5°C (±10°F)
Overvoltage Protection (Differential)	15 Vp
Sensor Break Detection	
Q2000R Q9000R	3 least-significant digits blanked 4 digits flash zeros
NMR at 50/60 Hz	50 dB
Common Mode	
Analog ground to ac power ground	
CMV at dc to 60 Hz	120 dB
CMV at dc to 60 Hz	±1500 Vp per HV test ±354 Vp per IEC spacing
Linearization	POLYLOG II
Accuracy at 25°C	
Temperature Scale Selection	°F or °C (internally selectable by push-on jumpers)
Zero Tempco	0.005 degree/degree
Span Tempco	0.006% R/°C
Warm up to rated accuracy	Less than 1 minute

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Q2000R MODEL	RANGE	ACCURACY ±1/2 COUNT	RESOLUTION
BSCR (Q2000R) °C	-199.9 to -199.9°C	±0.2°C ±0.01% R	0.1°C
BSCR (Q2000R) °F	-199.9 to +199.9°F	±0.2°F ±0.05% R	0.1°F

Q9000R MODEL	RANGE	ACCURACY ±2 COUNTS	RESOLUTION
BSCR (Q9000R) °C	-99.99 to +99.99°C	±0.1°C ±0.05% R	0.01°C
BSCR (Q9000R) °F	99.99 to +99.99°F	±0.2°F ±0.05% R	0.01°F

17.5 Q2000O & Q9000O: RESISTANCE INPUT SPECIFICATIONS

Connection Standard	2- or 4-wire configuration
Polarity	Bipolar
Zero	Adjustable ±50 counts minimum
Overvoltage Protection (differential)	15 Vp
Sensor Break Detection	
Q2000O	3 least-significant digits blanked
Q9000O	4 digits flash zeros
Sensor Excitation	4.2 mA max
NMR at 50/60 Hz	50 dB
Common Mode	
Analog ground to ac power ground	
CMV at dc to 60 Hz	120 dB
CMV at dc to 60 Hz	±1500 Vp per HV test ±354 Vp per IEC spacing
Range Selection	Internally selectable by push-on jumpers
Span Tempco	±0.006% R/°C
Open Circuit Voltage	12 V max
Accuracy at 25°C	
Warmup to rated accuracy	Less than 1 minute

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Q20000 2- or 4-WIRE RESISTANCE INPUTS

RANGE	RESOLUTION	ACCURACY	EXCITATION CURRENT	ZERO TEMPCO
19.99 ohms	10 mOhm	±0.05% R ±1 count	4.2 mA	2.5 mOhm/°C
199.9 ohms	100 mOhm		4.2 mA	2.5 mOhm/°C
1999 ohms	1 ohm		420 uA	25 mOhm/°C
19.99 kOhm	10 ohms		42 uA	250 mOhm/°C

Q90000 2- or 4-WIRE RESISTANCE INPUTS

RANGE	RESOLUTION	ACCURACY	EXCITATION CURRENT	ZERO TEMPCO
9.999 ohms	1 mOhm	±0.05% R ±2 counts	4.2 mA	2.5 mOhm/°C
99.99 ohms	10 mOhm		4.2 mA	2.5 mOhm/°C
999.9 ohms	100 mOhm		420 uA	25 mOhm/°C
9.999 kOhms	1 ohm		42 uA	250 mOhm/°C

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

18.0 SIGNAL INPUT CONNECTIONS (TB1) (SEE FIGURE 1)

The signal input connections for the BSCR & BSCR/O resistance temperature detector (RTD) signal conditioner are made at the 4-terminal barrier strip:

18.1 INPUT CONNECTIONS FOR BSCR & BSCR/O 4-WIRE RTD

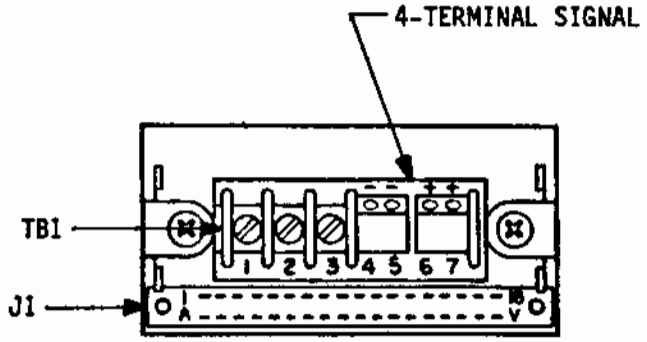
Terminal Connection	Signal	Input
4	-E (Excitation return)	4-WIRE * RTD (RESISTANCE)
5	-S (Signal LO input)	
6	+S (Signal HI input)	
7	+E (Excitation output)	

18.2 INPUT CONNECTIONS FOR BSCR 3-WIRE RTD

Terminal Connection	Signal	Input
4	-E (Excitation return)	3-WIRE ** RTD
5	-S (Signal LO input)	
6	+S (Signal HI input)	
7	no connection	

18.3 INPUT CONNECTIONS FOR BSCR & BSCR/O 2-WIRE RTD

Terminal Connection	Signal	Input
4	-E (Excitation return)	2-WIRE RTD (RESISTANCE)
5	-S (Signal LO input)	
6	+S (Signal HI input)	
7	+E (Excitation output)	



REAR TERMINAL VIEW

FIGURE 5. SIGNAL INPUT CONNECTIONS

* If using 4-wire, remove S2A and S2H on signal conditioner board.
** Unit is shipped as 3-wire (S2A and S2H factory-installed).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

19.0 TESTS AND DIAGNOSTICS

- The signal conditioner board BSCR is designed to function with a main board as a minimum configuration. There is no provision for testing a signal conditioner board alone.

- Signal input requirements for your configuration are identified in the specifications for the BSCR signal conditioner.

- Operating power and connections for your configuration are identified in the appropriate Main Assembly Section of this manual.

  NOTE: If using Main Assembly Q2000, refer to Section BQ20/BQ29.
  If using Main Assembly Q9000, refer to Section BQ90/BQ98.

- Inspect the QUANTA panel meter for physical damage. If damage is apparent, resolve the damage with the shipper or your supplier.

19.1 FUNCTIONAL ELECTRICAL TESTING

NOTE: Perform the appropriate test after your meter has been configured.

19.1.1 Testing BSCR

1. Connect RTD probe as shown in the Signal Input Section 18.0.

2. Apply proper power for your configuration to terminals 1, 2 and 3 on barrier strip (TB1). Display will read approximately ambient room temperature.

19.1.2 Testing BSCR/0

1. Short terminals 4, 5, 6 and 7 on barrier strip (TB1).

2. Apply proper power for your configuration to terminals 1, 2 and 3 on barrier strip (TB1). Display will read approximately zero (000).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

20.0 CONFIGURATION PROCEDURE

Use this procedure to determine the configuration of the RTD Pyrometer (BSCR) or Ohmmeter (BSCR/O).

Configure the unit using the push-on jumper provided separately or already positioned on the pin forests. Pin-forest designations are shown with each configuration chart.

20.1 GLOSSARY

The chart below explains various terms which appear throughout the following procedure:

Term	Definition Q2000	Q9000
RDF1	±199.9°F	±99.99°F
RDC1	±199.9°C	±99.99°C
	Ohm Range	
OOR1	(0-19.99 ohms)	(0-9.999 ohms)
OOR2	(0-199.9 ohms)	(0-99.99 ohms)
OOR3	(0-1999 ohms)	(0-999.9 ohms)
OOR4	(0-19.99 kOhms)	(0-9.999 ohms)

20.2 SELECTION

If the input is:

Degrees, proceed to Section 20.3.1
Ohms, proceed to Section 20.3.2

20.2.1 Degrees Selection

Select the required units from the following:

RDF1 = Degrees "F"
RDC1 = Degrees "C"
RD = _____

Proceed to Installation (Section 20.3)

20.2.2 Ohm Range Selection (OR1,2,3,4)

Specify the required range where the maximum input is equal to or less than the limit of that range:

Term	Q2000	Q9000
OOR1 =	0-19.99 ohms	0-9.999 ohms
OOR2 =	0-199.9 ohms	0-99.99 ohms
OOR3 =	0-1999 ohms	0-999.9 ohms
OOR4 =	0-19.99 kOhms	0-9.999 kOhms
OOR =	_____	

Proceed to Installation.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

20.3 INSTALLATION

Main Board Configuration

- **Decimal Point Selection** (includes no DP) must be configured.
- **Reference Voltage Selection** (used only on Q9XXXX models)
- The **Interface Bus** must be installed for use of the Q2XXXX or Q9XXXX when an option card isn't present. Remove the interface bus when installing an upper (option) card.

NOTE: If using Main Assembly Q2000, refer to Section BQ20/BQ29.
If using Main Assembly Q9000, refer to Section BQ90/BQ98.

Signal Conditioner Configuration

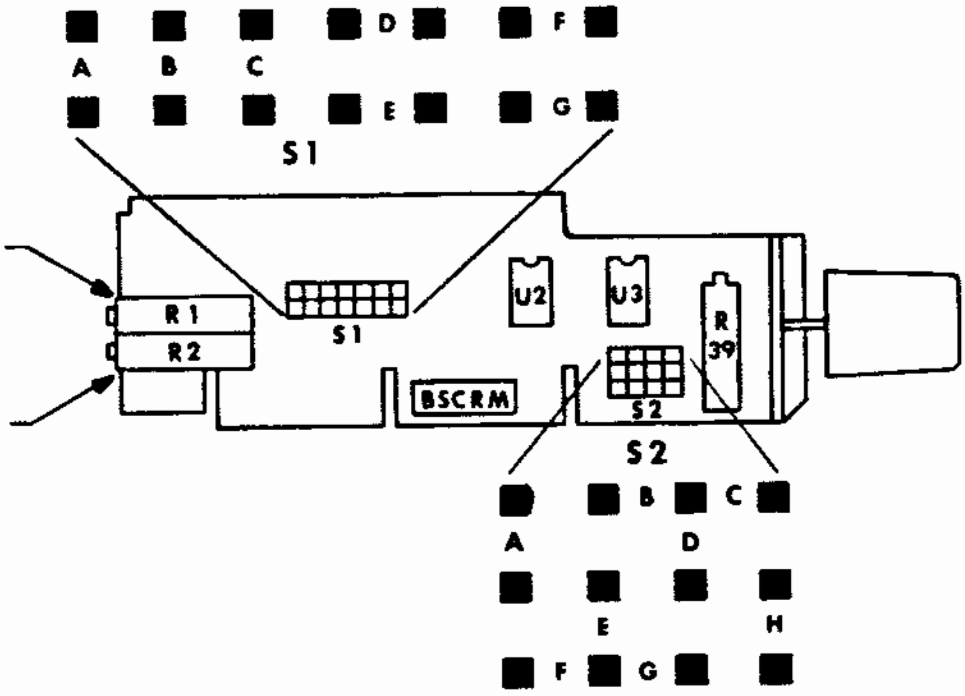
Select the Degrees/Ohms Range and install the push-on jumpers as indicated on the following pages.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

21.0 CONFIGURATION CHARTS

Select the input configuration from the chart below and install or remove the jumpers as indicated.	
Input Configuration	S2
3-Wire RTD (As shipped)	A,H
4-Wire RTD	(remove A,H)

21.1 DEGREES (RDF1, RDC1)

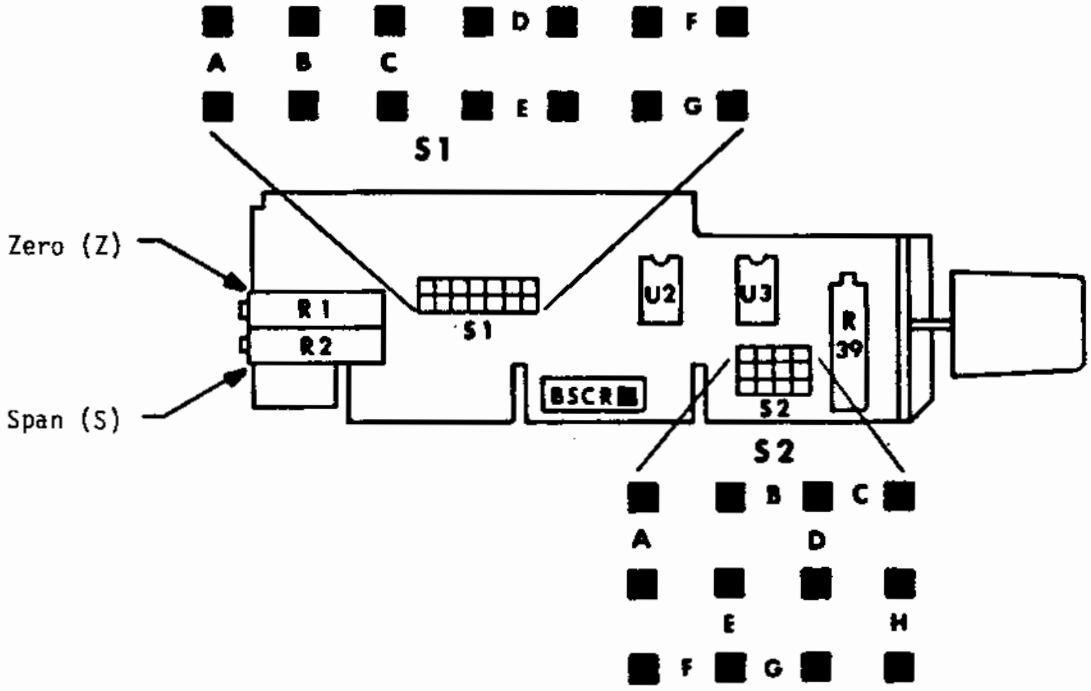


After reading the installation procedures on the preceding page, select the desired configuration from the chart below.				
Remove all push-on jumpers not used. Install jumpers as indicated.				
Degrees	Q2000 Decimal Point Location	Q9000 Decimal Point Location	S1	S2
RDF1 °F	199.9°	99.99°	D,E	C,G
RDC1 °C	199.9°	99.99°	F,G	C,G

Decimal point selection must be configured on main board.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

21.2 OHM RANGE (OOR1 THROUGH OOR4)



Step 1: Remove all push-on jumpers not used in the desired configuration(s).						
Step 2: Select the desired configuration from the chart below, then install the push-on jumpers indicated.						
	Ohm Range Configuration * Q2000	Q9000	S1		S2	
OOR1	0 to 19.99 ohms	0 to 9.999 ohms	A	C	C	G
OOR2	0 to 199.9 ohms	0 to 99.99 ohms	A	B	C	G
OOR3	0 to 1999 ohms	0 to 999.9 ohms	A	B	D	E
OOR4	0 to 19.99 kOhms	0 to 9.999 kOhms	A	B	B	F

* Used on the Q20000 or Q90000

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

22.0 CALIBRATION

NOTE: Calibrate with a precision resistance box with 0.01 ohm resolution.

22.1 CALIBRATION FOR Q2000

22.1.1 Q2000R °F (RDF1)

1. Apply an input of 93.03 ohms and adjust R1 (zero) for a reading of ±00.0 .
2. Remove push-on jumper S1-D.
3. Apply an input of 116.83 ohms and adjust R2 (span) for a reading of 104.7 .
4. Install push-on jumper S1-D.
5. Adjust R39 for a reading of 110.0 .

22.1.2 Q2000R °C (RDC1)

1. Apply an input of 100.00 ohms and adjust R1 (zero) for a reading of ±00.0 .
2. Remove push-on jumper S1-F.
3. Apply an input of 151.70 ohms and adjust R2 (span) for a reading of 127.3 .
4. Install push-on jumper S1-F.
5. Adjust R39 for a reading of 135.0 .

22.1.3 Q2000O OHMS RANGE (OOR1, 2, 3, 4)

1. Apply an input resistance equal to zero and adjust the zero (Z) pot (R1) to make the display read 00.0 .
2. Apply an input resistance equal to 95% of the high end of the range selected and adjust the span (S) pot (R2) to make the display read 190.0 .

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

22.2 CALIBRATION FOR Q9000

NOTE: Calibrate with a precision resistance box with 0.01 ohms resolution.

22.2.1 Q9000R °F (RDF1)

1. Apply an input of 93.03 ohms and adjust R1 (zero) for a reading of ±00.00 .
2. Remove push-on jumper S1-D.
3. Apply an input of 116.83 ohms and adjust R2 (span) for a flashing reading of 04.70 .
4. Install push-on jumper S1-D.
5. Adjust R39 for a flashing reading of 10.00 .

22.2.2 Q9000R °C (RDC1)

1. Apply an input of 100.00 ohms and adjust R1 (zero) for a reading of ±00.00 .
2. Remove push-on jumper S1-F.
3. Apply an input of 151.70 ohms and adjust R2 (span) for a flashing reading of 27.30 .
4. Install push-on jumper S1-F.
5. Adjust R39 for a flashing reading of 35.00 .

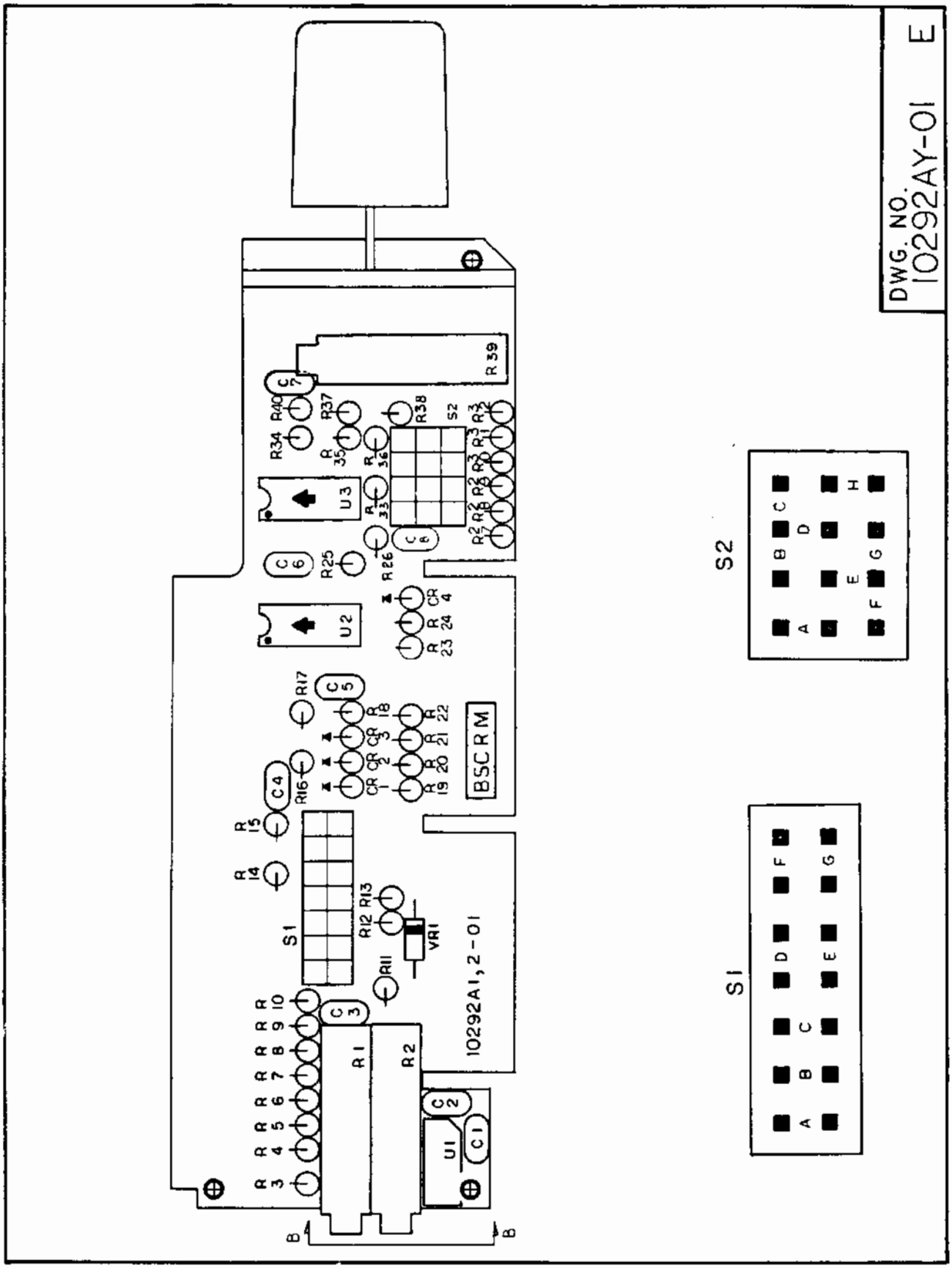
22.2.3 Q9000 OHM RANGE (OOR1, 2, 3, 4)

1. Apply an input resistance equal to zero and adjust the zero (Z) pot (R1) to make the display read 00.00 .
2. Apply an input resistance equal to 95% of the high end of the range selected and adjust the span (S) pot (R2) to make the display read 95.00 .

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

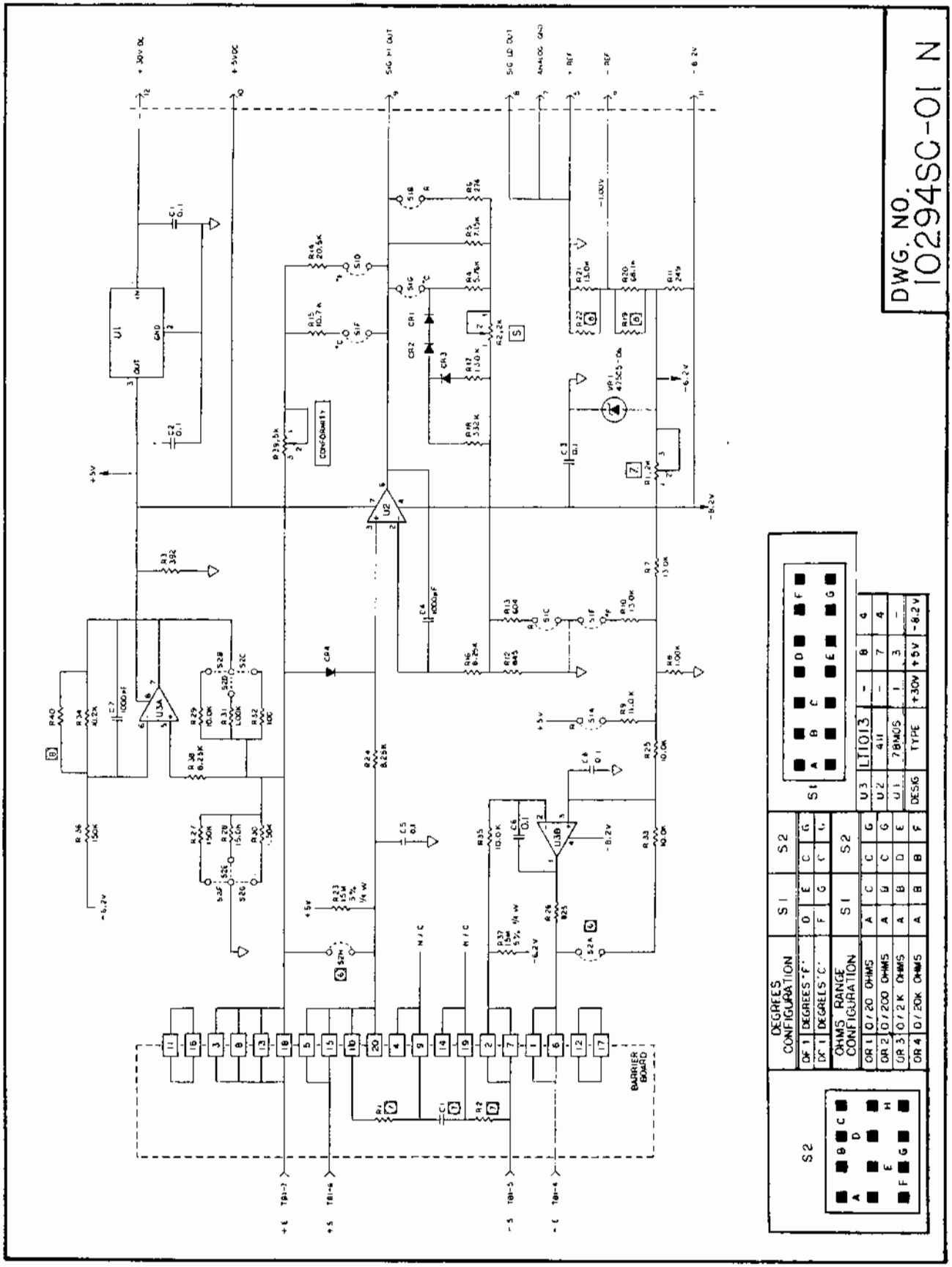
23.0 DRAWINGS

23.1 BSCR ASSEMBLY DIAGRAM



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

23.2 BSCR SCHEMATIC DIAGRAM



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

24.0 DIGITAL PANEL METER INSTALLATION INSTRUCTIONS

IMPORTANT:

For proper installation electrical connections must be made according to the model number on the meter label. Write the model number in the following space and use the appropriate instructions for your model number.

```
                    .--- Power requirement (Section 24.3)
                    :
                    :   .--- Analog output (see Analog Output Manual)
                    :   :
                    :   :   .--- Control output (see Controller/
                                                 Interface Manual)
                    :   :   :
                    :   :   :   .--- Signal input (Section 25.0)
                    :   :   :   :
 Model number  Q2 ____ ____ ____ ____
 Model number  Q9 ____ ____ ____ ____
```

24.1 UNPACKING & INSPECTION

Your QUANTA digital panel meter 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 shipping damage.

24.2 MECHANICAL INSTALLATION

1. Insure that the panel cutout dimensions are as shown on Figure 6.

2. Remove the lower printed circuit board edge connector, (if installed) J1, by pushing two molded plastic tabs away from the connector body and pulling the connector off the printed circuit board. Remove the printed circuit board edge connector, J2, if upper board output option was ordered.

3. Loosen two clamp screws on the rear of the case enough to rotate the two slide clamps.

4. Slide the two slide retainers toward the rear of the case and remove them.

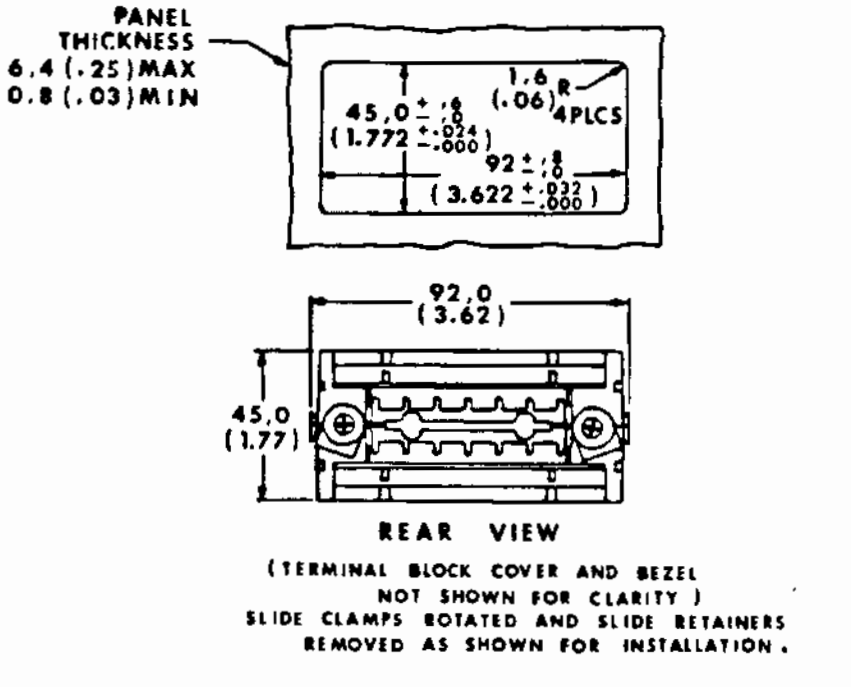
5. From the front of the panel, insert the meter into the panel cutout.

6. Slide the slide retainers back onto the case and push up tightly against the rear of the panel.

7. Rotate the slide clamps back into their original position and tighten enough to hold the case in place. Overtightening can break the clamps.

8. Install the lower printed circuit board edge connector, if supplied, by pushing it on to the prinped circuit board connections. Install the upper printed circuit board edge connector, if used.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



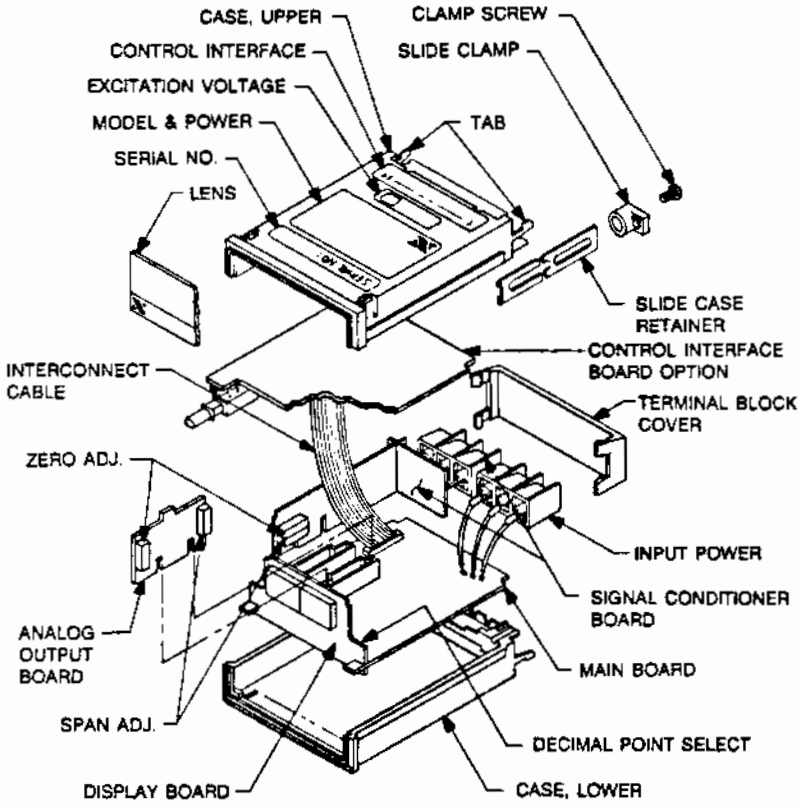


FIGURE 6. PANEL CUTOUT DIMENSIONS AND INSTALLATION

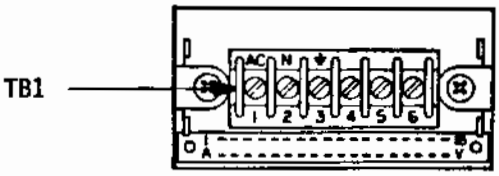
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

24.3 POWER REQUIREMENTS AND CONNECTIONS (TB1)

24.3.1 The standard meter is wired to operate from one of five power sources.

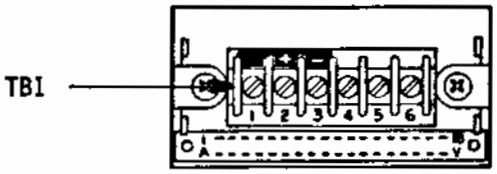
Models	Power Requirements
Q20XXX, Q21XXX, Q90XXX	120 V ac (50-60 Hz)
Q22XXX, Q23XXX, Q92XXX	240 V ac (50-60 Hz)
Q24XXX, Q25XXX, Q94XXX	9-32 V dc
Q26XXX, Q27XXX, Q96XXX	5 V dc
Q28XXX, Q29XXX, Q98XXX	24 V ac (50-60 Hz)

24.3.2 Regardless of the power source used, connections are made to the same terminal barrier strip, TB1, as follows:



REAR TERMINAL VIEW

TB1 Terminal Connection	AC Operation 24 V, 120 V, 240 V	Wire Color
1	AC power HI	Black
2	AC power LO (neutral)	White
3	AC power GND	Green



TB1 Terminal Connection	DC Operation 5 V or 9-32 V
1	No Connection
2	DC power +
3	DC power - (return)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

25.0 SIGNAL INPUT CONNECTIONS (TB1)

The signal input connections for the BSCR/O Resistance Temperature Detector (RTD) signal conditioner are made at the 4-terminal barrier strip:

Input connections for BSCR/O (Q2XXXR, Q2XXXO) 4-wire RTD

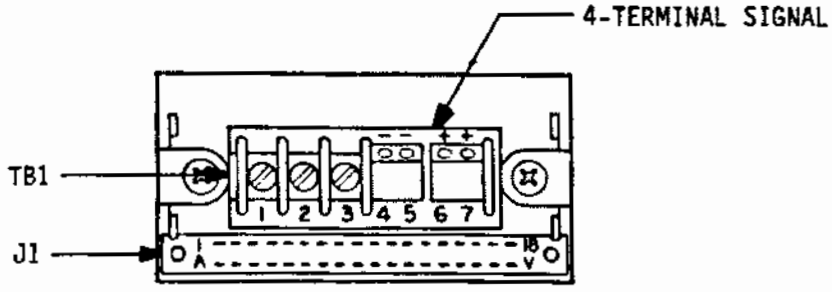
Terminal Connection	Signal	Input
4	-E (Excitation return)	4-WIRE RTD (RESISTANCE)
5	-S (Signal LO input)	
6	+S (Signal HI input)	
7	+E (Excitation output)	

Input connections for BSCR (Q2XXXR) 3-wire RTD

Terminal Connection	Signal	Input
4	-E (Excitation return)	3-wire * RTD
5	-S (Signal LO input)	
6	+S (Signal HI input)	
7	no connection	

Input connections for BSCR/O (Q2XXXR, Q2XXXO) 2-wire RTD

Terminal Connection	Signal	Input
4	-E (Excitation return)	2-wire RTD (RESISTANCE)
5	-S (Signal LO input)	
6	+S (Signal HI input)	
7	+E (Excitation output)	



REAR TERMINAL VIEW

FIGURE 7 SIGNAL INPUT CONNECTIONS

* Install S2A and S2H on signal conditioner board.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP