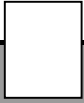


# ***Electronic Relay Module***

**Instruction Manual  
ERM260-000**





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# 1

## General Description

Carotron's Electronic Relay Module, Model ERM260-000, is a voltage and/or current sensing relay. The module provides inputs for a DC voltage and DC current input. These inputs are summed together and compared to with an adjustable PULL-IN level. When the external signals exceed the PULL-IN level, the relay is energized. The module has two modes of operation for de-energizing the relay. In the INTERNAL mode, the relay will de-energize when the sum of the external signals falls below an adjustable DROP-OUT level. In the EXTERNAL mode, the relay remains energized until reset via an external contact closure. A status LED is provided for visual indication of the relay state (relay is energized when LED is on).

Furthermore, jumper J2 provides a selection for either ON DELAY or OFF DELAY. A multi-turn potentiometer is used to adjust the delay time. When power is applied to the module the LED will flash once if ON DELAY is selected and twice if OFF DELAY is selected.

# 2

## Specifications

### 2.1 Electrical

#### D.C. Power Input

- 24 VDC  $\pm 10\%$ , 60mA max, internally fused

#### +10VDC Reference Output

- 10mA max

#### Voltage Input

- Range: 0-10VDC
- Input Impedance:  $10^{12} \Omega$

#### Current Input

- Range: 0-20mADC
- Input Impedance:  $250 \Omega$

#### Relay Output

- Form C contact
- 2A @ 115VAC (resistive load)
- 2A @ 60VDC (resistive load)

#### Delay Time

- Linear control adjustable from 0 to 60s max

#### Temperature Range

- 0-55°

## 2.2 Physical

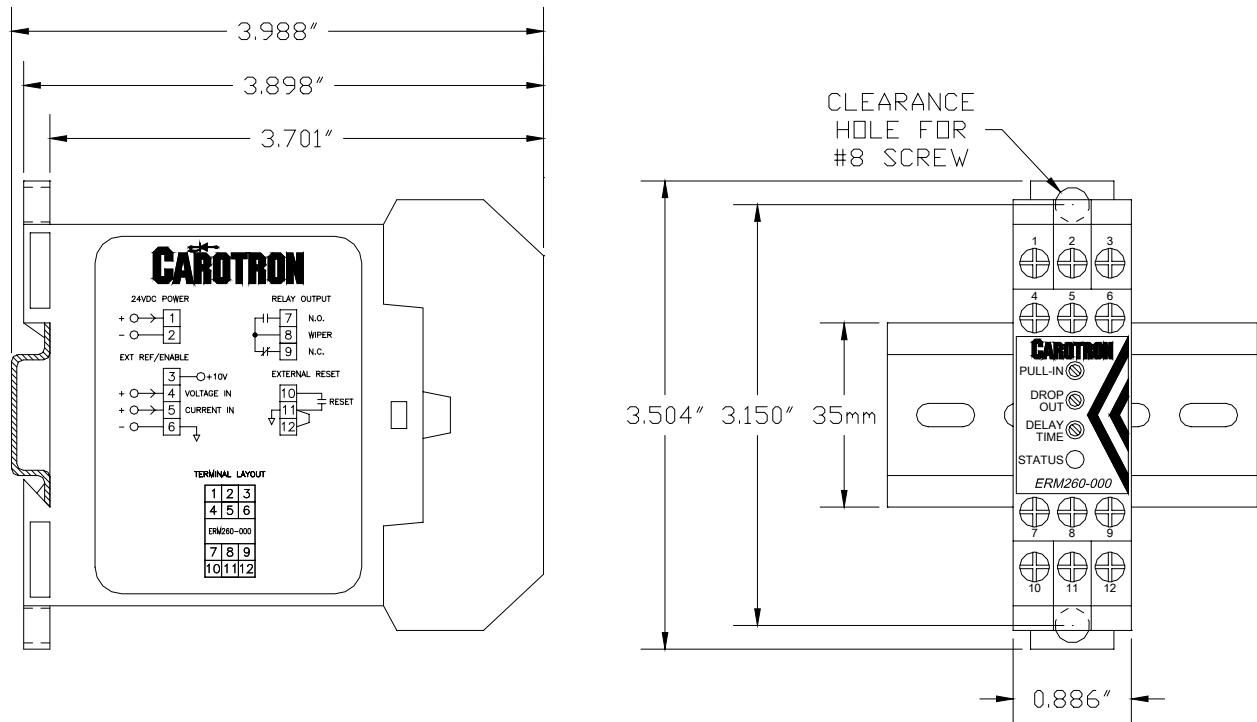


Figure 1: Physical Dimensions

## 3

## Installation

### 3.1 Wiring Guidelines

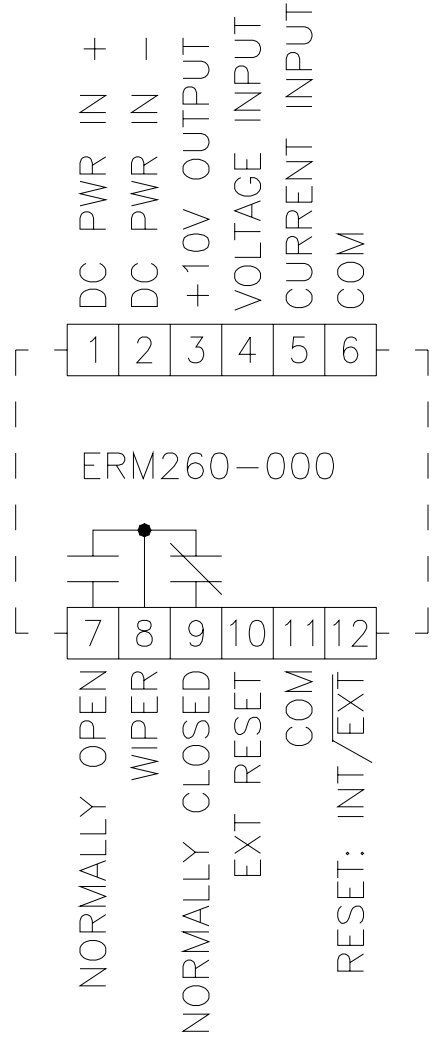
To prevent electrical interference and to minimize start-up problems, adhere to the following guidelines:

Use fully insulated and shielded cable for all signal wiring. The shield should be connected to circuit common at one end only. The other end of the shield should be clipped and insulated to prevent the possibility of accidental grounding.

Signal level wiring such as listed above should be routed separately from high level power wiring (such as the A.C. line, motor, operator control, and relay control wiring). When these two types of wire must cross, they should cross at right angles to each other.

Any relay, contactor, starter, solenoid or other electro-mechanical device located in close proximity to or on the same line supply as the ERM260-000 should have a transient suppression device such as an MOV or R-C snubber connected in parallel with its coil. The suppressor should have short leads and be connected as close to the coil as possible.

### 3.2 Signal Connections



**Figure 2: General Connections**

# 4

## Description of Features & Adjustments

### JUMPER J2

Selects either the ON DELAY or OFF DELAY function. The actual delay time is set by the DELAY TIME potentiometer. When power is applied to the module, the status LED will flash once for on delay and twice for off delay.



When ON DELAY is selected, the relay will delay in turning on (energizing) when the input signal exceeds the PULL-IN threshold. When OFF DELAY is selected, the relay will delay in turning off (de-energizing).

### PULL-IN Potentiometer

This adjustment is used to set the threshold level where the relay energizes. Clockwise rotation increases the threshold level, counter-clockwise decreases the level.

### DROP-OUT Potentiometer

This setting is only used if the INTERNAL reset mode is selected. This adjustment is used to set the threshold level where the relay de-energizes. Clockwise rotation increases the threshold level, counter-clockwise decreases the level.

### DELAY TIME Potentiometer

This adjustment is used to set the amount of ON DELAY or OFF DELAY. The potentiometer has a range of 0 to 60 seconds. Clockwise rotation increases the time, counter-clockwise decreases the time.

### RESET Mode

Terminal 12 selects between the INTERNAL and EXTERNAL reset modes. The module defaults to INTERNAL unless a jumper is placed between terminals 11 and 12.

### EXTERNAL RESET Input

When the EXTERNAL reset mode is selected and the input signal is below the PULL-IN threshold), a contact closure between terminals 10 & 11 will cause the relay to de-energize.



**WARNING! DURING CALIBRATION, THE ERM260-000 RELAY OUTPUT WILL BE ACTUATED. PLEASE DISCONNECT ANY EQUIPMENT FROM THE MODULE THAT COULD BE DAMAGED OR CAUSE INJURY DURING THIS PROCESS.**

## Step 1: Select Delay Mode

1. Select the type of delay using Jumper J2. If an ON DELAY is desired, place the jumper on both pins of J2. If an OFF DELAY is desired, place jumper on a single pin of J2.

## Step 2: Connections

1. Make connections per drawing C13720 on page 10.
2. Set the potentiometers as follows:
  - a. PULL-IN=fully CW (clockwise)
  - b. DROP-OUT=fully CCW (counter-clockwise)
  - c. DELAY TIME=fully CCW
3. If external reset is used, ensure contact across terminals 10 & 11 is initially open.
4. Apply power to the ERM260-000 Module.

## Step 3: Energize Relay

1. Apply the desired external signal level at which the relay is to energize.
2. Rotate the PULL-IN potentiometer CCW until the relay energizes and the status LED turns on.

## Step 4: De-Energize Relay

1. Decrease the external signal to the desired level where the relay should de-energize.
2. Perform either the INTERNAL or EXTERNAL reset procedure below based upon the desired mode of operation.

### INTERNAL

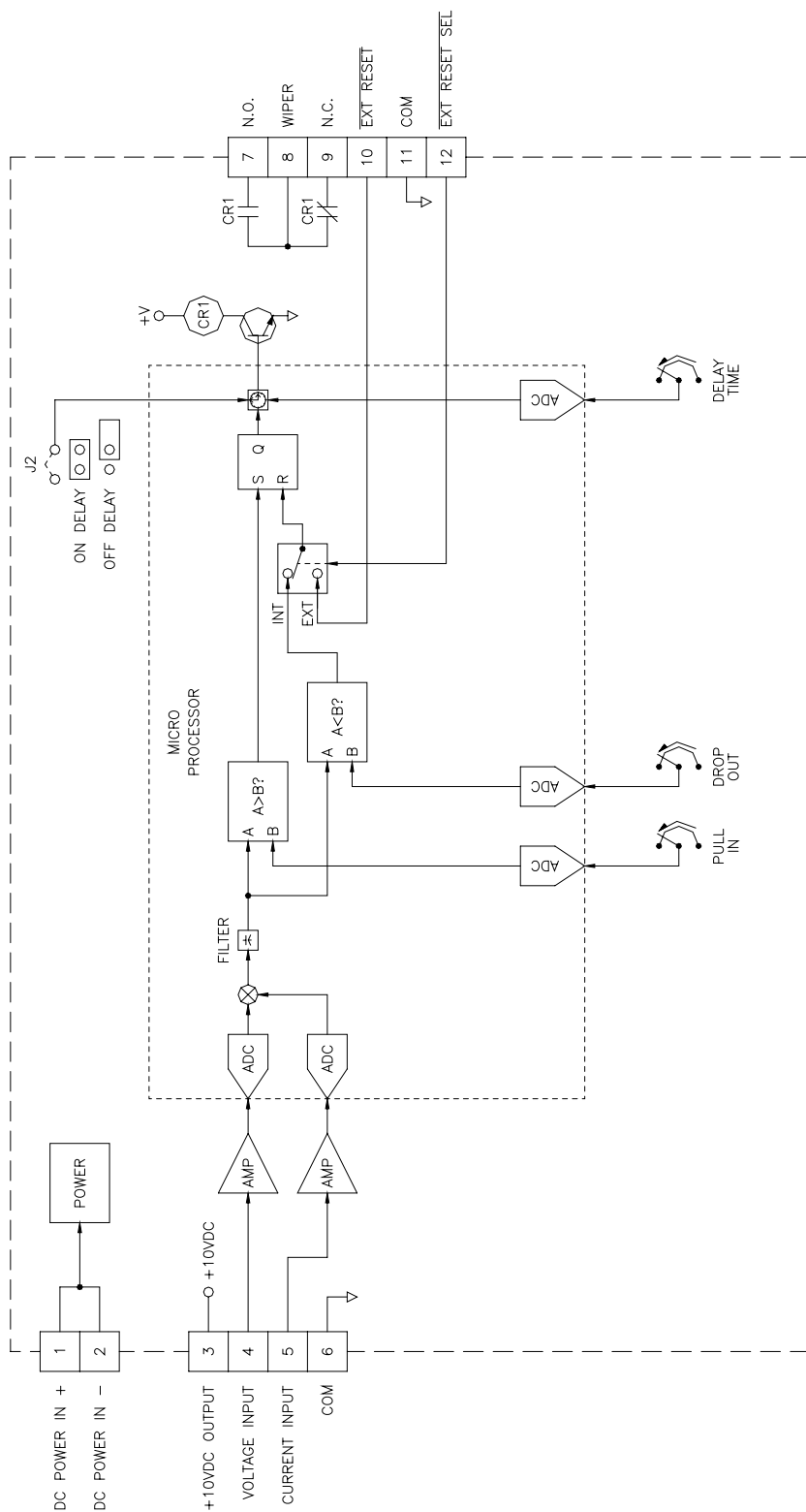
- Rotate the DROP-OUT potentiometer CW until the relay de-energizes and the status LED turns off.

### EXTERNAL

- Momentarily close the reset contact across terminals 10 and 11 and verify that the relay de-energizes and status LED turns off.

## Step 5: Set ON/OFF DELAY Time

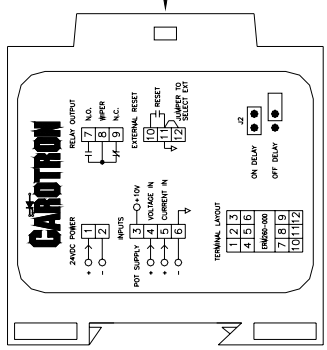
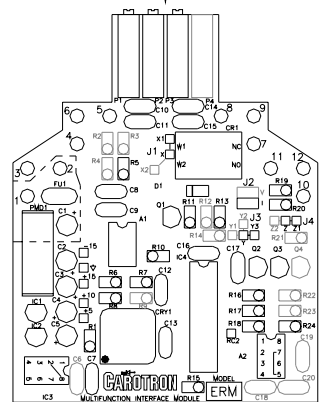
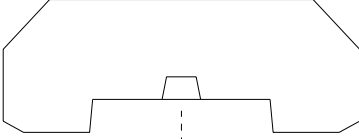
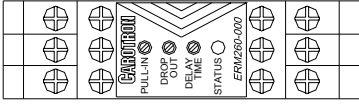
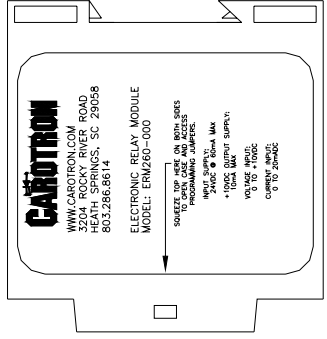
1. If an on delay or off delay time is required, adjust the DELAY TIME potentiometer CW to set the desired time. Each rotation of the potentiometer is approximately 4 seconds.
2. Adjust the input signal(s) to the module to energize and de-energize the relay. Verify the desired delay time. Adjust if necessary and repeat.



DATE: 6/28/10	HEATH SPRINGS, SC
DRAWN BY: BKP	TEL: 803-286-8614
APPROVED BY:	FAX: 803-286-6863
TOLERANCES: 1	TITLE: ERM260-000
2 DEC. PL. = .002	MODULE
3 DEC. PL. = .003	BLOCK DIAGRAM
SCALE:	REV. A
DRAWING NUMBER: C13719	SH. 1 OF 1

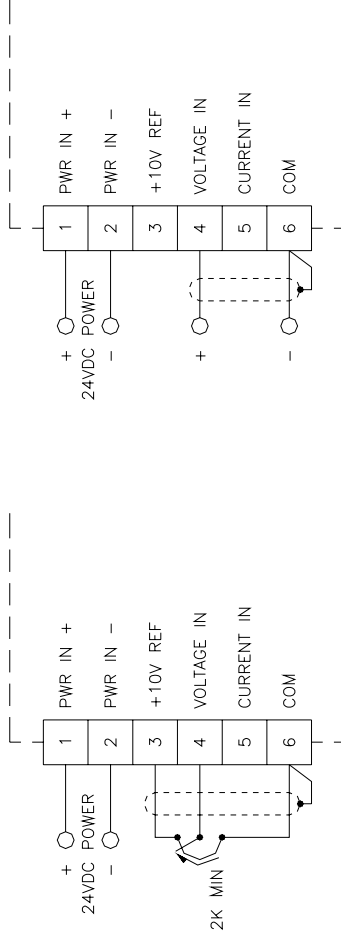




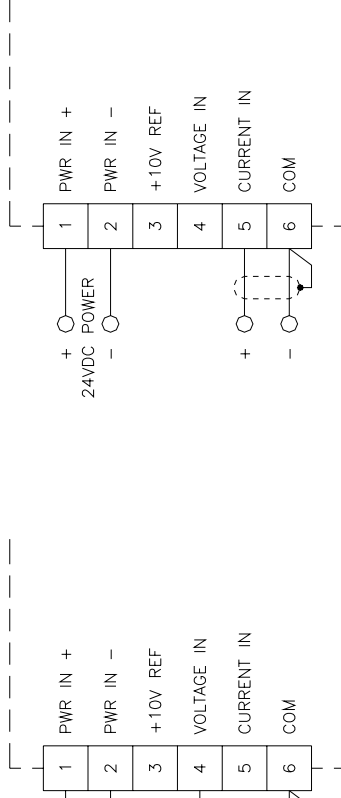


DESIGNED BY: <b>BKP</b>	DATE: 7/1/10
APPROVED BY:	DATE:
HEADQUARTERS: 2 DEC. PL. + 007 3 DEC. PL. + 007	
TITLE: ELECTRONIC RELAY MODULE ERM260-000 ASSEMBLY	
SCALE:	
DRAWING NUMBER: <b>C13718</b>	
REV. A	SH. 1 OF 1

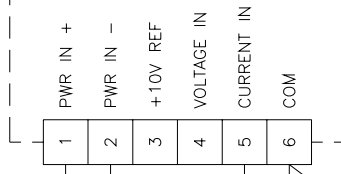
POTENTIOMETER  
INPUT



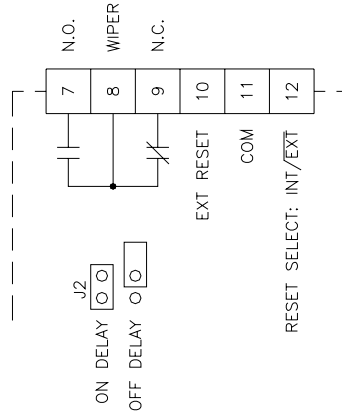
VOLTAGE  
INPUT



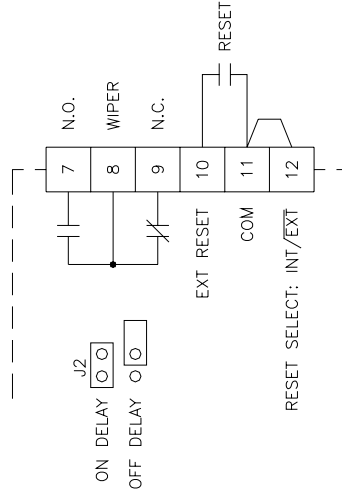
CURRENT  
INPUT



INTERNAL  
RESET



EXTERNAL  
RESET



DRAWN BY: <b>BKP</b>	DATE: <b>7/1/2010</b>	 <i>Driven by Excellence</i>
APPROVED BY:	DATE:	
TOLERANCES: + 2 DEC. PL. = .010" 3 DEC. PL. = .005"		HEATH SPRINGS, SC TEL: 803-286-6663 FAX: 803-286-6663
SCALE:		TITLE: ERM260-000 GENERAL CONNECTIONS
DRAWING NUMBER: <b>C13720</b>		REV. <b>A</b> SH. <b>1</b> OF <b>1</b>

# 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.



# CAROTRON

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MAN1058-0A

Issued 07-06-2010