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WV & TriPlex Instruments Document Revision B
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UNIVERSAL POWER SUPPLY 24V dc, 48V dc, 125V dc, 250V dc, 69V ac, AND 115V ac
for all WATT/VAR & Triplex Instruments

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CERTIFICATION

Bitronics LLC certifies that the calibration of its products are based on measurements using equipment whose calibration is traceable to the United States National Institute of Standards Technology (NIST).

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INSTALLATION AND MAINTENANCE

Bitronics' products are designed for ease of installation and maintenance. As with any product of this nature, however, such installation and maintenance can present electrical hazards and should only be performed by properly trained and qualified personnel. If the equipment is used in a manner not specified by Bitronics, the protection provided by the equipment may be impaired.

WARRANTY AND ASSISTANCE

Products manufactured by Bitronics LLC are warranted against defects in materials and workmanship for a period of thirty-six (36) months from the date of their original shipment from the factory. Products repaired at the factory are likewise warranted for eighteen (18) months from the date the repaired product is shipped, or for the remainder of the product's original Warranty, whichever is greater. Obligation under this warranty is limited to repairing or replacing, at Bitronics' factory, any part or parts which Bitronics' examination shows to be defective. Warranties only apply to products subject to normal use and service. There are no warranties, obligations, liabilities for consequential damages, or other liabilities on the part of Bitronics except this Warranty covering the repair of defective materials. The warranties of merchantability and fitness for a particular purpose are expressly excluded.

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1.0 DESCRIPTION

1.1 Introduction

The DOVD4A universal power supply option for the Watt, Var, Triplex, and Multiplus families of instruments is designed to allow operation of these instruments from standard backup power systems. No external equipment is needed, and the supply has been designed for use in the utility environment.

1.2 Features

- * For use on 24V dc, 48V dc, 125V dc, 250V dc, 69V ac, and 115V ac systems.
- * Electrically isolated power inputs.
- * Under/over-voltage, over-current, and over-temperature protection.
- * External MOV's and internal transient protection.
- * All electrolytic capacitors rated to 105 Deg C.

1.3 Specifications

Input Voltage: 20 to 280Vdc, 55 to 200Vac.

Surge Suppression: Meets' ANSI C37.9 Standards.

Operating Temp.: -20 to 70 Deg C.

Input Frequency: dc or 40 to 400Hz ac.

2.0 PRINCIPLES OF OPERATION

2.1 Input Power Connection and Circuit Operation

The universal power supply is a high-efficiency, high-frequency switching power supply with integrated over-voltage, over-temperature, and over-current protection. Power connections to the instrument are made directly to #10-32 brass studs on the rear panel of the instrument. **WARNING -DO NOT OVERTIGHTEN** the nuts on the input connections. Brass studs are preferred for their electrical properties, but are not as strong as steel studs. Therefore, **HAND** tighten connections to the instrument with a standard nut driver. 12 inch-pounds is the recommended torque, with a **MAXIMUM** of 15 inch-pounds.

Power from the input terminals is conducted to a full-wave bridge rectifier and capacitor to convert ac power inputs to filtered-dc. DC power inputs are unaffected by the bridge rectifier. Input polarities are marked for reference only. The dc voltage across the filter

capacitor is alternately connected and disconnected to the isolation/power transformer at a rate of about 60kHz, by a pulse-width controller. A separate feedback winding on the power transformer provides a signal which is used by the controller to vary the time that the transformer is connected to the power source. This allows the supply to provide a constant output voltage over a wide range of input voltages and output loads.

3.0 INSTALLATION

3.1 Initial Inspection

Bitronics' instruments are carefully checked and "burned in" at the factory before shipment. Damages can occur, however, so please check the instrument for shipping damage as it is unpacked. Notify Bitronics immediately if any damage has occurred, and save any damaged shipping containers which you may need to substantiate a claim with the transport company.

3.2 Surge Protection

Bitronics instruments are designed to withstand surges most commonly encountered in electrical substations and other electrically noisy environments. Transient protection is designed into the electronic circuits. In addition, it is recommended that metal oxide varistors (MOVs) be placed across the power supply inputs to further protect the meter in the event of high voltage switching transients. Digital WAIT/V AR and TriPlex meters are shipped with a transient suppression network already attached as a standard design. An MOV provides an added measure of protection against heavy switching transients occasionally experienced in the field. The MOV is designed to clamp applied power voltages above 270 V ac RMS. A single MOV protects the meter Line to Line, and two high voltage capacitors are provided to protect each Line to Ground. To avoid damaging the MOV protector, maintain continuously applied power voltages within the ratings of the instrument. The GREEN lead of the MOV assembly should be connected to a good earth ground. In most instances, this is usually accomplished by connecting the GREEN lead to the panel via the indicated front mounting stud. This mounting stud is a safety ground for the instrument, and should be connected to a protective earth circuit.

NOTE - Although the Line to Ground capacitors are 3kV and UL rated, users of DC power may not want the transient protection connected from the DC supply to earth ground. In this case the GREEN lead of the MOV assembly can be clipped at the board, or the GREEN lead may be connected to either of the meter power studs. Mounting of the MOV board external to the instrument allows easy access so that the MOV and Caps may be readily inspected for damage. If the unit is to be powered from a PT, it is recommended that one side of the PT be grounded at the instrument following ANSI/IEEE C57.13.3-1983. The MOV board voltage rating is indicated on the MOV board, and must match the voltage supply rating of the instrument.

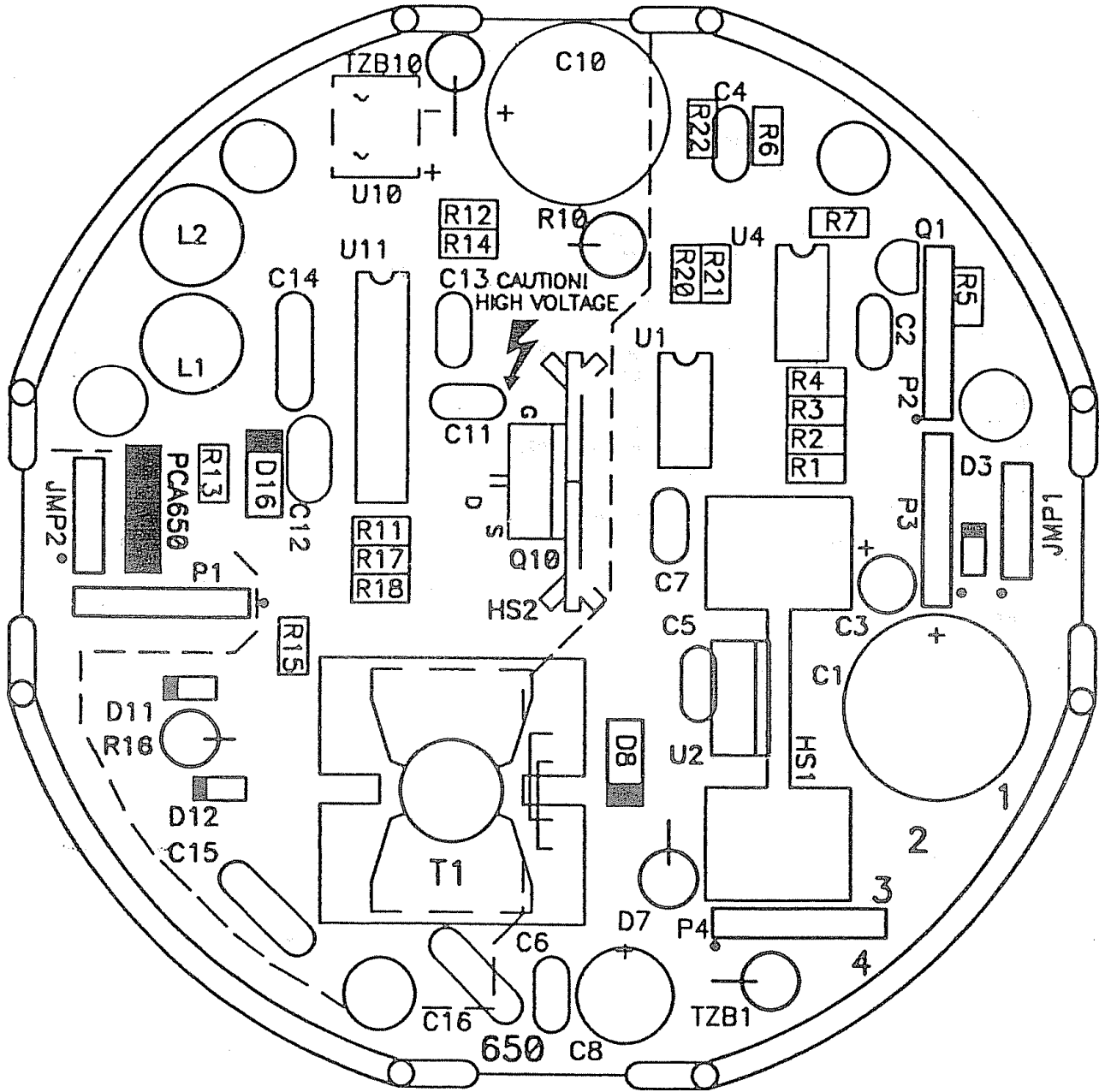


Figure 1 – Part Location, Board 650

Bill of Materials
PCA 650

Qty	Type	Value	Ref Designators
1	PCB650		
1	CAP1MFD2	1uF 50V HL CER	C12
1	CAP33MFDI	33uF 350V LYTIC	C10
1	CAP47MFD	47uF 16V LYTIC	C3
1	CAP150PFD	150pF 500V CER	C15
1	CAP220MFD2	220uF 25V LYTIC 220pF	C8
1	CAP220PFD	CERAMIC	C14
1	CAP470PFDI	470pF 3KV CER	C16
1	CAP1000MFD	1000uF 35V LYTIC	C1
6	CAP.1HFD	.1uF 50V HL CER	C2, C5, C6, C7, C11, C13
2	CH0470UH	470uH CHOKE	L1, L2
1	DOD 1 N4936	IN4936 012	D12
1	DOD1N5234	IN5234B 6.2V 5%	D3
1	DOD1N5949	IN5949 100V ZNR	D11
1	DOD1.SKE300	300V TRANZSORB	TZB10
2	DODMUR140	MUR140 IA 400V	D8, D16
1	DODMUR415	HUR415 DIODE	D7
1	DODSA1SC	15V TRANZSORB	TZB1
1	HRDHEATSINK3	HEATSINK	HS1
1	IC9120	Si91200P PWM	U11
1	I CCAT93C46P I	CAT93C46P1	U4
1	ICDF04M	DF04H BRIDGE	U10
1	ICIRF832	IRF830 500V N-CH	Q10
1	ICLH2940	LH2940CT-5.0	U2
1	IC0P177GP	OP177GP	U1
2	RECDIP4P	4PIN FLEX SOCKET	JHP1, JHP2
1	RES1	1 ohm 2W	R10
1	RES1K	1K 1/4W 1% MF	R18
2	RES10MF	10 ohm 1/4W 1% MF	R15, R17
3	RES20K	20K 1/4Y 1% MF	R20, R21, R22
1	RES40.2K	40.2K 1/4Y 1% MF	R14
1	RES68.1K	68.1K 1/4Y 1% MF	R13
4	RES102MF	1/4Y 1% 102 MF	R1, R2, R3, R4
1	RES301K	301K 1/4W 1% MF	R11
1	RES392K	392K 1/4W 1% MF	R12
1	RES470.1	470ohm 1/2Y MF	R16
4	TRMHEAD6P	6PIN .025SQ	P1, P2, P3, P4
1	TRNT1002R7	330011	T1
	1 CORE2	PC30PQ2016Z-12	
	1 BOB2	BPQ-2016-1111,CP	
	1 CLIP2	FPQ2016-A	

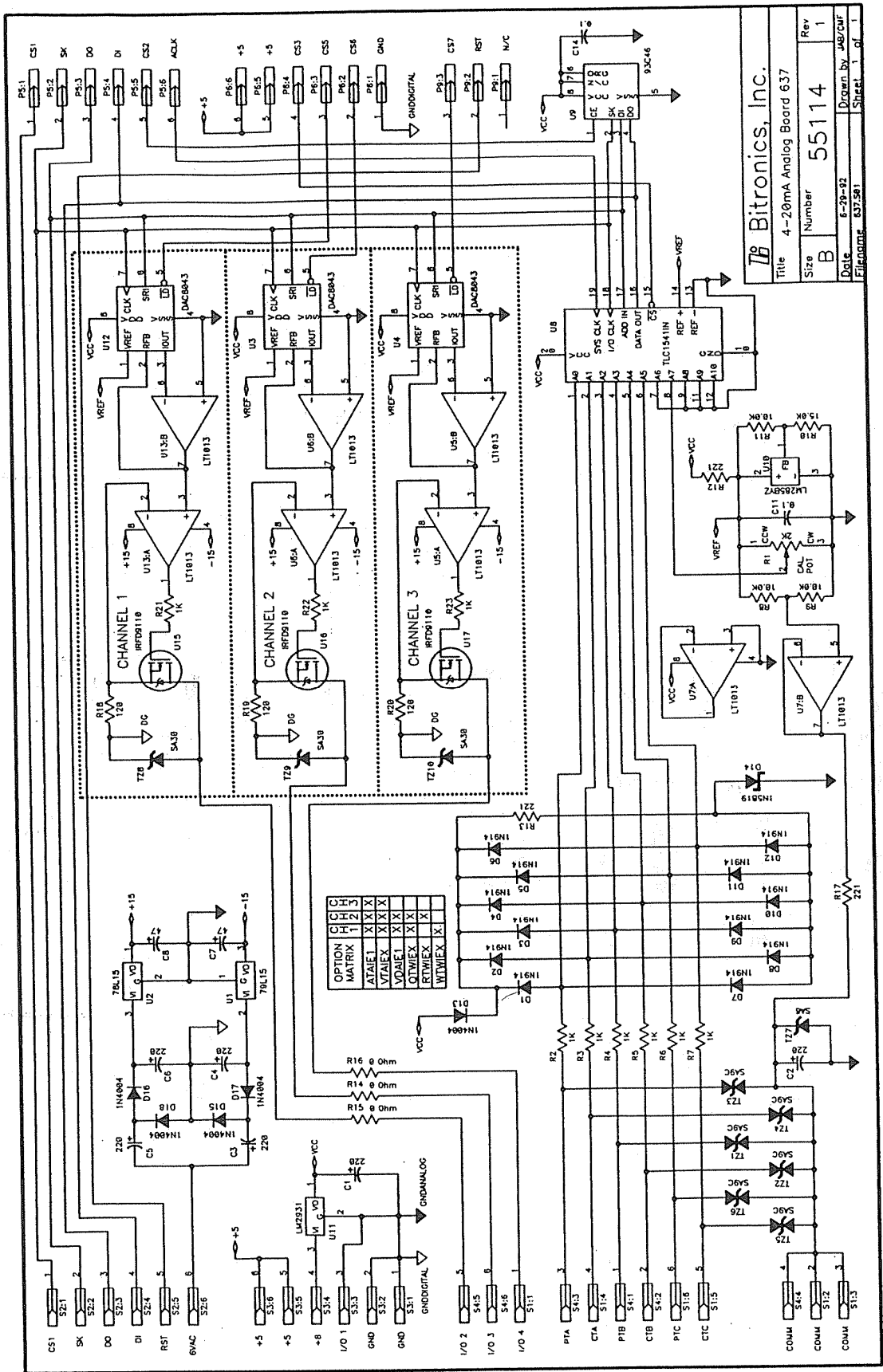


Figure 2 – Schematic for Analog/4-20mA Board 637

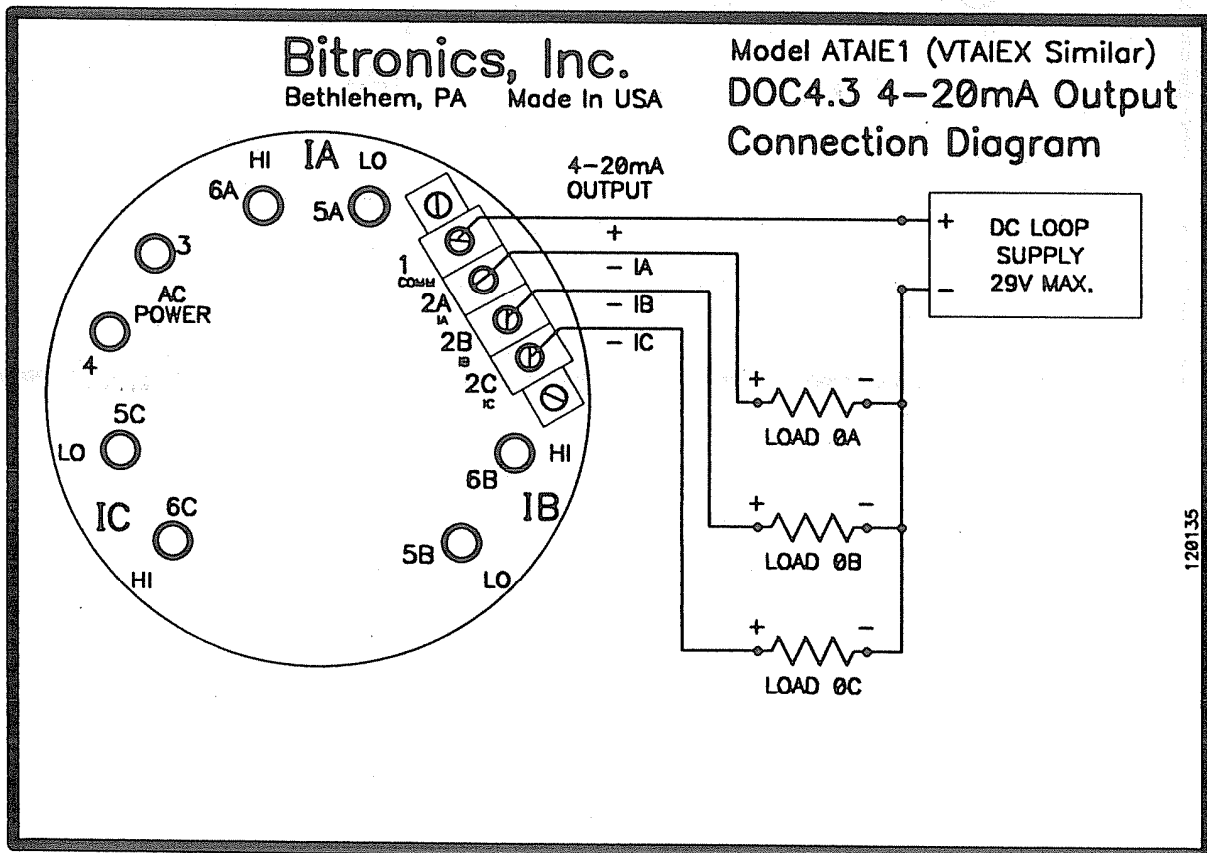
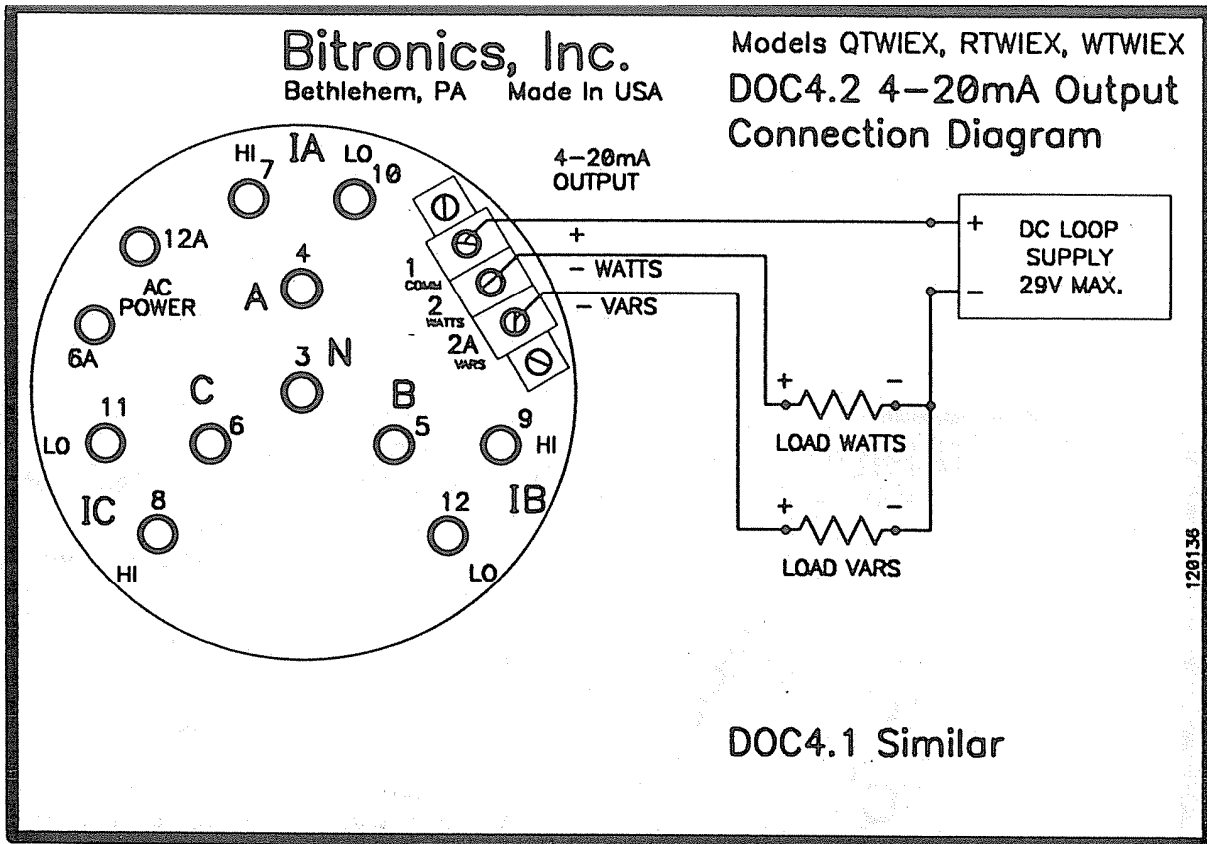


Figure 3 – Typical Back Panel Connections

Bitronics, Inc.
 Bethlehem, PA Made In USA

Model VDAIE1
 DOC1.2 4-20mA Output
 Connection Diagram

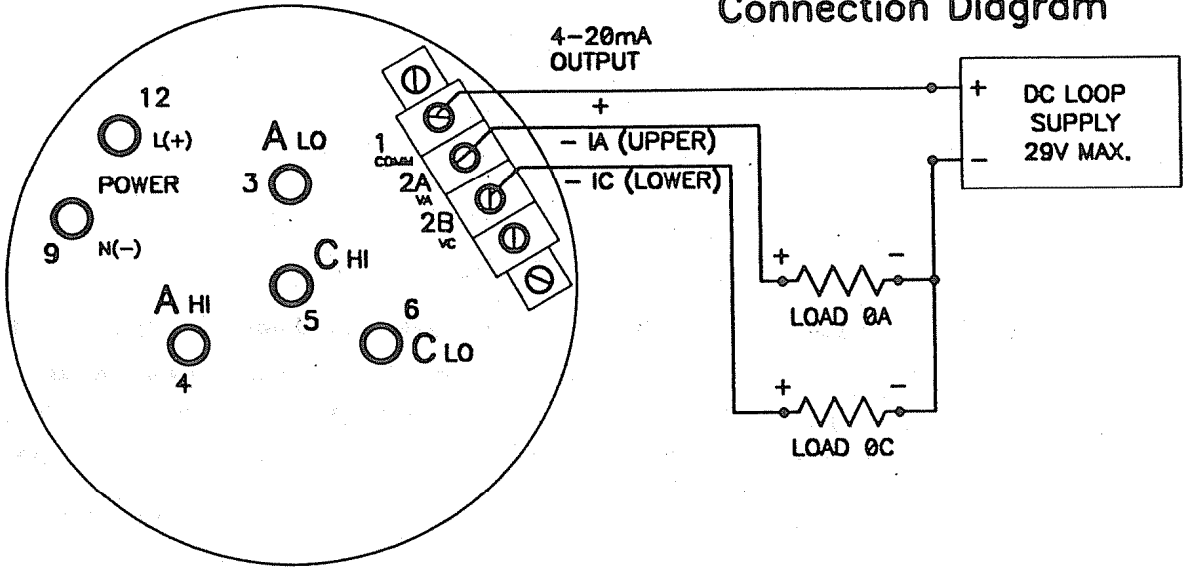


Figure 4 – GSWIE1 Back Panel Connections

Revision	Date	Changes	By
A	01/30/2009	Update Bitronics Name, Logo	E. Demicco
B	10/13/09	Updated logos and cover page	MarCom
C			



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