Electronic Relay Card

Instruction Manual

Model C10472-000

CAROTRON

Driven by Excellence

D.C. DRIVES, A.C. INVERTERS,
SOLID STATE STARTERS, SYSTEM INTERFACE
CIRCUITS AND ENGINEERED SYSTEMS

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1 General Description

Model C10472-000 Electronic Relay Card is designed for applications where voltage or current sensing is necessary. Designed for a wide variety of reference input signals, model C10472-000 can accept the following types of inputs.

A.C. VOLTAGE
D.C. VOLTAGE
D.C. CURRENT

Each input signal is conditioned by scaling circuits and then compared with an adjustable voltage level set by the PULL-IN potentiometer. When the scaled input signal exceeds the voltage level set by the PULL-IN potentiometer, the relay is energized. The relay drops out when the scaled input voltage level reaches a level 1 to 10% less than the PULL-IN level. This percentage is set by the DROP-OUT potentiometer.

2 Specifications & Technical Data

2.1 Electrical

A.C. Input

115 VAC ±10%, 50/60 Hz 9.2 VA MAX

Signal Inputs

• A.C. Voltage Input	• Input Impedance
0 - 15 VAC	1M OHMS
0 - 50 VAC	1M OHMS
0 - 100 VAC	1M OHMS
0 - 250 VAC	1M OHMS

• D.C. Voltage Input	• Input Impedance
0 - 15 VDC	1M OHMS
0 - 50 VDC	1M OHMS
0 - 100 VDC	1M OHMS
0 - 250 VDC	1M OHMS

• D.C. Current Input	• Input Impedance
1 - 5 MA	1K OHMS
4 - 20 MA	270 OHMS
10 - 50 MA	100 OHMS

Relay Output

- Two form "C" contacts rated at 110 VAC at 5 amperes resistive or inductive load.
  NOTE: For "fail safe" applications, the logic should be arranged so that power loss or relay failure will result in a safe situation.

2.2 Physical

Refer to drawing C10513 in Section 5 for complete mounting dimension information.

- TB1-20 (-TACH): This terminal is also circuit common. The second tachometer lead and tachometer wiring shield should connect here.

3 Description of Jumpers & Adjustments

Jumper J1

Selects voltage or current input

Jumper J2

Selects A.C. or D.C. voltage input

Jumper J3

Selects either positive voltage input circuit, negative voltage input circuit or bipolar voltage input circuit as the reference input. If the positive (+) position is selected, negative reference input signals will be ignored. If the negative (–) position is selected, positive reference input signals will be ignored. The bipolar mode will accept positive and negative reference signals. Always use the bipolar mode when the input is an A.C. voltage signal.

Jumper J4

Selects between the 4 voltage input ranges: 0 - 15V, 0 - 50V, 0 - 100V, 0 -250V.

Jumper J5

Selects between the 3 current input ranges: 1 - 5MA, 4 - 20MA, 10 - 50MA.

Jumper J6

Selects between internal and external reset functions. If the internal (INT.) position is selected, the relay will automatically drop out when the scaled voltage level reaches a voltage less than the voltage level set by the DROP-OUT potentiometer after the relay has been energized.

If the external (EXT.) position is selected, the relay can be reset from a remote station. **NOTE:** The relay cannot be reset until the scaled voltage level drops below a level set by the PULL-IN potentiometer.

PULL-IN potentiometer

Used to adjust the voltage level where the relay coil is energized.

DROP-OUT potentiometer

Used to adjust the voltage level where the relay drops out when the internal reset function is used. The range is from 90 to 99% of the voltage level set by the PULL-IN potentiometer.

4 Programing & Adjustments

4.1 A.C. Voltage Input

- Connect the A.C. voltage reference input per drawing C10514 . Select voltage (V) on jumper J1, A.C . on jumper J2, and Bipolar on jumper J3.

- Select the proper voltage input range on jumper J4 by using the following procedure:

  Determine the maximum input voltage.

  Select the lowest input range which is greater than or equal to this maximum input voltage.

- With the voltage reference input at minimum, apply 115 VAC to the electronic relay card.

  NOTE: All measurements should be made from circuit common at TP5.

- Apply the desired voltage level at which the relay is to actuate and monitor the SCALED VOLTAGE and the PULL-IN test points with a D.C. volt meter. Adjust the PULL-IN potentiometer until the voltages are equal. When the voltages are equal, the relay will actuate.

- **(Omit this step if EXT. is selected.)** Apply the desired voltage level at which the relay is to drop out and monitor the SCALED VOLTAGE and DROP-OUT test points with a D.C. volt meter. Adjust the DROP-OUT potentiometer until the voltages are equal. At this point the relay will drop out.

NOTE: The range of the drop-out potentiometer is from 90 to 99% of the voltage level set by the pull-in potentiometer.

- The unit is now calibrated for operation.

4.2 D.C. Voltage Input

- Connect the D.C. voltage reference input per drawing C10514 . Select voltage (V) on jumper J1, D.C . on jumper J2, and Bipolar, positive or negative on jumper J3 (This selection depends on the reference signal to be used).

- Select the proper voltage input range on jumper J4 by using the following procedure:

  Determine the maximum input voltage.

  Select the lowest input range which is greater than or equal to this maximum input voltage.

- With the voltage reference input at minimum, apply 115 VAC to the electronic relay card.

  NOTE: All measurements should be made from circuit common at TP5.

- Apply the desired voltage level at which the relay is to actuate and monitor the SCALED VOLTAGE and the PULL-IN test points with a D.C. volt meter. Adjust the PULL-IN potentiometer until the voltages are equal. At this point the relay will actuate.

- **(Omit this step if EXT. is selected.)** Apply the desired voltage level at which the relay is to drop out and monitor the SCALED VOLTAGE and DROP-OUT test points with a D.C. volt meter.

  NOTE: The range of the drop-out potentiometer is from 90 to 99% of the voltage level set by the pull-in potentiometer.

- The unit is now calibrated for operation.

4.3 D.C. Current Input

- Connect the current input reference per drawing C10514 . Select 1 - 5 mA, 4 - 20 mA, or 10 - 50 mA input range using jumper J5. Select current (I) on jumper J1.

- With the voltage reference input at minimum, apply 115 VAC to the electronic relay card.

NOTE: All measurements should be made from circuit common at TP5.

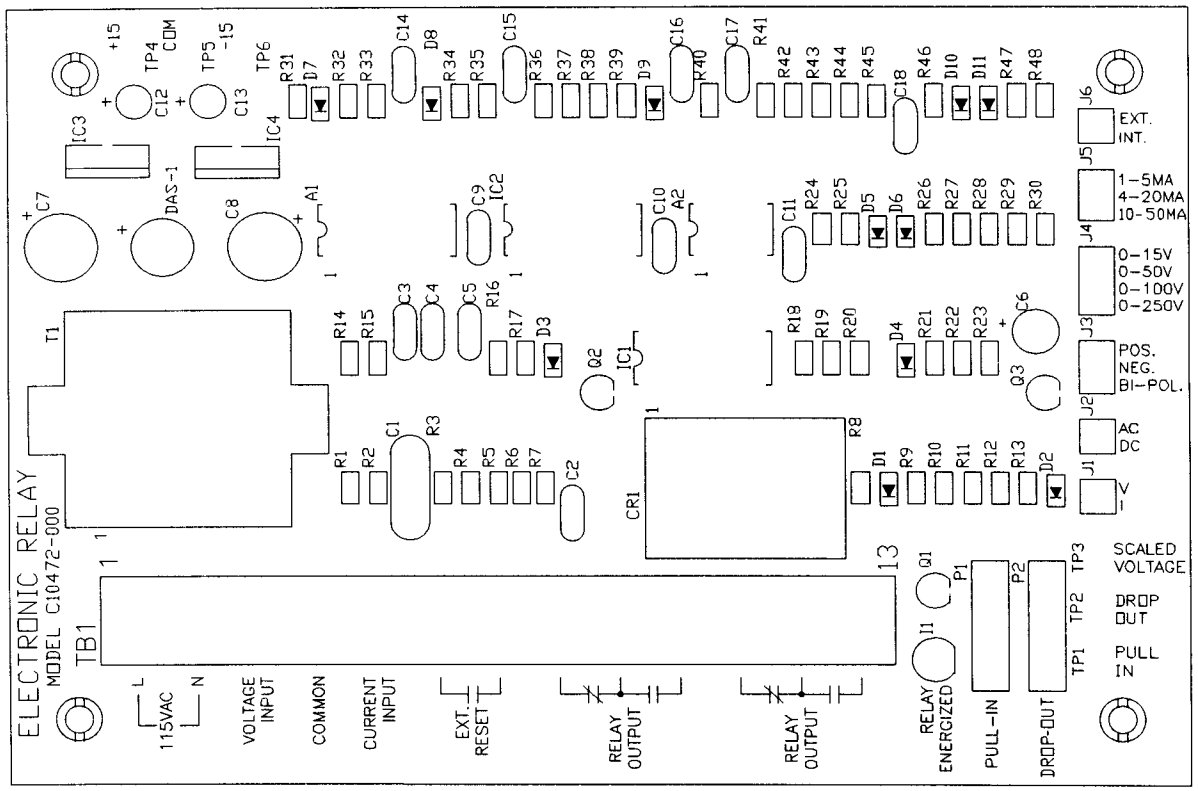
- Apply the desired current level at which the relay is to actuate and monitor the SCALED VOLTAGE and the PULL-IN test points with a D.C. volt meter. Adjust the PULL-IN potentiometer until the voltages are equal. At this point the relay will actuate.

- **(Omit this step if EXT. is selected.)** Apply the desired current level at which the relay is to drop out and monitor the SCALED VOLTAGE and DROP-OUT test points with a D.C. volt meter. Adjust the DROP-OUT potentiometer until the voltages are equal. At this point the relay will drop out.

  NOTE: The range of the drop-out potentiometer is from 90 to 99% of the voltage level set by the pull-in potentiometer.

- The unit is now calibrated for operation.

5 Prints



NOTES:
1. REF. SCHEM. DWG. C10473
2. REF. CONN. DWG. C10514
3. REF. DIM. DWG. C10513
4. REF. BOM. A10472

REV. B, ECO 80, 7-19-90

DRAWN BY: WRM	DATE: 3-7-90	CAROTRON Driven by Excellence	HEATH SPRINGS, SC TEL 803-286-8614 FAX 803-286-6063
APPROVED BY:	DATE:	TOLERANCES ± 2 DEC. PL. 3 DEC. PL.	C10472-000
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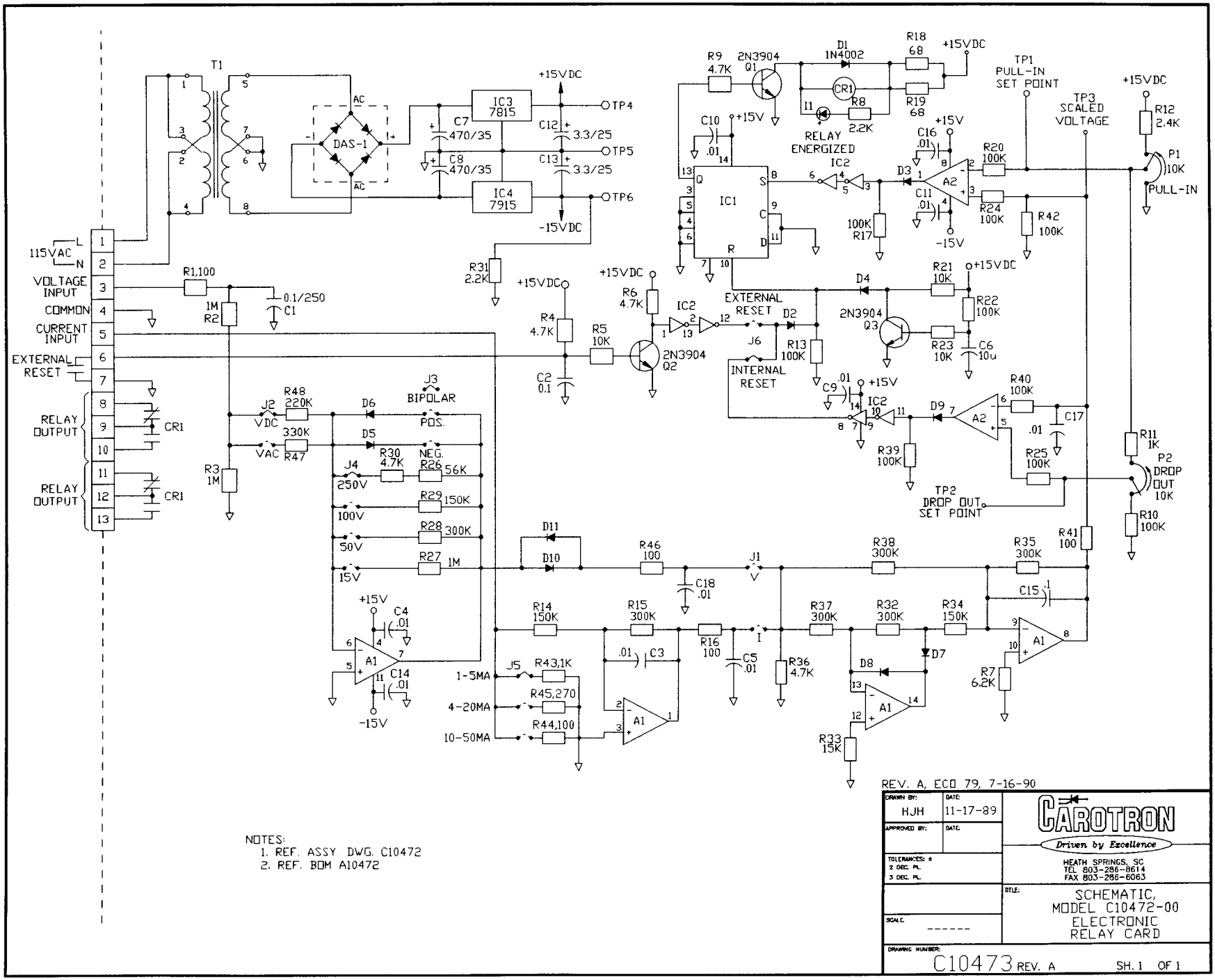
DRAWING NUMBER: C10472	REV. B	SH.1 OF 1	



NOTES:
1. REF. ASSY DWG. C10472
2. REF. BOM A10472

REV. A, ECO 79, 7-16-90

DRAWN BY: HJH	DATE: 11-17-89
APPROVED BY:	DATE:
TOLERANCES: ± 2 DEC. PL. 3 DEC. PL.	
SCALE: ------	
DRAWING NUMBER: C10473 REV. A	SH. 1 OF 1

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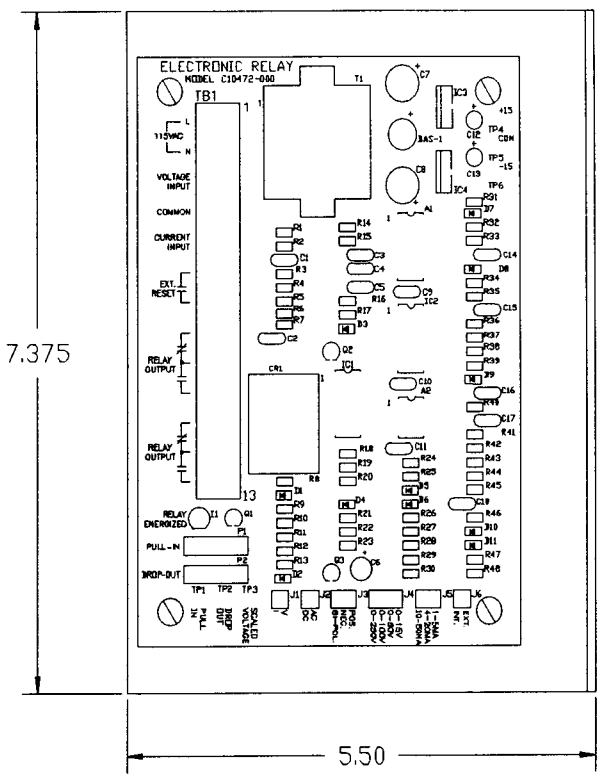
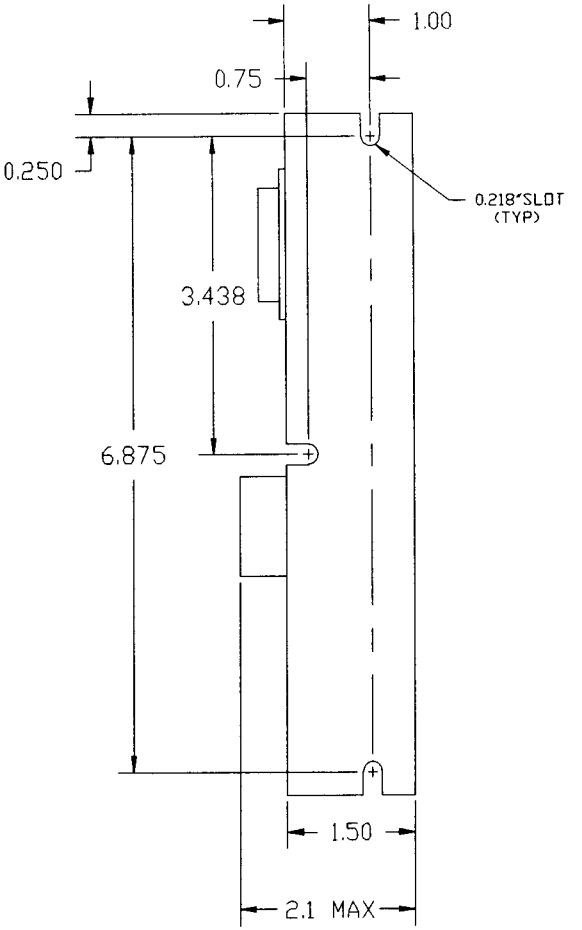
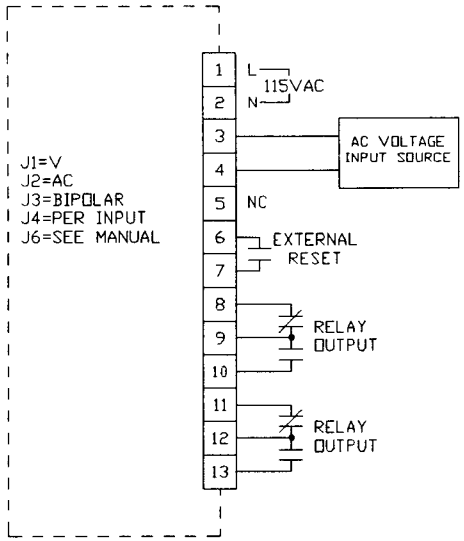
TITLE: SCHEMATIC, MODEL C10472-00 ELECTRONIC RELAY CARD

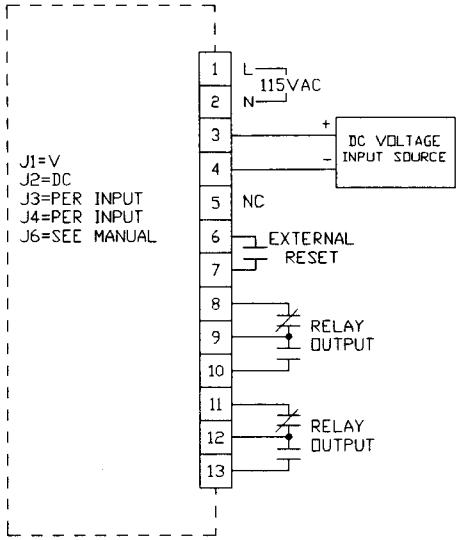




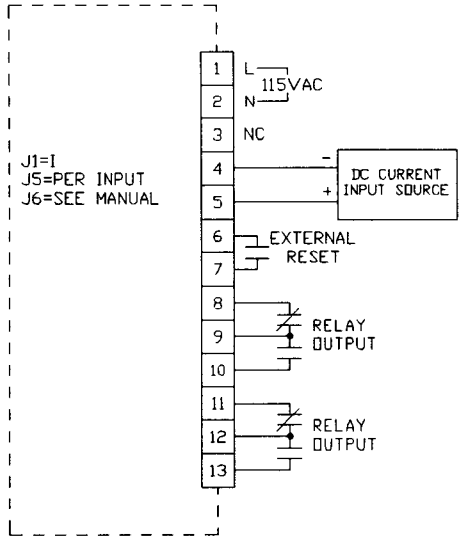
DRAWN BY: WRM	DATE: 3-7-90	CAROTRON Driven by Excellence HEATH SPRINGS, SC TEL 803-286-8614 FAX 803-286-6063
APPROVED BY:	DATE:	
TOLERANCES: ± 2 DEC. PL. 3 DEC. PL.		
SCALE: ------		TITLE: DIMENSIONS, MODEL C10472-000 ELECTRONIC RELAY CARD
DRAWING NUMBER: C10513	REV.	SH. 1 OF 1



AC VOLTAGE INPUT



DC VOLTAGE INPUT



DC CURRENT INPUT

NOTES:
1. REF. SCHEM. C10473
2. REF. ASSY. C10472

DRAWN BY: WRM	DATE: 3-8-90
APPROVED BY:	DATE:
TOLERANCES: ± 2 DEC. PL. 3 DEC. PL.	
SCALE: ----------	
DRAWING NUMBER: C10514	REV. SH. 1 OF 1

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TITLE: CONNECTION DIAGRAM, MODEL C10472-000 ELECTRONIC RELAY CARD

Standard Terms & Conditions of Sale

1. General

The Standard Terms and Conditions of Sale of Carotron, Inc. (hereinafter called "Company") are set forth as follows in order to give the Company and the Purchaser a clear understanding thereof. No additional or different terms and conditions of sale by the Company shall be binding upon the Company unless they are expressly consented to by the Company in writing. The acceptance by the Company of any order of the Purchaser is expressly conditioned upon the Purchaser's agreement to said Standard Terms and Conditions. The acceptance or acknowledgement, written, oral , by conduct or otherwise, by the Company of the Purchaser's order shall not constitute written consent by the Company to addition to or change in said Standard Terms and Conditions.

2. Prices

Prices, discounts, allowances, services and commissions are subject to change without notice. Prices shown on any Company published price list and other published literature issued by the Company are not offers to sell and are subject to express confirmation by written quotation and acknowledgement. All orders of the Purchaser are subject to acceptance, which shall not be effective unless made in writing by an authorized Company representative at its office in Heath Springs, S.C. The Company may refuse to accept any order for any reason whatsoever without incurring any liability to the Purchaser. The Company reserves the right to correct clerical and stenographic errors at any time.

3. Shipping dates

Quotation of a shipping date by the Company is based on conditions at the date upon which the quotation is made. Any such shipping date is subject to change occasioned by agreements entered into previous to the Company's acceptance of the Purchaser's order, governmental priorities, strikes, riots, fires, the elements, explosion, war, embargoes, epidemics, quarantines, acts of God, labor troubles, delays of vendors or of transportation, inability to obtain raw materials, containers or transportation or manufacturing facilities or any other cause beyond the reasonable control of the Company. In no event shall the Company be liable for consequential damages for failure to meet any shipping date resulting from any of the above causes or any other cause.

In the event of any delay in the Purchaser's accepting shipment of products or parts in accordance with scheduled shipping dates, which delay has been requested by the Purchaser, or any such delay which has been caused by lack of shipping instructions, the Company shall store all products and parts involved at the Purchaser's risk and expense and shall invoice the Purchaser for the full contract price of such products and parts on the date scheduled for shipment or on the date on which the same is ready for delivery, whichever occurs later.

4. Warranty

The Company warrants to the Purchaser that products manufactured or parts repaired by the Company, will be free, under normal use and maintenance, from defects in material and workmanship for a period of one (1) year after the shipment date from the Company's factory to the Purchaser. The Company makes no warranty concerning products manufactured by other parties.

As the Purchaser's sole and exclusive remedy under said warranty in regard to such products and parts, including but not limited to remedy for consequential damages, the Company will at its option, repair or replace without charge any product manufactured or part repaired by it, which is found to the Company's satisfaction to be so defective; provided, however, that (a) the product or part involved is returned to the Company at the location designated by the Company, transportation charges prepaid by the Purchaser; or (b) at the Company's option the product or part will be repaired or replaced in the Purchaser's plant; and also provided that (c) the Company is notified of the defect within one (1) year after the shipment date from the Company's factory of the product or part so involved.

The Company warrants to the Purchaser that any system engineered by it and started up under the supervision of an authorized Company representative will, if properly installed, operated and maintained, perform in compliance with such system's written specifications for a period of one (1) year from the date of shipment of such system.

As the Purchaser's sole and exclusive remedy under said warrant in regard to such systems, including but not limited to remedy for consequential damages, the Company will, at its option, cause, without charges any such system to so perform, which system is found to the Company's satisfaction to have failed to so perform, or refund to the Purchaser the purchase price paid by the Purchaser to the Company in regard thereto; provided, however, that (a) Company and its representatives are permitted to inspect and work upon the system involved during reasonable hours, and (b) the Company is notified of the failure within one (1) year after date of shipment of the system so involved.

The warranties hereunder of the Company specifically exclude and do not apply to the following:

a. Products and parts damaged or abused in shipment without fault of the Company.

b. Defects and failures due to operation, either intentional or otherwise, (1) above or beyond rated capacities, (2) in connection with equipment not recommended by the Company, or (3) in an otherwise improper manner.

c. Defects and failures due to misapplication, abuse, improper installation or abnormal conditions of temperature, humidity, abrasives, dirt or corrosive matter.

d. Products, parts and systems which have been in any way tampered with or altered by any party other than an authorized Company representative.

e. Products, parts and systems designed by the Purchaser.

f. Any party other than the Purchaser.

The Company makes no other warranties or representation, expressed or implied, of merchantability and of fitness for a particular purpose, in regard to products manufactured, parts repaired and systems engineered by it.

5. Terms of payment

Standard terms of payment are net thirty (30) days from date of the Company invoice. For invoice purposed, delivery shall be deemed to be complete at the time the products, parts and systems are shipped from the Company and shall not be conditioned upon the start up thereof. Amounts past due are subject to a service charge of 1.5% per month or fraction thereof.

6. Order cancellation

Any cancellation by the Purchaser of any order or contract between the Company and the Purchaser must be made in writing and receive written approval of an authorized Company representative at its office in Heath Springs, S.C. In the event of any cancellation of an order by either party, the Purchaser shall pay to the Company the reasonable costs, expenses, damages and loss of profit of the Company incurred there by, including but not limited to engineering expenses and expenses caused by commitments to the suppliers of the Company's subcontractors, as determined by the Company.

7. Changes

The Purchaser may, from time to time, but only with the written consent of an authorized Company representative, make a change in specifications to products, parts or systems covered by a purchase order accepted by the Company. In the event of any such changes, the Company shall be entitled to revise its price and delivery schedule under such order.

8. Returned material

If the Purchaser desires to return any product or part, written authorization thereof must first be obtained from the Company which will advise the Purchaser of the credit to be allowed and restocking charges to be paid in regard to such return. No product or part shall be returned to the Company without a "RETURN TAG" attached thereon which has been issued by the Company.

9. Packing

Published prices and quotations include the Company's standard packing for domestic shipment. Additional expenses for special packing or overseas shipments shall be paid by the Purchaser. If the Purchaser does not specify packing or accepts parts unpacked, no allowance will be made to the Purchaser in lieu of packing.

10. Standard transportation policy

Unless expressly provided in writing to the contrary, products, parts and systems are sold f.o.b. first point of shipment. Partial shipments shall be permitted, and the Company may invoice each shipment separately. Claims for non-delivery of products, parts and systems, and for damages thereto must be filed with the carrier by the Purchaser. The Company's responsibility therefor shall cease when the carrier signs for and accepts the shipment.

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